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Hunterian Oration

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ON THE

PATHOLOGY AND TREATMENT

OF

VALVULAR DISEASE OF THE HEART

AND ITS

SECONDARY AFFECTIONS:

BEING THE

GULSTONIAN LECTURES,

DELIVERED AT THE ROYAL COLLEGE OF PHYSICIANS IN FEBRUARY 1851.

BY

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LECTURE I.—Part I.

Diseases of the Heart—difficulties of the subject—scope of the present Lectures—Andral's survey of our knowledge of diseases of the Heart twenty-five years ago—deficiencies noted then—how far supplied now—division of the subject.

It would be hard, Sir, to find an entirely new subject fitted for the present occasion. For that could scarcely be of sufficient importance which had wholly escaped the attention of the many talented and industrious observers who are now engaged in the study of pathology in all its branches. I may seem to have run into the contrary error by choosing a subject so trite as Diseases of the Heart. But you cannot have forgotten what fresh light and interest Dr. Budd threw on abscess of the liver, and Dr. Baly on dysentery, from this place, on similar occasions, in their masterly reviews of these subjects as they had come respectively under their observation. May I shelter myself under their example, in trying to follow, at a humble distance, in the same manner, on a different track?

Apart from its own difficulties I cannot but feel that I have undertaken a very delicate task in addressing you from this place on diseases of the heart. Our accurate knowledge of the matter, indeed, is of no great age; yet its literature is very extensive, and still we are not arrived at that period that we may adopt the conclusions which have been deduced, and forget that they have ever been the subject of controversy, or that our gratitude is due to more than one independent observer for substantiating single points. I cannot think that I have not erred, on occasion, when referring to such points, by defective or inaccurate acknowledgments of the sources of our information concerning them; but I have erred in ignorance, unintentionally.

Besides the systematic works to which one naturally looks for information, there is another class of writings, towards which, from their very numbers, such errors of omission of reference are more excusable. There are masses of valuable cases and essays buried in the volumes of our own and the foreign periodical literature, which it is almost impossible, out of London, to consult and reduce within the limits which the present purpose assigns. The pleasure of having accidentally met with such, of no inconsiderable merit, now and then, has been marred by the thought of how many more there may be to which no such lucky accident has led.

But I should be defeating the object which I had proposed to myself were I to attempt to condense here all the literature and statistics of a subject whose every axiom, perhaps, has been as warmly asserted as denied. And it would be unnecessary; for Dr. Clendinning (Croonian Lectures, Med. Gaz., 1838, p. 442) has supplied the statistics, and Dr. Bellingham (Lectures on Diseases of the Heart, Med. Gaz., 1850) has laid me under great obligations for references to the original papers in which the discoveries on this subject were made known. I would refer to their more comprehensive lectures for this information.

At the risk of incurring the charge of affected humility, I must add one remark. The observation of nature is open to all: "Nature denies her instructions to none who desire to become her pupils;" and with such opportunities as the wards and dead-house of St. Bartholomew's Hospital supplied for testing the accuracy of the descriptions or explanations given by authors, and for comparing their discrepant conclusions with the result of fresh observation, it was scarcely possible not to form an opinion of one's own on the disputed points: the more so, as often occurring in the form of questions from intelligent students: and this with every assistance, which I take this opportunity of acknowledging, from friends and students in collecting obscure cases, and from Dr. Latham and Dr. Burrows in clearing up these obscurities. I could only wish that the results had borne a larger proportion to the opportunities. With the most sincere desire to elicit the truth, it has been my chief pleasure to draw from fresh observations results agreeing with those which have satisfied the minds of the more esteemed inquirers into those particular points. I could desire no more, in seeking the truth, independently as far as might be, than to have their testimony that I had attained it. But, in communicating these results, I feel on how much surer grounds they have known, and how much better they have expressed, what I have laboured to ascertain. It may be thus with all who, devoting themselves to any subject, acquire a feeling of veneration for the very words of the great masters of that particular sci-

ence. I feel it so towards all those, —the highest names in the past and present generation of physicians in our own country, or on the continent,—who have placed the knowledge of thoracic diseases, and especially diseases of the heart, on its present foundation.

It is now a quarter of a century, since Andral, writing on diseases of the heart,* pronounced our knowledge of them,—such as his immortal countrymen, Senac, Corvisart, and Laennec had described them,—to be almost complete. Since that time this subject has engaged the attention of many of the ablest minds in our profession, especially in this country; and additions to our information have continually accrued from their inquiries. Yet will any one say, even now, that our knowledge of the subject is nearly complete? Indeed, information is wanting on many of its most important points, and the solution of one question only opens another inquiry. After all our labour, still, the higher the structure grows, the wider does the district yet to be explored appear from its rising summit.

The points which at that time appeared to Andral to need further investigation were generally these four:—First, the whole subject of pericarditis was a complete mystery; next, the causes of valvular disease were very obscure; thirdly, the effects of valvular disease, either direct, as witnessed in the pulse, or indirect, as in the lesions of different organs, seemed to require a thorough investigation, in order to explain away many seeming anomalies; and lastly, the results of auscultation and percussion appeared, even in the best hands, to lead occasionally to such erroneous conclusions, that it was evident that this most elementary part of the whole subject was imperfectly understood.

I. On each of these points much has been done since Andral first wrote. The whole subject of pericarditis, of which Louis' elaborate researches† served but to show the extent of our ignorance, has been mastered, and chiefly by the skill of Dr. Watson and Dr. Stokes.‡ Indeed, difficulties greater than Andral had conceived have been surmounted as, with our increasing knowledge, they have come into view; for we have learned to look in the now familiarly understood diseases of the pericardium for the explanation of symptoms which had been thought to depend on disease of the brain. And such is the accuracy with which we can now investigate pericardial affections, that it is scarcely too much to say that the amount of fluid in the pericardium can often be measured by the experienced ear with an exactness little short of that of the practised eye. And if the diagnosis of adhesion of the pericardium still remain unsettled, and an obloquy to auscultators, is it not because, in truth, adhesion of the pericardium is of itself unimportant, and has really no symptoms?

II. In the knowledge of the causes of valvular disease, also, great advance has been made. Dr. Latham* and M. Bouillaud have satisfactorily traced valvular lesions, in many cases, to acute rheumatism. A disease which had been, with few exceptions, considered all but harmless, save in its present effects, would appear to be, in its remote consequences, almost as great a scourge to mankind as typhus fever. Perhaps this discovery is the single most important contribution to clinical medicine that has been made for many years. More recently, Dr. Barclay† has analyzed this subject in an essay, to which there will be frequent occasion hereafter to refer.

III. Again, something has been done towards supplying the third class of Andral's desiderata. Dr. Blakiston‡ has called attention to the modes in which some of the secondary affections are produced, tracing them, with whatever measure of success, to lesions of particular parts of the heart. And Dr. Burrows§ has done for the diseases of the brain which arise from the heart what, to display valvular disease in all its terrors, it needs some one to do for the corresponding class of pulmonary affections which crowd our hospitals on each return of winter. This field of observation is still open in all directions. The inquiry may be long and difficult, but, under the hands of numerous and able observers, it is daily bearing fruit.

IV. But it is in the fourth particular that the greatest advance has been made; and it is in the improvements in the physical diagnosis that much of the progress in the other particulars turns. Dr. Hope and Dr. Williams have explained the mode of production of the first sound of the heart‖, and Dr. Carswell has cleared up

* Clinique Médicale, tome iii. 1826.
† Recherches Anat. Path., p. 284.
‡ Watson's Lectures, lect. lxi. 1st edit.

* On Diseases of the Heart, vol. i. p. 101.
† Med.-Chir. Trans., xxxi. p. 183.
‡ On Diseases of the Chest, 1848.
§ On the Cerebral Circulation.
‖ Objections have been made to the theory of the cause of the first sound of the heart, as now generally received, as being too complex. It is a sufficient answer to these objections, that any explanation which did not include all the elements would be too limited. It does not fall within the scope of these remarks to discuss the question physiologically, even had I anything new to add; but it is worth while to point to two pathological phenomena bearing upon it. What share the friction of the blood, or other possible causes, may have in producing the first sound, I have had no means of ascertaining, and cannot say; but my experience would lead me to regard

many of the difficulties which beset the earliest auscultators, by his correct interpretation of the second sound. Dr. Hope has applied all this knowledge to practice in his doctrine of regurgitation, hereby explaining symptoms which occur in a large proportion of all cases of heart disease, and which must, before his discovery, have been misinterpreted. Meanwhile, by a close scrutiny of the character of particular murmurs, and the circumstances under which they occur, the category of valvular murmurs has been weeded of some that did not properly belong to it. Dr. Ogier Ward has brought an entirely new element into the field by his discovery of what we now call the venous murmur,* and thus supplied us with a means whereby to investigate the nature and causes of coincident arterial murmurs: in the same way, as already noticed, pericardial have been distinguished from endocardial murmurs.

To our knowledge of the physical conditions for the production of murmurs generally, no entirely new fact has been added, as might, indeed, have been expected; for the theories which still divide opinion were all foreshadowed by Laennec,† though he does not appear always to have chosen the best of them.

Much as auscultation is indebted for the rapidity of its progress to the talent of these original observers, it is no less indebted for the steadiness of its advance to the zeal and industry with which less gifted individuals have followed in their track, to confirm or correct their conclusions by a continual recurrence to the observation of nature. Scarce a stone is laid in the structure but it is marked by the name of him who placed it there, and by the names of those who have tried its stability and soundness in all possible ways. For any statement to be generally received with regard to the diagnosis of disease of the heart, indeed, it needs to be quite indubitable.

Still, with all this, the subject is far from complete, even to the extent that the best auscultators and most accomplished physicians may pronounce disease to be present when it is not—even to the extent that the most confirmed valvular disease may sometimes escape detection.‡ The interpretation of the common valvular murmurs is not yet perfect; and there are some less common signs, such as purring tremor and metallic cliquetis, of which something has yet to be learned. There is reason to think that we know little more than half of the causes of valvular disease, and the progress of that disease on the valves needs to be more fully traced. And the whole sad subject of death by disease of the heart is so continually receiving light from new observations, that its deficiencies, as we have it laid down now, must obviously be very many.

The subject of diseases of the heart is too large to be included in the compass of three lectures: nor, did even time allow me fully to enter upon it, could I ask your attention to my version of what Hope, Latham, Watson, and Williams, have already put forward with more ability and more authority. For the present occasion, the consideration of one part—namely, valvular disease—will suffice; and here, too, rather limiting ourselves to the examination of a few points which still remain open to discussion, than glancing cursorily over the whole subject. I fear that this mode of proceeding may give an unconnected character to all that I have to say, and that less important points may obtain undue prominence, while some of the most essential and most practical points are passed over almost without notice: but the circumstances of the case, and the nature of the materials from which these lectures have been composed, render this mode of treating the subject in some sort necessary. And I would offer this series of essays rather as a commentary on or as supplementary to the more complete treatises with which I may assume you to be familiar, than as constituting in themselves a

the dull sound of hypertrophy, and the sharp click of dilatation, as illustrating the muscular and valvular elements of the first sound, respectively, in their extreme degrees. I cannot reconcile with pathological observation any theory which would exclude either of these from the formation of the normal first sound of the heart.

* Medical Gazette, vol. xx. p. 9.
† Hope on the Heart, pp. 80-96, et seq.
‡ The Dublin School of Pathology, to which we owe so much in the knowledge of diseases of the heart as in other subjects, published in 1838 (Dublin Journal, vol. xiv. p. 178), in the names of Dr. Graves and Dr. Stokes, a formal expression of the recognised difficulties of the physical diagnosis of valvular disease:—

1. That the physical signs of valvular disease are not yet fully established.
2. That, taken alone, they are in no case sufficient for diagnosis.
3. That, even in organic diseases, *the nature and situation* of murmurs may vary in the course of a few days.
4. That all varieties of valvular murmurs may occur *without* organic disease.
5. That organic disease of the valves may exist to a very great degree without any murmur whatsoever.

It is a small matter to express my own present assent to these propositions; but, as it is always harder to profess incompetency than practical superiority, we owe much to Dr. Graves and Dr. Stokes for lending the protection of their names to those who would dare to express a doubt and a difficulty where all may be made to seem so plausible and so easy.

compendium even of that single part of this subject to which I have limited myself.

The subjects for investigation may be conveniently referred to four heads:—

I. The causes of valvular disease.

II. The physical diagnosis.

III. The organic changes on which the physical signs depend.

IV. The general symptoms, and their treatment.

I. CAUSES OF VALVULAR DISEASE OF THE HEART.

The inquiry must rest on morbid anatomy—Influence of age on the results—Various causes—Rheumatism, value of an endocardial murmur during—Difficulties of the inquiry—Congenital malformation involving elementary imperfection—Renal disease distinguished from rheumatism in the nature and situation of the effects—Inflammation of neighbouring parts—Other causes—Inconclusive nature of the evidence.

We have already seen how much has been done in this matter since Andral wrote his classical survey of the existing state of practical medicine. A few years ago we should have deemed this subject better understood than we do now; for Dr. Taylor has added a good deal to our knowledge, and thrown doubt on some of the received doctrines of the causes of pericarditis.* Dr. Barclay has carried the same investigation into the subject of endocardial affections,† to which our attention at present must be limited.

For the purposes of the present inquiry, 181 cases of valvular disease of the heart, disclosed by dissection, have been tabulated. They are divided into two series:—1. Containing 39 cases where the valvular lesion was the cause of death; 2. Containing 142 cases where it was of less pathological importance. In some, indeed, of the latter series, the valvular lesion might be looked upon as a mere morbid appearance, which had produced no symptoms during life, and appeared quite incapable of so doing. My friend Dr. Barclay's most elaborate paper, based on 79 cases, with a larger basis on particular points, supplies a means wherewith to compare the results.

The cases selected for the present inquiry have been restricted to those where the existence of valvular lesion has been determined by dissection. A much larger basis of observation, it is true, might have been obtained by tabulating the results of auscultation. It does not, however, appear safe to conclude from auscultations and symptoms alone without dissection. It is needless to enlarge on this point: a single instance will suffice. The results of auscultation and dissection in early life are directly opposed to each other—that is to say, murmurs are most commonly heard at the sigmoid orifice, while disease is most commonly found on the auriculo-ventricular valves. This contradiction depends on the frequent occurrence of functional murmurs at this period of life. They occur, indeed, so frequently as to conceal and even invert the proportion of lesions of the sigmoid and auriculo-ventricular valves which dissection establishes at this period. Unless we can eliminate this fallacy, we must be content to forego all assistance from such a source, as only calculated to mislead, and limit our inquiries to the results of dissection.

The reputed causes of valvular disease are not many. Rheumatism; the exanthemata (of which I have no experience as such); renal disease; congenital malformation; want and intemperance; accident; inflammation of neighbouring organs: these include all the causes of most common occurrence.

Generally speaking, it may be said that these causes have each a tendency to affect particular valves. Considering the different ages at which these causes are most active, especially (to anticipate thus much) rheumatism and the effects of want or intemperance, it were to be expected that the simple difference of age would show a great difference in the results of disease, according to the predominant action of any one cause during the particular period. These results are set out in the preceding table.

Age.	1st Series.					2d Series.					Total.				
	No.	Mit.	Aor.	Tric.	Pul.	No.	Mit.	Aor.	Tric.	Pul.	No.	Mit.	Aor.	Tric.	Pul.
— to 20	9	9	5	1		21	18	12	1		30	27	17	2	
20 „ 30	10	8	4	2	2	21	18	10	1	1	31	26	14	3	3
30 „ 40	9	5	3	3		36	19	24	2	2	45	24	27	5	2
40 „ 50	5	5	3	2		27	20	19	1	1	32	25	22	3	1
50 „ 60	2	1	2	1		22	14	20	3		24	15	22	4	
60 „ —	4	4	3			15	12	11			19	16	15		

This table shows clearly the preponderance of affections of the mitral valve during the earlier periods. The same appears from Dr. Barclay's table. He takes 34-35 as the point of division, and finds—

	Cases.	Lesions. Mitral.	Aortic.
Before 34	18	17	15
After 34	61	25	37

agreeing sufficiently with the above results.*

What the proportion of diseased to healthy valves at each of these ages may be, I have no means of determining. Of about five hundred dissections, valvular disease of some kind and degree or other was found in one hundred and eighty one cases. But this is probably above the average. For some of these patients were watched for a very long time to obtain an inspection of the heart after their death, and the pains which I myself took, and the assistance I have derived from friends in extending my experience, has been greater in this than in any other form of disease. The results accordingly are disproportionate, and unfitted for exact numerical comparison.

Of the conditions above enumerated there are four which have been found to precede, or coexist with, valvular disease, sufficiently often to allow one to think that the occurrence was more than a mere coincidence, and to give some means for tracing the nature of the connection, namely, rheumatism, congenital malformation, want and intemperance, and renal disease. In the annexed table, the two series of cases fatal by valvular disease (α), and of cases presenting evidence of valvular disease after death (β), have been kept distinct under their several conditions.†

Cause.		No. of cases	Seat of the Lesion. Mitral.	Aortic.	Tricuspid.	Pulmonary
Rheumatism	α	21	18	11	5	1
	β old.	9	8	5		
	β rent.	12	12	10	1	
	Total.	42	38	26	6	1
Congenital malformation.	α	5	3	3	1	2
	β	2	1	2		
	Total.	7	4	5	1	2
Want and intemperance.	α	6	4	3	2	
	β	35	22	26	1	2
	Total.	41	26	29	3	2
Renal disease.	α	12	11	8	2	1
	β	30	25	17	2	
	Total.	42	36	25	4	1

The inference is plain that rheumatism and renal disease coincide with affection of the auriculo-ventricular rather than of the sigmoid valves of either side; but of both valves of the left side rather than of either of those of the right. That congenital and one of pulmonary valvular lesion, have been entered under both rheumatism and congenital malformation. Some cases entered under renal disease have been also set down under rheumatism, and others under want and intemperance.

My results differ a little from those of Dr. Barclay. He finds rheumatism (op. cit. p. 190) a cause of valvular disease in 15 out of 79 cases, or 18·9 per cent. In the cases analysed above, it was found in at least 42 out of 181, or in 23·2 per cent.

The lesions in my 42 cases (O_1) and in 50 (B_1) which Dr. Barclay has analysed, were thus distributed—

	B. O.	
In —	4	the mitral, aortic, and tricuspid valves were affected.
—	2	mitral and tricuspid.
41	19	mitral and aortic.
5	13	mitral only
4	3	aortic only
—	1	pulmonary only.
50	42	

From which it would appear that there is not always in acute rheumatism so strong a tendency to affection of both sets of valves on the left side of the heart as occurred in Dr. Barclay's cases. Speaking now of the results of rheumatism as disclosed by dissection at all ages.

* Med.-Chir. Trans. vol. xxviii. p. 453. † Ibid. vol. xxxi. p. 185.

* It is scarcely necessary to do more than indicate one circumstance which limits the application of these tables, namely, that the death of the patient does not commonly occur within exactly the same period as the causation of the disease. Many valves, for instance, injured by rheumatism may not come under the hands of the anatomist till extreme old age; years after the infliction of the injury.

† Two cases, namely, one of mitral and aortic

malformation, on the contrary, induces sigmoid rather than auriculo-ventricular disease; observing this preference on both sides of the heart, though still affecting the left rather than the right side. The various causes which are included under the name of want and intemperance appear to act almost exclusively on the left side of the heart, and, by a slight preference, on the sigmoid valves. On the effects of three of these causes, namely, rheumatism, congenital malformation, and renal disease, there are a few remarks to be made which will find their most appropriate place here.

Rheumatism.—It is often asked, what becomes of the patients who are dismissed from our large hospitals after an attack of acute rheumatism with an endocardial murmur? In other words, what is the pathological value of an endocardial murmur under such circumstances? The question is very natural and simple, and part of the answer is certain and satisfactory. Some of these patients have no valvular disease at all, the murmur is anæmic or functional, and as they get strong the murmur ceases. Some of them, again, die, at a more or less distant period, of valvular disease of the heart. But the answer, as it relates to the remainder, is, with all its importance, so very obscure, that it will not be superfluous to point to a few of the causes which have continued to keep it in obscurity, in spite of the industry and intelligence which have been for some years bestowed upon the solution of the question. And the same facts may serve to show the grounds on which we form our prognosis under these circumstances.

Practically, the question is little more than one of morbid anatomy. All other sources from which information might be expected are almost entirely closed against inquiry. For comparatively few of the patients who have been the subjects of observation at the beginning of the disease fall again under notice, and still more rarely has the same observer the opportunity of watching the disease through, in one individual. The same remark, of course, applies more or less to all chronic diseases; but it applies pre-eminently to the results of acute rheumatism, as pre-eminently the disease of the poor patients of our hospitals. And difficult as it is to follow up the cases of all hospital patients, yet here another difficulty is added, from the fact that a large proportion of rheumatic patients are young persons of no settled habitations, many of them servant-girls, so that they can very rarely indeed be observed, for any length of time, after they have left the hospital.

We may conveniently divide the history of rheumatic valvular disease into three periods. Our knowledge of the first period, namely, that when the valvular lesion is inflicted, is pretty complete in all its details, for the application of the cause is readily appreciable; and the effects are easily recognized, very characteristic, and of not uncommon occurrence.

Again, another tolerably well-defined period, is that when life fails under the effect, direct or secondary, of obstruction to the circulation by valvular disease; and here, again, our knowledge is pretty complete, for the various lesions may be recognized and interpreted with greater facility than in most other organs; and the symptoms and physical signs are well understood. But between these two periods there is much of the utmost interest and importance almost entirely unknown, and this is the void to be filled up.

As far as my knowledge of what has been expressed on this subject goes, I think that physicians in general have filled up this void in rather gloomy colours; and naturally enough, we come to take an unfavourable view of the question. For we can speak only of what we see and know, and of nearly all the cases of which we know anything, we know that the disease has gone on from bad to worse, till it has destroyed life. And this, too, happens naturally enough, because, so long as the patients are well, they do not offer themselves to observation, and we see nothing, except by the merest chance, of those who have completely recovered. It is only those who have not recovered who fall under notice.

So we come insensibly to look upon an endocardial murmur arising in the course of acute rheumatism as indicative of the existence of fibrinous growths on the edges of the valves, and upon these fibrinous growths as the first stage of the most serious valvular lesions: for several reasons. First: because patients with an endocardial murmur dying during, or shortly after, an attack of acute rheumatism, mostly present such fibrinous growths; then, because many patients coming under observation with confirmed valvular disease of the heart date their symptoms from an attack of acute rheumatism;* and lastly, because the facts to justify a contrary opinion are so few and so liable to error.

All that pathology has to tell us, then, serves but to illustrate the unfavourable half of the answer; it tells us only what is too obvious to remain long concealed. Where there is any thing that can attract a

* Bouillaud (Rhumatisme Articulaire, p. xiij. Paris, 1840,) says that of 300 patients with disease of the heart, more than half dated their symptoms from an attack of acute articular rheumatism.

patient's notice,—the recollection that he could not run up stairs, or that he used to find his shoes tight in an evening, for instance,—there something may possibly be learned. But where health has been re-established; where there are, consequently, no present symptoms for the patient to complain of, nor for the physician to enquire after, relative to the heart, nothing is learned. And this is happening every day,—a great medical truth, the solution of a most important problem, is actually passing through our hands, which we, from our ignorance of the fact, are unable to grasp. From the majority of patients, the subjects of previous rheumatism, who come under notice, nothing is learned. Yet it is not only our want of information as to the fact of the previous occurrence of rheumatism which stands in our way. For even where our attention has been fully turned to this point, the information which can be obtained is small, and the evidence conflicting to a degree of which those only who have been at much pains to collect and estimate it can have any conception. Practically, the question is, indeed, little more than one of morbid anatomy, to which head I would defer its further consideration.

Congenital malformation.—That congenital malformation is a very important cause of valvular disease, especially of that form which there will be occasion hereafter to call the second form, may fairly be deduced from the foregoing table. It will, however, be of interest to dwell for a moment on the mode of connection of these two conditions, as involving a principle of very wide application.

It is a general law, that parts imperfectly developed are, as such, especially liable to disease or spontaneous degeneration. This law applies even to the products of disease, which are themselves obnoxious to further degeneration, in some sort according to the rapidity of their development. Moreover, it may be inferred that the degeneration which such parts spontaneously undergo, or the disease which they take on under the influence of causes insufficient to affect the same parts when normally constituted (call it disease or degeneration, as we will), is that which the same parts, when normally constituted, have a specific tendency to. If this inference be correct, the form of valvular disease to be called the second, which is so well illustrated in these cases of congenital malformation of the sigmoid valves, must be regarded as exemplifying that to which the valves are by nature liable.

In other words, the results of the ordinary processes of decay of normally constituted valves, and the disease which destroys congenitally malformed valves in early life, claim to be considered as identical. Such allowance only must be made for the difference of results as the comparatively greater activity of the process, and the presence of an exciting cause in the latter case, might reasonably demand.

But before assuming this identity on such grounds, it is necessary to meet one very obvious, though, apparently, only superficial objection—namely, that this so-called natural disease is not as common as that whose cause we seem to find in rheumatism or renal disease. The supposition involved in this objection is, I believe, contrary to the real state of things, if the lesser manifestations of each form and at all ages be taken into the account. Yet, were this not so,—were rheumatism the cause of the greatest number of valvular lesions, and those of the first (as they are), and not of the second form,—still the objection is unreal. For no one will deny that rheumatic affection of the valves of the heart is an accident, in the medical sense of the word. However far the tendency to rheumatism, even to rheumatic endocarditis, may be innate in the individual, none can deny that the attack itself, and its results, are purely accidental.* They are the effects of some contingent circumstance, for all that they may be of more common occurrence than the results of natural decay; just as death by old age, even among old people, is a much less common event than is death by the contingencies of bronchitis or paralysis. But for all that, it is the natural end of life.

Renal disease.—The results of renal disease, too, appear to demand a few remarks, not precisely on the same grounds as the effects of the two causes just specified, but to disentangle them from the results of other causes with which, in the tabular analysis, they have become combined. The results of renal disease, as there numerically estimated, scarcely differ from those of rheumatism. But this fact requires, and will repay, a little closer examination as to—first, the frequency of affection of particular valves; and second, the nature of the valvular lesions.

1. First, as to the proportionate frequency of the affection of particular valves.

* "The laws by which innumerable things happen of the greatest influence upon the affairs and state of the world,—these laws are so wholly unknown to us, that we call the events which come to pass by them accidental; though all reasonable men know certainly that there cannot, in reality, be any such thing as chance, and conclude that the things which have this appearance are the result of general laws, and may be reduced into them."—Buther's Analogy, Part II. Chap. iv. § iii.

On this question the cases of renal disease from Series I. are of no use; for almost all of them had also suffered acute rheumatism. Indeed, they quite contradict some of the inferences from Series II., where these two pathological conditions were as uniformly distinct. To facilitate inquiry, in the following table the numbers have all been adjusted proportionably to one hundred cases; the mean of the patient's age has been taken, and the cases of a corresponding period of life, from a previous table (p. 6), have been reduced to a similar scale. The proportion of valves affected and sound (allowing four valves to the heart), is given in the last column.

Series II.	Age.	Mitral.	Aortic.	Tricus.	Pulm.	Valves per cent. Affected.	Sound.
Renal disease . . .	45·4	83·3	56·6	6·6		36·6	63·4
All other causes . .	40 to 50	74·0	70·3	3·7	3·7	37·9	62·1
Rheumatism . . .	25·6	95	70	5		42·5	57·5
All other causes . .	20 to 30	85·7	47·6	4·7	4·7	35·7	64.3

The distinctions between the effects of renal disease and those of rheumatism on the endocardium, thus numerically estimated, are tolerably clear. Renal disease does not induce quite so large a per centage of valvular lesions as do all the diseases whose combined results in this particular were examined at the same period of life. Singularly, no rheumatic case falls within these limits of age—forty to fifty—in my cases, and only one in Dr. Barclay's cases. Comparing, therefore, for want of any other data, the total effects of the two causes, regardless of the difference of the age at which they each most distinctly show themselves, the per centage of valvular disease induced by renal disease appears very much lower than that induced by rheumatism. On the same grounds it appears that renal disease affects the mitral rather than the aortic valves in a higher proportion than even rheumatism does.

But while thus numerically estimating the effects of rheumatism and renal disease severally, we must recollect how common a complication of renal disease sub-acute rheumatism is. The history, indeed, of the cases tabulated from Series II. represents the two affections as occurring independently in the particular instances. And the numerical conclusion from such representation cannot be gainsaid. I owe it to those who have expressed their opinion on this subject to show how far the results of my observations agree with theirs. But I should be expressing an assurance which I do not feel were I not to add, that the facts on which the comparison is based do not bring conviction to my own mind; for in many cases the occurrence of rheumatism may have been overlooked.

The same remark applies to the effects of want and intemperance, with which, as might be expected, several cases of renal disease in Series II. coincide. The positive statement of their having been in want or dissipated is, unhappily, only too trustworthy. But this very fact much detracts from the value of the negative assertion concerning the non-occurrence of rheumatism. It places them in a class habitually exposed to disease of all kinds, and notoriously unobservant of their symptoms.

2. Secondly, as to the nature of the lesions, as far as we may go without anticipating what will form the subject of inquiry elsewhere. In Series I. the renal and rheumatic cases are nearly identical; and the morbid products must be considered in so far as the common result of the two causes. And so far, almost uniformly, what there will be occasion to describe as the second form of valvular disease prevails, and in its most extreme degree. In the renal cases of Series II. the results are much less striking, as might naturally be expected. But the changes have a character of their own. In their description the terms of opacity and general thickening of the valves are of the most common occurrence; while in that of the rheumatic cases the square edgings of the valves, and the concentration of the lesions on the edges of contact, are more particularly noticed.

To deny that renal disease has any influence in inducing valvular disease would be contrary to the fair inference from these observations. But I cannot look upon its independent influence as of any very great importance in this point of view. It is as a modifying rather than as an original cause of valvular disease that it seems to me to possess any high pathological interest. Dr. Barclay, however, in his valuable paper already quoted, would give renal disease a higher place among the causes of valvular disease than my observations allow me to assign to it. He has also met with it more frequently—namely, in forty-one out of seventy-nine cases, or about 52 per cent.: it occurred in not more than 23·2 per cent. of my cases.

There are still a few conditions whose claim to the consideration of causes of valvular disease requires to be investigated.

The occurrence of inflammation in a neighbouring part—chiefly the lungs or pleuræ—is another reputed cause of inflammatory affections and consequent organic disease of the investing or lining membrane of the heart. The grounds of this opinion, as far as concerns the endocardium, do not appear to me to be satisfactory.

There are necessarily but two sources whence the evidence can be drawn,—namely, cases of recent inflammation of these parts, or, cases displaying traces of its former presence. Neither of these appear to me to furnish the required data.

I. As to previous inflammatory affections of neighbouring parts. Practically, we are almost limited to the observation of the traces of such previous action in the pleuræ; for the traces of previous pneumonia are confessedly of too equivocal a character to be made the basis of any further inferences. Now, in a very large majority of cases of pleural adhesions, of whatever extent, tubercles are found in the lungs. But the admitted antagonism of the tubercular diathesis* and valvular imperfection, and the equally admitted fact of the close connection of pulmonary tubercles with pleural adhesions, must tend very much to diminish the evidences of the connection between pleural inflammation and valvular disease.

Notwithstanding this large deduction, the proportion in which valvular disease of the heart, and the traces of old pleurisy, are found to coincide, is certainly higher than that which is found to exist in patients dying of all disease, including pulmonary phthisis. In the examination of the bodies of 486 patients, dead of all diseases, of which I have more or less complete records available for the present purpose, pleural adhesions were found in 225; less than one half. In 182 of these 486 patients, who presented evidences of valvular disease of the heart, of whatever kind or degree, pleural adhesions were found in 94; rather more than one half. But before accepting the conclusion from these numbers, we must allow much for the greater attention bestowed on the examination and description of the thoracic organs, in cases of fatal thoracic disease. A fact this, which would obviously raise the proportion in which pleural adhesions have been found in connection with valvular disease of the heart.

Granting, on the grounds of their frequent coincidence, a more than accidental connection between the traces of old pleural adhesions and old valvular disease, we are yet very far from being entitled to assume that in the pleurisy we see the cause of the endocarditis. They may have a common cause; as they have, for instance, in cases of rheumatic pleurisy. We cannot hope to arrive at any certain conclusions, without a certain knowledge of the cause of the pleurisy, or at least of the date of its occurrence. I cannot, therefore, put any confidence in the deductions from cases of old pleural adhesions only discovered after death, in our present, and what must be, I believe, our perpetual state of uncertainty concerning the occasion of their origin, in the great majority of cases.

II. The examination of recent cases of pulmonary inflammation makes very much against the existence of any close connection between inflammation of the endocardium and that of the lungs or pleuræ. I have more or less complete notes of the dissection of eighty-eight cases dying with recent pleurisy, and of ninety-five with recent pneumonia. Several of the cases of these two affections are identical; but for the present purpose it is needless to enter into any elaborate analysis, and to set out this distinction with accuracy, for, out of the whole number, only six had coincident endocarditis. Five of these six cases had at the time acute rheumatism. The sixth died of meningitis. In her the existence of pneumonia was questionable, and the inflammation of the endocardium was limited to

* Rokitansky, who has brought a larger mass of facts to bear on this subject than have hitherto been employed in its examination, speaks very decidedly of the antagonism between tuberculosis and valvular imperfection (Path. Anat. Bd. i. S. 522). But he finds more reason to connect his opake yellow granular [croupös] tubercle with disease of the valves of the heart, and of the great vessels (S. 524).

Dr. Walshe, in his able report on phthisis (Brit. and For. Med. and Chir. Rev., Jan. 1849, p. 252) says, "I have never once seen cardiac disease, of such kind as to cause hæmoptysis, coexistent with *phthisis*, using the term in its practical sense; but in a fair number of instances I have seen advanced cardiac disease, in persons whose lungs contained *crude tubercles and grey granulations*. It may be, therefore, that the conditions of the system existing in heart disease are unfavourable to the development of tubercle; but the infrequency with which the two kinds of disease are found together, doubtless depends, in the main, on the difference in the periods of life at which each is especially prone to occur."

In the notes of my own dissections the number of cases of valvular disease is, from various causes, disproportionately large. But, where this peculiarity does not interfere, the numerical conclusions agree pretty closely with the above.

Tubercles or their remains were found in the lungs of

2 in 39 = 5·1 per cent. who died of valvular disease.

31 in 145 = 21·3 per cent. who had, but did not die of, valvular disease.

142 in 495 = 28·6 per cent. who died from all causes with all diseases.

Valvular disease, of whatever kind or degree, was found in about 30 per cent. of patients having tubercles in their lungs; 37 per cent. of all cases, with or without tubercles.

vascular injection of two patches of the mitral valve. It appears, therefore, that inflammation of the lungs and pleuræ, apart from the cause of that inflammation, have little to do with producing endocarditis.

My experience of acute non-rheumatic pericarditis is too limited to allow me to speak decidedly on the subject; but, such as it is, I believe inflammation of the investing has little tendency to spread to the lining membrane of the heart, apart, as before, from the original cause of the pericarditis.

So, too, with regard to purulent inflammations of, or depositions in, the areolar tissue in the neighbourhood of the heart. My own more limited experience in this matter would show that such processes have no more tendency to induce endocardial affections, than have inflammations of the same nature occurring anywhere throughout the body.

The question, how far the effects of a previous attack of endocarditis may be looked upon as the cause of a second or other attacks, is more complex. Indeed, it requires for its complete solution that we should know the exact history of endocarditis as a morbid process; to the discussion of which part of the present subject its consideration must therefore be deferred.

On the connection, in the last place, between atheromatous disease of the arteries, and valvular disease of the heart, the records of my dissections do not allow me to offer any remarks, for atheromatous disease is not noted in my dissections, unless when of considerable amount. And being of almost universal occurrence in some degree, it would be necessary to have a very carefully graduated table of its amount, if we would trace its connection with any particular condition. Such I have not at command. Only, of the cases where great disease of the coats of the arteries was noticed, valvular disease was found in more than half. And the form of valvular disease noticed under these circumstances, was, almost without exception, of that kind which has already been alluded to as the second; which is coincident also with renal disease, and with want and intemperance.

Before leaving this subject, I would ask your attention to one remark on what has been said. It is needless to explain the difficulties which beset any inquiry resting on the statements of poor hospital patients, as this does. And I should be claiming great merit to myself if I said that I had surmounted them. I do not apologise for my numbers being so small, but beg you to accept with caution what, with the utmost care, may conceal important errors. And this the more with regard to those conclusions which are at variance with those which Dr. Barclay has made in his valuable essay on this subject, already so often referred to. It is a matter in which we do well to be cautious, and hesitate before we accept any inference as true, and admitting of further application.

Though there were no reason to doubt the conclusions above drawn, yet it would be almost impossible for one observer, in one life, to prove their correctness. For the greater number of diseased valves are found on dissection, not of patients where the one assigned cause, and that only, has operated for a known period, but of patients dying of chronic bronchitis or anasarca, many years after the infliction of the original injury. These, too, having been exposed intermediately to all the causes usually considered as capable of inducing valvular disease of the heart, such as habitual intemperance, violent muscular exertions, and all the distresses and privations of a poor man's life. Besides, the assertion that these patients have or have not ever suffered from acute rheumatism, is rarely sufficiently trustworthy to be taken as a basis for any calculation. Much less so is their statement as to whether symptoms of affection of the heart were noticed during such an attack of rheumatism. Sometimes even auscultation fails to supply us with the exact date of the commencement of valvular disease; as, for instance, when the organic lesion has happened not to interfere, at its commencement, with the action of the affected valves.

LECTURE I.—Part II.

II. Physical Diagnosis of Valvular Disease of the Heart.

Valvular Lesions distinguished d by the position of Murmurs—Secondary importance of the intensity o. tone of Murmurs, or of the measurements of the exact position of the Heart.

1. *Organic Endocardial Murmurs—Distinctions between Tricuspid and Mitral Murmurs obscure—between Pulmonary and Aortic, practical utility of.—Direct Mitral—double Mitral—Bruit de rappel—Murmurs audible at a distance—Mechanism of Valvular Murmurs—of Murmurs not Valvular—Muscular Sound—Pericardial—Metallic Cliquetis—Purring Tremor, its Nature and Pathological Import.*
2. *Functional Endocardial Murmurs—Fallacies of Cardiac Auscultation—corrected by Pathology—General and Local Causes of Murmurs to be distinguished—Abstract meaning of Murmurs always the same—the observation more often correct than its interpretation.*

If the physical diagnosis of valvular murmurs had no higher object than the reference of each murmur to its proper seat, we might dismiss the subject in a few words. For the rules of diagnosis are clearly laid down, and when those can be applied, the diagnosis follows directly, as a plain inference. But in a higher point of view,—namely, as embracing the interpretation of such an inference, and forming the grounds of our prognosis,—the interest of the subject is as great as its importance and its difficulty. For it involves the *vexata questio* of the diagnosis of functional and organic affection of the heart; and, besides all the niceties of particular valvular diagnosis, the recognition of the effects of such valvular disease on the heart itself.

The fundamental law on which all diagnosis of the lesion of particular valves rests, is, that murmurs are heard loudest in certain parts, and propagated loudest in certain directions, according as they depend on lesions of different valves. When the time and position of a murmur can be exactly determined, its interpretation may be correctly made, according to established rules. Even if there be two or more murmurs coexisting in the heart of the same individual, so long as their time be determinable, and there be an appreciable distance between their positions of greatest intensity, this most complex case may be unravelled. This is not merely a statement handed on from one physician to another, but a fact of the truth of which any one may assure himself by careful observation in the wards and dead-house of any large hospital school. And it is most important that he should thus assure himself of it, for all the practice of cardiac auscultation hinges upon it.

While claiming the highest importance, in a diagnostic point of view, for the position, and next, for the time of murmurs, the information derived from the intensity or tone of murmurs must be entirely rejected, or received with great caution. For between these and the amount or character of the lesions on which the murmurs depend, there would appear to be no direct relation; in the former particular, indeed, the ratio is rather inverse.

As concerns the intensity of the abnormal sound, the loudest murmurs may be heard where there is no organic disease, and contrariwise, the amount of organic disease may be such as entirely to preclude the development of a murmur, either at the seat of such extreme disease, or lower down in the course of the circulation. And although a murmur ordinarily becomes feebler before it disappears, yet it does not certainly follow because it becomes feebler that therefore it is about to disappear, and that the valve is recovering itself.

So, again, with regard to the character of this sound, the loudest, shrillest, murmur may arise from anæmia; the softest blowing whisper may ensue from the passage of the blood through a rugged chink. And the same musical note may be heard, with all conceivable states of the valves, from an apparently healthy condition, up to rigid ossification of the parts. There are, then, no certain grounds for connecting the harsher murmurs with the more serious lesions, or for inferring from the diminution of the harshness, as before from that of the intensity of a murmur, that the valve is recovering itself.

It would be very desirable to have a code of signals, so to say, by which we might recognise particular forms of disease, or watch their daily progress. But certainly, neither the intensity nor the tone of the endocardial murmur can be safely trusted as furnishing any such. And, indeed, there

is nothing more in our confessed inability to draw such practical inferences from these grounds, than what an abstract consideration of the premises would have led us to anticipate. Doubtless there is a cause for each modification of each sound; but analogy would lead us to look for this cause anywhere rather than in the nature of the walls of the aperture of sound. At least within certain limits.

For by varying the form of the aperture, or altering the mode of propulsion of the current of air, we can elicit a wide range of sounds from an instrument composed of almost anything capable of being thrown into sonorous vibrations at all. Or conversely, an equal variety may be elicited by varying the mode of propulsion of the current, or the length of the tube leading to or from the aperture, while the aperture itself remains unaltered. And the range we can obtain by either of these methods, on any instrument, as far as I know, exceeds, both in tone and pitch, the limits within which the variation of endocardial murmurs is found to occur.

The case, then, stands thus. Briefly, in Dr. Latham's* words, "Experience does not countenance the belief that the *kind* of endocardial murmur follows the *kind* of endocardial disease." Nor, abstractedly considered, and by analogy, have we any reason to think that it should. But, apart from all such general considerations, the daily, nay the hourly variations of the character of endocardial murmurs, in some cases, show that these differences of tone or pitch depend on some cause capable of rapid change, rather than on fixed organic disease. Probably, differences in the mode of the heart's contraction, or in that of the coaptation of the valves, are sufficient to explain all these varieties. Probably, from the fact that these temporary variations occur during the systole, and at the auriculo-ventricular valves. For where the form and mode of action of the parts is not so susceptible of physical modifications, as, for instance, during the diastole, and at the sigmoid valves, though we have the same range and variety of sounds, taking one case with another, yet these variations do not all occur in the same person. Under the circumstances supposed, the limits of the scale are much narrower.

The truth is so very obvious here, on a little reflection,† that it may seem almost trifling to have dwelt so long on exposing this source of fallacy. And it may seem to be throwing needless difficulties in the way, by thus parading all our weaknesses and shortcomings in the foreground. But we are still inclined to interpret before we understand, to take up with a plausible error rather than to rest in doubt, and so far in truth. As Thucydides* told us long ago, "Ουτως ἁπαλαίπωρος τοῖς πολλοῖς ἡ ζήτησις τῆς ἀληθείας, καὶ ἐπὶ τὰ ἑτοῖμα μᾶλλον τρέπονται." And our minds need, no less than our eyes, to be warned at each moment not to trust to what is intrinsically unsound, however specious.

The determination of the exact position of the heart in the thorax has lately occupied a good deal of attention; more, apparently, than the intrinsic importance of the subject could command. For the position of the heart is not so uniform in all cases, as that we need to inquire into the cause of each lesser deviation. The hand and the ear are the best guides to the relative or actual position of the heart, in the individual case; for they tell us not only the present situation of the heart, but the nature of the cause, if so it be, of its displacement. If we can neither feel the apex of the heart, nor ascertain the point of greatest intensity of the first or second sound, all accuracy of diagnosis is at an end. But if these can be made out, we want no further information, than what an ordinary knowledge of anatomy supplies, for our educated senses to explain the condition of the parts in their natural or altered relations.

But let me not be misunderstood as seeming to underrate the value of these researches, in confessing my own inability to apply their results to cardiac pathology; or, as judging of their applicability in other hands, and to other diseases, from what they have appeared to me in diseases of the heart. Whatever value may be assigned them, as contributions to practical medicine, it is impossible not to appreciate most highly the talent and industry with which the investigation has been conducted by Dr. Sibson,† who has placed our knowledge in these particulars on so much more sure a foundation.

Such is, I believe, a just estimate of the comparative value of the indications afforded by the time, situation, tone, and intensity, of murmurs presumed to be endocardial. Having thus generally glanced at these preliminaries, it remains to apply them to the more particular examination of some of the physical signs of valvular disease.

* Op. cit. p. 51.

† Bouillaud has most happily expressed, in words which lose their force in a translation, the difference between the musical and the ordinary blowing murmurs. "Il y a la même différence qu'entre l'action de souffler et celle de siffler."—*Mal. du Cœur*, tom. i. p. 196, 2d. edit.

* De Bello Pelop. A. 20.

† Medical Gazette, 1848; Prov. Méd. and Surg. Trans. vol. xii.; Med. Chir. Trans. vol. xxxi.

Endocardial murmurs, distinguished according to their cause, are of two kinds,—organic and functional. On each of these there is something to be said. It is difficult to separate what are in nature so inextricably involved as these two subjects. It appears best, therefore, to speak of murmurs, in the first instance, in their probable relation to organic disease, and then to subjoin such considerations as diminish or destroy their pathological importance in particular cases, reducing them to the category of functional murmurs. And first of—

I. Organic Murmurs.

It requires no particular skill, in an ordinary case, to determine whether a murmur be heard loudest at the base or the apex of the heart, and with the first or the second sound. But it is much more difficult to get beyond this, and to discriminate between the affections of the right and left valves respectively at these points.

There is no accurate unfailing rule by which we can always distinguish mitral from tricuspid murmurs, so short is the distance between the two points where these valves respectively give evidence of their imperfections. A forcible pulsation, with extended dulness to the right of the lower end of the sternum, combined with the general signs of venous obstruction, has sometimes, to my experience, correctly indicated the existence of functional imperfection of the right auriculo-ventricular valve. Andral* notices such an occurrence. But tricuspid regurgitation is said by those who have paid most attention to this subject to be rarely accompanied by a murmur.† The inference would be, that a murmur heard loudest at the apex of the heart is pretty surely referable to imperfection of the mitral valve. Assuming the correctness of this inference, still the determination of the exact situation of greatest intensity of murmurs heard loudest about the apex is important; for by this means we may usefully subdivide the mitral murmur itself. For, judging from the results of morbid anatomy and auscultation alike, there appears an important difference between auriculo-ventricular murmurs, according as they are heard at the very apex, or a little above it. Thus, a murmur heard loudest about an inch to the right of, and rather above the situation where the apex of the heart pulsates, may be a mitral or a tricuspid murmur; may depend on a fixed organic, or on a functional cause: it is, in fact, subject to all the fallacies of cardiac diagnosis. But a murmur heard loudest at the apex itself, and thence transmitted up the side of the chest to the left of the mamma, admits of much less doubt. With only one exception, I have never found this to depend on anything but organic disease of the mitral valve.*

At first sight the diagnosis of pulmonary from aortic murmurs might seem much more difficult than that of mitral from tricuspid murmurs. But it is not so. The best proof of its practicability is the fact that in the only three cases of disease of the pulmonary valves which have fallen under my knowledge, where the heart has been examined during life, a correct diagnosis has been made by three different observers. The valves themselves, it is true, are so very near to each other, that, by the examination of their region only, no accurate information could be obtained. But as the vessels diverge from each other, the signs referable to each may be examined separately at the distance of half the width of the chest, or even, in some cases, the vessels of the neck, and the ramifications† of the pulmonary artery in the lungs, may give their independent testimony to the easy practicability of the diagnosis. Most commonly, however, all that is attainable is the appreciation of the more superficial character of the sound over the valves themselves, and of its distinct propagation along a line from the sternal end of the third left intercostal space for two or three inches towards the middle of the left clavicle.

* Clin. Méd iii. p. 154.

† Dr. Blakiston on Diseases of the Chest, p. 226.

* I feel so sure of the fact, that I am averse to mixing it up with what may prove an erroneous explanation; but the following seems the most probable:—The chordæ tendineæ of the lesser flaps of the mitral valve are inserted, by means of their carneæ columnæ, more to the left, though, indeed, further from the apex than those which retain the larger flap on Lieutaud's valve. By the law that the signs of valvular lesion are transmitted loudest in the direction of the attachments of those valves, we might expect to find a difference according as one or other of the flaps of the mitral valve were affected: and hence it is fair to suppose that sound caused by regurgitation through the mitral orifice, being transmitted equally along all the chordæ tendineæ, will be equally audible about the attachments of them all; while sound produced only on the larger flap will pass down only its own chordæ tendineæ, and therefore be traced less distinctly to the left than in the former case. The murmurs, then, heard more to the left than usual, would, in this view, most likely be due to regurgitation. Those heard in the ordinary situation—that is, rather to the right of the apex—might arise either from this cause, or from the blood being thrown into vibration as it runs up into the aorta against the chordæ tendineæ, traversing the ventricle in that direction. In this last case there would be many chances against their being organic; in the former there would be everything in favour of such an explanation of their origin. But all this may or may not be the true explanation. The fact is as above stated.

† See Med.-Chir. Trans. vol. xxiii. p. 352; and on the whole of this subject, Ed. Med. and Surg. Journal, vol. lxv.

This, however, is quite sufficient for the diagnosis in those cases where the entire absence of the murmur from the course of the ascending aorta, or from a corresponding situation on the right side of the chest, clearly shows it not to have its existence in that vessel.*

The determination of the existence of a murmur in the pulmonary artery is, in fact, easy enough. The distinction, however, is not urged here merely as a refinement in the particular diagnosis of valvular lesions, but rather in relation to the most interesting, yet most obscure part of cardiac pathology—the distinction between functional and organic murmurs of the heart, to much of which I believe that this is the key. For, under these circumstances, a comparison of different observations—that is, of auscultation—tells us something more than that the murmur is here or there; practising the ear like intricate scales in music, but leading to nothing beyond. It tells us something of the cause of the murmur: for disease of the pulmonary valves is so exceedingly rare, that in an enormous majority of cases we may certainly infer that pulmonary murmurs are independent of organic changes. The recognition of a murmur in this situation inclines to a favourable interpretation of all other murmurs in the particular case; for it renders probable the present active existence of a cause, other than organic disease, adequate to their explanation. At the same time, it supplies additional means for ascertaining the correctness of such an interpretation: for it increases the field of observation of the variation of murmurs. For instance: if a murmur be heard always at the base of the heart, the presumption is, that it depends on an abiding—to wit, an organic cause. But if, though always audible at the base, thus generally expressed, it be sometimes audible in the aorta only, and sometimes only in the pulmonary artery, the case is quite altered. All the doubt and anxiety which hang over the long continuance of an endocardial murmur are dispelled, when that murmur, as under such circumstances, is clearly shown to be independent of organic changes of the valves.

Without exploring the subject of probabilities to determine what is the exact diagnostic value of the fact of the recognition of a murmur in the pulmonary artery in relation to other co-existing murmurs in particular cases, it may be said, for all purposes of practice, to be very considerable. But it would be better for each one for himself to determine its just value, than to rely on any general inferences, where the consequences of an error may be so serious. It may appear very irrational to think one way and to act another; but however justly we may be assured that the frequency of affection of the heart in rheumatism is much overrated, still we are not justified in withholding the appropriate treatment from particular cases on the strength of such a belief. And this, too, though we may seem to hold the right clue in our hands: for the same process—namely, the rigorous investigation of the subject with the stethoscope and the scalpel, which assures us that the right valves are generally healthy—proves how very often the left are diseased.

The safe rule for practice, as applying to acute cases where the lesion appears to be progressive, is this:—A pulmonary murmur, if it be the only sign of endocardial lesion, may, under almost all circumstances, be disregarded: but when co-existing with an aortic or mitral murmur, its co-existence should not blind us to the possible importance of those other murmurs. It is true that the signs from the left valves *may* mean as little as those from the right, but they *may* mean much more; and in neglecting them we *may* be losing the favourable moment for treating organic disease.

Sinking, however, the use of the recognition of a pulmonary murmur to its lowest degree—that, namely, of giving us a hint often, and an assurance now and then, still, recollecting how obscure these cases often are, we may often turn it to the best account. Keeping within every limit of even the most superlative caution, still I believe the value of the recognition of murmurs in the pulmonary artery to be very great; and having for some years paid much attention to the subject, have found no reason to deviate from this opinion formerly expressed.*

It is scarcely possible to cultivate any part of a subject like practical medicine for any length of time without obtaining information, either in itself new, or as a new form of expression or confirmation of a recognized truth; and the practice of St. Bartholomew's Hospital seems to have supplied two or three instances of the latter in connection with the present inquiry. It appears better, on the present occasion, to regard our knowledge of the signs of valvular disease through this point of view, than to recapitulate what I will not merely say you already know, but what you have had a large share in originally discovering or establishing.

One of the rarest of all morbid cardiac sounds is the direct mitral murmur; and its origin is attributed, as its name implies, to obstruction to the onward passage of the blood through the mitral orifice. Here is a case in point, showing the correctness of the general opinion:—

A woman, past middle age, was admitted with anasarca, and albuminuria, and bronchitis. Her heart for some time presented no abnormal sound, but about three or four days before her death a murmur was audible with the second sound at the apex. On examination of the body after death, the left ventricle was found dilated; and at a short distance beneath the ring of the mitral valve, with its edge projecting into the onward stream of blood, there was a large coagulum adherent. It was evidently some days old; it had the form of an obliquely-truncated cone, and the upper edge presented to the stream of blood an angle of about forty degrees. In connection with a severe attack of neuralgia which she had suffered from three years before in the right leg, it is of interest to notice, in passing, the existence of a few cartilaginous flakes on the posterior roots of the nerves on the same side of the lower end of the spinal cord.

This single diastolic murmur at the apex is exceedingly rare. I never met with more than one other instance of it. But a double murmur has been recognised at the apex in eighteen cases. Out of these eighteen cases only four are known to have died,—one during the period of observation, and three at subsequent periods. Eleven of them left the hospital much relieved. If, in the absence of more certain data, and of the observation of single cases watched through the whole course of their disease, it be allowable to infer from the greater frequency of murmurs at one period of a disease than at another, a very curious conclusion follows with regard to the murmur under consideration. For, on these grounds, it appears to be a more common sign at some distance from the fatal period than during the disturbance of the heart's action which more immediately precedes death: since, out of many scores of observations, in only this one has the double murmur been heard about the period of dissolution.

The lesion on which this combination depends would seem, however, to be very serious, judging from the symptoms. And in the only dissection which has been obtained, two years subsequent to the last auscultation, the amount of the changes was certainly very striking. This patient had annular contraction and thickening of the mitral and tricuspid valves in the most extreme degree.

The singularity of any sign is scarcely a sufficient cause for detaining us on the present occasion. So the reduplication of the first sound at the apex,* which Bouillaud has denominated the *bruit de rappel*, claims here only a passing mention, and this only lest it should be confounded with the double murmur at the apex, just noticed, to which it bears so close a resemblance. The distinction, however, is important rather in theory than in practice; for my own more limited experience agrees with that of Bouillaud in connecting it, like the murmur last noticed, with extensive disorganization of the heart. Still, as depending rather on the hypertrophy which that disorganization has induced, than on the cause of the hypertrophy, it is in so far a sign of less importance than is the double valvular murmur at the apex above described.†

We need some better term for it than that in common use, namely, the reduplicated first sound.‡ The French name is much more expressive.

Sometimes an endocardial murmur may be heard by the patient himself or by other persons at a considerable distance from his body. The most probable explanation is that suggested by Laennec,§ who connects this phenomenon with the accidental circumstance of the vessel where the murmur originates lying in the neighbourhood of a cavity full of air. This is the generally received opinion; and it was well borne out by the most striking case of this kind which has come under my own observation. In connection with a murmur audible at a considerable distance from the patient, a large aneurism was found immediately over

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* Dr. Latham notices the frequent occurrence of a murmur with such negative evidence of its being in the pulmonary artery in cases of phthisis. Op. cit. vol. i. p. 66. See, also, MED. GAZ. vol. xi. p. 9. Dr. Ogier Ward.

* Ed. Med. and Surg. Journal, vol. lxv. Two rheumatic cases there mentioned in the second table have since come under notice. In one the murmurs had all disappeared; in the other the apex murmur and the murmur in the lungs had disappeared, and the existence of a murmur at the base was very questionable. She was then, however, suffering from another attack of rheumatic fever.

* Bouillaud, Des Maladies du Cœur, tom. i. p. 215.

† Dr. Williams "has heard it sometimes where there was no reason to suspect permanent lesion, but where the action of the heart was languid."—Diseases of the Chest, p. 211, 4th ed.

‡ Sometimes the second sound is reduplicated over the sigmoid valve: apparently from the time of closure of the aortic and pulmonary valves not exactly coinciding.

§ Ans. Med. tome iii. p. 133. Dr. Abercrombie, Ed. Med. Chir. Trans. vol. i. p. 48, mentions a curious circumstance, which was noticed in one of his patients, of interest in relation to this subject. "He attempts to relieve his uneasiness by frequent and very deep inspirations.... While the lungs are inflated in the state of full inspiration, a sound is heard by himself, and by a person sitting near him, exactly resembling the loud tick of a watch: it corresponds in frequency with the frequency of the pulse, and is only heard while the lungs are fully inflated; but it continues to be heard as long as he keeps them inflated, by resting upon the deep inspiration."

the bifurcation of the trachea. Cases, however, are continually occurring where no such disposition of neighbouring parts is found to explain this peculiarity of the murmur.

It would seem that the most definite meaning which we can attach to this peculiarity of being audible at a distance from the chest, relates more to the situation than to the cause of the murmur. In this way, though it gives no fixed grounds for modifying the prognosis of the cases in which it occurs, yet, as regards diagnosis, its recognition might be useful. For, recollecting that a stomach distended with air may conduce, just as well as the trachea or bronchi, by its proximity, to the manifestation of this peculiar sign, we may look here for an explanation of the cardiac symptoms which sometimes accompany an attack of dyspepsia. For, the same cause which, by distending the stomach, disturbs the heart's action and causes the murmur, may also make the murmur audible at a distance from the patient. But in illustration of this I have not at command a case sufficiently in point to offer to your notice.

The study of the exact mechanism of abnormal murmurs is one of exceeding beauty and interest, though it must be confessed that it is wholly inapplicable to treatment. Why these murmurs should come and go, what are the causes of their variety, why in this the stress should rest on the beginning, in that on the end, are all questions which arise so often, that, out of sheer curiosity, to rank the feeling no higher, one is very anxious to have a satisfactory solution of them. A means of imitating, after death, the exact mode of play of the mitral valve during life is here the great desideratum. For there is reason to think that many of the varieties of particular cases may arise from peculiarities in the form of the lesion, rendering this valve (in relation to which the varieties most often occur) inefficient at particular stages of its action. Some of these differences, however, admit of explanation.

The commonest, and probably the most important defect in the mitral valve, is where the edges do not fit after the valve is shut to; and where, consequently, regurgitation takes place through the aperture during the contraction of the ventricle till the complete obliteration of its cavity. A murmur indicating this condition, however arising, whether from thickening or perforation of the valve itself or from shortening of its chordæ tendineæ, begins suddenly with the first sound, and fades gradually until the occurrence of the second sound, which coincides with the cessation of the contraction of the ventricle. But sometimes the murmur at the apex, instead of suddenly rising to its maximum of intensity and gradually declining, rises less abruptly, but suddenly falls with a smart click and jerk sensible to the hand all over the cardiac region. From careful examination, it appears that this click and jerk are really the termination of the first sound, which the murmur accompanies, but does not follow. It may hence be inferred that regurgitation takes place with a murmur through the mitral aperture until the walls of the ventricle have approximated so that the edges of the valve can meet. The valve, being in itself sound and efficient, now precludes all regurgitation, and checks the stream suddenly, thus sending back an impulse nearly equal to that of the contraction of the left ventricle, only more sudden; similar to what we may produce by suddenly checking the flow of a stream of water or air through a tube.

It may here be objected, by those who only care to establish the fact that there is disease of the heart in a particular case, that this is a useless refinement. And the force of the objection could not be denied, were this refinement the only object attainable. But, with time to observe, and an unlimited field of observation, the interest of solving one of these problems is very great. And the ear, taught in this difficult and complicated inquiry, finds itself more perfectly at ease among the ordinary incidents of daily practice, where more important results than the solution of curious problems hang on its accurate perceptions: "For it breeds great perfection if the practice be harder than the use." I cannot meet this objection in more forcible words than those of Dr. Elliotson on the same subject.* "To condemn accurate diagnosis is to condemn accurate knowledge,—to rest satisfied with imperfect information, when industry would give us more, is to admire ignorance when knowledge is within our reach."

By thus accurately determining when and where murmurs are loudest, and the character and history, so to say (though the history be that of less than half a second of time), of each murmur, we learn to separate several sounds from the category of indications of valvular disease. It appears worth while to notice a few of those of most common occurrence in practice. Such are the muscular murmur, if it be correctly thus designated, the pericardial murmur, and metallic cliquetis. And to these have been subjoined a few remarks on purring tremor in its relation to organic

* Lumleian Lectures, p. 5.

disease, anticipating as little as might be the observations which this sign seems to require in relation to functional murmurs.

1. *Muscular sound.*—Sometimes a systolic murmur may be heard with equal intensity over the region of the ventricles, which is not transmitted at all along the great vessels, as its loudness, even up to the base, would have led us to expect. A closer examination of this murmur confirms the inference which would follow from the above particulars. It has no abrupt beginning or ending, its time coincides exactly with that of the contraction of the heart; and the sound is so like that of muscular contraction, that it is impossible, on all these grounds, not to believe it to have its seat really in the muscular structure of the heart. Why it should be audible only in some hearts, and only for a limited time, is not clear. But as occurring in patients who are the subjects of acute rheumatism, it is important to separate it from their valvular murmurs, which are of longer continuance and more serious importance. Be it muscular or not, it is worth while to distinguish it from the admitted endocardial murmurs, if only for the reason that it goes away and leaves the heart, in all its functional, and, for what I have been able to learn, in all its organic integrity.

2. *Pericardial murmur.*—There is another murmur which, by careful observation, may be shown not to be valvular but pericardial. The anatomical history of the white spots so often seen on the pericardium has been satisfactorily made out. Mr. Paget has adduced proof of the correctness of the common opinion, that they are generally the result of previous inflammation.* But their clinical history is still incomplete.† Of the white spots themselves I have nothing to say; but, with regard to the pericardial adhesions about the base of the heart, on which their correct interpretation depends, a few cases worthy of notice have come under my observation. In some patients a simple systolic murmur, of the character of a friction sound, has been audible over the first part of the pulmonary artery for several days in succession. These were generally the subjects of acute rheumatism,—women, and anæmic. Was this seeming friction sound really the sign of the existence of this limited pericarditis? I think it was; but death so rarely occurs during the progress of acute rheumatism, that I have been unable to obtain actual demonstration of the fact. The following case, however, seems in point:—

* Med.-Chir. Trans. xxiii. p. 29.

† Three of Dr. Blakiston's cases contribute to supply this deficiency: cases 52, 43, and 50.

Sarah Emmet, aged 13, a large, overgrown girl, came into St. Bartholomew's Hospital, in April 1845, with acute rheumatism and endocarditis. On the second day after admission she is described as having a harsh systolic murmur all over the region of the heart, most audible at the base, and about the third left costal cartilage, of a rustling character, but nowhere double. The systolic murmur at the apex, first heard two days before, continued unchanged. There was extended dulness on percussion over the region of the heart.

During the course of the next month, while she remained under observation, frequent examinations of her chest were made. The harsh dry sound moved a little; being for three weeks most audible at the junction of the fourth left cartilage with the sternum, from which point it disappeared at the end of that period. The notes preserved always carefully distinguish it from a soft blowing murmur which during this period manifested itself in the aorta and pulmonary artery. She was discharged five weeks after this, having escaped with difficulty from a severe attack of intercurrent pleuropneumonia; and this sound remained then unexplained.

In three months more she returned, the symptoms of anæmia being now exchanged for those of valvular disease. She gradually sank. Her friends, fearing she would die, and her body be examined, removed her from the hospital. Just then pericarditis came on, and a loud double friction-sound was audible all over the region of the heart, save in that part only where, on the previous occasion, we had so long heard the dry systolic murmur.

Probably the two surfaces of the pericardium were thus far either adherent, or, if not adherent, prevented by thickening, consequent on the former attack of inflammation, from so readily taking on inflammatory action; but the matter still needs to be elucidated by dissection.* The

* My friend Dr. Kirkes has been led to infer, from the rarity of adhesion of the pericardium in his dissections, contrasting with the frequency of the occurrence of the signs of pericarditis during life, that general adhesion is not the ordinary termination of general pericarditis. I cannot but think that some contingent circumstance has reduced the number of cases of adherent pericardium below the average during the time to which this inference alludes; for, during some years' observation in the same field, the number of adherent pericardiums bore as high a ratio to the number of cases of pericarditis as did any other organic lesion discovered after death to its symptoms noticed during life. But while advocating the opinion commonly received, that the ordinary termination of general pericarditis is by adhesion and obliteration of the cavity, we must admit the occasional occurrence of very striking exceptions to this rule. Dr. Kirkes mentions one such in his paper, MEDICAL GAZETTE, vol. xiv. p. 581.

question is one, if not of importance, at least of frequent occurrence; and it is of especial interest with regard to a subject previously under discussion—namely, the diagnosis of pulmonary murmurs. The real difficulty lies rather in their discrimination from such circumscribed pericardial than from aortic murmurs.

3. *Metallic cliquetis.*—Occasionally there may be heard over the region of the heart a very peculiar sound, to which the name of metallic cliquetis, or tinnitus, or costal percussion, has been applied. In the interpretation expressed by the use of the last appellation both Hope* and Bouillaud† agree, and Hope gives some details explanatory of the mode in which the sound appears to him to be produced. Laennec‡ explains the occurrence of this sound in the same way by costal percussion—"When the heart, beating in a sharp and rapid manner, though without any really forcible impulse, the apex only comes to strike the walls of the chest." Now, obviously, this explanation is somewhat shaken by the fact that this peculiar sound —which there can be no question about, for any one may produce it quite pure for himself in the way specified by each of these observers§—is not always audible at the apex in cases where it may be heard at the base of the heart. Dr. Hope correctly remarks that thin nervous persons are the most common subjects of it, but they are not exclusively so; and this fact again impairs the general applicability of the details of his explanation. The sound may be, and I believe is, trivial, and almost wholly unimportant; but, for all that, we need not accept a wrong or an unduly limited explanation.

I have met with it under four different conditions:—First, in nervous anæmic subjects, when the action of the heart was sharp; secondly, with more violent action of the heart, under circumstances which have led me erroneously to conclude, from the third condition with which I have less frequently found it connected, that it was indicative of the commencement of pericarditis. The fourth condition with which it has been found connected is a rough, almost scaly, state of the pericardium about the base of the heart; and perhaps a fifth might be subjoined, but for the fact that it is not always constant under these circumstances—namely, adhesion of the pericardium, with which we may class the occurrence of this sound over an aneurism. Dr. Latham tells me that he frequently meets with it in children, in whom he has noticed that it may be entirely suspended by a little pressure on the walls of the chest.

What should be the conclusion from these facts? The explanation by costal percussion is insufficient: it does not take in all the cases. The explanation by affection of the pericardium again is insufficient; certain as far as it goes:* yet there is positive proof, in the continuance of the sound after the two surfaces of the pericardium have become adherent, that the explanation does not go all the way. There are, then, three explanations of the mode of production of this sound—namely, costal percussion, friction of free surfaces, and movement of connecting areolar tissue. Each probably applies to a limited number of cases. There does not appear to be any one general explanation; nor, considering the nature of the sound, ought we perhaps to look for one.

4. *Purring tremor* is a sign which naturally attracts much attention. Really, it means little more than any valvular murmur heard under similar circumstances.† It is important, therefore, to dwell on all the facts which detract from its value as a certain evidence of irreparable organic disease.

Purring tremor may be produced either by the action of causes wholly external to the blood-vessels, or by abnormal conditions, organic or functional, of the blood-vessels themselves; or, lastly, by changes in the composition of the blood. Pericarditis occasionally furnishes an instance of

* Op. cit. pp. 41, 602.
† Œuv. cit. tome i. p. 218.
‡ Tome iii. p. 105.
§ By laying the palms of the hand over the ear, and lightly tapping the back of the hand with a finger.

* This interpretation is favoured by three of Bouillaud's cases (28, 30, 73), where metallic cliquetis was noticed in connection with traces of inflammation of the pericardium discovered after death.

† Opinions are at variance on this matter. Dr. Hope (Diseases of the Heart, p. 125) says that "he had never known tremor to exist in the heart independent of organic causes." Bouillaud (Mal. du Cœur, tome i. p. 182) takes the opposite view. Laennec (Ausc. Méd. tome iii. pp. 123, 130) says that he has frequently noticed its occurrence without there being any organic affection of the heart, and quotes a case where the tremor was produced by a simple change of position. And Andral (Œuv. cit. note, pp. 123-5), while he cautions us about accepting Laennec's statement, and maintains an opposite opinion, quotes a case where this sign depended on at least a removable cause. Dr. Graves (Clin. Med. p. 926, 1st edit.) gives the particulars of a very striking case, where the tremor appeared to be independent of organic change. My own experience is to the effect that this sign is usually manifested in the most severe cases of cardiac disease, but that it does not infallibly indicate the existence of such disease. The three most striking cases of this kind that I can recollect presented in two cases dilatation of the right auricle, while in the third the auscultatory signs of cardiac lesion were removed, and I believe that no organic disease of the heart or vessels ever existed in this patient.

the first kind. With this, however, beyond the mention, we have here nothing to do; the altered conditions of the blood, and its containing vessels, alone falling within the scope of the present remarks.

It appears that purring tremor may be produced immediately in healthy animals by large depletion.* It might be referred, under such circumstances, to imperfect distension of the vessels. This tremor, however, thus produced, not only continues, but increases in intensity in the course of a short time: but we know, from Dr. G. O. Rees' observations,† that the quantity of blood abstracted by venesection is rapidly replaced by absorption of water. We must therefore consider extreme attenuation of the blood as at least as powerful a predisposing cause of this sign as an imperfect distension of the blood-vessels can be. Certainly it is a cause in more durable, and probably in more frequent operation.

Now, obviously, no fluid could communicate this sensation to our ears or hands when perfectly at rest. We can admit the attenuation of the blood only as a predisposing cause of purring tremor. We look for the exciting or proximate cause in the movements of the circulation. In the experiments just alluded to the tremor was produced in healthy animals. Applying this to practice, even if all clinical experience were opposed to the statement (which it is not), we must admit that purring tremor does not necessarily imply the existence of organic disease of the blood-vessels, but that the movements of, or induced by, healthy circulating organs are capable of producing it in a subject so predisposed. We must admit that blood attenuated to a certain degree is capable of being thrown into vibration—to use this more general expression—by causes insufficient to affect healthy blood after such a manner—namely, by the ordinary movements of the circulation: but it requires unnatural agitation to throw normally-constituted blood into such a state of vibration; and, more than this, it is required that the fluid pressure shall be less at the point where the vibration manifests itself than elsewhere.‡

* Hope on Diseases of the Heart, p. 100, 3d edition.

† Gulstonian Lectures, MEDICAL GAZETTE, 1845, p. 851.

‡ We are indebted to Dr. Corrigan (Dublin Journal, vols. x. and xiv.) for a very clear explanation of the mode of production of this curious phenomenon. Of the correctness of the principle advocated any one may easily satisfy himself, by repeating the very simple experiments by which Dr. Corrigan supports his theory. A tube of metal, or animal membrane, through which a stream of water is running, is to be constricted at one point, so that the egress of the fluid from the lower portion of the tube may be freer than its ingress. In the previously silent stream of fluid, now, below this point, a loud murmur with purring tremor will become manifest. Constrict the tube in a second place, at a lower point, and the murmur and the tremor will both cease over the interspace, as soon as the equilibrium of pressure shall have been restored on each side of the point first constricted.

In the same able essays Dr. Corrigan enters very particularly into the conditions requisite for the production of a murmur. But in all diffidence I must here venture to withhold such complete assent to his conclusions. The theory does not appear to me so beautifully and closely applicable to murmurs, as to purring tremor. At least the conviction of its truth is not so forcibly impressed by the examination of each case of endocardial murmur, as it is by that of each case of purring tremor. Probably, as Dr. Williams (Dis. Chest, p. 217) remarks, the flaccid tube only receives the sound or tremor from the point of stricture, as the tube of a trumpet does that from the lips. It is an instrument necessary for the manifestation of the grosser sign, the tremor, but not for that of the more delicate sign, the murmur.

Both these requisite conditions of the circulating fluid are found under the circumstances where purring tremor is usually produced. The contracted aortic opening, for instance, does not allow of the immediate equalisation of pressure of the blood in the ventricle and in the aorta; and the same physical impediment which causes this, causes also unnatural disturbance of the current of the circulation. So it is also in many cases of mitral, or more especially tricuspid regurgitation, where the blood runs under pressure from the ventricle into the dilated and nearly fully distended auricle. So, again, these conditions are present in an aneurismal varix; the opening from the artery into the vein supplying the means whereby the current of the circulation is disturbed, and the fluid pressure is rendered unequal.

On such principles the occurrence of purring tremor under certain circumstances may be explained. But why is it not always found under these circumstances? Why, for instance, does it not occur always with sigmoid regurgitation, or, indeed, during the filling of the ventricles of the healthy heart? A very sufficient answer lies in the fact that, under ordinary circumstances, the blood is not in a condition to be thrown into such a state of vibration by those movements. But, apart from this, I think that these apparent exceptions illustrate a very important point in the explanation of the mode of production of purring tremor, on which it will be of interest briefly to dwell.

In both these instances one condition of the containing vessels is wanting. Regarding the purring tremor simply as a vibration, whether of the blood, or vessels, or both, obviously some degree of tension of the parts concerned is requisite for its

manifestation. Nothing moving in one direction only can be, in so far, in a state of vibration; and the force being, in the case supposed, exerted in one direction only, a certain degree of tension or elasticity of the parts is required to ensure alternate motion and vibration. This condition is wanting in the cases under examination; for such regurgitant or direct stream, as the case may be, flows not into a cavity whose walls are at this degree of tension, but into a loose yielding bag, as it were; and, under ordinary circumstances, as soon as the walls of this cavity have acquired that degree of tension, the currents are interrupted or reversed by the regular movements of the heart.

An instance occurs now and then clearly showing that the rule which has been proved for simple tubes does apply to the complex arrangements and action of the heart; and enough is generally found on dissection to explain why the purring tremor should have been perceptible at some one given point in particular cases: but it is commonly very difficult to ascertain why it should have been perceptible only at one, and why particularly at that one point. Perhaps the above considerations may tend in some measure to remove that difficulty. Probably, too, the direction in which sounds connected with lesion of particular parts have a tendency to be propagated, is an important element in the explanation of each individual case; for there is no reason to doubt that purring tremor, in this respect, obeys the same laws as valvular murmurs.

There is one case seemingly so very apposite, that it may at first sight appear strange that the whole of this question has not been discussed on that ground—namely, the case of aneurisms. The evidence, however, from this source is almost entirely negative; for a purring tremor is far from being a constant, or, indeed, a common, sign of the existence of an aneurism: and the so-called aneurismal thrill, said to be perceptible in the pulse, has its origin, to my experience, where not in the state of the heart of the patient, in the imagination of the observer.

The structural conditions requisite for the manifestation of purring tremor are, indeed, seldom present in aneurisms. For the common form of aneurism—the false one, nosologically speaking—is not an elastic bag, to be emptied by pressure, but a hard mass, with thick unyielding walls. Nothing could be better calculated to stop the transmission of any vibration than these walls, with their irregularly laminated structure and unequal consistency. And their firm unyielding nature would render the blood in their cavity very unlikely to originate any vibrations. For, having no power of emptying itself, the cavity must always be nearly full: so the amount of blood injected at each contraction of the heart would be very small, and commonly under scarcely any greater degree of pressure than the blood already in the aneurism. So that aneurisms have, on both these accounts, as originating or transmitting vibrations, but little to do with the matter under discussion, generally speaking.

Generally speaking: but when there is a cavity with thin elastic walls, traversed by a stream of blood, and capable of considerable changes of dimension, possessing, in fact, those properties which a common aneurism has not, then this tremor is manifested in the greatest perfection. Thus we find it in aneurismal varices,—thus in the true nosological aneurisms; and thus it may be produced in the large superficial vessels of almost any person, but especially of the anæmic, by artificially applied pressure.

II. Functional Murmurs.

In what has been said above of the physical diagnosis of valvular disease, each murmur has been referred, as far as might be, to its specific local organic cause. But there has been frequent occasion to remark on the necessity of distinguishing each organic from its corresponding functional murmur. Much, indeed, of what might have properly found its place here, has already so been anticipated; and, but that the importance of the subject of functional murmurs claims a separate consideration, nearly all that remains to be said here might have been with equal propriety inserted in the preceding remarks on organic murmurs, so closely are the two subjects interwoven in practice.

To the practical rules by which the distinction between functional and organic murmurs is to be made, there is nothing here to add to what has been already said; for, lay down what rules we may, the diagnosis is at times very difficult, whether the physical or the constitutional signs, or both, be consulted. It cannot be facilitated by multiplying rules of uncertain application, but rather by making those rules more practically intelligible.

No very long experience is wanted to show that there is scarcely any one of the ordinary endocardial murmurs from which we are in the habit of inferring the existence of valvular disease, which may not co-exist with a healthy condition of the valves. Even the diastolic murmur at the base is not free from this fallacy in connection with the neighbouring veins. Were our knowledge of heart diseases during life, then, limited to what auscultation tells us, it would be very uncertain.

But pathology, guided by a little observation, enables us to group the exceptional cases, where we are exposed to this fallacy, in one class, as the anæmic or functional. This position is supported by the direct results of numerous observations on the human subject,* showing that those whose blood is attenuated are particularly liable to have endocardial murmurs; just as it has been shown experimentally of fluids in tubes, that a murmur may be induced in a stream or suspended, simply by diluting the moving fluid or adding to its density, as the case requires.† We recognise, therefore, in the anæmic—to use this as a general expression—a condition of great susceptibility to the production of murmurs. They constitute a class in whom the ordinary movements of the circulation are sufficient to produce that, for whose manifestation, in most persons, a great disturbance of those ordinary movements is requisite. This, in fact, is precisely the same as has just been shown with regard to some of the subjects of purring tremor.

This principle of a predisposition to the production of a murmur must never be lost sight of in any inquiry into the nature of a murmur. It explains how many causes, insufficient thereto in a healthy person, may produce a murmur in a person so predisposed; and so far it detracts from the absolute value of the observation of the existence of a murmur at any particular point. It has been already shown that the point of greatest intensity of murmurs is very important to be ascertained, as determining the seat of the cause in which they originate. The limitation of a murmur, however, to a particular part does not show that it has its origin in an organic lesion of that part; for, in a person so predisposed, the natural conformation of the vessels at this point, without the existence of any abnormal obstruction, may so disturb the circulating fluid as to give rise to a murmur audible there, and there only. Instances of this are familiar, though the exact explanation of each in particular is not always obvious.

For instance, a venous murmur may be heard loud in one jugular,‡ and not at all in the other, or of different tones or intensities on the two sides; or it may be heard in the innominatæ, and nowhere else, or in the ascending cava, and nowhere else. Or a blowing murmur in the jugulars may become a cooing or a humming sound in the innominatæ veins; or a murmur in the pulmonary artery may be transmitted as a blowing sound through one lung, and as a musical note through the other.

In many such cases the circumstances at once render it clear that the local murmur is independent of any deviation from the natural conformation of the parts concerned. We may have such assurance from the murmur being referable to parts which we know to be almost invariably free from disease; and from other circumstances. But in some cases we must be content to remain in doubt while we watch for something to clear up the difficulty; for the existence of a general anæmic condition obviously does not negative the possibility of the existence of a local organic cause: it only increases the effect. Now suppose, in such a case, uncertain to the last, on dissection we ascertain the existence of organic disease, obstructing or disturbing the current of blood about the point where the murmur was most audible, we are content to look upon the organic disease as the physical cause of the murmur. Or suppose, on the other hand, that we find the same part—say the aortic valves—healthy, we are content to believe that the murmur—say a systolic murmur—was functional. Is it in the contentedness of ignorance that we accept these two opposite results as equally satisfying the conditions of the problem which we failed to solve during life? Certainly not: that a murmur was audible, is one fact; that there is or is not organic disease, is another. The question is not, are these seemingly contradictory results possible? for they plainly are so; but on what theory are the admitted facts explicable and consistent? The explanation need not occupy us long.

When we speak of a murmur as referable to an organic lesion, we must recollect that the same effect may be produced under three conditions of the organs of the circulation—namely, obstruction may be offered, or regurgitation may be allowed, or there may be a seemingly healthy condition of the parts in question. And the explanation which applies only to one case,—obstruction,—although the most common, is insufficient, and contradictory to the explanation of the rest. We owe Dr. Corrigan much for carrying our ideas beyond what is expressed by the term obstruction, to the effects which that obstruction may cause.

As to organic murmurs: of the applicability of Dr. Corrigan's theory to practice in many cases there can be no doubt; and,

* Andral, Hematologie, p. 53; Bouillaud, Clin. cit. tome i. p. 256.

† Archives Générales de Méd., Août 1838.

‡ Laennec (Aus. Méd. tome iii. p. 50) says that he has heard a murmur loudest most commonly on the right side of the neck. Bouillaud (Des Mal. du Cœur, tome i. p. 239) has heard it more often on the left. My own observations make me think that it is heard loudest, *ceteris paribus*, on the side farthest from the observer,—possibly from the fact of the integuments being generally made more tense on that side during auscultation.

strictly speaking, it must be applicable to nearly all cases of organic valvular disease; for, ifecessarily, when a fluid is moving under intermittent pressure in a certain direction, at the moment of the application of the moving power the pressure is less on the further than on the nearer side of any obstruction to the stream. But my own experience would not enable me to say that the degree of intensity of the murmur bears any very close relation to the amount of the mechanical effects of the organic lesion in this respect. I should feel, therefore, as a general rule, more disposed to refer the murmurs arising from organic disease simply to disturbance of the circulation than to admit (though not rejecting) Dr. Corrigan's more exact explanation.

So, too, with regard to functional murmurs. Abstractedly, Dr. Corrigan's theory holds good; for as the blood advances in the arteries, it naturally, yielding in the direction of least pressure, at each moment is less closely embraced by the blood-vessels. Here, then, is a cause sufficient, in a person so predisposed, to produce a murmur: but here, too, though the abstract correctness of the principle is unquestionable, I would rest content with the less definite expression of disturbance of the circulating fluid; for the effects are not manifested with any very close relation to the time and place where the presumed cause should have most influence.

Traced, then, into their elementary processes, functional and organic murmurs may each be explained clearly and consistently. The effect—namely, the murmur—is the same in both, and the proximate cause is the same.

With the more remote causes auscultation, as such, has nothing to do; for auscultation tells us only the ultimate acoustic effects: it has nothing to say of obstruction, or of the condition of the blood, or of the state of the valves. Between a functional and an organic murmur there is to auscultation, abstractedly speaking, no essential difference. They both equally indicate disturbance of the circulation.

But they indicate no more. All further information is to be obtained from pathology. It is pathology which, by laying the information from other sources to that which auscultation gives, tells us that in one case the blood is in a condition very susceptible of the influence of any ordinary disturbing cause, and that in the other there is some extraordinary disturbing cause in action. And now we know that the murmur in one case indicates disease of the blood; in another, diseased action or structure of the blood-vessels.

Yet one word more, which I should take shame to myself for saying, did I not feel that what we all now know so many of you have laboured hard to establish, and what we smile at now, you had once difficulty to controvert.

We err more often as pathologists than as auscultators. To detect the time and place of a murmur, and to measure the force of the heart's action, is not so very difficult; but it is often very hard to interpret correctly what all these signs mean. It is not very hard to see which way the compass points, but it requires a philosopher to explain its variations. Yet the compass is not an idle toy, nor auscultation a vain refinement, because their indications are not infallible.

When Andral published his classical survey of the condition of practical medicine at the time, our knowledge of diseases of the heart was, as we have seen, very different from what it is now. I have pointed, in the preceding pages, to several of the advancements which have been made in this department of practical medicine. But I cannot forbear adverting to some other particulars in which the subject of diseases of the heart now stands in quite a different place from that which it held when Andral wrote. There were then few auscultators, and many opponents;* but this has been all reversed. And if the weaker vessels then sheltered themselves under the name and example of those whose position gave weight to their rejection of the new-fangled doctrines, and to their incredulity, this, too, has been reversed.

It is not that the intimations of the ear are of more universal application in medicine than those of the other senses, but that they only just now take the place with the other senses which they should have held long ago; and their admitted importance results from the extent to which they are found to be applicable.

It is not that the intimations of the ear are more trustworthy or infallible: indeed, they are often very fallible and ambiguous. But those who use it most should know its use the best,—what it cannot explain, as well as what it can. And with regard to the profession of disbelief in auscultation,—thanks to those who have so clearly laid down its principles for us,—I think most would now be content to meet it in the same words which have been so well applied to the rejection of evidence on another subject: "There is cause to think that scepticism itself is often no more than a form of very unreasonable enthusiasm, demanding conviction without the pains of inquiry."†

* Hope on Diseases of the Heart, Dedication, 3d edit.

† Davison on Prophecy, p. 100, 4th edit.

LECTURE II.

III. Morbid Anatomy of Valvular Disease of the Heart.

Physicians and morbid anatomists not conversant with the same classes of cases. Morbid changes are of two forms: causes of each form: general characters how far distinctive of each: microscopic distinctions negative; pathological more important.

First form.—Effects of simple or rheumatic inflammation.—Are they really inflammatory? — Warty growths, their seat, early history, minute anatomy.—Ulterior changes, to reparation, to disorganization. —Allied changes.—Primary and secondary effects on the valves compared.

Second form.— Specific inflammatory or other affections; typified in the filamentous and globular growths; early history. — Filaments; successive changes; minute anatomy; compared with growths of the first form; size; softening, earthy degeneration.—Globular vegetations; history; compared with the filaments.—Allied changes.—Seat of the changes in the two forms contrasted.

In the preceding lecture we reviewed the chief causes of valvular disease, and the physical signs from which we conclude that those causes have taken effect. We turn next to the consideration of the nature of the lesions giving rise to those physical signs; that is to say, to the morbid anatomy of valvular disease.

It now becomes necessary to bear in mind that the classes of cases of valvular disease with which we have to deal as physicians and morbid anatomists respectively, are not the same. Even supposing the number of cases which we met with in these two separate capacities were the same, (making the proper allowances), still the two classes could in nowise be considered as identical.

As physicians, we have to do with cases of acute inflammation where the first foundation of those structural lesions is being laid; and with cases where structural lesions, arising from whatever cause, and dating from whatever period, are producing present disturbance of the circulation. We miss, as physicians, the end of those cases which get entirely well after acute inflammation, and the beginning of those cases where structural lesions have arisen from chronic insidious processes.

As morbid anatomists, of course, we meet with structural changes of all kinds and all degrees, and as such we meet with the beginnings of chronic processes, of which, as physicians, we only know the ends. But, as such, on the other hand, we see nothing, or rather know nothing when we do see them, of those cases where perfect reparation has taken place; cases of which we have seen the beginning as physicians, of which (may we say?) we have, as such, effected the cure.

It is needless, on the present occasion, to enumerate all the characters of a healthy valve. They must be often seen to be apprehended. The standard of health for each particular subject must be ascertained, as nearly as may be, by a comparison of the left valves with those on the right side, which so rarely suffer from the same kind of disease. It will be sufficient merely to indicate the points to be kept in view.

The opaque nodules so commonly found in the auriculo-ventricular, especially in the tricuspid valves, must be practically known to be distinguished from the morbid growths, which they in some sort resemble, found especially in the mitral valve. Speaking generally, the thinness, elasticity, and transparency, with the fan-like expansion of their chordæ tendineæ, just stopping short of their delicate edges, are the characters most important to notice in the auriculo-ventricular valves. In the sigmoid valves, the double crescentic line commencing from the corpus Arantii of each, and marking their edges of contact,—their thin free edges,—their exact symmetry, and the accuracy with which they can fall back against the sides of the artery during the onward passage of the blood, should be familiarly known. For it is in these particulars that disease is apt to induce the most important structural changes.

Abstractly speaking, the principal changes are not many. The valve may be simply thickened and more or less rigid, or its substance may be increased by external accretion, or removed by erosion. And with these changes of form and texture more or less important changes in composition may be allied.

A more particular survey of the various morbid changes, waiving the minor differences which the variety of situation and extent of these changes and their mutual

connections give rise to, enables us to group them into two classes. There seem to be sufficient grounds for subdividing diseases of the valves of the heart into two distinct forms, each characterized by external differences of figure of the morbid products, each owning different causes, allied to different changes of other parts, and passing through different phases from their first beginning to the fatal termination*.

The external figure of the secretions which characterise one of these forms is that of small warty granules studding the edges of contact of the valves. To the other belong those long leathery tails or filaments, and the round pedicled masses, known as Laennec's globular vegetations, which sometimes hang from the edges of the valves†. The one we recognise most commonly as the effect of acute rheumatism, judging from the circumstances under which it occurs; the other seems more closely connected with congenital malformation or predisposition, or with renal disease. We may group with the one the membranous flakes which sometimes overlie the interior of the left ventricle where it runs up into the aorta, and most of the changes of figure of the orifices of the heart or of the valves independent of present accretion or erosion. The other claims to itself those patches of papillary growths which sometimes stud the interior of the left auricle; and here nearly all the changes of form by ulceration‡ or erosion belong. In one the cause acts but for a while, and the subsequent changes which the organic results of the temporary action of this cause undergo are due to contraction, or consolidation, or obsolescence of the morbid products. But, in the other, the cause which has induced the growths acts permanently, and the growth increases at one part while it decays at another; softening and earthy degeneration may be found at the root, or in the centre of the yet growing mass. Such, in general terms, are the distinctions which it is proposed to display more in detail in the following remarks*.

We have already inquired into some of those conditions whose relation to disease of the valves of the heart, speaking generally, appeared to be that of cause to effect. It remains here briefly to show how far we may ascribe to any of these conditions a specific power of determining the existence of one or other of the two forms of valvular disease. Rheumatism, renal disease, and congenital malformation, seem more particularly to have such specific influence, and to require a separate consideration in this point of view.

1. *Rheumatism.*—Of the ordinary form of acute endocarditis, scarcely any other cause than articular rheumatism is familiarly known. Indeed, seeing with how slight an attack of articular rheumatism endocarditis may coexist, and how often the articular affection may be discovered by patient watching, in cases where we had believed it to be absent, one feels more inclined to doubt one's own accuracy than to record a case as an instance of non-rheumatic endocarditis. Though there is no question that such cases are occasionally observed, especially, (though I have no experience on this point) after the exanthemata, and of these after scarlatina. And what is true of the results of recent endocarditis applies more or less strictly to older morbid products, as they are more or less certainly referable to such a cause. Rheumatism would appear to be a most active cause of the first form of valvular disease.

* Dr. Williams has classed valvular lesions under three general heads, referring them:—1, to the thickening with or without induration; 2, to thickening with softening and ulceration; 3, to atrophy. The valvular lesions which have come under my own notice have appeared more readily to fall into two classes. But in venturing to differ with Dr. Williams as to the claims of his third class to a distinct consideration, I must acknowledge the correctness with which he has, in so few words, delineated the chief characters of the form of disease which he has described there, as here, in the second class. (Path. and Diag. of Dis. of the Chest, 4th edit. p. 250.)

Dr. Kingston has considered atrophy of the valves at some length. (Med.-Chir. Trans. Vol. xx. p. 90.) The importance of the principle inculcated I would not question. But I have not yet met with a case where the consequences of simple atrophy have been a cause of valvular imperfection, the only cases falling strictly under that denomination having been to my experience sigmoid valves with reticular edgings (if, indeed, they be not congenital) the apertures being beyond the edges of contact, and therefore unimportant, and valves whose diminishing proportions have apparently kept pace with the general atrophy of the heart. Cohesion of the chordæ tendineæ, or of the valves, or perforation with traces of some organic process, should rather be referred to such previous processes than to atrophy. And they have accordingly been distributed under these several heads in the ensuing pages.

† Their more common situation is at the tips of the auricles or ventricles, where only were they known to Laennec. (Aus. Méd. iii. p. 345.)

‡ The ulcerous patches of which the upper surface of the mitral valve is the common seat, admit of no very certain explanation. Considering them as evidences of something which has been (for my experience of them extends no farther) and has ceased to exist, leaving only irregular serpiginous markings on the valves, the investigation of a small number of cases would scarcely justify any inferences as to their essential nature.

* With regard to specific, and particularly malignant diseases of the valves of the heart, more facts are requisite before any attempt can be usefully made to arrange what is already known on the subject. The subject of tubercle has already been noticed in its negative bearings. (Walshe on Cancer, ad locum Med.-Chir. Trans. vol. xxx. pp. 1 and 39.)

In the other form it holds a lower place. Out of seventeen extreme cases, selected as the most unequivocal examples of this form of lesion, rheumatism appears as a cause in no more than seven. And this is the more striking, when, taking the converse view of the remark just made, we recollect how easily any previous attack of pain may be interpreted as rheumatism.

2. Of *renal disease* there is little here to observe more than has already been said in the previous lecture. Only it may be added to those remarks, in their present application, that renal disease existed in ten of the seventeen cases selected as the most characteristic examples of the second form of valvular disease.

3. *Congenital malformation*, as displayed most unequivocally in the development of only two sigmoid* valves, aortic, or pulmonary, or both, as the case might be, has been observed in the dissection of twelve patients, affecting fourteen out of their twenty-four sets of sigmoid valves. Six of these patients and six sets of valves were affected with what has been above designated as the second form of valvular disease, in an extreme degree, presenting long leathery growths hanging down into the vessels from the edges of the valves. Five other of these patients had valvular disease, not indeed of a nature so decided, or in so marked a degree as the six just quoted, or as to be considered with them as types of the affection, yet quite of a different nature to the results of ordinary rheumatic endocarditis†. Only one patient out of twelve, and three sets of valves out of fourteen, thus ill-developed, namely, one aortic and two pulmonary (this in the two double cases) had escaped disease.‡ We may contrast with this the curious fact that sets of four sigmoid valves, where there is no imperfect but rather redundant development, are generally found healthy. In my small experience (for this is a much less common appearance) they have been invariably so*.

Within certain limits, the distinctions between the effects of these several causes may be clearly traced. But these limits are not very wide. Disease of the valves of the heart, indeed, would be very unlike disease of any other part, if the different forms did not insensibly shade into each other; if simple inflammation, for instance, did not sometimes arise from the irritation of specific disease, or if this last did not sometimes extend itself in consequence of, and mingle with the products of, simple inflammation. So that the line cannot always be drawn where we may say this results from the one, and here end the products of the other form of disease. And there are two cases in particular where the products of the two forms are inextricably involved.

1. Extreme cases of simple rheumatic endocarditis may, there is no reason to doubt, shade into the second form. The warty granules may, when of rapid growth, acquire the form and properties of the long leathery accretions.†

2. Simple induration and thickening of contiguous parts may ensue upon the existence of either form; and the results of chronic inflammation and of the original disease, of whatever kind, may be so intermingled as to exceed all the powers of discrimination of the anatomist to disentangle them. It could not well be otherwise.

So far, however, as the delineation of the characters of the two forms is concerned, this need cause no difficulty. The deficiencies and indefinite results of one observation may be readily made good from others; and the succession of the several lesions, as traced in a large number of dissections, is complete and continuous. So that there is no reason to doubt that the two forms of disease which are denoted respectively by simple thickening of the edges of contact of the valves, and by minute filaments growing from their surface, are as distinct in these their lesser manifestations as in their more highly characteristic development, namely, in the warty granules and the long leathery growths which they each display at another period of their existence. But this by the way, only observing, as will appear further on, that the morbid appearances here placed in contrast do not indicate exactly the same period in the

* Dr. R. Quain (Edin. Monthly Journ. Dec. 1846) has published some cases where the sigmoid valves had been apparently reduced to the number of two by the rupture of one of their attachments. I do not think, however, that this explanation applies to any of the cases referred to above.

† Since writing the above another case has come under my notice, at too late a period, however, to allow me to add it to the tabular analysis. The three aortic valves were affected with recent endocarditis, the two pulmonary with old thickening and earthy degeneration. The man had renal disease. The muscles of his neck were infested with *trichina spiralis*.

‡ I owe my first knowledge of this fact (the liability of valves thus constituted to disease) as of many others, to Mr. Paget, who has remarked upon it in the Med.-Chir. Trans. vol. xxvii. p. 187. Dr. Barclay says, "I am not aware that, during the two years from which the cases are selected, any instances of this abnormal conformation (the existence of only two aortic valves) occurred unconnected with endocardial disease." (Med.-Chir. Trans. vol. xxxi. p. 209.)

* Dr. T. Thompson mentions the occurrence of four healthy pulmonary valves in a case of congenital malformation of the heart. He refers to other cases where the valves were found to differ in size, but are not said to have been diseased. (Med.-Chir. Trans. vol. xxv. pp. 249–251.)

† See Rokitansky, Path. Anat., Bd. ii. S. 478.

existence of each of the two forms respectively.

The general tendency of microscopic observations of the intimate structure of the growths by which the different forms of valvular disease are characterized, is rather to reduce them all to one type than to establish any essential differences. For many of the anatomical distinctions which appear so plain to the naked eye fade away under the more rigid, yet more partial scrutiny of the microscope.

Microscopic examination has not appeared to me to justify any exact essential distinction of the two forms, even in their most extreme and most characteristic development. The differences it indicates are but differences in degree. The structure of the morbid products in both forms alike is that of an imperfectly fibrous, more or less distinctly laminated mass. Through this mass are scattered numerous small granular bodies and granules, with a variable quantity of oil globules; the whole being cleared, but not entirely removed from sight, by acetic acid. I do not think that anything could be predicated more particularly of the intimate nature of the growths characterizing either of these forms; and I believe that this description is equally applicable to them both.

At first sight it might appear that this negative evidence of the microscope on so important a point is sufficient to set aside all other distinctions. Not so. For the microscope also tells us generally that the fibrinous traces of old inflammation, after a certain period, cease to present any characters distinctive of the known circumstances under which the inflammation took place. We have no particular reason, therefore, to expect to find any such distinctive characters in the particular case under consideration. The distinction, however, between the two forms rests on a safer foundation, in their observed pathological tendencies, than in these ambiguous differences of their microscopic structure.

Pathologically these two forms of valvular disease are distinguished, as already noticed, by the characters which the principle predominating in their development has impressed upon them. In the one form there is an original tendency to grow rapidly,* and still, while growing, to degenerate and decay. In the other there is a definite period of growth, on the determination of which the morbid products contract and consolidate themselves. In the one the morbid product inclines to be (for it is only a question of degree) soft, brittle, and granular; in the other it is rather firm, elastic, and of a fibrous structure. Such is the most general expression of the results of ordinary observation in this matter.

In speaking of an original disposition, and ascribing to morbid products living powers in so large a measure independent of the surrounding parts, I am presuming your acceptance of the doctrines which these terms involve. I need scarcely occupy your time with any detailed expositions of these doctrines. They have been made familiar to you by Mr. Paget.* And in their application to the matter under consideration I gladly acknowledge the extent of our obligations to Dr. C. J. B. Williams† for his labours in this department of general, as before in that of cardiac pathology. With these in your hands details from me would be superfluous.‡

It is necessary here only briefly to recapitulate, before applying them, the two general principles relating to the present subject, on which our attention must be fixed. These are:—First, that there are from the first essential differences in the products of the same disease according to the constitution of the patient. And, secondly, that such constitutional peculiarities imprint on the morbid products certain tendencies, which take effect after the morbid products have entered upon a condition of comparatively independent existence.

Valvular Lesions resulting from Simple or Rheumatic Inflammation.

The process which gives rise to the ordinary form of valvular disease has received the name of endocarditis. It is known better in connection with acute rheumatism, than as of apparently spontaneous origin. Yet, as the identity of the disease under both circumstances has been established, in the following remarks, as already by anticipation, the valvular lesions with which we are familiar as the effects of acute rheumatism will be considered as resulting from simple or rheumatic inflammation indifferently.

It has been urged that the changes which acute rheumatism induces in the valves are not due to inflammation at all, but merely

* See on this point "Dalrymple on the Rapid Organization of Lymph in Cachexia," Med.-Chir. Trans., vol. xxiii. p. 205. Dr. Bennett, "On Cancerous and Cancroid Growths," p. 164, says "[fibrin] is more connected with the decaying than with the formative stage of life."

* Lectures, Med. Gaz., 1847-49-50. Also "Simon's Lectures on General Pathology," Lect. VI., Lancet; and Dr. A. Clarke, Med. Gaz., xlii., p. 416.

† "Principles of Medicine," 2d edit. chaps. 3 and 4.

‡ See also a very practical exposition of the surgical application of these principles, "Humphry's Lectures," Prov. Med. and Surg. Journ. Lecture V.

to deposition of fibrin from the blood. Now, this is not a matter to be definitely settled in the present state of our knowledge; for there is no certain anatomical character by which we may distinguish the effects of inflammation from those of deposition in these morbid products. Neither do I think that on this point the results of different modes of treatment can be trusted as diagnostic of the elementary constitution of the organic mass. Each one must form his own conclusion from the different weight he attaches to certain general principles, from which alone have we any means of judging of the question at issue.

It may safely be admitted that, after a certain period, namely, when the morbid product has acquired a certain size, deposition does take place, and that the total results are most probably, in any case, of mixed origin. For experiments shew the tendency of any substance projecting into the arterial current to become the nucleus of fibrinous accretion.

But, obviously, such contingent deposition has nothing to do with the first beginning of the valvular lesion. With regard to this, the real question at issue, we must not overlook the pathological condition of other parts with which this change of the valves often coincides, namely, inflammation in its most aggravated form in the pleuræ, lungs, or pericardium. And the fact, to which we shall return hereafter, that the subsequent valvular changes are essentially not superficial, nor limited to the point of the original lesion, makes very much against any theory which would explain these changes as the result of simple deposition in the first instance.

The absence of *vasa vasorum* from the lining membrane of an artery is the strongest reason that has been urged why these growths cannot possibly result from inflammation in the ordinary sense of the term. But this objection is more specious than real. For inflammation may be carried on by the same organic means as nutrition. And if, in any part, nutrition by unusual means effect an ordinary end, surely inflammation in the same part may do so likewise.

This is a point on which the most trustworthy information might be expected from accurate observations of the other changes of the valves which coincide with or precede the earliest appearance of these equivocal growths. But from the fact that all the attempts to settle this much disputed question habitually refer rather to abstract principles and general inferences than to direct observation, we may conclude that opportunities of noticing the very earliest changes resulting from so called endocarditis are exceedingly rare in this country. For my own part I have almost entirely to rely on the observation of others* for the accuracy of the statement that redness, with subsequent swelling, and apparently softening and loosening of the tissues of the valves, precede the appearance of the warty excrescences at their edges; for the disease had advanced to this last stage in all the unequivocal cases which have been the subjects of my own observation.

Staining and softening must be received in any case with great caution as evidences of the presence of inflammation of the lining of the heart and its valves. But, while on our guard lest we should misinterpret the results of decomposition in particular cases, we must not allow excess of caution to carry us into an opposite error. We must not at once dismiss these appearances as useless, though we cease to regard them as infallible guides. We must allow appearances which elsewhere would be considered as characteristic of inflammation,† to bear that signification here also,—at least in the absence of facts justifying any other interpretation; or there would be an end to the question, which, though myself inclined to believe that the growths, under these circumstances, are the effects of inflammation, I hold to need further examination.

The first of the changes more familiarly known as the result of endocarditis is recognised as the accretion of little warty granules running like a row of beads along the edges of contact of the valves, most commonly the mitral and aortic. Their appearance is very striking, for the edges (which it is important to distinguish from the edges which come in contact, on closure, with the other flaps of the valves) retain, at this early period, their normal configuration, and the disease is limited to this little bank, which seems piled up, as it were, on a healthy valve. The beading is often uniform and continuous, running, at the distance of about a line from the edge of the valve, round a considerable part of the orifice affected; or, if the beading be not continuous and uniform, generally all the angular projections are tipped, or the re-entering angles filled with a little wart of this nature.

Why the edges of contact rather than the free edges,‡ and why especially the angular projections should be thus affected, is readily explained by the greater degree

* Rokitansky, Path Anat. Bd. ii. S. 428. Dr. Kirkes has recently supplied me with the notes of a case where in connection with rheumatism the valves were distinctly swollen and vascular. In this case there were no fibrinous growths.

† See Gendrin. Hist. des Infl. § 951, and § 1447.

‡ Watson's Lectures, Vol. ii. p. 67, 1st edit.

of attrition, tension, and pressure, to which these parts are exposed during the action of the valves. For whatever be the cause of the formation of these granules, whether they arise by deposition from the blood or exudation from the inflamed valves, it is easy to see how such a process might be determined at this particular part by any cause calculated, like the above, to lacerate, or roughen, or even press the endocardium there.

These double crescentic lines on the sigmoid valves, and the irregular beading with its angular projections along the auriculo-ventricular edges of contact, furnish commonly the earliest and certainly the most unequivocal evidence of the presence of what is generally known and is considered in the following remarks as endocarditis.

There is nothing else with which they can be confused. At the same time, however, their size must not be taken as an exact measure of the intensity of the local inflammatory action; for deposition from the blood is a process which may and very often does take place; and as any roughness on the surface of a valve would be likely to attract fibrin from the passing blood, even in a healthy individual, such an event might yet more readily ensue in a case where the blood has already a strong tendency to deposit fibrin. Such is the case in acute rheumatism, as appears not only from the analysis of the blood, but from the large inflammatory exudation into the pericardium or pleura which occurs coincidently in some such cases. Here, as in so many other cases, where two causes act conjointly, the energy of the one may in greater or less part supersede the operation of the other in the production of their joint effects. The exact amount of the results of each process we have no means of estimating.

However produced, there can be no doubt that these granules are, from the first, a serious lesion. The singular tendency which they display to grow most freely on all the angles of the valves, explains how, from their earliest formation, they obstruct the onward flow of blood through the aortic aperture, and allow of regurgitation through the mitral valve, which they wedge open. The amount of blood hindered, and the amount regurgitated at each beat of the heart, may not, it is true, be much, but a very small fractional part, when multiplied by more than seconds, and minutes, and hours, amounts to a good deal in a few years: and when, after the vicissitudes of a laborious life, the patients who have left the hospital after an attack of acute rheumatism, with an endocardial murmur, apparently depending on the existence of granules of this nature, come again under observation, the serious importance of the lesion, which was then only indicated by a faint abnormal sound, is now too obvious in the state of the heart and the symptoms generally. All thought of effecting a cure is now at an end; the utmost that we can hope to effect by treatment is to ward off present death or palliate suffering by dividing the burden among the different organs. Many of these patients sink at once, others after two or three more of such melancholy visits; and it is with no little interest that we look to dissection to show what has been going on intermediately.

The first fact which presents itself is a negative one: the warty growths which characterise endocarditis are, after an uncertain period, no longer to be seen.* What the exact term of their existence may be it would be hard to say, and, indeed, dissection favours the belief that they last very different periods in different subjects; but the fact is certain, that, with few exceptions, this peculiar morbid appearance is not met with in patients dying years, or even months, after the particular attack of acute rheumatism to which the cardiac symptoms appear referable. A fresh attack of rheumatism may have induced the growth of a fresh crop of these granules: but this only proves the rule; for this second crop is found planted on the solid basis which the changes in the first crop have prepared for its reception.

The comparatively rare and exceptional cases, where the granules remain as such, need not detain us long. Under these circumstances the granules shrink up and become hard, obtaining, like all other masses of indurated contracted fibrin, the name, however incorrectly applied, of cartilaginous.†

More commonly, as already stated, this granular appearance is superseded by other changes. Of these, the first seem to have no regard to the ultimate end of the process: that is to say, whether the whole process shall end in perfect functional and organic reparation of the valvular lesion, or whether it have the contrary tendency, the first stage in either case is alike,—the granules are effaced. In the place where there is reason to suppose that the beaded line ran along the edges of contact of the valves, we now find a round bank of fibrin. This little bank assimilates itself to the disposition of the original beading by its

* See Rokitansky, Path. Anat., Bd. ii. S. 436; and Watson's Lectures, ii. p. 286.

† Bouillaud, Rhumatisme Articulaire, p. 181, mentions one such case. I have seen also very rarely these granules having undergone earthy degeneration without quite losing their original form.

greater distinctness at all the angular projections of the valves.

This morbid appearance may be taken as displaying the completion of the second series of changes in this form of valvular disease, as the formation of the granules constituted the first. We are not led to speculate abstractly on the connection of these two stages, for dissection supplies numerous cases to illustrate the gradual transition from the detached warty granules to the smooth continuous wall of fibrin. The original fringe of little beads, closely set, touching each other at the sides, gradually assumes the form of a continuous wall or crest, the serratures in which correspond to the divisions of the original granules; and this as gradually takes the form of the round bank above described, the serratures becoming obliterated, and the surface polished, though still remaining uneven.

The recent soft growths may easily be stripped off from the heart, leaving the part of the endocardium on which they have rested perfectly sound. And in the same way these granules may be easily separated from their connections with the subjacent tissues, in cases where they have been implanted on the edges of valves thickened by old disease. Zehetmayer, who has paid some attention to this matter, says that the epithelium is not continued beneath even the recent granules*. I have not been able to satisfy myself of the fact.

But when the granules have existed for a longer time, they become agglutinated more firmly to the valve, as well as to each other. In one case, as the laminated structure of the fibrinous crest might have led one to anticipate, a layer could be torn off, consisting of the crest and the endocardium together, leaving the valve, where the experiment had best succeeded, to all appearance perfect, only wanting the endocardium; but the growths were not separable from the valve without at least this amount of injury to its structure. In another case, speaking rather of single, the most satisfactory experiments, than generally by way of deduction from them all, the growths and endocardium and all the tissues of the valves were firmly matted together. The endocardium, when raised in strips from the neighbouring healthy surface, tore away with it a little of the covering of the thickened edge or crest; and, in the same way, on raising a strip from the superficial part of the crest, the tear ran into the endocardium of the neighbouring surface. But the separation could not be carried far; the result of any attempt to separate the whole mass was the destruction of the edge of the valve. The diseased mass, here, as in the former case, was of a fibrous texture.

* Herz-krankheiten, S. 327.

In one case, the left ventricle, where it leads up into the aorta, was overlaid with a fibrinous patch slightly corrugated in parts. This was composed of long parallel wavy fibres wanting the distinct outline of the fibres of the endocardium, looking indeed quite woolly, apart from all other differences, as compared with these. On raising this, the endocardium was found beneath it smooth and polished, only a little thickened. The separation of this flake from the endocardium was made with increasing difficulty on approaching the sigmoid valves, and from the surface of these, which it overlaid, it was found quite inseparable, the substance of the valve tearing down, and the subjacent layers coming away with the firmly adherent adventitious membrane.

The results of these and other examinations of the minute anatomy of these growths in their several stages, greatly favour the opinion that they have their origin in inflammatory exudation. It is easy to see how, under any circumstances, whether deposited or exuded, the new product might become firmly agglutinated to the endocardium. But without some antecedent process affecting the deeper seated tissues of the valve, such as inflammation, it is not so easy to see why the whole substance of the valve should be implicated, and valve and growth be matted together into one mass; as is commonly found to be the case, when the external form has undergone those changes which mark the completion of the second period.

Thus far the processes have appeared to be identical, whatever the end in view might be, whether perfect repair of the lesion or disorganization of the heart. It will be most convenient to take this stage, characterised by the coalition of the granules, as the point of divergence from which repair or disorganization ensues. Perhaps a more natural distinction might be drawn from an earlier period, according as absorption or other processes predominate in the secondary changes. But, at least, this arbitrary period seems to be that when one or other of these processes begins legibly to stamp its own characters on the valvular lesion*.

* It is not intended to assert that from a certain period the changes in any one case are all for repair, or altogether tend to disorganization. Obviously, if analogy has any weight, the disorganizing changes might ensue at any period short of repair in any one case, and reparation might commence in the eleventh hour in any other. It may seem almost superfluous to advert to this, or to take any precaution against such an inference being deduced from the statements in the text.

I. Tracing, first, the process of repair:—The form of the fibrinous ridge changes; on section it appears square and angular rather than round. Next, all traces of the original mode of formation are lost; the fibrinous ridge has become smooth like the rest of the endocardium, with which it is inseparably united. It is now, to all appearance, an integral part of the valve, and, in its altered form, possibly itself the seat of new granulations arising from a recurrence of the disease in which itself originated.

The period occupied by these changes is apparently of different duration in different cases. Such a near approach to complete reparation was found in the mitral valve of a woman dying of syncope three months after the beginning of an attack of acute rheumatism, with endo- and pericarditis which had never been completely subdued. In her, as in another dying of syncope in a third attack, twenty and thirty years respectively after the two former attacks of rheumatism, the polished ridge had become the seat of new granulations. Another patient dying of bronchitis seven and ten years after two attacks of rheumatism presented the same ridges without any recent deposit. But reparation was quite as far advanced in a case dying ten months after the attack of rheumatism, as in those where life had been protracted to a longer period. Perhaps the original lesion had not been equally severe in all these cases.

I feel too sincere a desire to reach the truth in this matter to attempt to strengthen the above by extracting from an analytical table of valvular lesions, cases which might possibly conceal an error, and would only remark further, that this square edging in all its gradations is a very common appearance. And though, by the nature of the case, it is only discovered at a time when many of the opportunities for inquiring into its history are lost, the facts of such cases, as they stand, in no degree contravene, to rate their evidence at the lowest, the inferences which seem fairly to arise from the few cases where the particulars could be accurately ascertained.

There is no reason to suppose that organic reparation, having gone thus far, does not advance beyond this point. But I have not a case at command, to prove that reparation can be complete. All that I have attained to stops here. Indeed, it is hard to see what positive proof could be given of the occurrence of complete organic reparation in any one case: for with the removal of the disease the proof of its previous existence for all purposes of argument is gone.

In some such cases I have assured myself that the functional reparation was complete, though the organic disease had not been entirely removed. But here, too, a link is wanting in the chain of evidence; for I have not yet met with such a case where I have had satisfactory proof that there ever had been functional imperfection. However, this is not an abstract difficulty, as in the case last supposed, viz. the determination of the pre-existence of organic disease, but one which only requires more extended observation for its removal.

Summarily, and subject to all the fallacies already enumerated, the first organic results of acute endocarditis are not permanent, but are replaced after an uncertain period by other morbid appearances denoting the progress of more serious lesions, or of reparation, as the case may be. Perfect functional integrity (presumably functional reparation) is compatible with that degree of organic reparation of whose existence we have good evidence. And the occurrence of perfect organic reparation also is most highly probable. This, however, is a point not to be settled directly by single observation, but by way of inference from accumulated facts, where, therefore, the basis of observation should at least exceed the limits of error, which at present it does not.

II. In tracing the further changes in the process of disorganization of the valves, we are continually reminded of the remark already made that the distinction between simply inflammatory and other changes of the valves cannot always be accurately observed. The distinction is often quite lost in these extreme results of disease. Absorption has apparently the chief share in bringing about reparation of the valves, but henceforth, in tracing the progress of advancing disease, we have to deal with other processes. It is from thickening, contraction, and adhesion, separately or combined, that the most serious valvular lesions in this form arise. And this either directly, or more remotely, in consequence of earthy degeneration or softening; or more remotely still in consequence of changes basing on these last, such as laceration of the valves, or further obstruction by means of adventitious growths.

Thickening, in its most harmless form, occurs in the substance of the valves, far away from their edges, and, but that experience shows that the most delicate valves are strong enough for all the purposes of life, might be considered here as a salutary process. But when accompanied by rigidity, and affecting the edge of the valve, it is, on more than one account, a serious lesion, for it hinders the valves from closing: and judging from the rough edges which such thickened valves commonly present,

it would seem that their surface is liable to be injured by the irregular pressure and tension which their office subjects them to, but which their unyielding nature resents. And as if a certain local irritation was thus constantly kept up, it rarely happens that thickening goes on to any great degree without inducing general contraction.

The effect of simple *contraction** is best seen in the shortening of the chordæ tendineæ of the mitral valve. The mere fact of these cords being shortened might easily escape notice, but for the thickening which would seem to precede, and determine the occurrence of, this action. But none can doubt its importance, as measured, not by lines after death, but by the stethoscope and the observation of the general symptoms during life. In its extreme and most obvious degree, however, and as affecting the valves, this process cannot well be considered apart from *adhesion*, which completes the annihilation of the functions of the valves.

With the conviction that nothing has been made in vain, it is impossible sufficiently to admire the beautiful mechanism of the heart, faintly as we can appreciate its perfection. Each of the interlacing bundles of fibres has a definite duty, oftener than each moment, to perform, and each valve is suited to its purpose in a way that no human art has yet imitated: for the regular action of the best valves in our mechanical contrivances compared with these is so imperfect, that such a state in the heart constitutes disease. Sufficient when called into action, when they are not wanted the valves of the heart fall back so as to take up the least possible room, and to leave the passage free. Small in substance, differing little in specific gravity from the medium in which they play, great in strength, and accurate in their adaptation in health, how are they changed in disease! Thick, brittle, rigid, bony, and uneven, projecting into, and obstructing the blood as it goes on, and gaping when they should prevent its reflux,—such might be thought to be the extreme degree of organic change consistent with life. But no; these shrunk and puckered valves can do some duty still, and can still become more diseased. Creeping round the edges of the valves from their re-entering angles, another process now begins, which finally annihilates all their functions. If life is not previously interrupted by some contingent affection, the fissures between the flaps which compose the valves become gradually obliterated by adhesion,* and a little split in a thick, white, rigid membrane, or less commonly, an irregular hole in a kind of diaphragm, is all that remains of the mitral or sigmoid valves.

It will be of interest here briefly to notice two other conditions belonging to this form of valvular disease, affecting chiefly the aortic valves; for they are of a nature not to be comprehended in any merely general description of the successive effects of simple endocarditis, to which, however, the history of the cases renders it probable that they are to be referred.

The first, as consisting simply of the rolling back of the free edges of these valves, analogous in some respects to the rolling up of the great omentum in chronic peritonitis, may fall well under the head of adhesion and contraction, just considered. It is a change that has often been described, and could not well escape observation, the less as the pulmonary valves are so generally healthy as to afford a good standard of comparison for all deviations from the normal configuration of the aortic sigmoid valves.

The other form is, if I may judge by my own experience, very liable to escape observation, unless the attention is particularly turned to it, consisting as it does simply of a lengthening of one or more of the attachments of these valves. In such a case, the finger, when slid down the aorta, does not hitch in the pouch of the affected valve, as it does in the others, but slips on into the ventricle, from the doubling over of the edge of the valve, which is no longer retained by its proper attachment. And that the same yielding occurred during life, when the column of blood pressed against the valve, is shown by the loud diastolic murmur audible in such cases over the situation of the aortic valves. Of the actual cause of this lengthening it would be difficult to speak with certainty. The nature of the changes, however, with which it

* Dr. Corrigan has made a paper on cirrhosis of the Lungs the means for communicating some very good remarks on the effect of contraction on the mitral and aortic sigmoid orifices respectively (Dublin Journ. Vol. xiii. p. 280).

* Dr. Elliotson (Lumleian Lectures), and after him Bouillaud (Des Maladies du Cœur, Tom. 2, pp. 95, et seq.), mention adhesion of the flaps of the auriculo-ventricular valves to the walls of the ventricle as a result of inflammation of the endocardium. I have never met with such a form of adhesion, though the sudden supervention of a loud aortic diastolic murmur at an early period of acute rheumatism in one case made me suspect its occurrence in the sigmoid valves. It is not, however, uncommon to find in cases of advanced disease of the heart that the auriculo-ventricular valves in the neighbourhood of their attached edges are drawn down as it were close to the walls of the ventricle. It seems as if the edge of attachment had extended itself; in other words, that adhesion had taken place. But, from careful examination of such cases, I am more inclined to refer this appearance to the results of contraction of the valve itself and of its chordæ tendineæ.

ordinarily co-exists, and the history of the cases, point to endocarditis.

Doubtless, reviewing this subject, we are right in attaching the value that we do to the little warty granules which furnish the earliest unequivocal evidences of endocarditis. In themselves they are a serious lesion: but their natural tendency is to disappear, to become obsolete, as we say; and their pathological value, as far as they themselves are concerned, declines from the moment that they cease to grow. Though it be the rule that they interfere with the functions of the valves, they do so only contingently. They add temporarily to the mass of the valves, and so far temporarily may interfere with its action. But the injury caused by the slight material addition is trifling compared to the injury done in other ways by the cause of whose action these are the earliest and most obvious results, and which action their existence may possibly tend to renew.

Look, for instance, at an old thickened valve along whose edges a new crop of warty granules has grown up in consequence of recent endocarditis. Will the amount of valvular imperfection which they occasion bear a moment's comparison with that which the immobility of the whole valve, or the contraction of its orifice, gives rise to? Look at the most extreme effects of recent endocarditis on a previously healthy valve; the amount of organic disease there displayed is incomparably smaller than what almost any old thickened valve exhibits, taking into account the extent over which the lesion is spread in each case respectively. There can be no question that the subsequent or consequent changes are of much greater pathological importance than the results of the first outbreak of endocarditis.

It seems that the material importance of these warty growths—that, in other words, which they derive simply from their size—has a tendency to continually diminish. For two or three successive crops of them may leave no more serious organic result than a smooth laminated ridge to denote their previous existence. But regarded in a more comprehensive point of view, pathologically, they are of much greater importance: the inflammatory changes with which they are allied extending back into the substance of the valves, induce graver and more permanent results than the growths themselves. There is, indeed, no sufficient reason to deny that these secondary changes can ever be repaired. On the contrary, the examination of the results of previous inflammation of other fibrous tissues quite justifies the abstract conclusion that they are capable of repair. But the same examination practically forbids us to hope for much in parts circumstanced as the valves of the heart are,—never at rest—quite out of the reach of all mechanical remedies; two conditions these which in affections of fibrous structures are all-important.

The serious nature of any process which induces rigidity and contraction of the valves, diminishing the extent of their efficient surface and impeding their action, is obvious. But we may find other equally serious, though less obvious effects, ensuing upon inflammation of the valves, even in cases where the primary result of inflammation might seem at first sight to have been unimportant, perhaps even salutary.

Of this kind is the lengthening of the attachments of the aortic valves. Looking at the ordinary effect of inflammation in inducing contraction and rigidity, we are not at once reconciled to the idea of fibrous parts being relaxed and lengthened from such a cause. But structures which, in consequence of disease, have, in howsoever small a degree, exchanged their vital powers of adaptation to circumstances for a fixed addition to their mere mechanical powers of resistance, are rarely stronger for the purposes of life. The power of resisting a greater strain by increased mechanical strength is a very poor exchange for the power of repairing the injury which that strain may have occasioned in a weaker part. When this is lost, it fares with the heart as with the hardest substances in nature which have no power of repairing their injuries. It is not a strain now and then, but the constant wear and tear which does the mischief:—"Gutta cavat lapidem non vi sed sæpe cadendo." And the attachments of the aortic valves which have been the seat of inflammation yield to the continued pressure of the blood in the large vessels. If they ever had any increased mechanical strength, they lose it: they lengthen, and allow the edges of the valves to fall over, and the blood to regurgitate into the ventricle.

Valvular Lesions resulting from specific inflammatory or other affections.

The form of valvular disease remaining to be considered differs generally from that just described, in the same manner as inflammation in an unhealthy individual, or in a diseased part, differs from the same process in an individual, or in a part of a healthy constitution. The elementary process may indeed be the same, for of the nature of this we are in almost entire ignorance, and necessarily so; but the ultimate results are different, for the organic elements, though similarly combined, are differently constituted.

Probably, in its lesser manifestations, this

form should not be considered as inflammation at all, except in that vague sense in which we habitually attribute all slow organic changes to chronic inflammation. It is the form of disease to which the lining of the heart and great vessels is specifically liable, under the influence of no more immediately exciting cause than what the advance of years and the circumstances of civilized life supply.*

* I am indebted to Dr. Bond, Regius Professor of Medicine at Cambridge, as on many other occasions, so here also, for the notes of the following very interesting case. Its connection with the present part of the subject lies in a small compass, namely, in the description of the extremely characteristic morbid changes. But the symptoms dependent on these morbid changes are too striking to be passed over. I have given, therefore, the case at length, almost in the words which Dr. Bond has kindly communicated to me from his note-books.

A gentleman of more than sixty years of age presented the ordinary symptoms of hectic fever. He had two paroxysms recurring pretty regularly every day, viz. at 4 A.M. and at 4 P.M. He lost his appetite, and wasted away; and he had all the appearance of senile phthisis, from which he was popularly supposed to be suffering.

But a more particular examination disclosed the existence of a diastolic murmur at the base of his heart, and of an intermitting pulse, and his breathing was uneasy during his sleep.

Such were the symptoms for about four months. During the last few days of his life the dyspnœa became more urgent, compelling him to the upright posture, and expiration being accompanied by a peculiar involuntary sound, like that which paviours make. But occasionally the dyspnœa subsided of itself, coincidently with a large discharge of urine.

On the evening of April 17 he was in great distress; the dyspnœa was intense, but his position was prostrate; he had constant jactitation, and intolerance of the least confinement by the bed-clothes; his mind wandered, but with lucid intervals; there was fair power in the pulse. Towards morning all these symptoms were relieved upon a free action of the bowels and kidneys. He passed that day altogether calmly, and died, in a moment, on April 19, as he was rising from his bed.

On examination of the body:—The lungs were found sedentatous, but free from tubercle. The heart was enlarged in all its dimensions, its muscular structure rather flabby; the left side and the entire thoracic aorta were tense with recent coagulum, which entirely filled them; the mitral, and more especially the aortic valves, were fringed, and their surfaces covered with carunculæ vegetationes,—some forming conical projections, others pendulous—one remarkably long,—of different consistence, but all reducible by pressure with the finger.

Dr. Bond tells me that he has since met with a somewhat similar case, where with a more chronic cardiac affection, declared by a similar diastolic murmur, there was a distinctly marked daily hectic paroxysm. In this case, the constitutional symptoms subsided upon some blood being taken from the scapular region, as indicated by the other symptoms. The same hectic had also been seen in one other case by Dr. Watson, who was in consultation with Dr. Bond on the case above narrated.

My friend, Mr. Scott, of Brighton, had also recently under his care a case very similar to these two less marked ones. Dr. Bond's narrative seems to illustrate the fuller development, and to supply the explanation of the anomalous symptoms in all three of them.

But to produce any thing beyond these lesser manifestations, or the monstrosities (I know of no term short of this sufficiently expressive), which we occasionally meet with, something more active is required. Such might be acute inflammation, such the condition of the system which accompanies that renal disease with which this form of cardiac lesion has appeared to be connected.

The growths which characterise this form of valvular disease display themselves at the earliest period, as already noticed, as little filaments or buttons attached to the edges of the valves. At this period they are so minute, and their specific characters are so little developed, that it may seem at first sight almost unreasonable to attempt to connect them with the larger masses, which there will be occasion to describe, as their complete manifestation. The argument for their connection rests, however, pretty surely on the occasional coexistence of these two extreme degrees in the same case; on their habitual occurrence, when separate, in cases of a strictly analogous nature, and on the observation of many intermediate gradations by which the change from one to the other may be most satisfactorily traced.

From the observation of a single filament or two, the next step is to that of more growths of the same form, but of larger size. At this point, with the increase of size, the difference between the little pedicled growths and the simple filaments becomes more distinct. Leaving the former, however, for the present, to return to them under the name of Laennec's globular vegetations, we may here trace the successive changes of these filaments from their first indistinct rudiments till they become the broad leathery excrescences which give their name to this form of disease.

The appearances observed in the case which supplies the next observation, in order of time, of the progress of these filamentous growths, are very characteristic. They are described in the notes of the case as long growths of fibrin hanging from the free edges of the valves; two of these long, soft, gelatinous tails floating loose in the stream, while the third, which was of a deep red colour in parts, and sprung more immediately from the corpus Arantii, sat closely, so as to form a double tuberosity on the valves.

From this stage the progress of growth is distinctly to be traced as the threads become flattened, so as no longer to merit the names of filaments, into long, strap-shaped, or triangular excrescences. Smaller processes, however, are generally found in company with the larger masses, whose forms, while they display the stages through

which the masses have attained their present irregular development, point to their possible origin in some cases by rupture of chordæ tendineæ.

It is to these growths that the names of combs, wattles, cauliflowers, and so on, have been applied, as descriptive of their external form, and sufficiently expressive of the difference which subsists in that respect between them and the beading so characteristic of the results of rheumatic endocarditis.

But other processes than the mere addition of new matter on the exterior are generally required to produce these appearances. The effect of simple growth is merely to form long processes or filaments. It is to the other processes, which advance simultaneously with growth, namely, earthy or atheromatous degeneration, laceration, and perforation, of these, and of the parts in their immediate neighbourhood, that the singularity of their form, and the grave extent of the lesion, are mainly owing.*

A more minute inquiry into the nature of these morbid changes gave the following results. As before, the most satisfactory single observations, rather than the general inferences, are detailed.

In one case the growth is described as soft and leathery. It sprang rather from the interior than from the surface of the valve, and the endocardium stopped abruptly at its root. It was possible to distinguish in the mass numerous small granules and some fat. This growth had given origin to a similar one on the corresponding edge of the other flap of the mitral valve.

Another case of the same kind displayed soft growths, over which the endocardium was not continued, but was thickened in their immediate neighbourhood. The growths had a granular, not a fibrous texture; they were insoluble in ether and acetic acid, but soluble in liq. potassæ. Throughout the soft mass were scattered cubic crystals, with striated facets, soluble, with effervescence, in hydrochloric acid. These crystals were accumulated chiefly on the surface of the diseased parts. The same granular texture was observed in the ends of some ruptured chordæ tendineæ which were found in this case.

The above may be taken as fair instances o this second form of disease in its most characteristic development. But I think that, whatever general rules might be laid down, it would be impossible to tell, from the microscopic examination only, except at particular periods and under very favourable circumstances, what was originally the cause of the disease of the valves. At least, after some pains spent in the inquiry, I am sure that I cannot certainly do so.

There is one very important distinction between growths of this kind, and those which result from rheumatic endocarditis; namely, the minute distance which separates the points where we may find severally, the growth advancing, the traces of its degeneration, and a healthy state of the valve from which it has sprung. All these may be seen within the space of three or four lines. This fact quite falls in with the result of general observation elsewhere noticed; namely, that the products of disease bear the stamp of their origin upon them in their tendency to undergo certain ulterior changes, and to decay nearly in proportion to the rapidity of their growth. But it illustrates another very important point; for it has been shown, when on the subject of the first form of disease, of how serious a nature were the changes implicating the structure of the valve, and creeping back into its substance. Such changes are in this form almost entirely wanting. The substance of the valve is affected to no further extent than the existence of the growths would seem sufficient to explain. Even to this extent the different tissues are not matted together: though they are thickened, they appear even looser than natural. On the one side they shade rapidly off into the healthy structure of the valve; on the other, the change into the morbid growth is still more abrupt. The affection of the endocardium especially would seem to be quite secondary, for it commonly terminates abruptly at the edge of the growth, just as the skin does sometimes at the edge of a malignant tumor springing from a different subjacent tissue; and for the reason that this form is not primarily and essentially a disease of the endocardium.

The large size to which such masses may attain in patients scarcely arrived at manhood, or even at puberty, is very characteristic of this form of growth. In one patient, aged 21 years, one of these growths from the aortic valves measured 1½ inches in length.

With these large masses obstructing the onward flow of blood, and with such extreme disease of the valves, it is at first sight almost inconceivable how the circulation can be maintained. But their form and consistence in some degree explain this; at least, as far as concerns the sigmoid orifices, where it is most commonly that they attain to such a size. For the elongated masses or tails floating loose in the onward stream would not obstruct the circulation so much as, from their size, might be imagined; and, during the diastole, there can be little doubt that valves, growths, and all, are jammed down by the backward pressure so as to plug the orifice and prevent regurgitation. Auscultation, at least, tells us that a diastolic murmur is repeatedly absent in such cases.

But this contingent advantage of the soft yielding nature of these growths is more than compensated for by the liability to a most serious accident which not uncommonly befals valves thus affected. Evidence of such an occurrence may be found in their frequent coincidence with torn or perforated* sigmoid valves, and in the ruptured chordæ tendineæ, which cannot always be distinguished from the original filamentous growths. It is important to notice such a secondary lesion, as tending to show that the integral structure of the valve may be altered more than its external appearance might lead one to expect. For such lesions sometimes take place at a point not connected, by visibly continuous changes of the endocardium, with the seat of the principal organic lesion.

The term *ossification*, as implying the formation of anything possessing more of the physical properties of bone than hardness, is scarcely applicable to the changes which ensue in this direction in these cases: that of earthy or calcareous degeneration seems more appropriate. Their importance can scarcely be over-rated; for the existence of the rugged earthy masses thus produced is quite inconsistent with the pliability and the maintenance of that elongated form which alone render the effects of the original lesion less serious. And it is a change which these growths are singularly liable to undergo.

The above description needs but little alteration to be applied to the allied form known as Laennec's globular vegetations. But let the following narrative in the same way supply the place of any more abstract description of these growths, reserving the points of difference for subsequent consideration. The lesions were extreme, and, apart from the immediate object with which the case is cited, it displays well the connection of congenital malformation and albuminuria with disease so extreme and of such a kind.

Thomas Blakey, aged 22,* a hawker, married, temperate, habitually healthy, but always incapable of any great exertion, owing to shortness of breath and palpitation. His mother died of disease of the heart. Once, when a child, he was in imminent danger from a sudden attack of dyspnœa, with lividity; but he has not been usually livid. Eight weeks before admission, after exposure to cold and wet, his feet began to swell, and his symptoms continually increased, till he was admitted with anasarca, ascites, palpitation, dyspnœa, and pain in the right hypochondrium.

On *auscultation* there was a purring tremor over the cardiac region, with forcible impulse and extended transverse dulness. There was a loud, harsh, double murmur over the whole cardiac region, most intense at the junction of the fourth rib with the sternum, but heard also in the ascending aorta. A loud systolic murmur was audible in the epigastrium, and thence was communicated upwards over the region of the right ventricle.

He died in the course of about a month after his admission, the fatal termination being accompanied by pericarditis.

The heart was found, on dissection, generally much enlarged. The tricuspid valve presented, along its free edge, a number of little globular excrescences of a yellow colour, some of which had little irregularly excavated depressions at their free extremities. There were only two pulmonary valves, both of which were thickened and opaque, and had large masses of fibrin, mixed with earthy matter, attached to their free border. One of these masses, three-quarters of an inch in length, which now hung into the cavity of the ventricle, seemed to have drawn out the narrow portion of the valve to which it was attached, by the resistance which it had offered to the stream of the blood. The lower surface of one portion of the mitral valve was crusted with vegetations like those on the right side of the heart; otherwise, like the aortic valves, it was healthy and apparently efficient. There was a free communication, apparently congenital, between the two ventricles, opening, from behind the large carnea columna of the right ventricle. The sinus of the pulmonary artery was considerably dilated; there was much atheromatous disease of the coats of the aorta.

These are changes not to be misunderstood; they interpret themselves. And the symptoms in some of these cases are equally characteristic. They may have been quite absent, or, as more commonly

* See Watson's Lectures, vol. ii. p. 286, for a description of two cases of this kind.

* Two cases of this nature have been detailed by Mr. Thurnam (Med.-Chir. Trans., vol. xxi., p. 256); one from the notes of Dr. Watson, the other from the Museum of Guy's Hospital. They had each only two aortic valves, both of which were thickened and one perforated. Dr. Watson's case had suffered acute rheumatism, and had apparently diseased kidneys. I do not quote these as being rare, but in order to collate my own experience with that of others. Also Bouillaud (Rhumatisme Articulaire, Paris, 1840, p. 146) describes a case where, in connection with a growth of this nature, one of the aortic valves was perforated.

* Ed. Med. Surg. Journal, vol. lxv.: "On a Systolic Murmur in the Pulmonary Artery," this case is more briefly detailed.

happens, present all life in an extremely low degree. But when they are at length fully aroused, they run on to death with great rapidity. And such are the morbid changes on which they depend.

The comparative rarity of these particular growths necessarily renders the description of their successive changes in so far incomplete. But the two extremes are well marked, and we do not need many intermediate links to connect them. One of these extremes has already been described as displaying little yellow globular growths hollowed out with small cup-shaped cavities, bearing some resemblance to the common cup-moss. The other extreme, illustrating the earliest stage, displays them as round granules (studding the edge of the tricuspid valve in the case to which this description particularly refers), rough and apparently partially abraded at their summits, but not as yet softened within; and co-existing with perforation of the mitral valve. The morbid appearances tell their own story of the intermediate processes. The mass softens from the centre, till the shell is no longer able to retain its fluid contents; then the globule ruptures, and the little stem and shell are left behind like a cup, while the rest is hurried along the current of the circulation. The mechanical influence to which these vegetations are exposed, owing to their position on the valves, does not allow the internal softening to advance far before the growth ruptures. And an examination of these masses, as they are found on the valves only, would favour the belief that they are abraded from their summits downwards. The examination, however, of the larger growths of the same kind, as they are found in the tips of the auricles or ventricles, may suffice to correct this impression.

It is with these globular vegetations just as with the long leathery growths already described; they all alike grow rapidly, and as they grow they soften. And though the more variable shape of the filamentous growths does not always allow us to perceive that they have ruptured or been torn as readily as in the case of the globular vegetations, yet attentive observation will often find the proofs of such an occurrence.*

The analogy between these two morbid appearances is indeed very close. The first stage in both of them is nearly the same, consisting in the growth of a small tubercle, filamentous or globular, as the case may be, of a moderately firm consistency, with a smooth white surface, springing, as far as concerns us on the present occasion, from the edge of the valves. Here the two diverge. The filaments go on to become long leathery tails; while the globular tubercles assume the form of little buttons with contracted bases. There are certain obvious mechanical considerations which go some way to explain the much larger size to which the long filaments may attain, as compared with the ordinary dimensions of the globular vegetations; but

* Laennec quotes a case from Crüwel, where one of these globular vegetations had apparently been detached from its situation, and carried down the stream, as far as the pulmonary valves, where it had caught. The growth in this instance had undergone partial earthy degeneration. (Aus. Méd. iii. p. 265.)

The more ordinary course of events is, as above stated, for the growth to be broken down and its component particles to be mixed with the circulating fluid. The whole subject of capillary phlebitis—the changes to which these particles are thought to give rise—has been so ably considered by Rokitansky, that any remarks of mine on the anatomy and pathology of these morbid appearances would be superfluous. Referring to his work (Path. Anat. Band i. S. 242; Band ii. S. 680, &c.) for such information, I would here only subjoin an analysis of twenty-seven observations of this disease which have occurred to me illustrating its connection with valvular disease of the heart.

Although these growths are found to exist where the valves of the heart are quite healthy, yet there is certainly a very close relation of coincidence between them and valvular disease, especially what has been described as of the second form. For of twenty-seven cases where these growths were observed, nine had disease of the valves of this form, and two had Laennec's globular vegetations either on the valves or on the muscular walls of the cavities of the heart. Four more had simple extreme atheroma of the valves without lesion of the surface. In one case the heart could not be examined after death. In the remaining eleven the valves were either quite healthy, or the amount of disease was very slight. But one of these had little organized tufts, growing from the interior of the ascending aorta, and six of them had ulceration, simple or specific, of internal organs. One was a young healthy man killed by a fall.

Allowing largely for errors of observations, there are two facts which come out most prominently from this analysis:—First, the connection of this peculiar morbid appearance with the second form of valvular disease; and, secondly, the want of any connection between capillary phlebitis and tubercular deposition,—though this last result appears rather in arranging the cases for analysis, than in the analysis itself. The almost uniform absence of tubercles from all the other organs in each case shows that, whatever ground for error there may be in other particulars, there is very little real danger of confounding capillary phlebitis with tubercle. This fact quite agrees with the observations of the extreme rarity of the coincidence of phthisis with valvular disease; though the form of valvular disease which coincides with capillary phlebitis is of the two the more compatible with the tubercular diathesis.

In the twenty-seven cases at present under examination, this morbid appearance was found in the spleen eighteen, kidneys eleven, lungs five, and brain three times. It is worth consideration how many of the cases of softening of the brain which accompany extreme valvular disease of the heart may be referable to this cause. In the muscular substance of the heart I have only met with one, and that a very equivocal instance of capillary phlebitis.

the cause which originally determined the difference of form has doubtless the largest share in influencing the mode of succession of the further changes.

For though their elongated form may indeed protect the growths which affect this peculiar shape, yet they have an additional protection in their firmer internal texture, in which, from whatever cause, the softening appears not to advance as rapidly as in the rounder masses. We may occasionally find quite long filamentous growths displaying no evidence of laceration, while the results of mechanical injury constitute one of the most striking features of the globular vegetations on the valves. On the valves: for as we have seen, growths of the same nature, when occupying in comparative quiet the apex of a ventricle or auricle, attain a large size. We need all this to show that these two kinds of growths are not identical: of their close analogy there is no room to doubt.

The fibrinous patches which may sometimes be seen overlaying the left ventricle, as it leads up into the aorta, have already been noticed, and their origin connected with the first form of valvular disease. They have their analogues in the form under consideration, in the papillary growths which are found clustering in patches in the left auricle. These have been compared to the papillæ inside a sheep's mouth, to which, indeed, their resemblance is tolerably exact. Of five cases where these papillary growths were observed, four had leathery accretions on the valves. The same coincidence was noticed in one of Laennec's cases.* Further, four of these cases had granular disease of the kidney; in the fifth there was no opportunity of ascertaining this point.

It has already been shown that the immediate consequences of endocarditis—those, namely, from which we infer its recent existence, are less to be dreaded than those which may more remotely arise from it. The same may be said generally of the morbid changes belonging to the second form of valvular disease. But, there the changes were to be traced in the valves apart from the growth; here the subsequent changes have a closer connection with the morbid product originally characterizing the disease. Perhaps the statement that the valves in the one case, and the growths themselves in the other, are the seat respectively of the secondary consequences most to be dreaded, would not be made clearer by being qualified so as to meet every case. But, speaking generally, and more particularly with regard to the extreme cases, we may safely adopt this expression of the difference of the seat of the changes which lead to disorganization of the heart in the two forms respectively.

* Aus. Méd. iii. p. 337.

LECTURE III.—Part I.

IV. Symptoms and Treatment of Valvular Disease of the Heart.

Earliest evidences of valvular disease. Endocarditis, its obscurity, encouragement to its active treatment—its consequences, chronic valvular disease.

General considerations. Physiognomy of valvular disease, affected by age. Hypertrophy and dilatation, their causes, purposes, and contingent dangers—their relation to treatment. Affections of other organs—their importance—the mode of their successions—their relation to particular cardiac lesions. General principles of treatment.

Cerebral complications:—Apoplexy and softening, their relation to valvular disease—other affections—principles of their treatment.

Pulmonary:—Emphysema—pleural effusion—pulmonary obstructions—an abiding or temporary condition—mode of relief. Pathology of cerebral and pulmonary affections contrasted.

Abdominal:—Structural affections of the solid viscera—their pathological interest. Vomiting and diarrhœa, their treatment and pathology.

We have now reviewed the causes of valvular disease, the physical signs by which that disease makes its presence known, and the structural changes of the valves on which those signs depend. It remains to consider the symptoms which these valvular lesions give rise to, and, little though it be, what can be done for their relief.

Our knowledge of the symptoms of the first beginnings of valvular disease is almost confined to cases of rheumatic endocarditis. Even here, where we have learned to look for them, they are often obscure enough. And, that they rarely force themselves upon our notice unsought for, we are assured from the long time that the connection between rheumatism and endocarditis remained unknown.

The only sign of valvular disease at its commencement, in many of these cases, is an endocardial murmur. In some, however, there may be uneasiness, and even pain in the region of the heart, with increased hardness and frequency of the pulse. In others, percussion may show, besides, that the heart occupies more than its natural space, a condition which, in its occasional connection with other symptoms, and from the good effects of depletion in relieving it, may be considered as an effect of inflammation. Pain then, and swelling, or distension (if we may venture to call by one of these names the cause of this increased dulness), with the general signs of inflammatory fever, and the local auscultatory signs are the means, by some or all of which the presence of valvular disease, or, more correctly speaking, of endocarditis, may be manifested in the first instance. Endocarditis, it is true, like pericarditis, may sometimes display itself through the nervous system, in the symptoms of the most violent, even of fatal chorea.* It is necessary to bear in mind the possibility of the occurrence of such extreme cases. But practically, it is much less important to know how anomalous or violent the symptoms of endocarditis may sometimes be, than to be assured how obscure they usually are—how often they are entirely wanting; and this at the time when their effects are to be obviated, or if ever, to be removed.

It scarcely falls within the scope of these remarks to enter at length upon the treatment of endocarditis, or other causes of valvular disease, did either space allow, or had I anything to add to what others, and most recently, Dr. Latham, have told us. The sum of my experience may be very briefly expressed:—Of cases of rheumatic endocarditis treated in all ways, the immediate and ultimate results were better in

* Clinically, cases of chorea with rheumatism should be divided into two classes. First, those coinciding with capsular rheumatism, where the articular affection is commonly slight and chronic. Second, those coinciding with fibrous rheumatism, where the articular affection is commonly very intense, and there is pericarditis or endocarditis also.

What share the rheumatism itself may have in inducing the nervous symptoms in either of these classes I could not say. I would accept the explanation, which is sometimes offered, that it acts as a blood poison, inducing organic disease of the heart, and functional disturbance of the brain, only as an expression of our ignorance, not as a solution of the question. For I have seen fatal chorea with pericarditis consequent on disease of the kidneys, independent of rheumatism. I am inclined to connect it with the cardiac affection.

Whatever share, however, carditis (using this as a general term) may have in causing the chorea, we must not hastily dismiss the consideration of its connection, in treating the disease. For the prompt recognition and treatment of the cardiac affection appears to be a very important element in ensuring a successful termination of the case. Dr. Burrows, Cerebral Circ. p. 213. See also Dr. Kirkes, Med. Gaz. vol. xlvi. pp. 1004-1049.

those treated actively by mercury and depletion, than in those treated in any other way.* I cannot express in less vague and general terms the opinion which these cases have seemed to justify on this point of practice; and it is needless to enumerate the possible sources of fallacy which this expression may conceal, especially with regard to the ultimate effects, with which we have here chiefly to do. Only I would not withhold this testimony, however inconclusive, to the correctness of the practice inculcated by Dr. Latham, as having had large opportunities, during my connection with St. Bartholomew's, of observing its results, in the field from whence his information was derived.

The attack of acute rheumatism passes away: the acute period of endocarditis has gone by, perhaps never to return. And with it, too often, all prospect of a cure passes away. We have now no longer to deal with acute inflammation, but with its organic results, and with the chronic changes which these morbid products undergo. The treatment has no longer in view the cure of the disease, but merely the palliation of its symptoms.

The question what becomes of these patients has already been discussed on a previous occasion, on other grounds. We have here to do only with those in whom the disease goes on, from bad to worse, to destroy life at a more or less remote period.† And here all the distinctions of the causes of valvular disease cease in the consideration of the symptoms common to the secondary effects of them all.

The ways in which suffering and death may ensue in the subjects of valvular disease of the heart are various. The difference chiefly arises from the prominence which diseases of particular organs assume in the several cases. The subject naturally divides itself in correspondence with these secondary affections. But, before entering upon their examination, there are some more general conditions, of much interest and practical importance, which require a separate consideration.

1. There are few diseases but have their peculiar physiognomy.* Among the many advantages resulting from the collection of vast masses of disease at our large hospitals, must be reckoned the opportunity thus afforded of learning rapidly to recognise the external characters, literally the features, of disease. Disease of the heart, too, stamps its peculiar marks on the face. It will not be superfluous to trace what Corvisart† did not deem beneath his notice.

Many diseases communicate to the face an expression of their own, in which all distinctions of age are merged, and the child puts on the face of the old man. But it is not so with valvular disease of the heart. On the contrary, we may readily, and without any forced refinement, distinguish between the features which childhood and more advanced age respectively assume under these circumstances‡.

In children suffering from valvular disease of the heart, the face and conjunctivæ are pale and bloodless. Only, through the unusually transparent skin, small vessels may be seen ramifying over the malar eminences and the alæ of the nose, and the face becomes dusky on any exertion or emotion. The features are full, not pinched, as in most of the chronic diseases of childhood. There is no expression of anxiety. With the eyelids partly closed, and the eyes turned down, they sit, motionless, save for the constant heaving of their chests, and even of their whole bodies, with the beating of their hearts. Sad experience has taught them which posture is the freest from suffering, and this they steadily maintain, either upright, with the head leaning a little forwards on the chest, or, as the disease advances, reclining back so as to extend the trachea to the utmost: doubtless, on account of the relief which they thus afford to some labouring organ. They are sensible, and intelligent often to a remarkable degree, like other children who have suffered much from sickness, and seem to

* I am led to this conclusion, as far as concerns the immediate effects, by comparing cases submitted to all forms of treatment during their stay in the different wards of St. Bartholomew's Hospital, or wholly neglected for an indefinite period before their admission. Of the remote effects I have less certain means of judging; none, indeed, but what chance cases, which have come under observation at a subsequent period, supply.

† From an analysis of my own cases, in about eight years. Probably an analysis of other than Hospital cases would give a much higher average.

* Dr. Corfe's Remarks on the Physiognomy of Disease, p. 71, and Dr. Hope, op. cit. p. 401, may be consulted on this subject.

† Le hazard fait tomber les yeux de Corvisart sur un portrait: à l'instant, il s'écrie: "Si le peintre a été exact l'original de ce portrait est mort d'une maladie de cœur." Corvisart avait divin juste.—Pariset, Eloges, tome i. p. 111.

‡ The differences of the expression of patients suffering from valvular disease of the heart have appeared to most who have written on this subject capable of being reduced to two classes. Dr. Bellingham, Med. Gaz. vol. xlvi. p. 562, would connect them with differences in the nature of the valvular imperfections. Hope and Corvisart connect them rather with the temperament of the individual. My own observations generally agree with their conclusion, for the divisions in which youth and the lymphatic temperament respectively predominate usually coincide. But I think that, where the two divisions do not exactly coincide, the age overrules the temperament.

take pleasure in being auscultated and made objects of attention. But as soon as they are left to themselves, their eyes fix again upon some object, and they lie looking at it without apparently noticing it, like figures in wax.

The expression is quite different in persons of more advanced age; it is no longer one of placid quiet, but of anxiety and pain. There are still the same constrained unnatural postures, and the same fixed yet vacant gaze, but the face is drawn and livid, the lips are blue and pinched, the cheeks are of a dusky purple, and wherever the skin is put upon the stretch by subjacent parts, vessels may be seen ramifying just beneath the surface. Commonly the skin hangs in a fold from the lower eyelid, so as to expose the dull dingy conjunctiva covering the sclerotic; bloodless, indeed, but wanting that pearly white which we see in anæmia. Much as bronchitis has to do with the sufferings of these patients, and with these particular appearances, yet attentive observation will recognise here quite a different expression to what we see in connection with that disease. There is neither the intense restless agony of the present attack, nor the passive endurance when the acute stage of bronchitis is past. But to an expression which might suit with the most urgent distress and despair, there is joined a quietude of demeanour which might betoken perfect resignation. In all the patient's distress and uneasy movements, the great object of his efforts is to maintain the most complete rest. As if it were a question whether to bear the present posture, or the wearying search after one more tolerable to his feelings, were the greater misery. "He cannot bear to be at rest, for rest brings him no relief; he seeks but in one to be freed from the feeling of another pain."*

II. The effect of valvular disease on the heart itself in producing hypertrophy or dilatation of its walls or cavities respectively, enters into the pathology of the secondary complications of valvular disease to such an extent as to require preliminary consideration. Hypertrophy and dilatation, like most scientific words in very common use, are not always applied with strict precision to the things intended to be so designated. In their ordinary acceptation, however, these terms are quite sufficient for most, as for the present purposes; the one or the other, or both, being employed as the condition thereby expressed predominates. Hypertrophy, indeed, almost always implies the co-existence of some degree of dilatation, and the converse.

Dilatation would seem to be most commonly predominant on the right side of the heart and in the auricles, essentially the feeblest parts of the organ. Hypertrophy is found most often, and manifests itself most strikingly, in the left ventricle, essentially the strongest chamber of the heart. But as disease of the pulmonary valves is as surely followed by hypertrophy of the right, as is disease of the aortic valves by that of the left ventricle, the explanation why sometimes dilatation ensues, and sometimes hypertrophy, must be sought rather in the difference of their causes than in that of the constitution of the two sides of the heart respectively. Dr. Hope says:*—

"The exciting causes of hypertrophy are equally those of dilatation; and supposing no unknown agencies to interfere, it depends on the proportion which the cause bears to the reacting energy of the cavity exposed to its influence, whether that cavity become affected with hypertrophy, with dilatation, or with a combination of the two. It may be said generally, that when congestion is *constant* in a cavity, dilatation is more commonly the result; and that when there is only resistance to the expulsion of the blood, without constant or gorgement of the cavity, it is more common for hypertrophy to be produced. Contraction, for instance, of the aortic orifice, causes hypertrophy of the left ventricle in a greater degree than dilatation; whereas, patescence of that orifice, attended with regurgitation, and constant engorgement of the cavity, causes dilatation in a greater degree than hypertrophy."

Perhaps this is as near the truth as we are likely to attain, for the principle is not of very generally precise application, the causes being commonly mixed: but when an opportunity does occur of watching the effects of these causes separately, the result is agreeable to Dr. Hope's observation. Thus, emphysema and chronic bronchitis, which always cause more or less obstruction to the circulation, but on occasion for a while completely interrupt it, and cause the blood to accumulate on the right side of the heart, induce dilatation of these cavities. Granular disease of the kidney, on the contrary, where the obstruction to the circulation is tolerably uniform, and habitually surmounted, induces hypertrophy of the corresponding ventricle. It would seem, too, that hypertrophy ensues rather in the robust, dilatation in the cachectic and weakly. And, as a corollary to this, dilatation more commonly affects both sides of the heart than hypertrophy is found to do.

* Aretæus de Tonsillarum ulceribus.

* Diseases of the Heart, 3d ed. p. 250.

In one point of view—namely, in relation to the maintenance of the circulation—hypertrophy and dilatation may be considered as conservative processes:* for, unless the heart be made strong enough to overcome the obstruction, or large enough, so that a sufficient quantity of blood shall, after allowing for regurgitation, be distributed to the different organs, the man must die, or at least be incapable of exertion. But by such means, in some cases, and supposing that the valvular lesion remains unaltered, health may be *pro tanto* restored; and thus life may be prolonged for many years, and the patient remain ignorant alike of the existence of his disease, and of the beautiful adjustment by which it is rendered imperceptible or tolerable to his feelings.

But, in other points of view, hypertrophy and dilatation must be regarded as in themselves most serious diseases. The same circumstance which gives rise to these changes of the heart's structure necessitates the continuance, and commonly the increase of them. For even supposing that the valvular lesion were always to remain the same, it is easy to see how the adjustment can only in very few cases be absolutely and permanently perfect. Apparently, the effects of sigmoid obstruction would be most remediable by these means, then those of sigmoid regurgitation, and least of all those of auriculo-ventricular regurgitation. But the fact that the valvular lesion does very rarely remain unchanged renders it quite superfluous on the present occasion to discuss that hypothetical case. Whether or no hypertrophy and dilatation must still go on increasing in any particular instance, even though the valvular lesion remain unchanged, at least they certainly do so in the vast majority of cases where the valvular lesion does not remain the same.

Mechanically, indeed, the remedy is temporarily perfect. An hypertrophied heart can sustain the contraction long enough, or impel the blood with force enough, to maintain the normal pressure beyond the stricture. Again, a dilated heart can contain blood enough to allow for regurgitation to any amount. But the cure of a diseased heart, unhappily, is not a question of mechanics; for this mechanical remedy acts more or less at the expense of the capillaries, pulmonary or systemic, against which is now made the pressure which the walls of the heart were by nature intended to bear. Hence hæmorrhage, or œdema, visceral obstructions or inflammations, under one or all of which the patient sinks.

More than this: hypertrophy and dilatation are temporary expedients to prolong life, requiring continual adaptation to the progressive alterations of the valvular lesion whose effects they are calculated to obviate. While we admire, to the fullest extent, the manner in which the heart can thus make good its own defects, and adapt itself to the altered circumstances of disease, we cannot fail to see that the resulting condition is in itself one of serious disease. They are necessary evils—necessary to support life under the circumstances, but not the less evils; for it is not in the body, as in a coarse machine, that there is merely so much work to be done: it is of the first importance how that work is done. The circulation must not merely be maintained any how, but it must be smoothly and uniformly maintained. And this is very rarely the case in valvular disease of the heart, however perfect the compensation may seem to the patient himself, or to ordinary observation. A careful examination of a patient with valvular disease of the heart, for the relief of whatever ailment he may have applied, rarely fails to disclose to the physician the existence of the cardiac lesion: and it is most commonly a morbid state of the circulation, as indicated by the pulse, the immediate consequence of hypertrophy or dilatation, which leads thus directly to the discovery of the disease.

It would be impossible to determine absolutely the limits within which these changes of the muscular substance of the heart might be considered as safe or salutary, for probably they vary much in different cases; but the limits apparently are generally very narrow, and soon passed. Obviously the condition of the heart is neither safe nor wholly salutary when it is a source of distress to the patient; and scarcely so when, as just instanced, a full, or hard, or jerking pulse, denotes to the physician the abnormal pressure which is made on different organs, or the irregularity of the supply of blood which they receive.

But even supposing that no functional derangement detectible either by the physician or the patient arises, still the patient whose circulation has to be maintained by a dilated or an hypertrophied heart, however accurate the adjustment may be, is not in a state of health. Obviously it is a very serious state of things when the pressure which should be resisted by the

* "In speaking of what *nature intends*, it is difficult not to use language which may seem to favour some foolish hypothesis; but, in point of fact, we always must form a judgment of what nature is aiming at whenever we interfere with what nature is doing. And, as our practice is sometimes right, it is presumed that a right judgment is both attainable and sometimes attained."—Latham, Diseases of the Heart, vol. ii. p. 344.

mitral valve—to take the commonest case—has to be supported by the delicate pulmonary capillaries, with only that amount of relief which the increase of capacity of the auricle supplies. It is life bought by disease, by sheer force—a make-shift, not a remedy. Nor yet, when the heart itself sustains the increased pressure, as in the case of sigmoid obstruction, does hypertrophy consist with perfect health; for the power of adaptation to different circumstances, wherein animal mechanism surpasses artificial contrivances, is here most sorely impaired. The power of the hypertrophied heart is indeed most accurately calculated to the mean daily requirements of the body; yet, though the adjustment be correct, and the heart's action safe for all ordinary purposes, the impulse of an hypertrophied heart under excitement cannot be regarded without apprehension. Take, for instance, such a case of aortic obstruction where the impediment is exactly counterbalanced by the increased power of the heart. It is obvious that the more the arteries are distended on the further side of the obstruction, the more forcibly will the shock of the heart's contraction be transmitted past the obstruction to distant parts. The most trivial cause, impeding for a moment the flow of blood through the jugular veins, may readily induce such a condition of the arteries leading from the heart to the brain: the more readily, the slighter the obstruction—that is to say, generally, the earlier in the disease. And when the effect of the organic obstruction at the sigmoid orifice has been thus neutralised, a few full, forcible contractions of the left ventricle may place such a patient in the most imminent danger of extravasation of blood into the substance of the brain.

It is our duty as physicians to prevent, as far as may be, what we cannot cure. This rule must never be absent from our minds, but must enter into all the minutiæ of the treatment of valvular disease of the heart. By enjoining rest and prudence we may delay the advance of dilatation and hypertrophy; but we cannot reasonably attempt their cure, except by removing their cause, which to a great extent is impracticable. It is worse than idle to cup and leech, and use antimony and mercury, to try to cure them, or the disease of the valves on which they depend, except so far as their existence is connected with a condition of parts or a general condition indicating the employment of such remedies. Such treatment cannot remove them; and, if it could, we must needs bring them back again, or the patient would die.

The rational indications of treatment in many such cases are satisfied rather by the use of quinine and iron* than by antiphlogistic means. For serious as are the secondary effects of increase in the strength and capacity of the ventricles on other organs, the direct effects of weakness of the heart are much more to be apprehended. It is a very imperfect view of the effects of valvular disease on the heart itself which sees only a progressive increase of its strength or capacity, and does not look forward to that period when its powers of adaptation fail, and, instead of rising to meet, the heart sinks beneath its burden.

The data are as yet wanting from which to investigate this most important practical question,—under what circumstances, namely, this state of things occurs. On the more obvious explanations, which the effects of the original size of the coronary trunks in limiting the supply of blood, or which the deteriorated quality of the imperfectly aerated blood suggest, there is as yet room for little beyond conjecture, however probable. Only let us keep clear of one fallacy. Fatty degeneration of the heart is apparently the natural termination of hypertrophy of that organ where the hypertrophy has depended on a temporary cause. But such is essentially not the case in valvular disease. The cause of the hypertrophy is rather progressively increasing than temporary. These two forms of disease of the heart—fatty degeneration and valvular disease—have little in common: their coincidence is but rare, and the mode of their connection in these rare cases quite inexplicable.

But there will be occasion to refer to this hereafter. The failure of the heart's action marks a distinct period; and, whether it be the rhythm or the power that fails, the influence that should direct, or the substance that should sustain the action—whether it supervene in the same gradual way as the hypertrophy, or in a moment fatally, it is a matter of the deepest interest. It is the last alternative awaiting those who have avoided or struggled through those complications of other organs which first demand our attention.

III. However great be the value of observations of the effect of valvular disease in inducing hypertrophy and dilatation of the heart, as a measure of the virtual amount of that disease, yet, as a rule, the duration of life under such circumstances depends more on the degree to which the various organs can assist or tolerate the impeded circulation, or the heart can accommodate itself to its altered circumstances, than on the amount of valvular imperfection. Of this degree, obviously, these changes of the muscular substance of the heart afford very inadequate indications. The grounds for prognosis are to be sought rather in the age and condition of life and constitution of the patients. Children, in whom there is scarcely any limit to the tolerance of their various organs, and in whom the principle of growth is so active, and those whom Providence has placed above the necessity of labouring for their existence, may bear almost without distress an amount of valvular disease which would sink a poor, or an old, or a weakly patient at once.*

And, as man is born to toil, and liable to disease and to old age, so these conditions interfere largely to prevent the most natural being the most common termination of valvular disease. The secondary symptoms succeed each other very regularly. Commonly the failure of the action of one valve, most frequently on the left side, impedes the regular course of the circulation behind it; and hence ensue dyspnœa,† and all the symptoms which betoken the obstruction of the passage of blood through the lungs. At a later period, when the faulty action transmits its influence yet further back, through the right side of the heart, anasarca follows, with congestion of other organs besides the lungs: and it is from one or all of these that the patient sinks, under local disease or general exhaustion.

To all these patients the condition of each of these organs, and of the general powers of the constitution, are of as great importance as is the condition of the heart itself; for though there are very few diseases of the different vital organs in whose secondary affections we should not have to include diseases of most of the other vital organs, it is so, perhaps, in the highest degree as concerns diseases of the heart. And here the secondary affections have yet a graver interest, in the fact that it is by their means, in the majority of cases, that the primary disease of the heart proves fatal. Headache,—to take an instance from the brain,—epistaxis, even mental anxiety, which might be safely overlooked when secondary to disease of some other organs, require continual watching in cases of disease of the heart; for they indicate both the organ through which the fatal termination may be reached at last, and the approach of that event.

It does not appear that any of these secondary affections of particular organs are definitely and exclusively connected with any particular valvular lesion. Their local origin cannot be stated with more precision than to connect them simply with disorganization of the right or left side of the heart, according to the situation which the suffering organ holds in relation to either of these chambers; nor does the intimate mode of their production admit of any more elaborate subdivision. They depend simply on increased or diminished arterial pressure, or on venous obstruction.

The effects which such changes in the degree of arterial pressure produce are best displayed among the cerebral complications of valvular disease, for there only do these changes assume any pathological importance; but the effects of venous obstruction, which is the more usual form of derangement of the circulation, seem to require some general notice in this place.

As a rule, such secondary effects of valvular disease are displayed behind—in the order of the circulation—the particular chamber of the heart affected. Affection of the left side of the heart, for instance, is most often attended by pulmonary obstruction or œdema; of the right, by general venous congestion or anasarca. In practice, one of the earliest indications of imperfection of the heart is usually found in dyspnœa on exertion; while the accession of general dropsy, or its rapid increase, commonly denotes the entire failure of the system, and the approach of death. Abstractedly, however, we are not justified in disregarding failure of the left side because its symptoms occur in slight cases, often many years before death; nor are we correct in attaching that absolute value to functional imperfection of the right side of the heart which the circumstances under which its symptoms are usually met with at first sight seem to demand.

Whether disease of the valves of the

* See on this subject Dr. S. Allison on the Use of Iron in Organic Affections of the Heart; and a most excellent practical paper by Dr. Law, Dublin Medical Journal, vol. xvii. p. 192.

* It is a matter of interesting consideration what share other peculiarities of children, besides the greater tolerance of their various organs, may have in sustaining life with such disorganisation of the mechanical apparatus of the circulation. The greater extent of the respiratory movements, and the comparative freedom of the lungs from disease—phthisis, perhaps, excepted, which, however, has little to do with the present question—naturally suggest themselves; and others will readily occur: but, besides these obvious differences between childhood and more advanced age, I think that we must not overlook the *vis a fronte*, the force which draws the arterial blood to the capillaries, as distinguished from the *vis a tergo*, the impulsive action of the heart. Perhaps, indeed, this is only the legitimate physiological expression of what we are content to call clinically the tolerance of the organs in childhood—that the organs are not really passively tolerant of congestion, but actively engaged, by the aid of the organic affinities which are so much stronger in children than in adults, in thus maintaining the burthen for which the heart is insufficient. See on this subject Reid's Physiological Researches, p. 49.

† Andral (Clin. Med., iii. p. 120) thinks that dyspnœa does not supervene so early in proportion in old as in young subjects of valvular disease.

right side of the heart is more rapidly fatal than disease of the left valves, I am not able to determine; for the ordinary results of practice give no means for settling this question, which it must be allowed that the more limited observation of less equivocal cases leaves doubtful. We cannot, in the majority of cases, judge of the absolute pathological value of disease of the right side of the heart from its apparent effects; for these are usually mixed with, and, indeed, based on, the effects of disease of the left valves—namely, on a condition of the pulmonary similar to that of the systemic capillaries. And by the time that the effects of the obstruction have reached the systemic capillaries, they have made themselves felt pretty well all through the circulation. For by this time the disease has probably assumed a very serious aspect, from the secondary affections of the left side, independent of this new source of danger and distress from those of the right.

Whatever be the importance of functional imperfections of the right side of the heart,—and great, confessedly, it is,—yet they should hold a lower place, pathologically, than diseases of the left—the effect, to wit, being lower than the cause. For dilatation and hypertrophy—the indices of the virtual amount of imperfection—are, with two exceptions,* rarely met with independent of organic valvular disease, that attribute of the left side. All experience agrees in placing, on such grounds, disorganization of the left side of the heart first in the series of changes, and assigning to it the highest importance. Functional imperfection of the tricuspid valve, and consequent disorganization of the right side of the heart, however frequent and serious its occurrence may be (and I may, with many others, have often erred in overlooking its existence), is commonly but a secondary effect of disorganization of the left side.†

IV. In the nature of the secondary affections themselves, abstractly considered, there is little peculiar; but in the mode of their treatment and the choice of remedies there is much to be remarked. The bronchitis, for instance, which ensues upon disease of the heart, does not differ in such a way from that which arises in connection with disease of the kidneys or emphysema that it could be certainly recognised as such at first sight; but the difference may be well made to appear in the treatment. From this point of view the secondary affections have been chiefly regarded in the following remarks. The cure, indeed, of the original disease is a matter to be left out of consideration; but its existence and continual agency must never be lost sight of. Our treatment must relate entirely to the secondary symptoms; but it must be modified by the knowledge that, as the cause of the disease will still remain behind, the same thing may still have to be done over and over again, and each time under less favourable circumstances than before.

Yet, indeed, these are not cases to leave alone, nor routine cases, to all of which one uniform plan of treatment is applicable. Each case is a study of itself; and, provided only that the "*ninia medici diligentia*" do not place the patient in a worse condition to resist any future attacks, there is no cause to fear doing too much to relieve these patients. And the close attention to their symptoms which such a plan of treatment would involve, is now and then rewarded by the discovery of some happy idiosyncrasy with regard to the effects of particular remedies, or of the action of particular organs on the system at large.

Our knowledge of diseases of the heart has advanced much since the time of Senac; but could the most accomplished physician of the present day express more clearly the rules that should guide their treatment than Senac* has done? His remarks apply, it must be observed, to what we commonly know as old disease of the heart. Senac's knowledge, however, stretched beyond that of the past epoch of *morbus cordis* to that of the present day.

"The further we explore the subject of diseases of the heart, the more barren in resources does medicine appear. The remedial agents which are required are but few, and those who are so prodigal in the application of remedies, are ignorant alike of the causes with which they have to contend, and of the real use of the means which they are employing. The resources of our art rest rather in the patients themselves than in any drugs. What can we hope for from medicines, for instance, in dilatation of the heart? Will they restore to its normal form an organ whose action is always abnormal? If the substance of the heart become bony, will medicine soften it? Will medicine melt down tumors or earthy concretions? Can it enlarge constricted passages? Will it dissolve polypi that resist all known solvents? Ignorance and credulity alone could hope for such unheard-of success.

"Must we, then, leave these diseases to themselves? — No; but our powers are limited to arresting their progress, to alleviating their symptoms, to preventing or removing their consequences. The fundamental cause is abiding, and on this, as its basis, all the treatment must hinge. If we adopt any other view, we shall expose our patients to risk without any chance of benefiting them.

"I say that the fundamental cause will persist in spite of our efforts. This is true for the most part; still, if we could take these diseases at the beginning, probably many of them would be amenable to treatment. How many observations have proved that internal aneurisms are not quite beyond our resources! May not aneurisms of the heart and ascending aorta, and other cardiac diseases, be in the same case?

"But what are the remedies from which we could hope to derive any advantage? They must be suggested by the causes from which the patient has reason to apprehend danger. Such causes, summarily, are those which may either disturb anew the action of the heart, may overload its cavities, or may check the circulation there. * * * * * *

"After having provided for the safety of the heart, as far as regards the blood, the functions of the stomach and of the bowels, the condition of the nervous system must not be neglected. * * * *

"It is not less necessary to preserve the tranquillity of the mind. The passions disturb the action of the heart, agitating it even when it is free from disease. We must needs, therefore, avoid them, or moderate them, and forbid all employments of the mind requiring long application or over-exertion.

"The treatment of the symptoms must be guided by the same principles, our remedies being employed strictly according to the indications and urgency of the case. I will not enter here into further details, but give only general rules. It seems hard that, after speaking of particular diseases, one should be able to point out no more particular mode of treatment: but this is not the fault of our art; we can expect of it no more than what is possible, and it cannot possibly repair what in its nature is irreparable."

I. *Cerebral complications.*—To the description of the cerebral complications of disease of the heart which Dr. Burrows* has given us, there is little to add. I would only, as having drawn my experience from the same field—namely, the wards of St. Bartholomew's Hospital, express my humble confirmation of the correctness of his remarks.

Of the frequency of the connection between apoplexy and valvular disease of the heart there can be no doubt; it has been made matter of arithmetical demonstration. But it is surprising how what is now so clear should have so long remained unknown, or have been even denied; and the probable reason of this circumstance, as involving a great point of pathology, is worth investigation.

Lallemand† says that in no cases of apoplexy which he has read or observed has he ever found contraction of the aortic orifice, which yet he considers to be the most common cause of hypertrophy of the heart. For that, under these circumstances, the increased force of the heart is lost in overcoming the resistance occasioned by the contraction, and does not affect the brain. Hence he infers that it is only in cases where the obstruction causing the hypertrophy does not lie between the left ventricle and the carotids that sanguineous apoplexy can ensue; and he adds that it is not usually in the apoplectic cases of heart disease that we observe the livid lips and cheeks, or the œdema, which point to obstruction of the circulation in the veins.

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* Viz. dilatation of the right side of the heart, consequent on pulmonary, and hypertrophy of the left, on renal obstruction.

† The subject of functional imperfection of the right side of the heart engaged the attention of the late Mr. Wilkinson King (Guy's Hospital Reports, vol. ii. p. 104) and others. More recently, Dr. Blakiston (Diseases of the Chest) has pursued the subject in its pathological bearings.

Of the fact that the tricuspid does not act as perfectly as the mitral valve at all times, there is scarcely room to doubt. Of the cause of this imperfection there is some difference of opinion. Physically, indeed, I think we must admit that the tricuspid valve is less efficient than the mitral,—as far, at least, as the very simple, but very equivocal, experiment of injecting water backwards against the valves of the dead heart goes; but that regurgitation always takes place at each contraction of the right ventricle is scarcely admissible. The hypothesis that tricuspid regurgitation takes place on occasion, when required, by dilatation of the right ventricle, the segments of the valves being by this means drawn asunder, in consequence of the divergence of their bases, is more satisfactory; and Dr. Blakiston's pathological observations of cases where dilatation has become the abiding condition greatly favour this view.

But I think that all purely physical explanations fall far short of the truth. The more complex structure of the right ventricle, and its comparative immunity from disease, seem to show that its functions are of a less purely mechanical nature than are those of the left. Apart from these very important considerations, to which Dr. Williams (Diseases of the Chest, p. 256) has called attention, it would be difficult to believe that so important a function as the regulation of the pulmonary circulation had been left to any mere mechanical contrivance, however beautiful, and that no remedy had been provided, under such circumstances, against congestion of the lungs, short of that degree which should thus relieve itself by forcible distension of the right ventricle.

* Traité de la Structure du Cœur, &c., tome ii. p. 328-331.

* On the Cerebral Circulation, &c.

† Recherches Anat.-path. sur l'Encéphale, tome i. p. 44, note.

As far as the above statement goes, I believe it is literally correct. Real sanguineous apoplexy is very rare under the circumstances; but the symptoms of apoplexy—sudden coma and hemiplegia, for instance—are not quite so rare in connection with advanced valvular disease of the heart as might be supposed from a less literal interpretation of Lallemand's statement? What, then, is the nature of the changes on which the symptoms depend?

There appears, from all that I have been able to observe or to read of the observations of others, no reason to question the accuracy of the conclusion which Dr. Burrows has expressed, that "hypertrophy of the left ventricle must be admitted as a powerful predisposing, or even exciting, cause to apoplexy and sudden hemiplegia."* But where the hypertrophy is not more than sufficient, from whatever cause, to make good the valvular imperfection, we should be wrong in expecting *commonly* to find the results of increased arterial pressure. And sanguineous apoplexy, as already observed, is rare under such circumstances: from whence we may also infer that venous congestion is not one of its common causes.

The evidence of the older writers, as far as I have been able to consult them or the conclusions from them, is negative on this point: but at least it may be inferred from their silence that they did not connect sanguineous apoplexy with advanced and obvious disease of the heart. An analysis, however, of the cases detailed by Andral† and Bouillaud,‡ the most available, for the present purpose, of those invaluable masses of detailed observations in which the French medical literature is so much richer than our own, give a very striking result, which goes far to explain the cause of the discrepancy between former and more recent observation as to the connection between the symptoms of apoplexy and those of valvular disease of the heart.

From these two writers we may collect twenty-eight observations of cerebral disease of limited extent accompanying disease of the heart. Fourteen of these cases had softening of, and fourteen had sanguineous effusion into, the substance of the brain. This different nature of the changes may be observed to present a close correspondence with the varying amount of the symptoms of the valvular lesion. Of the exact nature of the valvular lesion itself, however, the details do not always allow me to speak. The cases may be thus arranged:—

Sanguineous Apoplexy.

Andral 11 cases, age 57·5.	10*	had no general symptoms of valvular disease, the heart being more or less hypertrophied.
	1	had anasarca.
Bouillaud 3 cases, age 54·6	1	no general symptoms,
	1	amasarca. [&c.
	1	pulmonary complication.

Cerebral Softening.

Andral 8 cases, age 59·2.	4	no general symptoms.
	4	anasarca, dyspnœa, &c.
Bouillaud 6 cases, age 32·3.	All had more or less general symptoms of valvular disease.	

The general symptoms of valvular disease were therefore

	Apoplexy.	Softening.
Present in . . .	3	10
Absent	11	4
	14	14

I fear to weaken the force of the conclusions of this table by any comments, or by any verbal expression of what the figures so clearly convey.†

My own experience on this subject, though very limited, is quite in accordance with the above. Of four cases of dissection after death from sanguineous apoplexy, with disease of the valves of the heart, the valvular affection was small in degree and simple in kind, and the heart had met the imperfection by hypertrophy of its muscular walls.

Of four dissections after death from extreme disease of the heart, with cerebral symptoms—namely, hemiplegia—in two there was softening of the brain, and in two no explanation at all was found of the paralysis, which, however, it should be noticed, happened in one of these eight months before death, and had been recovered from.

I believe that, without analysing other series of cases, I might confidently appeal to each one's experience for a confirmation of the statement, that it is in comparatively early cases, where the general symptoms of heart disease are scarcely developed, that sanguineous apoplexy most commonly occurs; not in those patients whom a cold winter sends into our hospitals, loaded with dropsical accumulations, and with venous blood,—cold, livid, and struggling for breath. These are rather the subjects of softening of the brain, or of serous effusion, than of sanguineous apoplexy.

If this be correct, it is easy to see how the connection between valvular disease of the heart and apoplexy may have been overlooked at a time when neither auscultation nor morbid anatomy lent such aid to pathology as at present in the recognition of the physical signs and morbid changes, respectively, of valvular disease. And it is, moreover, easy to see how, when this connection was asserted, it should have been denied, on the unjustifiable grounds, that, if the two diseases were really connected, the greater the disease of the heart the more frequent should be the occurrence of apoplexy. But, indeed, the question was not capable of a true solution on such grounds; and a more thorough examination of the correct premises has returned a different answer.

There are other affections of the brain depending on valvular disease besides those which leave organic traces in the forms of cerebral softening and apoplexy. In some of these venous congestion plays a considerable part, while others seem referable to increased arterial pressure. Dr. Latham* has described two of these. He speaks of a state of things where "the heart, by the simple vehemence of its action, has the power to kill, and to kill through the medium of the brain." There is intense headache, sleeplessness, delirium, and death by exhaustion. This is the effect of increased arterial pressure, which we must carefully discriminate by the history of the case, and the character of the pulse, may be, (for auscultation will help us but little) from the symptoms of simple exhaustion: for the alternative of life or death may depend on the correctness of our diagnosis.

Another form of disease presents the symptoms of apoplectic coma, suddenly supervening, and when it passes away leaving no paralysis behind. Here "neither serum nor blood has been let loose upon the brain. The whole mischief is effected by the blood still within its proper vessels, by its congestion, retardation, or remora." In this case "the disease of the heart consists of passive dilatation."

Then there are all the symptoms, if not actually attaining to either of these conditions, at least of sufficient importance to demand especial notice,—such as headache, vertigo, drowsiness, mental anxiety, and the spontaneous relief of these—epistaxis. There is epilepsy, always terrible, and not least so when connected with such a hopeless cause as valvular disease of the heart. And there is syncope—a symptom closely connected with advanced disease of this organ, and not uncommonly the mode of its fatal termination. To this, under the head of failure of the heart's action, there will be occasion to recur.

There is little to be added to what Dr. Burrows* and others† have told us of the pathology and treatment of these affections. As far as a few words can express a general rule of practice in these cases, it is this:—In all cases of disease of the heart we can scarcely pay too much attention to cerebral symptoms which might seem trivial when viewed in connection with disease of any other organ. Under these particular circumstances, drowsiness, headache, and even mental anxiety, claim a consideration which they do not ordinarily possess; and the rule of letting secondary symptoms alone, unless they are dangerous to life, does not apply, for the contingencies which these point to really are dangerous to life in the highest degree.

But when, from whatever cause, the symptoms to be dreaded—namely, those of apoplexy—have supervened, the rule must in some sort be reversed. Now the care must be, not to over-treat the organic disease, as it was before not to under-treat the threatening symptoms. For, not to do more than mention the danger arising from the excessive reaction of an hypertrophied heart on the injured brain, it must be remem-

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* Op. cit. p. 121.

† Clin. Méd. tome v. 4me éd., illustrating sanguineous apoplexy and softening of the brain generally.

‡ Des Maladies du Cœur, tome ii. 2me éd. All the cases of valvular disease in which cerebral disease referable to either of these two heads occurred.

* One of these ten cases had œdema at the time of death, which followed two years after the attack of apoplexy.

† Dr. Law (Dublin Quarterly Journal, vol. xvii. p. 181) has called attention to the importance of the distinction, in cases of paralysis accompanying disease of the heart, between the effects of increased and those of diminished arterial pressure on the brain. He refers sanguineous apoplexy to one, and softening to the other cause. He attributes the first of these to the action of an hypertrophied, the other to that of a debilitated or inefficient heart.

Dr. Bright (Med Reports, vol. ii. p. 193), again, regarding the subject from another point of view, has taken a case of extreme disease of the heart as furnishing an illustration of that form of softening of the brain where, "from obstructed circulation, the part undergoes a change analogous to gangrene—the more genuine form of the disease" (Case lxxii). There appears good reason, however, for admitting the existence of another cause of this particular change. It would seem, in some cases, to be more properly referable to that form of disease known as capillary phlebitis in other organs, than to gangrene.

But in speaking of the conditions of the heart which co-exist, by preference, with one or other of these forms of disease, there is some danger of overlooking a most important change of the vessels which is connected equally with both apoplexy and softening—namely, an atheromatous state of the arteries of the brain. There is no doubt of the close connection of this condition alike with disease of the valves of the heart, with sanguineous apoplexy, and with softening of the brain. See Watson, Lectures, i. p. 516; Abercrombie, this. Brain, p. 241, referring to Scarpa; Paget, Med. Gaz. 1850, on Fatty Degeneration of the Small Vessels of the Brain.

* On Diseases of the Heart, vol. i. p. 326; ii. p. 336.

* Op. cit.

† See especially Corvisart, Des Maladies du Cœur, p. 141, 3me éd.

bered that the lesion may be either softening or sanguineous effusion. And without expressing any definite opinion as to the essential nature of softening, it approaches too near to that of gangrene* for us to venture rashly on reducing the already weakened constitutional powers by over-active treatment.

II. *Pulmonary Complications.*—The pulmonary affections dependent on valvular disease of the heart may be either primarily referable to venous obstruction, or they may be contingent thereupon. Of this latter class are pneumonia and bronchitis, pleural effusion, or pulmonary œdema; and to these must be added, though its practical importance could scarcely demand even this passing notice, pulmonary apoplexy.

It is not so easy to assign an exact place to pulmonary emphysema† among this class of complications of valvular disease. Probably, in the majority of these cases, it is only secondary to the pulmonary obstruction, chronically and generally resulting from causes similar to those which induce its development in an acute form in the uninflamed parts of the lungs of children suffering from pneumonia.‡ We habitually connect the idea of common asthma with pulmonary emphysema, with which so often, and so often with which alone, it coincides. But in the more complex case of cardiac asthma, I think we need to be reminded of the separate value of emphysema as a possible element of the mixed results which we are called upon to treat under this name. I would not anticipate on this subject what falls under the head of the treatment of abiding pulmonary obstruction. I would here only point to the existence of pulmonary emphysema, as explaining, in some cases, much of the dyspnœa attendant on valvular disease, and in that exact proportion, it must be added, limiting our expectations of the curative effects of our remedies.

With regard to the other complications separately; and first to pleural effusion. Of this there is little to be said here, for the knowledge of its existence in nowise affects the treatment or the prognosis of the cases in which it occurs. Doubtless, it is a very serious complication, but my observation has not led me to think worse of the cases in which it is found* than of others, where large effusions exist in the areolar tissue or serous cavities. Nor has observation shown me any more particularly successful method of removing it.

Pneumonia arising under these circumstances has more claims to distinct notice. When occurring at an early period of valvular disease, it is, as far as I have seen, very amenable to the ordinary medical treatment, but singularly liable to recur after its removal. More commonly, however, it occurs at a later period, under conditions which forbid any treatment especially directed for its removal. The very unfavourable nature of its prognosis under such circumstances is explicable, partly on general grounds, and partly by the tendency which it then displays to run into the third stage. More than all the other pulmonary complications of valvular disease, pneumonia is to be considered in the light of an accident,—but as an accident of the most serious nature, always more and more liable to recur, and always more and more dangerous on each recurrence.

As to the other forms of pulmonary secondary complication—namely, bronchitis and pulmonary œdema—their consideration cannot well be separated from that of their immediate cause—their primary form, pulmonary obstruction: for, practically, they are little more than aggravations of this habitual condition, whether we regard their symptoms or their several characteristic morbid changes.

Without underrating all the means and appliances for arriving at, and availing ourselves of, a more accurate diagnosis, I believe that I should be vaunting a refinement which can find no place in practice if I spoke of anything more definite on this subject in connection with valvular disease of the heart than pulmonary obstruction. Nosological distinctions almost entirely fail us here, as after death by fever. They cannot be accurately maintained in the gorged, œdematous, and obstructed lung, by dissection; and they certainly do not afford us the safest grounds for treatment. The general principles of treatment, and what each of these affections has in common, claim attention rather than the specific differences which secondary causes may have developed in the individual case.

* See Abercrombie, Dis. Brain, p. 22, 3d ed.

† I am indebted to Dr. Hawkins for recalling my attention to the frequency of the coincidence of valvular disease with this condition, which I had otherwise omitted to notice in this place.

‡ See Dr. West's lectures on the Diseases of Children, p. 178. I need scarcely guard myself against being supposed to adopt generally this mechanical (so to call it) explanation of emphysema. It must be regarded, indeed, from such a point of view in the present case: but I would refer to Dr. Budd's paper on this subject (Med.-Chir. Trans. vol. xxiii. p. 37), and to the authorities there quoted, for a more comprehensive survey of this interesting pathological question than the present purpose requires, or my limits permit.

* These remarks apply to the chronic cases. Probably each one, from his own experience, could supply instances where patients suffering from acute inflammatory disease of the heart have been carried off in a day, or less, by sudden pleural effusion.

Pulmonary obstruction, then, to adopt this most general term, may be considered in two points of view,—as a temporary or as an abiding condition. Its symptoms as a temporary condition, induced suddenly by violent exertion, or other passing cause, are familiar to us all. It is an accident to which all are more or less liable; and art can do little more, whatever the cause, than aid in maintaining that perfect rest which nature does her best to enforce. But when pulmonary obstruction, though it be temporary only, is induced by the ordinary exertions of life, itself becomes a matter of serious consideration, and the detection of its cause of the highest importance.

On the present occasion we have only one cause to deal with,—namely, valvular disease of the heart. Under these circumstances, it is but a short stage from these temporary attacks to that affection known as winter cough, when the obstruction is present for a considerable portion of the year. And another still shorter step brings us to where this has become the abiding state of things, on which attacks of bronchitis or pneumonia are engrafted from time to time, and under one or other of which life at last terminates.

Still, however short these stages may be, in the treatment of such a case, apart from all other considerations, the question of the temporary or abiding nature of the pulmonary obstruction is of importance. For, if it be only temporary we may venture on more active measures, trusting to the reparatory powers of the constitution during the interval before the next attack, than we could do if the diseased condition were permanent.

The mode of relief which nature adopts in cases of pulmonary obstruction, that, namely, by local extravasation of blood inducing haemoptysis, is the most direct. But there are many objections to allowing the congestion thus to relieve itself. For the existence of blood and serum in the bronchi tends largely to aggravate the obstruction to respiration. And its removal necessitates frequent violent exertion in coughing. For the serous effusion, to bring relief, must be very abundant, and the expectoration frequent and copious. And though serous excreation may be easy enough, yet blood so effused does not usually come up quietly, being loose, as we say; but it is tenacious, being bound up with the glairy mucus which results as a secretion from that conditionof parts which induces the haemorrhage. The relief obtained by abstracting blood, less directly than from the congested membrane itself, may not be so great, but it is incomparably safer, and cupping or leeches to the chest will generally effect the object in view of relieving present pulmonary obstruction. This, however valuable, is yet a mode of relief which we cannot indiscriminately adopt; its fittest application is to the cases where at present the affection is only temporary.

With regard to abiding pulmonary obstruction in connection with valvular disease. Such a case is hopeless from the beginning; all that can be done is to palliate present suffering, or to remove present danger. Obviously, therefore, nothing but the most absolute necessity should induce us to do anything which might at all tax the constitutional powers of the patient. If the vessels are overloaded they may be relieved by cautious abstraction of blood. If the bronchi are obstructed with glairy mucus, or with abundant secretion, they, too, may be indirectly relieved by expectorants and diuretics, either to facilitate the removal of the viscid mucus, or to draw the watery discharge from the blood to another quarter. Or, if present danger to life threatens, we must of course, with out regard to more remote dangers, relieve the suffering organ by whatever means, and at whatever cost to the constitution. But if rest and warmth alone will enable the lungs to bear the burden of the circulation, those simple means should be trusted to; for a diarrhœa or a diuresis, the next available means, though powerful instruments for good, cannot be maintained without great exhaustion. They are instruments, moreover, which act with most effect on their first application. It is of the utmost importance to know that such a patient is most readily acted on through his bowels, and such a one through his kidneys, and by such particular remedies: but this knowledge need not be always put in practice. It is only for what warmth and rest will not, or do not appear likely to do, that abstraction, of blood, diuretics, purgatives or expectorants, should be employed under such circumstances.

But though we are sorely straightened in our use of means of relief, by the knowledge that the pulmonary obstruction is an abiding condition, this very circumstance, the habitual presence of the malady, enables us to employ a remedy which under other circumstances would not be available. In such cases we may safely employ opium in the face of symptoms which would otherwise contra-indicate its use, and by its means procure a night's rest with present safety and ulterior benefit. And it is no little thing to say that opium is not quite a forbidden remedy in cases of abiding pulmonary obstruction dependent on valvular disease.

How different is the pathology and treatment of the pulmonary and cerebral

complications respectively of valvular disease? The brain, as we have seen, may suffer from increased or diminished arterial pressure, or from venous obstruction, and of these the first two are of infinitely the greatest importance. The lungs, on the contrary, suffer, in a large majority of cases, under the like circumstances, from venous obstruction. The cerebral complication is in truth rightly so called, for its occurrence tends only to augment the amount of disease. But in the pulmonary affection we may often recognise a spontaneous attempt at the relief of the labouring heart. Could it well be otherwise than that the treatment of the two should present an equally striking contrast with their pathology? It is so. In the one we do all, even by excessively active treatment, to prevent; for we can do but little to cure, even if the immediate danger be escaped. In the other, too, we may try to prevent; but so far from leaving the actual lesion entirely to nature, observation shows that the best mode of reaching the heart is to direct our treatment to it through the lungs, irrespective of the degree of prominence of the pulmonary symptoms.

It might almost seem, from what has been said thus far of the cerebral and pulmonary complications of valvular disease, that the treatment resolved itself into a simple question, of how much depletion the patient could bear? Not so. But at least depletion is the most important and most available means in such cases, and my limits scarcely allow me to touch on any besides these. For the other complications our remedies are more numerous, and, as usual, under such circumstances, of less certain application.

Abdominal complications.—It is only from their position in the same cavity of the body, not from any thing else which they have in common, that the secondary affections of the abdominal viscera are here classed together. For valvular disease of the heart acts injuriously in a very different way on the solid, to what it does on the hollow viscera of this cavity.

Of the importance of the structural diseases of the liver and kidneys, which coincide with valvular disease of the heart, there can be no doubt, were it only for the share they have in inducing dropsy under such circumstances. But in many cases these changes should be placed side by side with the cardiac disease, rather as parallel effects of some common cause,* than as resulting, themselves, from the obstruction to the circulation. Such, I believe, is their true pathology in most, and these the most important, instances. But it is scarcely the place to discuss the principles of their pathology here. Its explanation is a part of that great problem of the effects of chronic inflammation, and degeneration of the products of previous disease, on organic tissues, which is now being worked out by so many independent observers. We scarcely appreciate the importance of the results already obtained, from their having so insensibly grown upon us, and incorporated themselves with all our previous pathological knowledge, which they at once illustrate and advance. The pathology of these structural changes forms part of a great subject, of which valvular disease of the heart is itself but a branch. But it would exceed alike my limits and my purpose to discuss them here. I would restrict myself to those few remarks which the secondary affections of the stomach and intestines, and the functional lesions of the solid viscera, seem to require.

Constant vomiting and pain in the epigastrium are not unfrequently met with.* But for the uncertainty which hangs over the interpretation of the morbid appearances of the gastric mucous membrane,† one would feel inclined to connect their symptoms with the intense congestion which this membrane often displays in fatal cases of valvular disease.‡ The remedies which have appeared to me most de-

* It is satisfactory on such a point to be able to cite Dr. Latham's authority (Diseases of the Heart, vol. ii. p. 307). "If I except those cases, in which the damage done to the heart could be clearly traced back to some distinct attack of accidental disease, such as rheumatic inflammation, my records of dissection do not supply me with a single instance of a person reputed to die of disorganized heart and its consequences, in whom after death other parts also were not found disorganized, such as the liver, the kidneys, serous and mucous membranes, and above all, and more frequently than all the rest, the whole arterial system. And the kind of disease in other parts has been such as could have in no wise been derived from the heart; but it must have grown out of special morbid processes within themselves, whether prior or subsequent to, or simultaneous with, the disease of the heart."

* Testa (Dei Mal. del Cuore, ii. p. 197, 2nda ed.) speaks of an uncomfortable sensation in the stomach only allayed by taking food, an habitual intolerance of an empty condition of the stomach, as an occasional symptom of cardiac disease. In some cases, indeed, this symptom was so prominent, as to mislead the medical attendants into the belief that the primary disease was in the stomach, and not in the heart. The opposite form of gastric affection, where everything is rejected from the stomach, is, however, much more commonly met with.

† This very interesting subject may be pursued at greater length, in two papers by Dr. Yelloly, Med. Chir. Trans. vol. iv. and vol. xx.

‡ Dr. Todd mentions a case of hæmatemesis, in connection with rupture of the chordæ tendineæ of the tricuspid valve, where he was disposed to connect the hæmorrhage with the patent condition of the tricuspid orifice (Dublin Journal, vol. xxxiii. p. 1).

serving of confidence in the treatment of the epigastric pain are dry cupping, and especially blisters. In attempting to allay the vomiting dependent on valvular disease, I have not observed any particular medicaments to possess specific properties in this respect, apart from the general indications on which they have been prescribed. Only once I saw the alkalies, empirically administered for the relief of obstinate vomiting dependent on such a cause, produce much more good than any peculiarity of the case could have led me to anticipate.

Diarrhœa is not a common accompaniment of heart disease; on the contrary, constipation is much more frequently met with. But it has much interest in connection with advanced valvular disease, as being at times the cause of sudden death, under those circumstances, through exhaustion and syncope.* This is particularly the case in children,—as far, at least, as induction from a limited number of cases, and a general impression from a more extended observation, would allow me to infer. The fact, however, whether observed in children or adults, is explicable on the principle previously adduced, that life maintained under difficulties is destroyed at last by the most trivial causes. We find parallel illustrations in the trivial causes which may suddenly destroy those whose respiration has been long impeded by some tumor or laryngeal affection. And a more painful illustration is found in the rapidly fatal effects on the aged inmates of workhouses, of a slight fall of the external temperature.†

* Contrast with the well-known disproportionately exhausting effects of diarrhœa, the equally well-known fact that the system will bear with safety a much larger amount of hæmorrhage from the hollow abdominal viscera than from any other source, except, perhaps, the recently emptied uterus. Yet the contradiction is only apparent. A large secretion may be, temporarily, as exhausting as a large hæmorrhage.

† Liebig, Chemistry of Pathology, &c., p. 255. "We see, in hospitals and charitable institutions (in Brussels, for example) in which old people spend the last years of life, when the temperature of the dormitory, in winter, sinks two or three degrees below the usual point, that by this slight degree of cooling the death of the oldest and weakest, males as well as females, is brought about. They are found lying tranquilly in bed, without the slightest symptoms of disease, or of the usual recognizable causes of death."

With regard to the treatment of the diarrhœa there is nothing to say, for there is nothing peculiar in it, except this one possible contingency of syncope. Forewarned, fore-armed. We cannot always foresee and prevent diarrhœa, but we can generally check it. If we know when to expect syncope, on the contrary, we can commonly obviate it; but when it has supervened, in cases of advanced valvular disease of the heart, all treatment often comes too late to save life.

It would seem that venous congestion of organs, as involving imperfect arterialization of the blood supplied to them, is in so far an unfavourable condition for the growth of fibrinous tissues. Valvular obstruction, therefore, as far as its effects in inducing venous congestion can be separated from any general pathological conditions (as already indicated) on which itself may depend, tends to produce but slight changes in the structure of organs. But on their secretions its effects are more positive, albeit seemingly at times inconsistent, or at least inexplicable. For it does not appear why, in connection with valvular imperfection, sometimes the watery and sometimes the solid constituents of the secretions should be in excess.

But, by the side of affections causing distress and danger to life, all minor derangements sink into nothing. We recognise, indeed, in valvular imperfection of the heart, a sufficient cause for jaundice, in all its degrees, from mere biliary congestion, to the well-marked form of the disease. Again, the explanation of albuminuria under the same circumstances is obvious. But these are scarcely in themselves, under these circumstances, objects of treatment. The great interest, on the present occasion, of the subject of venous congestion of these organs, turns on its connection with cardiac dropsy, rather than with these minor functional derangements.

LECTURE III.—Part II.

IV. Symptoms and Treatment of Valvular Disease of the Heart (continued).

Cardiac dropsy: effusion from inflammation, from venous obstruction—Principles of treatment—Influence of rest on the heart's action—Use of purgatives, diuretics. Complications of dropsy, mortification, erysipelas; may occur without dropsy.

Effects of valvular disease on the action of the heart—Palpitation—Failure of the heart—Effects of a shock on the healthy, on the diseased organ.

Modes of death from valvular disease.

IV. *Cardiac dropsy.*—Under this name I would class only the effusions of fluid which occur in the serous cavities, or the general areolar tissue, in connection with valvular disease; though the distinction which would exclude œdema of organs, and notably serous apoplexy of the brain, from this category, is rather convenient than pathologically accurate. On the same plea of convenience, however, we may group with general dropsy the various gangrenous or erysipelatous inflammations of the integuments, which commonly arise from it, and last, though not least, complete the sad catalogue of the secondary consequences of valvular disease of the heart. On what causes does this class of secondary affections depend, and what can we do for their relief?

The history of patients suffering from dropsical effusions in connection with valvular disease commonly speaks of exposure to cold, or distress, or of unusual exertion. Instead of laying any great stress on the statements of patients for the most part very incompetent to observe their own symptoms, we may simply refer these, in the present instance, to the two heads of inflammation and venous obstruction respectively.

The effects of inflammation under these circumstances are shown, perhaps, most commonly by effusion into the general areolar tissue, rather than into the serous cavities. On neither of these, however, is it necessary to dwell here; for the facts and appearances, in the first class of cases, will of themselves explain the relation which the inflammation bears to the exudation—namely, whether it be cause or effect. And as to the second, the comparative rarity of the occurrence, under these circumstances, of inflammatory effusion into the serous cavities, to any large amount, forbids any lengthened notice of this form of disease. But the possibility of the last occurrence should at least be borne in mind; for this may sometimes throw a more favourable light on particular cases, allowing us to interpret their more distressing symptoms of pain and dyspnœa, not as the physical effect of an irremediable organic disease, but as signs of a present action which it is in our power to control by careful antiphlogistic treatment. Such cases, however, are exceptions to the general rule; effusion, in the majority of these cases, depending on obstruction rather than on inflammation.*

It might seem, at first sight, that with the statement that the remaining cases of cardiac dropsy were dependent on mechanical causes, and these, so far as concerns us at present, essentially irremediable, the subject was exhausted. Not so. It does not, indeed, admit of a systematic examination of the details within the present limits: and as to the general principles, we have already considered the influence of one or other side of the heart in the production of cardiac dropsy. But, taking up the subject a little further on, and speaking of the removal of the dropsy, rather than of its accession, as being the rather a matter of clinical inquiry, here is a field in which each observation of less absolute importance may find its proper place. The general principles of treatment of this affection,—nor of this affection only, but applicable alike to all the other forms of secondary complications of valvular disease,—will well repay attention. For, indeed, they are general principles which are required here. There are fewer lucky hits made by guess-work in cardiac than in other dropsy.

The first thing to be done is to set the patient, and so his heart, at rest,—the most simple, and yet the most effectual means in our power, for his relief. The influence of simple rest may be beneficial in several ways. First, as the strength of the heart is accurately adjusted to the mean requirements of a day's work, by rest so much is directly saved; of exertion to the heart, if it be sound; of suffering, if the valves be imperfect, to the organs against which, under such circumstances, the pressure is made: and this, whatever be the mode of the heart's action. But the functions of the heart are more perfectly executed when the heart's action is quiet, than when it is morbidly excited: and the action of a diseased heart is, as a rule, more liable to be so excited, and from a less cause, than is that of a healthy heart. It follows that the effects of rest will be in such case, in that exact proportion, the more salutary.

The closure of the sigmoid valves is a simple matter enough; but for the perfect coaptation of the auriculo-ventricular valves during the whole period of the systole, much precision in the action of all the parts concerned is required. There can be no doubt what the effect of an imperfect coaptation would be; and I believe as little that such a condition would be induced by a very slight change in the relative degree and time of contraction of the different fibres of the heart's muscular walls.* That is to say, a very slight alteration of the rhythm of the heart's action in detail is quite a sufficient, and most probably the actual cause, of functional imperfection of the valves in many cases. The most effectual means in our power for correcting this alteration, and the consequent regurgitation, is rest.

We cannot, obviously, look to auscultation for absolute demonstration of the correctness of this explanation in the cases with which we have here to do. Neither can auscultation alone determine the degree, even, in which the heart's imperfections have been remedied, if so it should happen, by such means: for probably the murmur dependent on the organic lesion would become only the more audible when the rhythm of the heart was restored, and the superadded effects of this functional lesion were removed. We are to look for it in the quiet, steady action which has replaced the tumultuous palpitations, and in the patient's altered feelings. If we cannot hear it from his heart, we may often hear from his lips how much present ease he owes to the calming the action of his heart, to simple rest. Perfect rest is almost a necessary preliminary to our successful treatment of cardiac dropsy. It is at times all that is necessary, and supersedes all other treatment.

It might provoke a smile to refer to a period, not so many years past, when the expression *morbus cordis* shed a seeming of knowledge over a class of symptoms presumed to depend on disease of the heart,—to be, as such, essentially incurable, and therefore not to be likely to repay the trouble of a minute examination. And it would be superfluous to repeat here how these, the most unattractive cases, have become the most interesting, and how much has been learned from their study by which to discriminate the disease at an earlier period, and to prevent many of its consequences. There still remains much for us to do in palliating the effects of what we have not prevented, and which we cannot cure.

Speaking generally, as far as my own observation on this subject goes, greater and more permanent relief has been obtained from the use of purgatives than from any other means in cases of cardiac dropsy; and of these, the saline purgatives with senna, given every morning, or every other morning, as the patient could bear them, have seemed more useful than the occasional employment of more active means, such as elaterium. But this mode of treatment is rather adapted to those cases where the powers of the constitution are as yet little affected. It does not succeed so well, and is accompanied by considerable risk, in the more advanced cases. Here diuretics are a safer, though a less certain means of relief:* and of these, my

* With regard to the chemistry of this subject, it is hardly too much to say that it is almost wholly unknown. I am not aware of any other source of exact information than Andral's sixteen cases analysed in his Essai d'Hématologie pathologique, Bruxelles, p.136-8. Yet dropsical effusion is a subject in which we have a right to look for information from organic chemistry.

Vogel (Path. Anat. by Dr. Day, p. 37-43) gives references to different authors who have treated on this subject. I have not been able to refer to these authors, but, judging from his own expressions, the chemical part—the relation, namely, of the effused fluid to the serum of the blood—remains as obscure as ever.

* Dr. Hope (op. cit. p. 392), quotes instances where the functional integrity of the heart was restored by simply loosening the tight dress which had impeded its action; though he adopts a different explanation of the production of the murmur to that in the text, and which the circumstances seem more naturally to suggest. Excluding the fallacies from coincident endocarditis, the mitral murmurs so often heard in chorea seem to me to fall under the same category of the results of an abnormal mode of contraction of the heart. And further illustrations will readily suggest themselves.

The disordered rhythm of the heart's contraction here spoken of must be distinguished from that irregular action which we may often find in patients who have, perhaps, no other symptoms of disease of the heart; and particularly in the subjects of pulmonary emphysema, irrespective, however, of the amount of this change. Perplexing as such a tumbling irregular heart is to the auscultator, the rhythm of its contraction, judged by the symptoms, has been disturbed in a much less serious manner than in the form of disease under consideration.

* Dr. Hope's experience led him to a somewhat different conclusion on this matter (Diseases of the Heart, p. 409). He puts diuretics in the first place, as being the remedies deserving the first trial; and speaks of purgatives only as the second alternative. Of these, too, he mentions elaterium with greater commendation than my own observations, in St. Bartholomew's Hospital or elsewhere, would seem to me to justify. Not that, as Dr. Hope remarks, the effects of elaterium are not at times truly asto-

own observation would induce me to prefer the nitrate of potash, assisted in the lesser details by what the circumstances of the case might suggest. Such are warm stimulant diuretics or purgatives exactly apportioned to the powers, and, what is equally important, to the habits of the patient. These supplementary matters are not beneath consideration; nothing which alleviates suffering can properly be so. A knowledge of, and a due regard to, the habits which have had a large share in inducing disease, may sometimes assist us in our attempts at its removal. Dropsy, with diseased heart and obstructed liver and kidneys, which has defied all the regular applisnces of pharmacy, may yield to —gin.

Under such a very cautious plan of treatment, sometimes the present symptoms have been relieved, the effusion removed, and the patient, to all but the physician, has seemed to be quite well. Sometimes our rational attempts may be aided by a happy idiosyncrasy on the part of the patient. Perhaps one particular diuretic, such as the acetate of potash, may act again and again surprisingly well; and sometimes digitalis will succeed beyond all expectation; and this, I think, wholly irrespective of the particular preparation employed.* Iron, again, is a remedy which no one would neglect to employ in all cases where debility of the system at large was known to exist. But whatever may be the good obtained from iron in these cases, it is not in cardiac, as in renal dropsy, that iron does wonders.†

With whatsoever success this complication be treated, yet, after all, it is but a complication, and, considered abstractly and in itself, one of but secondary importance. For it is not ordinarily by effusion into the general areolar tissue or the serous cavities, by sheer exhaustion, or by obstruction to the functions of different organs, that cardiac dropsy destroys life. Much as the serous effusion may have to do with inducing the fatal termination, it is not commonly the immediate cause of that event, especially when occurring in the form of anasarca. Extensive œdema cannot long exist under these circumstances without giving rise to excoriations, whose results tend more directly, by pain and loss of sleep, and by local action, to destroy life.* It remains to consider these, the associate complications of cardiac dropsy.

Mortification,† as a consequence of valvular disease of the heart, most commonly ensues upon the erysipelatous inflammation to which anasarca gives rise, and is limited to the integuments and the parts immediately subjacent. The ordinary course of events, under such circumstances, is but too familiar to daily experience. I would therefore pass over these, and dwell rather on some forms of disease which fall less frequently under observation.

In some cases of valvular disease of the heart, the mortification, which usually begins in, or is limited to, the integuments, implicates the deeper structures. My own observation furnishes a single instance of this very unusual occurrence, where the right leg mortified in its entire extent, though there had been neither anasarca nor evident inflammation precedently. Unfortunately, no examination of the body after death was permitted. The details of the case, therefore, possess no such particular interest as to need to be recalled here at length. Briefly, it was a case of dry gangrene, occurring in a woman forty-three years of age, who had been suffering for some time from a first (?) attack of subacute rheumatism, and had, on her admission, pericarditis and considerable aortic sigmoid obstruction. The gangrene was accompanied by intense pain in the limb, with insensibility to external impressions. Death happened at the end of five weeks,

nishing; but that the employment of this remedy in cases where there is room for such effects to be produced, is commonly not without danger.

Probably the correct principle of practice is that inculcated by Dr. Williams (London Journal, 1850, p. 467)—that, namely, of restoring *all* the secretions to their normal condition before we determine the plan of our further proceedings, or select the secretion by which, in particular, we should endeavour to remove the effused fluid.

* But see on this subject Dr. Munk's paper, Guy's Hospital Reports, vol. xi. p. 295.

† Of cases of recovery against hope—of instances of the good effects of steady persistence in a fixed plan of treatment—the most striking which have come under my own observation have been renal dropsies treated by preparations of iron.

* There is another respect in which cardiac differs from renal dropsy. In both alike, excoriations and sloughing of the integuments are of most unfavourable augury, and in both alike it is the exception when they are not followed by fatal consequences. Still, in cardiac dropsy they are sometimes recovered from, and the relief afforded by the free outlet thus offered to the dropsical fluid sometimes tends to prolong life. But in renal dropsy, sometimes, from these consequences, the patient seems to date a new period of his existence, and as the slough parts, and the wound suppurates and slowly heals, the fluid is absorbed, the albumen disappears from the urine, the heart ceases to strive, and, judged by the rules by which we determined him to be ill before, the patient seems to be again well. Morbid anatomy, indeed, tells us here that the recovery is only seeming; clinical experience, however, has not such a pleasing semblance even to tell us of as concerns cardiac dropsy.

† See Cyclop. Pract. Med. vol. iii. p. 131; Hope, op. cit. p. 224; and a striking case, Med. Gaz. xv. p. 748; also Dublin Journal, vol. x. N. S. p. 301.

resulting apparently from the exhaustion of diarrhœa.

Mortification must be regarded rather as indicating the amount of incurable mischief done, and as displaying the action of injurious influences, than as itself exerting such influences, in any marked degree, beyond the limits of the organic lesion. The case just narrated might serve to point this conclusion; for there, mortification of half an extremity was only after five weeks, and then only contingently, a cause of death.

Anasarca, inflammation, mortification—this is the regular order of succession. In the last case the two first processes seemed to be absent; in other cases the integuments inflame and slough, not as an effect of the anasarca, but, as it might seem, primarily, from venous obstruction. Under these circumstances the inflammation assumes a much more formidable aspect than when it is consequent on anasarca. The few cases on record which I have met with agree with what my own observation has supplied, in representing this form of disease as most rapidly fatal.

We may express, as a general conclusion, what these consequences of venous obstruction illustrate in but one,—albeit, the most important form. Inflammation of the integuments is more to be dreaded, when, in connection with valvular disease of the heart, it arises from some widely diffused cause, instead of originating in some limited point, as more commonly happens; for so the cause which has presided over its first manifestation prevails generally, and the system, under these circumstances, is ill calculated to withstand its attacks. There would seem to be less cause for present fear in the inflammation which extends from a wound, where, for instance, the serum has made its way through the cuticle, or has been evacuated by acu-puncture. Extreme is the patient's misery from such a cause; yet, as a question of time merely, inflammation commencing in this way, and running on to sloughing, certainly does not bring so much present danger to life as when it occurs under the condition above noticed.

There is no reason to question the correctness of the explanation generally received, which, connecting the diffused gangrene secondarily with the condition of the heart, would refer it more immediately to the ossified state of the arteries, and to their obstruction by coagula: but I have nothing to add to the data on which this opinion is founded.

In all these cases, where active treatment is out of the question, a good deal may be done to relieve distress by fomentations and poultices, and the very cautious application of leeches. The necessity of maintaining particular positions, on account of the dyspnœa, interferes with the use of the water-bed: but the want of this most useful appliance is not so much felt here as might seem at first to be the case; for the sloughs are usually on the sides of the legs, and in the folds of the skin, rather than on the hips and sacrum, and parts exposed to pressure, as in fever. As an encouragement to treat these cases with that care and assiduity which only the hope of success can inspire, a case is recorded by Andral,* where the use of quinine and stimulants, and the external application of bark, was followed, as far as concerned the gangrene, with the most complete success. And that these slight hopes may not rest on routine treatment, but on the fulfilment of the rational indications in each individual, an instance is supplied by Andral of the successful issue of a case of the same disease treated on the most opposite plan. The complication was diffuse inflammation of the integuments; and, under the use of very free depletion, the patient so far did well. Such cases, however, form the exceptions: they are very rare.

Effects of valvular disease on the action of the heart.

We have considered, in a former part of this lecture, the organic effects of valvular disease on the muscular structure of the heart, as lying at the root of almost all the secondary complications above described; and perhaps the changes which the functions of the heart undergo from this cause might, on the same grounds, have claimed a preliminary notice. But these seemed to find their fittest place here, at the close of the sad catalogue of symptoms which the other suffering organs display. For let all these complications of other organs have been avoided, whether by accident or by the patient's happy constitution in these particular respects, whether the disease have been averted or fairly met by the physician, or have never threatened at all, still there is the natural termination of the disease to be apprehended—death through failure of the heart's action.†

And there has already been occasion to notice one or two conditions of disease into which a deranged action of the heart, as distinct from valvular imperfection,

* Clin. Méd. tome iii. p. 84-86.

† Not unfrequently we find advanced valvular disease of the heart in the bodies of patients who have sunk unaccountably from diseases or accidents which may have seemed scarcely severe enough to destroy life. This, however, is not exactly the death from failure of the heart intended in the text. Such an event, moreover, is more frequently explained by coincident renal than by cardiac disease.

seemed to enter. There is still another condition, which, though it has scarcely been named, yet much of what might be said of it under its own name has been already forestalled in the consideration of the diseases with which it coincides. Palpitation, as a disease in itself, apart from hypertrophy and dilatation—the instruments by which it becomes a source of so much distress and danger, and apart from that functional imperfection of the valves by which the symptoms may temporarily be so aggravated, is a subject of great practical importance: yet it has no claims for any lengthened notice here; for it coincides, perhaps, as often with a healthy as with a diseased state of the valves; and it is, *per se*, a sign of an irritable rather than of a labouring heart.

Of its treatment and pathology, where depending on other causes than valvular disease, it is beside the present purpose to speak at length. We must keep in mind that palpitation coinciding with, need not depend on valvular disease, though it may be much aggravated by this means. So far as it is connected with valvular disease and its complications, the treatment, of course, will bear a due regard to the cause; and, under these circumstances, nitrate of potash, or digitalis, with perfect rest, have always appeared to be of most avail. But the distress and alarm which this symptom of palpitation gives rise to are so great, that we must make its relief a special point of treatment, and act on its own indications when we fail in its removal by a due attention to those which the valvular disease suggests.

Does the mind, in very terror at the much dreaded name of disease of the heart, produce this symptom of palpitation? The same upright candour which forbad us to hold out deceitful hopes of cure to the patient will now give him confidence in our assurance of the absence of present danger, and so aid to fulfill our promise of speedy relief. What iron, or tonics, or opium, or belladonna plasters, with a more liberal diet, will do for anæmic palpitation where the heart is sound, they will do here, though the heart be diseased; or, if the irritability be inflammatory rather than anæmic, a few leeches,* or the cautious use of digitalis, or the insertion of a seton, may calm, almost, as it were, by magic, the throbbing heart.†

But this by the way.* We have here to do, not so much with these lesser perversions or derangements of the heart's action, as with its failure; and of this, palpitation gives no certain indications. It is a sign of active life, however feeble,—of resistance to, or irritability under, disease. We are dealing now rather with the signs of coming death.

The failure of the heart is a condition which enters largely into the termination of nearly every protracted case of heart disease, in the ordinary course of events: and Dr. Williams justly calls attention† to its earliest indications, as constituting an important element in the prognosis of the duration of life in any particular case; though, among the various complications of valvular disease, they are very likely to be overlooked.

Again, the gradual failure of the heart's action may be, under very favourable circumstances, the sole indication of coming death, or, as we say, of the breaking up of the constitution: and as it gradually makes itself felt, the patient may sink to death by almost imperceptible decay. But on neither of these forms of the disease have I here anything to remark: for I have nothing to add to what, in one or other shape, is so familiar to daily experience. Rather, in pursuance of the plan which has been followed, as closely as might be, through these lectures, I would limit my remarks to a less common form, where the action of the heart is suddenly deranged, or the patient is struck down in a moment by fatal syncope.

It needs no lengthened exposition here to show that the heart is something more than a hollow muscle,—that it is endowed with something higher than mere mechanical functions. Perhaps, even the attempt to prove it weakens the consciousness which each one has in his own breast of the fact. We have seen how the proper contraction of the heart may be impeded, and how mechanical disease may be secondarily induced, by mental emotions, just as well as by more tangible physical causes. But thus the cause is not mechanical nor necessarily irremediable. When it has ceased to act, there are no incurable organic effects left behind, at least in the first instance,—no obstacle to the immediate restoration of health,—nor, save a liability to the recurrence of the same functional disturbance, to its permanency. Yet this perverted action may go on to induce organic disease, or even to destroy life.

Even as such, freed from all this obscurity which coexistent symptoms may throw around it, in the mixed or opposing results of different causes, derangement of the heart's action now comes before us as the most prominent, and, indeed, the fatal symptom. Such an event is to be apprehended rather in children than in adults. This arises partly from the greater extent of tolerance of the different organs in children, which allows life, as already observed, to be continued in them under greater difficulties than could be so surmounted in an adult, and partly from the fact that they are much less able to withstand a sudden shock, when it does come, than an adult is. So, in them, valvular disease runs on more often to its natural termination, death through the heart itself. Life continues till the heart comes actually to a standstill. The various organs can do much to relieve the effects of stagnation of the blood, but they alone cannot move it onwards, and death comes at last suddenly, by syncope, when some, perhaps trivial, cause has given to the heart's action a momentary check, from which it cannot recover itself.

Dr. Latham* mentions two striking cases, where, after a sudden shock, caused by fear and anger respectively, all the symptoms of valvular disease set in, and ultimately destroyed life: yet, after death, no lesion of the mechanical apparatus of the heart, sufficient to explain these symptoms, was discovered.

It would seem that, in the moment of passion, the rhythmical action of the fibres of the heart had been suddenly deranged, and had never been restored. Thence ensued valvular imperfection, and thence disease and death, just as if the valvular imperfection had depended entirely on a physical cause. Only, as the patients' hearts were healthy, they could bear the first shock which, where the heart is already diseased, is capable of destroying life.

There is little or nothing to add here to what Dr. Latham has so graphically described under the name of the effects of a shock to the heart. The subject may be pursued at greater length in his Lectures, from which I have, throughout, so largely drawn, and, I feel, so insufficiently acknowledged. I believe that he has expressed and duly arranged all that is known on this matter, throwing the light of modern pathology on the quaint narratives in which the older observers have so well recorded what had moved their curiosity, yet passed their understanding.

It remains to trace upon a heart diseased, and already failing under its burden, the effects of what we see to be so serious an injury to the heart. No general description could display these effects better than the brief details of the following case. For the particulars of the early history I am indebted to Mr. Paget.

A gentleman, twenty years of age, had always enjoyed good health, and had always passed for a singularly healthy and robust man, almost to the moment of his sudden death. He was fond of all athletic exercises—riding, and playing at cricket; only he had a great aversion to bathing, as he said that "the cold water made him feel so tight across the chest." One day, having got up in his usual robust health, he was suddenly taken ill on Holborn Hill, —so suddenly, that he turned into a shop, and begged for a glass of water, and leave to sit down for a while. He rose and said he would walk on, but he looked so pale that the people went to call a cab:—before it could come, he was dead.

On examination of the body, his heart was found to be enormously enlarged; the mitral valve was much contracted, and there was very extensive earthy deposit round its base. The aortic valves were only two in number,—ragged, earthy, and hollowed out like carious teeth.*

Why the heart should have stopped at this particular period is perhaps less a matter for surprise than why it should have gone on for so long without a symptom. For his was not a life of quiet and repose,—he mixed in and enjoyed all the most athletic exercises. The increased obstruction which the valvular disease caused was overcome by the most exactly commensu-

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* Latham, Diseases of the Heart, vol. ii. p. 255.

† The coincidence between enlargement of the thyroid body and palpitation of the heart has been noticed by numerous writers. Extreme habitual anæmia, nervous excitability, and staring prominent eyeballs, mark very characteristically the subjects of this coincidence. Since Dr. Parry's observations called my attention to the subject (Collections, vol. ii. p. 111.), I have often met with notices of the same coincidence. Neither reading nor observation, however, have yet shown me any particularly successful method of treating this peculiarly violent and intractable form of palpitation.

* It is scarcely necessary to dwell here on what have been so very fully described by systematic writers,—namely, the effects of valvular disease on the pulse. In the present point of view, setting out, as we do, from the knowledge of valvular disease of the heart, the feel of the pulse but repeats the intimations of the stethoscope. The great practical value of the information derived from this source is rather to suggest inquiry than to confirm what we know more surely on other grounds.

† London Journal, vol. ii. p. 312.

* Op. cit. vol. ii. p. 205-206.

* I am indebted to Dr. Taylor, of Guildford Street, for some particulars of great interest in relation to the congenital origin of the disease in this case.

The son died, æt. 20, as above described.

The mother died three years ago, after forty-eight hours' illness. She had been considered to have dilatation with thinning of the walls of the heart: but no examination of the body was made after death.

The father died, since these Lectures were delivered, æt. 66, of rupture of the heart, after ten hours' illness. His heart was soft and rotten. The aortic valves were thick and opake, but efficient, the coronary arteries pervious. There was no opportunity of examining the heart microscopically.

rate increase of muscular power. Suddenly the heart failed: the huge mass which, by the most accurate adjustment of its various parts, had been doing its work as smoothly, to his own feelings at least, and imperceptibly as in health, and made up for the imperfections of the instrument by its strength, received a sudden shock; and death resulted almost as rapidly as when the pressure of the blood is suddenly removed on the rupture of an aneurism. It is of interest to trace, in the only symptom of his disease which this man had ever displayed, indications of the heart's impatience of any sudden shock. The sudden shock of cold water on the breast, though momentary, was felt much more keenly than the severe sustained exertion of the sports in which he delighted and excelled.

If the occurrence of death, under these circumstances, owned any fixed unvarying laws, it would be better to occupy our time in endeavouring to establish these laws, with however small a measure of success, than in illustrating particular points. But it is not so: we have attained no further on this matter than to know that this or that may happen. We have a succession of pictures rather than one continued view. I would, then, ask your patience, while I bring forward but one more picture of human suffering from this gloomy series, selecting, as before, a case where the usual earlier symptoms had been absent, or at least unnoticed. Not to say that the history of disease of the heart might not have been elicited, by inquiry, either in this or the preceding case, had circumstances allowed; at least, to them the symptoms appeared to date from the stated period. But for the accident, the subject of the following might have lived on till death overtook him as suddenly as it did that of the preceding narrative. For the opportunity of observing this patient, I have much pleasure in acknowledging my obligations to Dr. Jenks, of Brighton.

Thomas Elliott, aged 25, was admitted into the Sussex County Hospital, under the care of Dr. Jenks, September 1849, pale and dusky-looking, suffering intense dyspnœa. He said that he had suffered acute rheumatism on two occasions, thirteen and five years ago, in St. George's Hospital. Before the attacks of rheumatism he had been strong, but since then he had been at times liable to pain in the region of the heart, and to palpitation. However, he thought himself well till ten days before his death, when, walking home in the dark, he tripped over a stone and stumbled, but did not fall. From that moment his symptoms set in: as he said, he stumbled a healthy man, and he rose up such as he came in, after eight days, to die.

On auscultation, the heart was found to beat with very great rapidity and irregularity, but there was no morbid sound. The impulse of the heart was not forcible, and its situation was ill defined. He had abundant small crepitation, with dulness on percussion, over the upper lobe of the left lung.

He was supported by wine, while an attempt was made to relieve his circulation by taking a little blood from over the lungs by cupping: but he died in a few hours from the time that I saw him.

The pericardium was found to be closely adherent by tough old areolar tissue. The right side of the heart was scarcely larger than natural. The left was enormously enlarged, the mitral valve thick and stiff, evidently not efficient, the chordæ tendineæ elongated and much thickened. The aortic valves were rigid, their attachments lengthened, and their edges rolled back.

Dissection fully explained this very obscure case, though it did not favour the interpretation which was put upon the symptoms and history before death. A previous attack of rheumatism, subsequent enjoyment of health suddenly interrupted by a fall, then all the symptoms of extreme valvular disease, with no evidence of enlargement of the heart,—how were these to be explained? Nothing seemed more probable than that an extensive rupture of a valve had taken place: nothing was further from the truth. The physical examination of the heart tended only to confuse the diagnosis, for in his condition no thorough examination could be made, and the evidence obtained was altogether inconclusive or negative. There had been no mechanical injury inflicted on the heart by the slight shock which it had sustained; but this slight shock had inflicted an irreparable injury on the nice adjustment of the action of its several parts. The regularity of its action had been for a moment checked, and could not be restored again; and this irregularity had induced sudden pulmonary congestion, with rapid and extensive effusion into the vesicular structure of the lungs.

It needs but little more to complete the subject of valvular disease of the heart,—but a few words on the last end of our ineffectual pains, and of the sufferings of the patient, on the period when the evident approach of death suspends every other indication, save that of soothing the last moments of the dying man.

It were a sad story to tell in how many various ways death has carried off patients

suffering from disease of the heart, though, in many cases, the history is singularly uniform.

Thus: they have had a slight diarrhœa, they are observed to look pale on returning to bed; with all haste assistance is sent for, but death has already done its work, and neither brandy, nor ammonia, nor ether, can relieve the heart of the burthen which has weighed it down. Perhaps the patient has been sitting up, as being a little more cheerful than usual; perhaps the unusual heat has exhausted him; or perhaps we turn to the cold as the explanation of the sudden fatal syncope. But in truth we need very little more explanation than dissection gives us, for it is to be wondered at how the heart went on so long, and how smoothly everything else must have gone on not to suspend its action long before. It would be yet more to be wondered at, if, after any interruption, it could have righted itself.

For dissection shows us in these cases the most extreme disorganization that might seem to be compatible with any continuance of the functions of the heart and of life. The orifices may be contracted to almost complete closure, the organ hypertrophied and dilated, forcing the lungs out of its way; its walls rigid and fibrous, creaking under the knife; or the pericardium may be agglutinated with the walls into a leathery elastic mass, which we wonder to think how it could have contracted to expel its contents at all.

But the approach to death has often greater terrors than death itself,—so calm, although so sudden, as just described. Indeed, it were a sad story to tell how patients with disease of the heart have died,—the tragedies, so to say, of the medical wards of our large hospitals. How some, wrung with pain, have struggled in the week-long agony of death. How some have, for days together, fixed themselves in the most fantastic postures, the only way in which they could find relief; some leaning forwards,* resting their heads on a stool to catch a few minutes' sleep; some on their hands and knees, till the approach of death, blunting their sensations, allowed them to lie down,—a sure sign of coming dissolution. How some, not one only, in their gloomy despondency,—for

> . . . . "we are not ourselves
> When nature being oppressed commands the mind
> To suffer with the body,"—

have laid violent hands on themselves, and others have shrieked in terror when the agony of death at last came upon the dreams which had cheered them in the thought that their sufferings were but for a while, and in the hope of renewed health and strength. He had done a good service to humanity, who had taught us how to prevent disease of the heart; and he, as society is constituted, yet more, who had taught us how to cure it. But his were no little diminution of the cup of human misery who should teach us but its enthanasia.

* Especially in connection with dilatation of the ascending aorta.

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Dr. A. T. Thomson —

GROUP III. NON-FEBRILE VESICULAR ERUPTIONS*.

The eruptions comprehended under this group are characterised by *vesicles*, or round elevations of the cuticle, filled with a serous fluid more or less transparent. The fluid, however, as well as its cuticular covering, soon acquires opacity, probably owing to the absorption of the aqueous portion of the serum; thence the vesicles lose their pellucidness, and acquire either a dingy white or a pale-yellow hue: occasionally, as in *Scabies*, they are mixed with pustules. They sometimes, but rarely, terminate in resolution; more frequently, the fluid is absorbed, or it escapes and concretes into crusts or scabs, which are in some instances, however, formed of the altered cuticle. The inflammation which causes the vesicles is most frequently of a chronic character.

No class of society is exempt from these eruptions; but some of them, namely *Eczema*, *Rupia*, and *Scabies*, more frequently occur in the lower than in the middle or the higher ranks. They are not more common in one sex than in the other; neither are they peculiar to any age or temperament. They appear, also, in every season of the year.

S. The non-febrile vesicular eruptions are generally preceded by reddened or inflamed, detached spots, sometimes extremely minute, in the centre of which the vesicle forms; at other times, an inflammatory redness is seen spreading over a portion of the skin, to a greater or less extent, upon which the vesicles rise in clusters: but occasionally they appear without any apparent previous inflammation, or other local symptom except itching. As they enlarge, they are surrounded, individually, by a distinct red areola, or they are clustered upon the inflamed surface. They vary considerably in size. In form, they are either acuminated, or globular, or flattened. In some instances, they are few in number and detached from one another; in others, they are numerous, and closely aggregated in clusters of an irregular form; or

VER. SYN. Φλυκταινα, (*G.*): Vesicu'æ (*Lat.*): Vesicules (*Fr.*): die Wasserblattern (*Germ.*): Vesicles (*Eng.*).

NOS. SYN. Vesiculæ (*Willan, Bateman*): Ecphlysis (*Good*): Cytisma, (*Young*): Vesicules (*Biett*): Inflammations Vesiculeuses (*Royer*).

in bands; or in regular circles. They are frequently preceded neither by pain, nor any sensation in the part: sometimes, by acute and severe deep-seated pain, or by pungent heat; and, after their appearance, they are generally accompanied by tingling or itching.

The eruptions in this group of chronic inflammatory affections of the skin are rarely spread over the whole surface of the body; although I have witnessed cases of Eczema which involved the greater part of the skin; but they generally appear on circumscribed portions of it. They are not confined to any particular regions, with the exception of *Scabies*, some of the species of *Eczema*, and some of the varieties of *Herpes*.

The immediate seat of the inflammation which forms the vesicles is the uppermost sub-epidermic or reticular layer of the cutis, in which partial congestions take place, and pass into inflammation of a degree adequate to cause the effusion of the serum, which elevates the cuticle: thence the vesicles are produced in the same manner as when vesication is the result of topical irritants. The formation of the vesicles also, generally, proves critical: on their appearance, the inflammation gradually subsides.

C. Some of the non-febrile vesicular eruptions are the effects of local irritations; but in general they do not depend upon local causes; neither are they the consequences of general fever, such as precedes the contagious exanthematous eruptions, although they are almost always the result of some constitutional disturbance, most commonly gastro-intestinal irritation, and are accompanied with some degree of symptomatic fever. The sympathy, indeed, which exists between the skin and the mucous membrane of the alimentary canal, as a cause of this description of cutaneous eruptions, is well demonstrated by the appearance of Herpes and Eczema during the presence of dyspepsia in one or other of its various forms; and not unfrequently with decided relief to the internal disease. That this should occur is not wonderful, if we reflect that many diseases of the mucous membrane are developed by noxious influences operating on the skin; and that "the skin may become the seat of extensive exanthematous inflammation, acute as well as chronic, from its having, by virtue of its office of a secreting organ, a certain affinity for morbid matters circulating in the fluids of the body*." It is not, however, essential that there should be even a morbid condition of the mucous surface for the appearance of some of these eruptions; it is well known that the action of the skin is much modified in accordance with the condition of the nervous and the vascular systems. Neither is it necessary that the exciting cause should be material, the influence of mental emotions being adequate for their production. It is, indeed, well known that the power of mental emotions over the cutaneous system is so considerable, that eruptions on the skin are, sometimes, the immediate result of the depressing passions, influencing the dermoid through the nervous system. I am acquainted with a lady of a highly hysterical diathesis, who has several times suffered from a small vesicular eruption on the upper part of the chest, immediately after a fit of distressing anxiety, caused by domestic calamities. These vesicular eruptions are not hereditary; nor, with the exception of Scabies, are they contagious.

D. The distinction between the non-febrile vesicular, and the non-febrile pustular eruptions is not always so very obvious as to lead to a ready and correct diagnosis; for, when the effused fluid becomes opaque and assumes a sero-purulent aspect, the vesicle may easily be mistaken for a pustule. The defect, however, of a hard, circumscribed, inflamed base; the fluid being either serous, or sero-purulent, but never true pus; and the crusts being thin and lamellated, not cellular; are characteristics of the vesicle sufficient for every diagnostic purpose.

P. The vesicular eruptions of this group are not dangerous; but they are sometimes severe, protracted, and resist the most energetic treatment. They seldom terminate by resolution; the fluid is either absorbed, or it exudes and concretes into yellowish-brown lamellated scabs; or it occasionally, although rarely, forms ulcerations.

T. The following are the indications to be fulfilled in the general treatment of the non-febrile vesicular eruptions:—1. The removal of every cause of local irritation, and the correc-

* Muller's Elements of Physiology, trans. by Baly, vol. i. p. 782.

tion of any morbid condition of the mucous membrane, or other internal organ, to which the eruptive disease can be attributed: 2. The improvement of the general secerning function: 3. The augmentation of the tone of the habit to that degree which is requisite to subdue the morbidly excitable condition of the skin, so as to change diseased into healthy action in that part of the system. The mode of fulfilling these indications shall be noticed in treating of the genera, which constitute the group.

There are four genera of non-febrile vesicular eruptions; namely—1, HERPES; 2, RUPIA; 3, ECZEMA; 4, SCABIES.

Willan and Bateman have placed Varicella, Vaccinia, Miliaria, and Aphtha, in the order Vesiculæ; and Scabies among the pustular eruptions: but, as I regard both Varicella, and Vaccinia which may be considered a congener of Variola, as real exanthemata, and Miliaria as always the result of general fever, they cannot be ranked as non-febrile vesicular eruptions; and it is not easy to conceive upon what ground Aphtha can be considered a cutaneous disease, without comprehending under that term every affection of the mouth, the fauces, and the alimentary canal. Rayer and Biett, who follow closely the footsteps of Willan and Bateman in their classification, have, nevertheless, modified their arrangement in the formation of this group. The former has separated Varicella, Vaccinia, and Aphtha from, and added Scabies to, the list of Vesiculæ: the latter has also rejected Aphtha, and placed Scabies in it.

The syphilitic eruptions, which coincide with the external aspect of the genera in this group, are necessarily embraced in it.

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NON-FEBRILE VESICULAR ERUPTIONS.

GENUS I. HERPES*.

Herpes is an eruption of small, distinct, round vesicles, aggregated in irregular, circumscribed clusters upon inflamed patches of the skin, and accompanied with itching or tingling.

S. The eruption is usually preceded by some degree of constitutional disturbance; but this is rarely severe: and indeed, in many cases, it is either altogether absent, or so trifling as to be scarcely obvious to the patient. When present, it consists of languor, accompanied with anorexia, and a sensation of heat and tingling, sometimes of deep-seated lancinating pains in the affected parts, which occasionally, not always, dis-

* This term is derived from the Greek word ἕρπω—serpo, I *creep*; and it was employed by the Greeks to express any spreading eruption on the skin. Actuarius, in the following passage, quoted by Bateman (*Synopsis*), explains the origin of the term. "Herpes dicitur eo quod videatur ἕρπειν (quod est serpere per summam cutem), modo hanc ejus partem, modo proximam occupans, quod semper, priore sanatâ, propinqua ejus vitium excipiat; non secus quam ignis qui proxima quæque, depascitur, ubi ea quæ prius accensa erant, deficiente jam materia idoneâ, prius quoque extinguuntur." (*Method. Med.* lib. ii. c. 12.) The ancients appear to have been well acquainted with its diagnostic characters, although they have not described its symptoms with perspicuity. Galen (*Lib. de Tumoribus præter naturam*) mentions three kinds of Herpes; two of which only, namely, κεγχριας, miliary, and φλυκταινώδης, vesicular Herpes, accord with the disease of modern writers. He describes it well, as an eruption of minute and crowded vesicles (φλυκταιναι μικραι), of the size of millet seeds, on the surface of the skin. Celsus, also, describes it under the title *Ignis sacer*. He speaks of the vesicles as pustules "quarum nulla altera major est, sed plurimæ perexiguæ."—"Serpitque id nonnunquam senescente eo quod primum vitiatum est: nonnunquam etiam exulcerato, ubi, ruptis pustulis, ulcus continuatur, humorque exit, qui esse inter saniem et pus videri potest. Fit maxime in pectore, aut lateribus, aut eminentibus partibus, præcipue in plantis." (*De Medicina*, lib. v. c. 28, § 4.) Indeed, most of the old authors speak of Herpes as a vesicular disease. Fernelius describes it as a papular eruption. (Lib. vii. *De Extern. Affect.* c. iv.)

VERN. SYN. Ερπης ζωστηρ (*Greek*); Herpes (*Lat.*); Dartre, Herpe (*Fr.*); Zittermahl, Flechte, (*Germ.*); Springend vuur (*Dutch*); Erpete (*Ital.*); Herpes (*Span.*); Neshr (*Arab.*); Tetter (*Eng.*).

NOS. SYN. Ερπης (*Galen, Dioscor, Celsus, Aetius, Paulus Ægineta*), Ερπηδων (*Nicander*); Herpes (*Pliny, Lucil, Cullen, Sauvage, Linnæus, Willan, Bateman*); Formica (*Avicenna*); Cytisma Herpes (*Young*); Ecphlysis Herpes (*Good*).

appear on the breaking out of the eruption. Fever is rarely present.

The vesicles of Herpes are at first minute and distinct; but, as they enlarge, they coalesce and form clusters of various forms and dimensions. They are at first watery, pellucid and colourless; but the fluid which they contain becomes gradually opaque and of a milky, or yellowish colour, but not purulent. The cuticle then shrinks, acquires colour, and forms a scab, which falls and leaves the surface sound. In some instances, however, the vesicles burst, and tedious ulceration ensues. The eruption, in some of the forms of the disease (H. *phlyctænodes* and H. *circinatus*), may affect the body generally, spreading from the neck to the trunk, and to both the upper and the lower extremities; and different parts of the body are affected at the same time: other forms of it (H. *labialis* and H. *præputialis*) are confined to a particular locality; whilst others are distinguished by the figure which the clusters of vesicles assume; namely, H. *zona*, H. *circinatus*, and H. *iris*. The eruption, in most of its forms, runs a certain progress of increase, maturation, and decline, in a period generally from ten to fourteen days*.

Herpes, in many of its forms, is a common disease. I have witnessed cases of it in every class of society; in all sexes, although women are more liable to it than men; and in individuals of every age, after the period of the first dentition. It is, however, most common about the age of puberty, and in the decline of life.

D. Although the diagnostic characters of Herpes are very obvious, yet it has been confounded with Lichen, Erysipelas, Eczema, Pompholyx, and even with Impetigo. From the first, it is readily recognised by the eruption being vesicular instead of papular: from the second by no tumefaction, tension, and extensive redness preceding the appearance of the vesicles; by the skin retaining the natural state between the clusters, which are merely surrounded by a red areola; by the regular form and clustering of the vesicles; and the absence of the

* Lorry extends the period to forty days—"vulgò intra quadraginta dies terminandum." De Morbis Cutaneis, Introductio, § vi.

fever which accompanies Erysipelas*. From Eczema it is distinguished by the round, purely vesicular form of the eruption, in the commencement; the regular course which it maintains in its progress; the maturation and decline of the vesicles, and the limitation of their duration, in the greater number of instances, to a nearly certain period of time. The psydracious pustules of Impetigo, notwithstanding the admixture of vesicles with these, in some cases; the semi-pellucid plates which succeed the pustules; and that disease having no limited duration; clearly distinguish it from Herpes. From Pompholyx, Herpes is recognised by the vesicles appearing in groups or clusters on an inflamed patch.

C. Without regarding the opinions of the ancients, who referred Herpes to thickened pituita†, and the admixture of pituita with bile‡, there is no doubt that its exciting causes are such as can produce any partial congestion or inflammation of the skin; whether cold, violent exercise, errors in diet, dyspepsia, or any other affection of internal organs. It has also appeared as the result of violent paroxysms of passion. In some instances it has been produced by external irritation. The proximate cause of the eruption is congestion and consequent inflammation in the uppermost layer of the true skin, which is relieved by the effusion of the serum which forms the vesicles. A question arises, how far are the pain and tingling to be ascribed to pressure on the peripheral extremities of the nerves of sensation?

Herpes is not contagious; neither does it appear to be hereditary§. In some of its forms, it is occasionally critical of certain febrile affections; and probably, in every instance, it may be regarded as symptomatic of some constitutional disturbance.

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* Lorry adds—"nisi epidermicè sæviat." De Morbis Cutaneis, pars. i. sect. i.

† *Hippocrates.* Lib. de affect. sect. v. *Avicenna*, fen. 3, cap. vi.

‡ Galen, de tumor. præternat. Med. Method. lib. iv. Paulus Ægineta lib. iv. cap. xx.

§ Lorry and some other old writers, however, assert its contagious nature.—"Per contagium adhuc herpes communicatur, uti osculando, si herpes in facie fit, vel concubando." *Tract. duo Patholog. Med. Monspel*, t. ii. p. 273.

P. The prognosis in Herpes is always favourable: nevertheless, danger may result from the retrocession or repulsion of the eruption. A much extended erythematic redness, with interspersed vesicles, generally denotes an obstinate disease.

T. The general treatment in both the species, and in all the varieties of Herpes, is nearly the same. When the local varieties occur as critical eruptions in the decline of fevers, or acute internal disease, they ought not be interfered with: and, even when they accompany inflammatory affections under which the patient is still labouring, although bloodletting or any other means requisite to subdue the original disease are resorted to, yet the herpetic eruption should be left to run its own course. If the eruption can be traced to a deranged condition of the digestive organs, it must, in such a case, be regarded as a symptomatic or secondary affection, and the treatment consequently directed to the primary disease, by the removal of which, the Herpes, indirectly sharing the salutary influence of the means employed, will generally decline and disappear. Under these circumstances, the disease may demand antiphlogistic measures, which, independent of the internal affection, would not be requisite; for, when the primary disease is not of an inflammatory character, even the deep-seated, severe pain which precedes the appearance of Herpes *Zoster*, and remains after it, especially when it is seated on the thorax, is not relieved either by general or topical bloodletting. Indeed, the quick, sharp, incompressible pulse which accompanies this state, and which might lead to the presumption that pleurisy is present, is wholly the result of the pain, and is to be relieved by narcotics. I have found nothing answer this purpose better than the following combination:

℞ Magnesiæ, ℈i.
Colchici seminum vini, m. xlviii.
Solutionis Morphiæ Bimeconatis, m. xxx.
Misturæ Camphoræ, f ʒxi. M.
Fiat haustus horâ somni sumendus.

Such a narcotic is particularly indicated when the pain is severe: by its means much comfort may be afforded, and sleep secured. In some instances, however, even more powerful narcotics fail to afford relief.

It is in that form of indigestion which depends on functional derangement of the duodenum that Herpes most commonly appears. The indications to be fulfilled are exactly those which present themselves to our attention when no affection of the skin exists; and which must necessarily vary according as the primary affection is of an *asthenic* or a *sthenic* character. In the asthenic form of the dyspeptic affection, the varieties of Herpes which particularly display themselves are H. *circinatus, præputialis, vulcaris*, and *auricularis;* whilst H. *zona* is that which usually attends the inflammatory duodenal affection.

1. When the herpetic eruption can be traced to the first of the above-mentioned affections, the indications to be fulfilled are:—*a.* to unload the duodenum; *b.* to restore its proper function by promoting a more healthy secretion of bile; and *c.* to correct the morbid condition of the intestine.

a. b. No medicines so effectually answer the first and second indications as Sulphate of Magnèsia, combined with Infusion of Senna, in combination with some warm aromatic. When the sulphate is administered in a portion of fluid adequate only to its solution, the stimulus given to the duodenum is extended to the liver and the pancreas, both of which are in a torpid condition; thence their secreting powers receive a new impulse; and the flow of bile into the duodenum being also elicited, this is afterwards freely evacuated by the administration of Infusion of Senna.

c. With regard to the third indication, neither calomel nor alteratives are in general required; it is sufficient to maintain a moderately free condition of the bowels by mild aperients, and to improve the tone of the general system, in which the alimentary canal must necessarily share. This I have seen best effected by small doses of saline purgatives: followed by the disulphate of Quinæ, in the decoction of Sarsaparilla, or the Infusion of Chiraytæ; the tepid shower bath; and friction over the duodenal surface with the hair or the coarse flannel glove.

2. When the duodenal affection is of an inflammatory description, Herpes *phlyctænodes* and *zona* are the varieties of this genus of eruptions which usually accompany it. The indications to be fulfilled, in this case, are—*a.* the removal of the sub-inflammatory condition of the mucous membrane of the diseased intestine; *b.* the facilitating of the digestive function, by a proper regulation of diet, and the use of gentle aperients.

a. In our endeavours to fulfil the first of these indications, notwithstanding the inflammatory character of the internal disease, unless the patient is plethoric, and the pulse hard, tense, and incompressible, with a red, dry tongue, general bloodletting is not required; on the contrary, more advantage is obtained from small but repeated abstractions of blood, to the amount of ten or twelve ounces, by cupping on the right hypochondrium. If a hæmorrhoidal diathesis exists, and the swollen, indented condition of the tongue indicates general visceral congestion, instead of cupping on the region of the duodenum, eight or ten leeches may be applied to the verge of the anus. These may be followed by moderate doses of gentle aperients, such as castor oil, or of infusion of senna made with cold water: the castor oil, indeed, not only moves the bowels moderately, but, at the same time, it soothes the inflamed mucous surface. As an antiphlogistic, nitrate of potassa, in small doses, namely, from eight to twelve grains, is perhaps the best that can be prescribed in cases of Herpes connected with inflammatory duodenal disease. Diaphoretics are not indicated; and even when there is considerable heat of skin, more advantage is derived from the employment of cooling diluents than from any medicines calculated to excite perspiration. It is only when there is a decided derangement of the hepatic secretion that mercurials are called for, or rather, in such a state, they are not likely to prove injurious. When their administration is decided upon, the mildest preparations, for example, the blue pill or the Hydrargyrum cum Creta, are to be preferred; and the dose of either should be so small as not to irritate the mucous membrane, but, nevertheless, be adequate to act upon the diseased organ.

b. With respect to the second indication, it is best fulfilled by placing the patient on an exclusively farinaceous diet, with a moderate proportion of milk or light animal broths, abstaining from every stimulant, whether solid or fluid. If milk disagree, it is likely to be made to agree if warmed and mixed

with seltzer or soda water. As the inflammatory condition of the mucous membrane subsides, the herpetic eruptions disappear; and, generally, slight debility and languor ensue. These symptoms are best combated by a light infusion or decoction of Cinchona bark, combined with small doses of Nitrate of Potassæ. I have found the decoction or the infusion of the bark preferable to the solution of the salts of Quina or of Cinchonia, in these cases; for, as the increased susceptibility of impression, on the recently inflamed mucous membrane, remains for some time after the inflammatory action is subdued, the salts of these alkalies are too excitant to be borne with impunity.

As to the eruptions themselves, little should be attempted until the primary affections are subdued: for, if the eruptions are dependent upon the visceral diseases, it is evident, that, as the secondary affections partake of the nature of the primary diseases from which they spring, the former are likely to undergo the influence of the changes effected upon the latter, by the treatment to which they are subjected.

The modifications of treatment which the different varieties of the disease demand, and the topical applications which have been found most advantageous, shall be noticed under each variety. I may, however, remark here, that the ancients trusted almost entirely to external remedies: Celsus ordered the affected parts to be fomented, either with hot water or with warm wine, according to circumstances*; others trusted chiefly to astringent applications,—a practice which descended to our countryman Turner, who employed solutions of white vitriol (Sulphate of Zinc) and alum, and ointments containing calomel†. To this confidence in the beneficial influence of astringents, we may ascribe the popular custom, which still prevails among the vulgar, of applying ink to Herpes *circinatus*. There is no doubt that, in cases where topical remedies are indicated, they need not be refrained from on account of danger likely to arise from repelling the eruption: for although this has happened, yet, experience has demonstrated that it is not very likely to occur. When the eruptions are solitary and circumscribed, and cannot be traced to any derangement of an internal organ, topical applications may be at once resorted to, varying their nature according to the character and the period of the eruption. In the commencement, whilst the inflammation, heat, and tingling remain, the applications should be cooling and sedative; but when these symptoms have been allayed, astringents and moderate stimulants may be employed.

From this sketch of the general treatment of Herpes, it must not be inferred that it is a disease always under the control of medicine. Cases occasionally occur of extreme severity and long duration; consequently the favorable prognosis which may be always pronounced respecting its danger, does not authorize the practitioner to regard it, in every instance, with indifference. It is true that, when the local varieties appear as critical of some acute disease, Herpes may be disregarded, and treated merely by topical applications: but when it is dependent upon, or complicated with, internal diseases, the most acute sufferings from deep-seated pain are to be allayed; the irritable state of the nervous system is to be soothed; and the digestive function improved. An accurate knowledge of the internal disease must, in every case, be obtained, before any measures can be taken likely to prove effectual in removing the morbid condition of the skin.

Bateman has described five species of Herpes; namely—1, H. *phlyctænodes;* 2, H. *Zoster;* 3, H. *circinatus;* 4, H. *labialis;* 5, H. *præputialis;* and 6, H. *Iris*. Rayer has separated H. *Zoster* from this list, and placed it among the *Bullæ:* but he has added three other local species, namely, H. *auricularis*, H. *palpebralis*, and H. *vulcaris:* whilst Biett regards all the forms of the disease as varieties of H. *phlyctænodes*, differing only in the seat of the eruptions and the form of the vesicular patches. Close observation of the character of these eruptions, however, has convinced me that H. *Iris* is a distinct species: and, on this conviction, the following arrangement of the genus is founded.

* "Ipsa autem ulcera, si mediocriter serpunt aqua calida; si vehementius vino calido fovenda sunt"—*De Medicina*, lib. v c. 27, § 5.

† A Treatise on Diseases of the Skin, chap. v.

Species i. H. *phlyctænodes*.

* *Varieties depending on the form of the vesicular clusters, migratory.*

Var. a. H. *Zoster*.
b. H. *circinatus*.

** ——— *depending on the site of the eruption, non-migratory.*

c. H. *labialis*.
d. H. *palpebralis*.
e. H. *auricularis*.
f. H. *præputialis*.
g. H. *vulcaris*.

Species ii. H. *Iris*.

Species i.—Herpes *phlyctænodes**.

This species of Herpes may be regarded as the type of all the varieties arranged under it; but it does not affect any particular locality, nor assume any determinate form. It usually appears in irregular, agglomerated, small vesicles, at first not larger than a millet seed; displaying themselves sometimes on the chest or upper part of the trunk of the body, or on the neck, or the cheeks; sometimes on the arms, extending to the hands and the fingers; more rarely, but occasionally, it commences on the legs. Sometimes a single cluster only displays itself; but, at other times, many break out at the same time, and coalesce, and rapidly extend, new clusters successively appearing for nearly a week. Each fresh crop of the eruption runs the same course as those crops which preceded it, whilst the termination of the whole is usually completed before the tenth or fourteenth day; although the period is sometimes extended to twenty days.

The clusters of vesicles vary from an inch to three or four

* Vern. Syn. Dartre (*Fr.*); die Flechte (*Germ.*); Miliary Tetter (*Eng.*).
Nos. Syn. Ερπες Φλυκταινιδες (*Auct. Græc.*); Herpes miliaris (*Sennert, Hoffm. Good*); Dartre phlyctænode (*Alibert*); Herpes phlyctenoide (*Biett, Rayer*).

inches in magnitude (Pl. 1. *a b*). Each cluster contains vesicles of various sizes, from the minutest point to one third of an inch in diameter; but the smaller vesicles are always the most numerous. Whether the clusters are distant or near, the intermediate skin appears almost of its natural colour, unless a number of small clusters are crowded together, when the portions of interposing skin are red and inflamed (Pl. 1. *c c*). The patches generally extend longitudinally, especially when they appear on the extremities.

S. The eruption is commonly preceded by some slight constitutional derangement, such as languor, anorexia, or a febrile attack. It first displays itself in a number of small red points, grouped in a somewhat circular form; or it appears as an irregular red blotch, which feels rough to the finger. On the following day, the patches are covered with small, transparent, shining, incompressible vesicles; whilst the redness extends a small space beyond the outline of each group. At first, the vesicles are nearly pellucid and globular; but, in twelve or fourteen hours, the contained lymph becomes opaque, and of a milky or pale yellow colour. On the third, or the fourth day, the vesicles appear shrivelled; after which, the centre sinks and forms a dry brown crust or scab, that, after six or eight days, falls off, and leaves a red spot, which slowly regains the natural colour of the skin. In some instances the vesicles burst, and, having discharged their contents, either form the usual scabs, or slight ulcerations remain, which are sometimes difficult to heal.

During the extension of the eruption, when it is not confined to a single patch, the appearance of each cluster of vesicles is preceded by a sensation of pungent heat in the part, and restlessness. On the breaking out of the vesicles, these symptoms are followed by itching and tingling, aggravated by taking food, or swallowing warm or stimulating fluids; or by external heat, and when the patient is warm in bed.

The constitutional affection is not always immediately relieved on the first appearance of the eruption; but it gradually abates as the clusters progress and extend. The smaller the vesicles are, the more extensively the eruption spreads over the body. It most frequently affects the arms, the thighs, back and face.

C. Herpes *phlyctænodes* often appears without any obvious cause. It is usually referred to cold; violent exertions*; or to having drank water in a heated condition of the body: but it most commonly depends on some derangement of the chylopoietic viscera; and this is rendered more probable when the patient has previously complained of obtuse pain in the posterior part of the head, headache, vertigo, or a sensation of fulness or distension of the head, with languor, a disinclination to any exertion either of mind or body, and depression of spirits. It has been attributed to mechanical causes, in an excited condition of the system, (see Case II).

D. Herpes *phlyctænodes* is readily distinguished from the other varieties of the species, by the disease appearing on several parts of the skin at the same time; by its extension, sometimes, over a great portion of the surface of the body, as well as by the irregular form of the clusters; and the nearly miliary character of the vesicles. The younger and more robust the patient is, the vesicles are more decidedly miliary, and spread more extensively over the surface of the body.

Biett and some other continental writers have considered it necessary to point out the distinction between this species of Herpes and Pemphigus; but it is scarcely possible to confound the former with a disease in which the eruption consists of large, distinct bullæ; or even with *Pompholyx*, the bullæ of which are numerous, and sometimes approach one another; but they never appear in aggregated patches like those of the small vesicles, which characterize the eruption of Herpes *phlyctænodes*.

T. The treatment of this species of Herpes is conducted upon the general principles already laid down; but modified according to the age and constitution of the patient. Thus, if the patient be young and robust, and the pulse indicate the necessity of depletion, a moderate bleeding may be necessary at first; but, in general, gentle aperients, demulcents, the use of the warm bath, and a mild diet, consisting chiefly of milk and farinaceous matters, are adequate to answer every intention. When the case is protracted, minute doses of the blue pill, or Hydrargyrum cum Creta, with decoction of Sarsaparilla, will be found useful.

* Turner mentions the case of a servant who walked in the heat of the day from her master's country house to London, and was seized with a burning heat and tingling in her thigh, which was immediately followed by Herpes.—*Treatise on Dis. of the Skin.*

With the exception of the warm bath, at 95° Farenheit, or the aqueous vapour baths, topical applications are seldom requisite. If the itching be very troublesome, it is rapidly allayed by applying over the affected parts pledgets of lint, soaked in a lotion, consisting of equal parts of tincture of opium, alcohol, and water. If the vesicles happen to be rubbed, and ulceration occur, this is best treated with a solution of sulphate of zinc. Bateman says "that the little ulcers may be touched with butter of antimony*" *(chloride of antimony)*; but I have never met with a case which required it.

The following cases are well calculated to demonstrate the efficacy of a more active plan of treatment than is usually requisite, when the eruption is accompanied with an inflammatory state of the habit.

CASE I.

John Basset, æt. 40, a coach-painter, was admitted, March 5, 1838, into University College Hospital. He is of a sanguine temperament, and naturally delicate; a widower; temperate and regular in his habits: his place of abode is not very healthy. He is a native of Somersetshire; but he has resided in London twenty years, and has always enjoyed very good health, with the exception of an attack of typhus fever sixteen years since. He never had any venereal disease.

About a fortnight before last Christmas he caught cold by getting wet through, and remaining in his damp clothes: at this time, he was an out-patient at Charing Cross Hospital, for a complaint which consisted of chilliness, numbness, and stiffness of the limbs, with little pain. He likewise had cough, with an expectoration of thick sputa, occasionally mixed with blood. He was rapidly recovering, when, having caught a fresh cold, he felt some pimples on the back, where

* Pract. Synopsis, 7th ed. p. 325.

a plaster had been applied in consequence of a fall. The eruption gradually increased, stretching round to the abdomen; and, subsequently, appeared on both upper and lower extremities. It was not attended with any itching or tingling; it, however, smarted a little.

On his admission into the Hospital, the eruption had assumed a vesiculo-pustular character. It covered the lower part of the abdomen, the back, and the thighs; the legs were also partly covered by it; and there were some clusters on the shoulders, the breasts, and around the mouth. The eruption appeared to be in different stages of its progress: on some parts, in the *most recent* stage, it consisted of minute, firm, red elevations; in the *more advanced*, there were perfect vesicles, about the size of a millet seed, having an inflamed base; in the *still further advanced*, the vesicles were larger, firmer, redder, and contained a more opaque, purulent-like fluid; and when *most advanced*, the vesicles were shrunk, and covered with a little brownish crust or scab. The clusters in many parts formed irregular circles and semicircles. The general appearance of the patches of surface on which the vesicles were seated was dark red, particularly on the legs. It caused no uneasiness, unless when accidentally rubbed; neither did it itch, or smart, or tingle. The general health of the patient was apparently good: there was no obvious disturbance of stomach; no affection of the chest nor of the heart. The pulse was small and quick.

V. S. ad ℥x. Balneum Calidum omni nocte.

℞ Pulveris Jalapæ comp. ℈i, cras primo mane sumendus. Low diet.

March 9th.—Much of the eruption has died away; but fresh vesicles are appearing. The blood taken on the 5th was buffed. Sumatur Pulveris Jalapæ comp. ℈i, alternis noctibus. Balneum Calidum secunda quâque die. Let him have middle diet.

16th.—The eruption is less on every part; indeed, it is dying away. Pergat in usu pulveris. Give him a pint of milk daily.

19th.—The eruption is much less distinct. Haustus purgans pro re nata. Let him have full diet.

23rd.—The eruption is nearly gone. He complains only of great weakness.

26th.—Improving. The jalap powder causes griping.

℞ Extracti Colocynthidis comp. gr. v.
Pulveris Scillæ, gr. ii.
Pulveris Ipecacuanhæ, gr. i.

Ft. pilulæ ii, alternis noctibus sumendæ. Omittatur Pulvis Jalapæ. Balneum Calidum tertia quaque die.

30th.—The remains only of the eruption is to be seen; but he is still weak.

April 3rd.—Much the same. Omittatur Balneum.

9th.—He has been complaining of pain in various parts of the limbs, something like rheumatism. Omittantur medicamenta.

℞ Sol. Potassii Iodidi, m. xx, ter quotidie.

13th.—The pains are rather better than they were; but he is still very weak. Pergat in usu guttarum.

16th.—He is still very weak, but in no pain.

℞ Potassii Iodidi Solutionis, m. xxx, ter quotidie.

20th.—He is getting gradually stronger.

24th.—Discharged, cured.

In this case, the propriety of the bleeding is questionable. The moderate purging, and regulated diet, with rest and quiet, seem to have been the chief sources of the recovery.

CASE II.

Ann ———, æt. 25, a single woman, was admitted, 27th August, 1838, into University College Hospital. She has not menstruated for the last three months until to-day; and, during this time, she has suffered much from pain in the head, and giddiness. On Saturday last, August 22nd, she observed a few small, red patches on the left arm, which were attended by great smarting and heat. After a few hours, these became clusters of minute vesicles, and fresh ones continued to make their appearance both on the left and the right arm, so as to form large patches. The affected parts continued very red and hot; but she experienced no uneasiness before the appearance of the eruption. There were likewise a few small patches on the neck. The pulse was 120, and sharp; the tongue white and its papillæ slightly elevated;

the bowels were open. There was great thirst, no appetite, and much pain in the head. V. S. Brachio ad ℥xvi.

℞ Calomelanos gr. viii, hora somni sumendus. Haust. Sennæ primo cras mane.

29th.—The blood taken on the 25th was buffed and cupped. The heat of the skin began to diminish before the blood ceased to flow, and the patches became much paler. The bowels have been freely acted on by the medicine. V. S. Brachio ad ℥xvi. Repetantur Calomel et Haustus.

31st.—The blood last taken was also buffed and cupped. The heat and redness are much diminished; the bowels have been freely opened by the medicines. Repetantur Medicamenta.

Sept. 1st.—The parts of the skin occupied by the eruption are much paler, and the heat is greatly diminished, except about the right wrist, where it is greater than at the last visit; it is also very painful. She feels very weak. Admoveantur hirudines sex manui dextro. Omittantur Medicamenta.

3rd. The pain and heat of the wrist are gone; the heat of the parts occupied by the eruption is not above the natural standard: the eruption itself is much paler, and it is rapidly disappearing. Full diet.

5th.—The cuticle is desquamating in some parts, chiefly where the eruption was the greatest; the colour is approaching to that of the surrounding integument. She is daily gaining strength.

8th.—Discharged cured.

VARIETIES OF H. PHLYCTÆNODES.

A. *Depending on the form of the Eruption.—Migratory.*

Var. a. H. *Zona**. (Pl. 2). This variety, well known under the name *shingles*, has an affinity, in some respects, to

* Vern. Syn. Ζωστηρ (*Greek*): Zona, Ignis sacer (*Lat.*): Le Zone, Ceinture dartreuse (*Fr.*): Feuergürtel, der Gürtel (*Ger.*): Zeker Zeer (*Dut.*): Sarpullido (*Span.*): Fuoco salvatico (*Ital*): Shingles (*Eng.*).

Nos. Syn. Zoster (*Pliny*): Ignis sacer (*Celsus*): Zona (*Scriben. Sagar, Rossel*): Zona ignea (*Hoffm. Darwin*): Hieropyr Zoster (*Vogel*): Herpes Zoster (*Hoffm. Sauv. Bateman*): Erysipelas phlyctænodes (*Cullen*): Ecphylis, Herpes Zoster (*Good*).

The terms *Zona*, *Zoster*, *a belt*, and *Shingles*, a corruption of the Latin *Cingulum*, have evidently originated in the form which this variety of Herpes assumes on the trunk of the body. Pliny (Nat. Hist. lib. xxvi. c. 11) terms the disease simply *Zoster*: Celsus describes it under the name *Ignis sacer* (*de Medicina*, lib. v. c. xxviii. § 4); and Scribonius Largus, under the appellation of Zona.—"Zona quam Græci ἑρυσηρα dicunt" (de Compos. Medicam. c. 13). Sauvages (*Nos. Method.* C. iii. g. viii.); Cullen (*Synopsis Nosologiæ Meth.* Cl. i. Ord. iii. g. xxxi); and Frank and Richter have placed it under Erysipelas. Cullen, however, seems to doubt the propriety of this arrangement in the following note:—"An hæc species ad item cum erysipelate vesiculoso genus recti referatur, dubito; sed judicant periti." Rayer (*Traité des Mal. de la Peau*, lib. i. p. 202) places it among the *Bullæ*, and regards it as the intermediate link between the *Vesiculæ* and *Bullæ*; an opinion which Cazinave and Schedel severely and justly criticise, remarking that the affinity between H. Zona and the Bullæ is "absolument rien." (*Abrégé pratique des Mal. de la Peau*, p. 101.) In my opinion, the vesicles of H. Zona depend solely on inflammation of the reticular web of the cutis, and never extends, as in Erysipelas, to the whole cutis, or to its subcutaneous cellular tissue. Barsetius has placed it among the febrile exanthemata. (*Inst. Med. Pract.* t. xi. cap. 3.)

the febrile vesicular eruptions; for although it is not contagious, and may attack the same individual more than once, yet it runs a course almost as regular as the vesicular Exanthemata, namely, that of incubation, premonitory fever, eruption, maturation, and decline.

The disease is not uncommon in the metropolis. It is characterized by irregular, various sized, red, inflamed patches, which are covered with clusters of pearl-like vesicles, some of which are agglomerated, others distinct; the clusters usually extend in a manner which gives the whole the appearance of a half-zone or girdle, when the eruption is seated on the trunk of the body. This form of the eruption is not the result of a crop of continuous vesicles, but it is made up of isolated clusters (Pl. 2, *a b c*), with intervals of unaffected skin between them; and these spaces are sometimes considerable. In some instances the patches appear at the opposite extremities of the half-zone; and, progressing, join by successive clusters extending towards the centre.

The clusters of vesicles most commonly appear on the right side of the body; but, on whichever side they first appear, there they remain: they never display themselves on both sides, even when they appear across the shoulder or on

the thigh, which sometimes occurs. I have seen the eruption extending obliquely, from the loins or the nates, down the thigh to the knee. Rayer mentions having seen similar cases: and he also mentions a case in which the eruption attacked the face and extended into the mouth*. In a few rare instances, the zone has extended round the body; a circumstance, however, not very likely to happen, as the first clusters generally have run their course, and even desquamated, before the last have risen†.

S. The appearance of the eruption in H. *Zona* is not always preceded by the obvious constitutional derangement, which is not uncommon in H. *phlyctænodes:* often no precursory symptoms are felt; and the patient is first made aware of the presence of the eruption by a slight sensation of heat or of tingling in the part; and, on examination, he finds vesicles already present. But sometimes there are decided premonitory symptoms: namely—a general feeling of discomfort; loss of appetite, and slight febrile rigors; the pulse is occasionally quickened, and somewhat augmented in force; there is also sickness, and pains dart across the chest and the epigastrium. There is almost always a sensation of painful tension, and

* In detailing the case, he notes the following appearance. "La moitié gauche de la langue est tuméfiée, épaisse, rouge et couverte de plaques blanches, molles, irrégulières. Les unes ont le volume des vésicules de la peau, les autres se rapprochent des bulles pour leur plus grand dimension. L'épaisseur de ces plaques est égale à celle d'une feuille de papier. Quelques-unes de ces plaques, formée par l'épithélium épaissi, sont presque detachées. De semblables plaques blanchâtres existent à la surface inférieure de la langue, sur la paroi interne de la joue gauche, et sur la moitié gauche des gencives et de la lèvre inférieure; mais on n'en voit point sur le palais ni sur la lèvre supérieure. Enfin cette affection est limitée d'une manière extrêmement exacte de la ligne médiane. La moitié droite de la bouche, et en particulier la moitié droite de la langue, ont leur couleur et leur aspects naturels.

La salive, sécrétée en abondance, est filante; l'haleine est fétide, mais n'a point l'odeur particulière qui s'exhale de la bouche chez les personnes qui ont abusé des préparations mercurielles." Traité des Mal. de la Peau, tome i. p. 220.

† Bateman remarks that the rarity of the two ends of the Zone meeting, probably gave rise to the popular apprehension, which is as old as Pliny, "that if the eruption completed the circle of the body, it would prove fatal." "Zoster appellatur, et enecat si cinxerit—" (Pliny, Nat. Hist. l. xxvi. c. 11). Bateman affirms that he has "seen the clusters extend across the linea alba in front;" and Turner, Dr. Russel, and Tulpius, saw cases which contradict this affirmation of Pliny. *Synopsis*, 7th edit. p. 327, note.

scalding heat, in the seat or spot where the first patches of the eruption are about to appear: indeed, the pain is, sometimes, so deep seated and severe, when the eruption is breaking out on the chest, as to induce the belief of the presence of pleurisy, and the necessity of bleeding. A greater or less degree of pain remains during the presence of the eruption; and sometimes the pain, in a mitigated degree, continues for a week or more after it has disappeared.

The vesicles, when first they appear, are small, have a silvery lustre, and are pellucid: they gradually enlarge, and acquire their utmost size, which rarely exceeds that of a large pea (Pl. 2, *d e f*), in three or four days: and, at this time, the inflammation is of a vivid red at the base of the vesicles. Before this period, however, the fluid in the first clusters of vesicles becomes opaque, and they acquire a milky, or pale yellow, or bluish hue, causing the supposition that the fluid is pus, or a fluid of a sanious character. Rayer says, "Lorsque l'inflammation est plus intense, les vesicles et les bulles ne tardent pas a contenir de veritable pus*;" but this requires farther proof. The vesicles next shrivel, or sink in the centre, and subside in the form of thin scabs (Pl. 2, *e f*), which fall off in ten or twelve days, and leave a reddish, somewhat livid spot, which slowly disappears. If the vesicles are accidentally rubbed, they break, discharge their contents, and either crust over or become ulcerated. When the latter occurs, the ulcers are, sometimes, difficult to heal, and hollow cicatrices or pits remain.

These symptoms vary according to circumstances. The febrile excitement, when present during the breaking out of the vesicles, generally subsides when the eruption is completed; but this is not constant; on the contrary, I have observed the uncomfortable feelings, and the fever rather augmented than diminished during the whole period of the eruption: even the deep-seated pain which precedes it has suffered no abatement. Hoffman also mentions its continuance†. In severe cases, psydraceous pustules sometimes ap-

* *Traité des Mal. de la Peau*, t. i. p. 203.

† Inde quidem symptomata remiserunt, excepto exquisito ardente dolore, qui tantus erat, ut nec somnum capere, nec locum affectum contingere posset. *Med. Syst. Rat.* t. iv. p. i. cap. 13, § 6. obs. vi.

pear amongst the vesicles. The lymphatic glands in the axilla occasionally swell when the thorax is the seat of the eruption.

C. The causes of Herpes *Zona* are often obscure. It attacks the young and robust, as well as the aged and infirm; and it more frequently appears in men than in women; yet those of a thin and irritable skin seem to be most liable to its attacks. It has been ascribed to exposure to cold after violent exercise. It is more frequently seen in summer and in autumn, than in spring and winter. In many instances it appears as a critical eruption at the termination of acute diseases. Biett mentions small-pox as one of these. It is highly probable that a deranged state of the digestive organs is the most frequent predisposing cause. It is not an unfrequent attendant on inflammatory duodenal dyspepsia. It is certainly not contagious.

Mental causes seem, also, to operate in its production. Schwartz saw three instances which followed violent fits of passion*; and Plenck saw it occur twice after violent anger, and a copious potation of beer†. The severest case I ever witnessed occurred in a gentleman, during a fit of vexation from the loss of a large sum of money. It is unnecessary to notice the imaginary causes to which the old authors referred it.

D. The form of the eruption in H. *Zona* at once distinguishes it from every other vesicular eruption; although before its full development, when only one or two clusters of vesicles have appeared, it may be mistaken for H. *phlyctænodes*; but as the eruption proceeds, the characteristic features of the disease become too clearly obvious to be mistaken. On the limbs, where it sometimes appears, it spreads longitudinally; nevertheless it is easily recognised. It has no resemblance either to Erysipelas or to Pemphigus.

P. The prognosis is always favourable, the disease being generally slight, and free from danger. In none of the cases which I have treated has it displayed much severity; indeed, in the greater number, it has required scarcely any treatment beyond a simple aperient. Some authors, nevertheless, amongst whom are Platner and Hoffman*, have deemed it a malignant and dangerous disease; and Langius† has recorded two fatal cases of it occurring in noblemen: but Dr. Bateman, in noticing these, has suggested the idea that they mistook the disease. The ulcerations which occasionally occur from breaking the vesicles, are sometimes difficult to cure: and cases have occurred, in old men, in which the eruption was followed by gangrene of the skin. In general, however, it is free from danger; an opinion in which most writers agree.

The idea of danger from the retrocession, or the repulsion of the eruption, is not altogether vague; De Miza relates an instance in which its repulsion was immediately followed by an intermittent‡.

T. The treatment of H. *Zona* is generally very simple, consisting of purgatives; diluents; warm baths, and fomentations. When the patients are of an irritable habit, impatient under pain, and when the inflammation is more than usually acute, tonics and a regulated diet are indicated. Bateman mentions diaphoretics; but in no instance have I ever found them required§. Bleeding, general or local, is rarely or never requisite; nevertheless Rayer recommends both general and local bloodletting, although he limits the use of the former to those cases in which the eruption occupies a large surface, or when it is complicated with other inflammatory affections.

Purgatives. These should be gentle, and especially when the eruption is suspected to be connected with inflammatory duodenal dyspepsia. Castor oil is admirably adapted for such cases: it should be administered in small doses, namely, a drachm, or, at the utmost, double that quantity, rubbed up with Acacia gum and simple distilled water. In such doses, if it fails to move the bowels, it soothes the inflamed mucous

* *Diss. de Zona serpiginosa.*

† *De Morbis cutaneis*, p. 28. Both quoted by Bateman, *Synopsis*, 7th ed. p. 370.

* *Med. Syst. Rat.* t. iv. part i. c. 13.

† *Epist. Med.* p. 110.

‡ *Act. Soc. Med. Hoffm.* t. i. n. 10.

§ Professor Callisen, also, mentions diaphoretics. He sums up the treatment in the following terse manner: "solis remediis internis purificantibus, demulcentibus, lenibus diaphoreticis tractandus.—Graviora symptomata interdum methodum pascant antiphlogisticum." (*Syst. Chyrurg. Hodiern.* t. i. p. 424.)

membrane; and whatever relieves the primary affection is always serviceable in that to which it has given birth. In ordinary cases, the saline purgatives may be prescribed*.

Baths and Fomentations. If these be indicated, they should be of a temperature not to increase excitement, but to soothe; thence the tepid bath, not exceeding 94° Farenheit, is the best. Rayer recommends that they should be emollient and narcotic: but when topical narcotics are indicated, they are best applied in the form of fomentations. These undoubtedly allay the pain; but, if they are long continued, they favour ulceration. I have seen no applications more serviceable than alcohol, or Eau de Cologne, when the itching and tingling are severe. If pain be also present, a small portion of tincture of opium may be added to these spirituous lotions. I have seen a solution of six to ten grains of nitrate of silver, in an ounce of water, applied by means of a hair pencil or a feather to the part, extremely useful, when the vesicles break.

Ointments, &c. With respect to other topical applications, my experience has not led me to place any confidence in the opiate liniments, and astringent ointments recommended by continental practitioners. If the vesicles have broken and the linen adheres to the part, the ointment of oxide of zinc spread on lint is the best means of obviating that evil. Nothing can be more injurious than the custom proposed by the older practitioners of cutting away the vesicles, and applying red precipitate and stimulating ointments to the denuded surface†. Plenck observed the mischief resulting from ointments‡; and the moderns have altogether discarded them. Chomel condemns all topical applications.

Diet and Tonics. The diet, although it ought not to be

* The older practitioners had a dread of purgatives, "founded entirely upon the prejudices of the humoral pathology." *Bateman.*

† Dr. Russel writes thus:—"Illa autem ut inspicio vesiculis depressis et minimè tumentibus, ut livescentibus inducta esse, atque acrem quendam ichorem substare cerno, proinde secantur vesiculæ, et precipitato rubro, cum unguento nur. et cerato, ut medicamenta fixa atque immota emanerent, curantur. (*De tale glandulari hist.* 35.) This treatment was recommended by M. Eberl, so lately as 1830, and practiced by him. (*Rust's Mag.* t. xxv. cap. 1, p. 141.)

‡ Pinguia et humida, ut vidi, admodum nocent. *Doct. de Morb. Cutaneis*, p. 28.

stimulant, yet, should not be exclusively farinaceous, nor of too low a description. It should be light, bland, and cooling, and embrace a moderate allowance of poultry or tender mutton once a day. Fish, fat, and salted meats must be prohibited: but in every case it is more important to moderate the quantity, than to select the quality of the food. With regard to beverage, whey, toast-water, or Seltzer water, are to be preferred to any other.

When debility supervenes, on the decline of the disease in severe cases, the best method of rousing the energy of the habit, is the administration of some light bitter, acidulated with diluted sulphuric or diluted nitric acid, in combination with sulphate of magnesia, sulphate of potassa, or some other mild purgative salt.

One of the most distressing symptoms, and the most difficult to combat, is an intense, deep, darting pain which appears on the decline of the disease, and which cannot be allayed by opium or narcotics.

To sum up these remarks on the treatment of H. *Zona*, whatever plan may be adopted, it can be regarded as only palliative of particular symptoms; under no circumstances can the disease be cut short by medicine.

CASE I.

Jane Owen, aged 13, admitted to the University College Hospital, January 22, 1838 (see Pl. 2). An only child, living at home in Bloomsbury, of a cachectic habit. She says she has been used to live well, and is in general healthy; her skin is very dirty. She was attacked last Sunday, ten days ago, with an eruption, at the upper part of the epigastric region, and extending round on the right side. No general affection preceded or accompanied the eruption. The symptoms, when she entered the hospital, were an eruption of vesicles, attended by slight inflammation; at first they were small and closely crowded, but they increased to a considerable size, one taking the place of several surrounding ones: they then subsided and became rather darker, and depressed in the centre. There was little or no pain or itching accompanying the eruption. She complained of some pain on exposure to the air, or on the application of cold, and a sensation of

burning, at night, in the affected parts. Her general health was good; the appetite was good; the bowels were regular; the tongue was moist and natural. The pulse was small and feeble.

℞. Magnesiæ Sulphatis ℥vi, Infusi Cascarillæ vi, Acidi Sulphurici diluti ℥i, fiat mistura cujus sumantur cochliaria duo majora quartâ quâque horâ.

℞. Alcoholis ℥iv, Aquæ ℥iiiss, fiat lotio, parti affectæ applicanda. Full diet.

Jan. 26.—The red blush surrounding the vesicles is deepened. In some of the vesicles a small quantity of a pus-like fluid appears. Pergat.

Jan. 28.—The old vesicles are crusted over, and no new ones have appeared. Pergat.

Feb. 1.—Convalescent. Full diet. A few marks only remained.

Feb. 11.—Discharged, cured.

CASE II.

Mr. ——, a gentleman, sixty-four years of age, of a melancholic, bilious temperament, consulted me (August 1, 1838) respecting a severe, deep-seated pain on the right side of the thorax, about an inch below the mamma, under which he had been suffering for five days. There was no cough, nor were his sufferings augmented by taking a deep inspiration; the breathing, although slightly hurried, yet, was natural; and neither percussion nor the stethoscope authorized the idea of any affection of the lungs. As he had been subject to rheumatism, the pain was supposed to originate from that disease affecting the intercostal muscles: it was worse at night, and prevented him from lying on the affected side; but it differed greatly from any rheumatic pain which he had previously experienced, being accompanied with a sensation of scalding, and a tingling not unlike that of stinging of nettles. The pulse was 65, small and wiry; and the tongue redder than natural, smooth, and slightly adhesive. The bowels were torpid, and opened only by the aid of purgatives; whilst the urine was high-coloured, turbid, and deposited, on cooling, a pinkish sediment. The skin was natural, but the hands were

cold and clammy; and he experienced great depression of spirits, attended with a feeling of despondency.

As the diagnosis was obscure, the bowels were, in the first instance, merely opened by a full dose of calomel, followed by a black draught; and he was directed to take the following pill at bed-time, instead of an opiate, which always distressed him.

℞ Hydrargyri Pilulæ, gr. ii.
Colchici Extracti Acetici, gr. ss.
Aconiti Extracti, gr. i.
Ft. pilula h. s. sumenda.

2nd. He had no sleep in the night, and obtained no relief from the pain; he was therefore ordered to be cupped on the side, and the dose of the Extract of Aconite to be augmented to a grain and a half.

3rd. The pain and scalding sensation remained unabated, and he spent another restless night: but, this morning, having stated that he felt much tingling and itching on the skin, near the spot on which the cups had been placed, I examined the part, and observed it covered with a red blush, extending obliquely backwards, and covered with several patches of small watery vesicles, evidently Herpes *Zona*. I was surprised that he had experienced scarcely any abatement of the pain and sensation of scalding. The pulse was 68, feeble, and intermittent. His bowels were again freely opened: the pill was continued at bed time; and the following draught was ordered.

℞ Potassæ Liquoris, m. xx.
Hydrocyanici Acidi diluti, m. iii.
Calumbæ Infusi, f℥xii. M.
Ft. haustus ter quotidie sumendus.

He was directed to take a small portion of animal food once a day only; and to make the staple of his diet milk and farinaceous matters.

10. The eruption has gradually extended round to the spine, and appears about to terminate at the scapula. Before the last crop of vesicles appeared, the first had shrivelled and crusted over; and many of the thin scabs have already fallen. The pain still continues where the eruption first appeared; but the scalding sensation follows the course of the eruption.

18. The whole of the eruption has desquamated: but slight pain still remains. The appetite is good; the bowels are more regular and more easily moved; and his chief complaint is debility. He was directed to omit his medicines, and to take a light decoction of Cinchona bark; his usual glass of sherry; and to go into the country. He returned to town on the 2nd of September, in his ordinary health and spirits.

No topical applications were employed.

In this case, it is difficult to say how far the Herpetic disease was connected with the deranged condition of the digestive organs. The treatment was directed chiefly to allay the irritable state of the mucous membrane; and, as that became improved, the successive crops of vesicles ceased to appear.

Var. b. H. *circinatus**. (Pl. 3, fig. 1.) This is a very common variety of Herpes; and, from the annular form which it assumes, it is termed, in this country, *Ringworm*. It is very frequent among children, especially girls of a strumous diathesis. It is confined to no class of society, being as frequently seen in the highest as in the lowest ranks. It is most common in warm climates. It is not usually preceded or accompanied by any constitutional disturbance. It is characterized by an eruption of minute globular vesicles, seated upon red inflamed bases, and arranged in an annular form. The space within the ring of vesicles is at first only slightly discoloured, and free from any eruption; but by degrees it becomes rough, of a dull red colour, and an exfoliation succeeds.

S. The eruption of this variety of Herpes is preceded by a sensation of circumscribed tingling and itching, which is followed by a red patch, varying in size from two thirds of an inch to two inches in diameter. It is generally circular, but occasionally oval. The circumference of each patch is covered with minute, globular vesicles, whilst the skin in the centre of the larger circles acquires a slight redness; and, in

* Ver. Syn. Dartre encroutée *(French)*: Ringworm *(English)*.
Nos. Syn. Formica ambulatoria (*Celsus, Turner*): Herpes serpigo (*Saun.*): Annulus repens (*Darw.*): Herpes circinatus (*Willan, Bateman*).

the smaller, much greater degree of redness. The vesicles are at first pellucid, and contain a transparent lymph, which soon becomes opaque. In some instances this fluid is absorbed; in which case, the vesicles shrivel, and almost imperceptibly exfoliate: in others, the vesicles burst, and dark-coloured scabs form over them, which fall in about a week, and leave a red mark behind them. As soon as the crusts form, the centre of the ring becomes rough, not vesicular, and lastly exfoliates. The period in which the vesicular circle rises, maturates, and incrusts or terminates, is from eight to ten days; but often fresh circles appear successively, and the disease is protracted for several weeks. In persons of a delicate skin, the redness left after the desquamation of the vesicles continues for a considerable time. In some instances, instead of the ring, a circular patch of vesicles of a larger size appears, surrounded by an inflamed border, accompanied with much heat, pain, irritation, and some degree of fever, which does not immediately abate on the appearance of the eruption, but continues for five or six days. In this form of the eruption, a rapid succession of clusters appears on the face, arms, neck, trunk, and lower extremities. The area of the vesicular clusters extends; and the vesicles, instead of exfoliating, form ulcerations of considerable depth; whilst new circles of vesicles appear successively beyond the former, and in turn ulcerate as the interior of the patch heals*. The vesicles usually burst on the ninth day, scales form, the fever ceases, and the disease terminates on the fifteenth day.

Herpes *circinatus*, in its ordinary form, generally appears on the neck, the shoulders, the arms, and the chest; rarely on the lower extremities. It is not uncommon, in delicate girls with a thin, white skin, to observe the herpetic circles on the cheeks and the chin.

C. The exciting causes of this variety of Herpes are obscure. It is occasionally an attendant on atonic duodenal dyspepsia; but, as the internal disease is not relieved by the

* Bateman (Pract. Synopsis of Cutaneous Diseases, 7th ed. page 334) quotes Celsus as having described this form of Herpes as his second species of Ignis sacer.

appearance of the eruption, it is probable that the same condition of habit, which predisposes to the formation of the dyspeptic affection, also renders the skin susceptible to the attack of Herpes, without any direct connection existing between the two diseases. Children, who are the subjects of this form of Herpes, are more liable to duodenal dyspepsia than adults.

Herpes *circinatus* is also often present in that condition of the habit which has been termed strumous dyspepsia. I have frequently observed it accompanying rheumatism in young girls. It is not contagious; but it seems to be occasionally epidemic; as it appears in several children in the same school, and even district, at the same time.

D. The peculiar annular form of this variety of Herpes, namely, a reddish spot surrounded by a circle of minute vesicles, distinguishes it from all other vesicular diseases. When it appears on the scalp, it might be mistaken for that pustular eruption which is named Porrigo *scutulata*. But, independent of the pustular and contagious character of that disease, the fall of the hair where it attacks the hairy scalp, the hard, thick scabs that succeed the pustules, and the protracted course which it runs, are sufficient diagnostic characters to distinguish it from Herpes *circinatus*.

T. Herpes *circinatus* requires no internal treatment, unless it extends widely over the body; in which case some mild aperients may be administered. The best topical applications are alkaline lotions, consisting of liquor Potassæ and Bitter-almond emulsion, in the proportion of two drachms of the former to six ounces of the latter; or weak solutions of Biborate of Soda, or of Sulphate of Zinc, or of Sulphate of Iron, which are superior to ink, so commonly employed. I have found the simple application of pledgets of lint, dipped in cold water, and frequently renewed, as recommended by Rayer, answer the purpose as well as any of the above-mentioned lotions*. The use of the flesh-brush is a good prophylactic in incipient Herpes *circinatus*, in those liable to frequent attacks of it†.

* Traité Théorique et Pratique des Maladies de la Peau, t. i. p. 246.

† Underwood on the Diseases of Children, 8th ed. page 459.

In that form of the eruption in which the whole surface of the circular patch is vesicular, and ulcerations occur, the ulcers require to be treated with stimulant ointments.

CASE I.

Miss M ——, a young lady, eighteen years of age, of a delicate frame of body, who had never menstruated, consulted me respecting a stiffness and pain of the neck, which forced her to keep the head turned towards the right shoulder. Whilst examining the neck, I perceived several circles of H. *circinatus* on the shoulders and neck, and one behind the ears. One of them on the left shoulder was of an oval shape, and nearly an inch and a half in its longest diameter. No attention was paid to the eruption; and medicines for the primary affection only ordered. In a week, every vesicular circle had disappeared.

This was a case of rheumatism, with the appearance and the decline of which the eruptive affection was coeval.

B.—*Varieties depending on the locality of the eruption.—Non-migratory.*

Var. c. H. *labialis** (Pl. 3, fig. 2). This variety of Herpes consists of irregular vesicular patches, differing from those of H. *phlyctænodes* only in the place which they occupy. They sometimes are confined to the upper, sometimes to the lower lips, and, at other times, they surround the whole mouth, extending to the cheek, the chin, and the alæ of the nose. The eruption generally appears on the external part of the lip only, and most commonly at the line of junction between the epithelium and the skin. It is usually critical of some acute disease.

S. The eruption of H. *labialis* sometimes appears suddenly, without any precursory symptoms; at other times, it is preceded by heat and tingling in the part, which continues for some hours before the vesicles burst forth. The lip on which it appears is usually hot, red, swelled, shining, and painful to the touch. At first, the vesicles, which are large,

* Vern. Syn. Eruption des levres (*French*): Tetter of the lips (*English*).
Nos. Syn. Exanthema labiale (*Auct. Var.*): Hydroa febrile (*Forestus, Frank, &c.*): Eruption de levres (*Rayer*).

contain a transparent fluid; but, as in the other varieties of the disease, it soon becomes opaque, and acquires a yellowish hue; the tumefaction subsides; and brown scabs succeed, which begin to fall in four or five days, and leave a redness on the skin which soon disappears. The duration of the eruption varies; but it rarely exceeds ten or twelve days.

C. This variety of Herpes not unfrequently accompanies internal visceral affections, and often proves critical, the disease abating as soon as the eruption appears. It is observed to accompany severe catarrhs, bilious fevers, dysentery, cholera, and acute inflammatory diseases of serous membranes; and it is commonly regarded as a favourable symptom in the latter stage of malignant fevers. Bateman quotes Huxham* and Plenck† as authorities in testimony of its occurrence in intermittents. Under such circumstances, we must regard the reaction on the surface, which usually accompanies the decline of these febrile affections, as the exciting cause of this variety of H. *phlyctænodes*.

H. *labialis*, however, occasionally appears to be symptomatic of a distinct description of fever, originating from sudden alternations of heat and cold, long-continued fatigue, and over-exertion. The febrile affection is manifested by rigors, pains in the limbs, headache, lassitude, and languor. "Under these circumstances," says Bateman, "a sort of herpetic sore throat is sometimes connected with it, a similar eruption of inflamed vesicles taking place over the tonsils and uvula, and producing considerable pain and difficulty of deglutition. The internal vesicles, being kept in a state of moisture, form slight ulcerations when they break; but these heal about the eighth and ninth days, whilst the scabs are drying upon the external eruption‡."

T. When H. *labialis* is a critical eruption, it requires no treatment except that requisite in the decline of the disease which it attends. When it is hot and tingling, spirituous applications, such as diluted alcohol, or Eau de Cologne, relieve the heat and smarting.

In some instances, however, it assumes a chronic form,

* Huxham, de Aere et Morb. Epid. vol. ii. p. 56.
† Plenck, Doct. de Morb. Cutan. p. 83.
‡ Pract. Synopsis, 7th edition, p. 335.

and is attended with a deranged condition of the digestive organs; indeed it may, in such a case, be regarded symptomatic of the dyspeptic affection, and requiring the aid of mild alteratives. The Hydrargyrum cum Creta, in doses of eight or ten grains, combined with a grain of Ipecacuanha, at bed time—and, during the day, the Liquor Potassæ, in full doses, in the decoction of Sarsaparilla—will be found adequate to fulfil every indication.

Var. d. H. *palpebralis*. As this variety differs from H. *labialis* only in the situation which it occupies, namely, the upper eye-lids in catarrhal ophthalmia; and as it does not require any particular treatment; it is unnecessary to comment upon it. The same remark applies to *Var. e*, H. *auricularis*, which displays itself upon the external ear.

Var. f. H. *Præputialis**. This variety of H. *phlyctænodes* appears upon the prepuce, and may excite unnecessary apprehensions respecting the nature of the eruption, from its similarity to chancre. It attacks most frequently the internal surface of the prepuce; but sometimes it appears on the exterior; and occasionally on both surfaces at the same time. It is of frequent occurrence, and returns repeatedly in the same individual.

S. The eruption of this variety of Herpes is always preceded by heat and itching, usually in the inner part of the prepuce, which attracts the attention of the patient; and, on examination, one, sometimes two, round, slightly raised, red spots, about half an inch in diameter, are observed. In a few hours, they are covered with from five to eight small, distinct vesicles, which occasionally become confluent. In twenty-four hours, they become opaque; and, in a couple of days, break and exude a watery discharge. When the vesicles are seated on the inner surface of the prepuce, they often ulcerate. On the fourth day, the redness and swelling have disappeared, and a superficial sore remains, tender, and covered with a kind of mucaginous discharge. When no curative measures are adopted, the ulcer gradually heals in ten or twelve days; but, in severe cases, it has remained for

* Ver. Syn. Herpes du Prepuce (*French*): Herpes or Tetter of the Prepuce.

five or six weeks. The crusts, which succeed the external eruption, usually fall on the thirteenth or the fourteenth day, and leave no mark behind them. When the eruption appears on the external part of the prepuce, however, it rarely ulcerates. It sometimes recurs, periodically, every six or eight weeks*.

C. This form of Herpes has been ascribed to an irritable state of the urethra, the precursor of stricture†; to the use of mercury‡; and to sympathy with a deranged condition of the digestive organs. I have witnessed it where neither stricture existed, nor mercury had been taken, nor any derangement of the digestive organs was apparent. It is, nevertheless, often an accompaniment of inflammatory duodenal dyspepsia. I have a case, under my care at present, in which the disease alternates with relaxation and œdema of the uvula. When no constitutional derangement is present, it appears to depend on a morbid condition of the generative organ itself, since the secretion of the follicles of the glans (glandulæ Tysoni) is always unhealthy at the time; and the disease is more frequent in those who are continent than in libertines and in married men. It is not contagious.

D. In the vesicular state, this eruption cannot be confounded with chancre; but, in the ulcerative state, it has been mistaken for incipient chancre, and treated as such; and this is more likely to occur when any irritant or escharotic applications have been employed, as these generally extend the ulceration, and produce a deep-seated hardness beneath the sore. In Herpes *præputialis*, when not improperly treated, the absence of a hardened base, raised, ragged edges, and an excavated, sloughy surface, afford sufficient diagnostic features to distinguish it from chancre: when it has been irritated, the distinction is less obvious; but, when any doubt

* An anonymous writer, in the second volume of the London Med. Repository, 1814, p. 371, adverts to the case of a gentleman who had suffered from it eighteen times in two years and a half. It rarely happens that the inflammation is sufficient to cause sympathetic swellings in the inguinal glands: nevertheless, Mr. Evans states that he has seen several instances of such swellings caused by it. (Pathological and Pract. Remarks on Ulceration of the Genital Organs. Lond. 1819, p. 27.)

† This was the opinion of Mr. Royston, who *first* described this eruption. (See Med. and Phys. Journ. June 1810.)

‡ This was the opinion of Mr. John Pearson.

remains, the administration of mercurials should be refrained from until the doubt is removed.

P. This variety of Herpes is of little consequence when it is properly managed; but, when it has been mistaken for chancre, and treated with escharotics, ulceration occurs, and the ulcers are sometimes difficult to cure.

T. No diseased condition of a part is so easily removed as this form of Herpes, when it is not connected with dyspeptic arrangements. Dr. Bateman recommends "a little clean, dry lint to be interposed twice a day between the prepuce and the glans*." I have not found this sufficient, unless it is conjoined with frequent ablutions with *hot* water, and the administration of two or three doses of magnesia, or any other antacid, in combination with a gentle purgative. All ointments and lotions should be avoided. When any mercurial application, especially the ointment of the Binoxide of mercury, has been used, the superficial ulcer is apt to degenerate into an ill-conditioned sore; and a disease, simple and easily managed, may thus become a source of much suffering to the patient. As such applications, also, induce the suspicion that the practitioner entertains the idea of the existence of syphilis, the comfort and peace of domestic life may be disturbed by them, and a permanent injury inflicted upon an innocent person from ignorance and mismanagement.

Var. g. H. *Vulcaris*. This variety closely resembles H. *præputialis*, both in its aspect and its origin. It appears upon the labia pudendi, and is most frequently seen in pregnant women, and those affected with leucorrhœa. Cleanliness, and the regulation of the bowels, constitute the only treatment requisite in H. *vulcaris*, unless the disease be the consequence of digestive derangements.

Species ii. Herpes *iris*.

This is a rare form of Herpes, and differs in all its characters from H. *phlyctænodes*, and its varieties (Pl. 3, fig. 3). It most frequently appears on the back of the hands; sometimes on the instep; and occasionally on other parts of the body; but always on parts where there is little fleshy substance.

* Pract. Synopsis, 7th edition, p. 338.

Children and delicate young women, with fair complexions and thin skins, are the subjects most liable to its attacks.

S. H. *iris* first shews itself in the form of small, round, red spots, in the centre of which a flattened vesicle forms, of a yellowish-white colour, and is soon surrounded by several rings more or less distinctly vesicular. Bateman describes the first ring as being usually "of a dark or brownish-red colour; the second nearly of the same colour as the centre; and the third, which is narrower than the rest, is of a dark-red colour; the fourth and outer ring, or areola, does not appear until the seventh, eighth, or ninth day, and is of a light hue, which is gradually lost in the colour of the skin*." The vesicles generally decline, shrivel, burst, and desquamate in the same succession in which they appear; and commonly the whole has disappeared before the end of the second week. The various rings, however, are seldom so conspicuously distinct as this description would lead us to believe.

C. H. *Iris* can seldom be traced to any constitutional derangement: it has occasionally appeared critical of, or has been followed by, a severe catarrhal affection, accompanied with hoarseness, and an eruption of H. *labialis*.

D. The remarkable appearance of this species of Herpes renders it scarcely possible to confound it with any other disease of the skin. There is, indeed, one species of Roscola which extends in circles; but the absence of vesicles is a sufficient characteristic to prevent it from being mistaken for Herpes *Iris*.

T. This singular eruption requires no treatment unless it is accompanied with some constitutional disturbance; in which event, the plan of managing the general disease will neither retard nor advance the progress of the eruption. Fomentations of linseed and emollient lotions recommended by Rayer† are useless. A small piece of soap-plaster laid over the circles favours a kindly and rapid desquamation.

It is a rare disease. I have seen three cases of it; but no notes of them were preserved.

* Practical Synopsis, 7th edit. p. 340.

† Traité Theor. et Prat. des Mal. de la Peau, t. i. p. 36.

HERPES MODIFIED BY SYPHILIS.

In speaking of this modification, it is not intended to imply that Syphilis can be the cause of any form of Herpes; but merely to designate, by this expression, an attack of Herpes occurring in a subject who is labouring under Syphilis. The only form of Herpes which I have observed accompanying Syphilis is that of H. *phlyctænodes*; and it differs from it only in the darker colour, and the coppery hue of the inflammatory patches on which the vesicles are seated.

This combination of Herpes and Syphilis is rare. I have seen two cases only of it; and therefore I do not consider my materials sufficient to enable me to offer any comments upon it, or even to attempt any detail of symptoms likely to prove useful to the reader. Both cases were treated with mild alteratives; namely, minute doses of the Bichloride of Mercury, administered in the diluted Nitric acid; and the Compound Decoction of Sarsaparilla given at the same time. Both patients were confined strictly to a milk and farinaceous diet; and both completely recovered.

GENUS II. RUPIA* (*Rhypia ?*).

Rupia is a partial, acute, inflammatory eruption of the skin, terminating in small, distinct, flat, gradually enlarging vesicles, containing a sero-puriform fluid, which concretes into accumulating scabs, easily removed and quickly reproduced. The vesicles are usually distant from one another, and a few only are present at a time; but, occasionally, they become confluent (Pl. 1, fig. 1, *h*). The eruption appears first as a small red

* This term was not used in the genera of Dr. Willan. It was first employed by Dr. Bateman. It is arbitrarily formed from ῥυπος, *Sordes*; but Dr. Good (Nosology, Genus *Ecphlysis*, p. 477) objects to the mode of writing the word, which he contends should be *Rhypia*, the ῥ being aspirated, and the Greek υ being also, almost always, expressed by the Roman *y*: for example, *rhythm* from ῥυθμὸς; *Syenesis* from συνεσις, &c.

Ver. Syn. Ulcères atoniques, superficiel (F.).

Nos. Syn. Phlyzacium *chronicum (Alibert)*; Ecphlysis Rhypia *(Good)*.

point (fig. 1, *a a*), on which quickly rises a minute, irregular, but somewhat round vesicle, containing a serous fluid (fig 1, *b b*). The vesicle being very little elevated, and extending only in diameter, appears flattened. The contained fluid is at first transparent; but it soon becomes opaque, and assumes a sero-puriform aspect. Before the vesicle, however, attains the breadth of the third of an inch, it appears partially flaccid and puckered at the margin (fig. 1, *c c*); and the fluid, escaping, concretes into a nearly flat, brown scab, thickest in the centre (fig. 1, *d d*). In some instances, the scab is increased by successive layers, each wider than the preceding one; so as to form overlapping crusts, and an accumulated crust, which acquires a considerable size, and is elevated into more or less of a conical shape. In other instances, the scab acquires the form and the magnitude of an ordinary sized limpet (fig. 2, *e*),—and nearly an inch in height. In both instances, it is superficial, and easily removed; and, if rubbed off, it is replaced by a fresh scab. The vesicles and the incrustations are surrounded by a dusky-red areola, the cuticle covering which, in the aggravated variety of the disease (Rupia *prominens*), separates from the edges of the scab, and displays, between them and it, a raw, ulcerated surface (fig 2, *f*), secreting the fluid which forms the new crust. When the disease either spontaneously disappears, or when it is artificially cured, the crusts fall, and leave a red, or somewhat livid-coloured spot, which does not soon recover the natural hue of the skin (fig. 3, *g g*).

Rupia most commonly appears in the arms, the legs, the thighs, and the loins; and occasionally upon the hands and the face.

The eruption is always preceded by constitutional disturbance, generally of a chronic character, which has debilitated and wasted down the body. Some degree of irritative fever is always present, accompanied with a chapped, red tongue, headache, and a sensation of general languor; whilst the countenance is strikingly expressive of painful anxiety. There is always heat, itching, and tingling in the parts on which the eruption appears.

D. Rupia may be confounded with Ecthyma, under which Dr. Willan first classed it; and with some pustular

syphilitic eruptions. The former, indeed, especially E. *luridum* et *cachecticum*, are sometimes found in conjunction with it, and display many features in common with Rupia; but, nevertheless, the two diseases may be readily distinguished from one another. Ecthyma is a pustular eruption; the pustule being seated on a hard, deep-seated, highly inflammatory base, extending into the cellular layer, beneath the cuticle; whilst Rupia is vesicular; the vesicle has no hard base, but is merely surrounded by a red areola, the cuticle over which is traced in continuation with the edge of the scab. The crust of Rupia is easily rubbed off; that of Ecthyma is hard, deeply indented, and firmly fixed. I cannot accord with the opinion of Mr. Plumbe, that Rupia is the advanced stage of Ecthyma, neglected or improperly treated.

In some of the pustular syphilitic eruptions, the scab resembles that of Rupia; but the areola has the copper colour peculiar to these affections, and the base of the pustule and that of the scab are hard. The constitutional symptoms, in these cases, are also sufficient to distinguish them from Rupia.

There is no necessity for detailing the characters which distinguish Rupia from Pemphigus, as it is scarcely possible to confound the large prominent bullæ of that disease with the flattened vesicles of Rupia; nor the excoriations which follow the bullæ of Pemphigus with the crusts of Rupia. The clustered vesicles, their clear serous contents, and the forms which the eruption assumes, readily distinguish Herpes from Rupia.

C. Rupia is not a very common disease. It attacks, most frequently, the aged, the debilitated, and those of intemperate habits, who have been much exposed to the vicissitudes of weather, and who are ill clothed and badly nourished. It is not uncommon, also, to find it a sequel of other diseases; Small-pox, for example, and occasionally Syphilis which has been imperfectly cured; and sometimes it appears as a result of the abuse of mercury. Men, especially those of a melancholic temperament, with a languid circulation, are more liable to it than women. It is more common in adult age than in youth or in boyhood.

That disease which Bateman describes as a species of

Rupia, and which he named R. *escharotica*, attacks only infants and young children: it belongs to the genus Pemphigus, not to Rupia. I am not aware that Rupia is hereditary; it, assuredly, is not contagious. Rayer* informs us that he has seen it complicated with subcutaneous hæmorrhages of the mucous membranes (Purpura *hæmorrhagica*. Willan).

P. Rupia, under no circumstances, can be regarded as a dangerous disease, although it may continue for many months. Its severity is usually in the ratio of the advanced age of the patient, and the delicacy of his constitution. If the crusts be frequently rubbed off, the ulceration which succeeds sometimes induces a degree of low fever, which still farther breaks down the constitution; but, even under this, it rarely or never proves fatal: our prognosis, therefore, must necessarily refer rather to the duration of the disease than to its fatality. When the person is below the middle age, of a moderately sound constitution, and of temperate habits—if the crusts on falling leave an entire, cicatrised surface—we may venture to pronounce that it will be rapidly removed. On the contrary, if the crusts be rubbed off, and the inflammation extends beneath the surface, producing an unhealthy ulcer, the cure is always likely to be protracted.

T. In the treatment of Rupia, two indications are to be fulfilled; namely,

1. To change the existing condition of the capillary system, so as to improve the secretions generally, and to convert diseased into healthy action in the skin.

2. To maintain this improved state, by giving tone to the stomach, and consequent vigour and energy to the entire system.

1. The first indication is best fulfilled by the use of mild alteratives; regulating the bowels, and supporting the habit with a light nutritious diet. The best alteratives are the milder mercurial preparations, such as the blue pill, and Hydrargyrum c. Creta, given in very small doses; administering, at the same time, the Iodide of Potassium, also in small doses, in the decoction of Sarsaparilla; or in the decoction of the root of Burdock, Arctium *Lappa*. The latter has, of late years, been too much neglected as a vehicle for more active remedies in diseases of the skin, connected with a deranged state of the mucous membrane. It possesses mild aperient and tonic properties; and proves diaphoretic or diuretic according to the temperature to which the surface of the body is exposed during its administration. I am fully aware that objections have been raised to the employment of mercurials in Rupia: certainly, their indiscriminate use, or a too long continuance of them, so as to affect the mouth, is productive of mischief; yet, in minute doses, namely, from a quarter to half a grain of blue pill, or three to four grains of Hydrargyrum cum Creta, at bed time, daily, they are not only useful, but, in many cases, essential. When the tongue is red and much chapped, indicating an irritable state of the mucous surface, the Liquor Potassæ, in full doses, may be advantageously added to the mixture, with Iodide of Potassium and the decoction of Sarsaparilla. The dose does not require to be carried to the same extent as in Psoriasis. I have seen no occasion for the employment of narcotics or sedatives in Rupia, except as soporifics, when the nights are restless.

Topical applications for fulfilling this indication in the treatment of Rupia have been much insisted upon by continental physicians, and even by some British practitioners; but, except in cases where the crusts have been forcibly removed, and have been succeeded by an unhealthy spreading ulcer, which is difficult to heal in old people, I seldom find any necessity for their employment. The applications recommended in such cases may be arranged under the heads of *poultices*, *baths*, *lotions*, *ointments*, and *cicatrisants*.

a. Poultices.—These, in my opinion, ought never to be employed: it is always preferable to leave the crusts undisturbed, and to trust to the constitutional treatment.

b. Baths.—The simplest, namely, the warm water bath, is the best in Rupia: it not only excites the skin, and alters its morbid condition, but its influence is extended to the general habit, and it aids greatly the action of the alteratives. In general, the period of remaining in the bath is too limited to effect any important change upon the diseased skin. In order to render the bath more efficacious, Biett recommends

* Traité des Maladies de la Peau, tome i. p. 197.

alkalies to be added to it*, especially when the spots ulcerate and the sores are tardy in cicatrizing†.

c. Lotions.—When the scabs fall off, and cicatrization does not follow, the ulcerated surfaces may be bathed with a strong decoction of poppy heads and bran: but, in aggravated cases, more stimulant lotions are requisite; namely, bran tea, with Carbonate of Ammonia in the proportion of two drachms to a pint; or with any aromatic. The application of a weak solution of Carbonate of Ammonia to the entire skin has, indeed, a very decided influence in preventing the extension of the eruption: advantage has also been derived from lotions of very dilute Nitric or Hydrochloric Acid. Rayer recommends a solution of the Bitartrate of Potassa. The simple emollient lotions, such as decoction of the marsh Mallow, and similar substances, which are much employed on the continent, are utterly useless.

d. Ointments.—I have never seen any ointments useful in Rupia; but Biett recommends ointments made either with the *Iodide* or the *Biniodide* of Mercury‡. Rayer recommends the ulcerated surfaces to be dressed with saturnine cerate§, then covered with pledgets of lint, and a bandage to be applied over the whole, so as to keep up a degree of moderate pressure.

e. Cicatrisants.—When the ulcerations occur in old persons, and remain extremely indolent, the diseased surface requires to be powerfully stimulated. Every thing which can be expected in such cases may be obtained from the Nitrate of Silver. It may be used either in the form of solution, composed of one drachm of the Nitrate and an ounce of distilled water, or the cylinder of the Nitrate may be lightly passed over the ulcerated surface, and applied to the bordering cuticle, in the mode recommended by Mr. Higginbotham

* The usual alkaline bath of the French physicians consists of—℥ivss of Carbonate of Soda, + ℥x of Sulphate of Soda, + ℥ii of Chloride of Sodium, + ℥iii of Gelatine, + xxxii gallons of river water.

† Abrégé Pratique des Maladies de la Peau, p. 144.

‡ The proportion of the Iodide is a scruple, that of the Biniodide fifteen grains, to an ounce of fresh lard.

§ The Saturnine Cerate of Rayer consists of cerate of Galen, recently prepared, ℔i, and solution of Diacetate of Lead ℥i; but the *Unguentum Plumbi compositum* of the London Pharmacopœia will answer equally well.

for cicatrizing common ulcers. Biett recommends, also, that the surface of the sores be washed with largely diluted Nitric or Hydrochloric acid; and, in obstinate cases, he advises the use of these acids concentrated, or the Pernitrate of Mercury dissolved in Nitric acid†. The choice of these cauterants must be left to the judgment of the practitioner, guided by the nature of the case.

Under every circumstance, the horizontal position, and resting the affected limb, are essential.

2. In fulfilling the second indication, it is scarcely necessary to say that tonics are the chief means to be relied upon. The Disulphate of Quina, acidulated with diluted Sulphuric acid, may be added to the decoction of Sarsaparilla, or the decoction of Cinchona. In some instances, when the strength has been much reduced, and the emaciation considerable, I have seen advantage derived from the employment of the solution of the Iodide of Iron, in doses of a drachm of the solution, which is equivalent to three grains of the Iodide. The local affection has usually rapidly improved under this treatment.

The diet of the patient labouring under Rupia is of the first importance. It should be light, but nutritious; and assuredly not stimulant. An animal diet, with a moderate proportion of well-boiled vegetables, is to be preferred. It should consist chiefly of mutton or poultry, which should be plainly cooked. Salted meats, highly seasoned dishes, baked meats, pastry and pickles, should be avoided.

Dr. Bateman has described the various forms of Rupia under three species; namely, R. *simplex*, R. *prominens*, R. *escharotica*. Under the head Diagnosis, I have pointed out the distinction between Rupia and gangrenous *Pemphigus*, the latter of which is in every feature the same disease as the R. *escharotica* of Bateman. I have, consequently, removed that assumed species altogether from the present genus: and as the two other species of Bateman differ from one another only in degree of severity, I feel justified in regarding them

* Abrégé Pratique des Mal. de la Peau. p. 145.

merely as varieties of one species, which may be named as follows:

Species 1. Rupia *vulgaris.*
Var. a. —— *simplex;*
b. —— *prominens.*

RUPIA VULGARIS—COMMON RUPIA.

Var. a.—R. *simplex* (*Bateman*) is the mildest form of the disease, and displays itself on several parts of the body at the same time. The first appearance of the eruption is a minute red point (*a a*, fig. 1), on which a vesicle rapidly forms, with a slight, red areola. The vesicle at first contains a clear lymph (*b b*); but as it enlarges, the fluid thickens, becomes opaque, and presents a puriform aspect. The vesicle continues flat, but increases in diameter; and finally, becoming flaccid, it changes into a thin, darkish brown, irregular, round scab, thicker in the centre than at the circumference, where it is continuous with the cuticle (*d d*), which is somewhat raised. The part under the crust is a superficial ulcer, which generally cicatrizes before the scab falls spontaneously, or is thrown off from the influence of medicine, leaving a reddish, somewhat livid spot (fig. 3, *g g*), which does not hastily disappear. I have never seen this spot of the colour described by Bateman, namely, "of a livid or blackish colour, as if from a thickening of the rete mucosum*."

Var. b.——*prominens* (*Bateman*). This variety commences and progresses nearly in the same manner as the former; but, the ulceration of the cuticle being more severe, successive scabs form; and, as the one last produced always pushes upwards those above it, they gradually accumulate and acquire elevation, and resemble the convex shell of an oyster, or assume a conical shape, somewhat resembling a limpet (*e e*, fig. 2). The vesicle extends, and the scab forms more rapidly in this variety than in the former; the fluid has also more of a purulent appearance, is more viscid, and is frequently mixed with blood. The cuticle is not so continuous with the edge

* Practical Synopsis, 7th edit. p. 342.

of the crust as in R. *simplex;* but it is often separated from it so as to shew the ulcerated base (*f f*, fig. 2), upon which the crust is raised. The colour of the crust varies from a light greenish-brown to a deep brown. The vesicles are always distinct, and generally at a considerable distance from one another; but when they are less apart than usual, the crusts as they extend infringe upon one another, and appear confluent (*h*, fig. 1). The scab is more or less easily rubbed off; and, when it is removed, the denuded surface displays an ulcer of variable depth; which, in a few hours, however, is again covered with a new crust. In old people, and in those of broken-down constitutions, the crusts are not always reproduced; the ulcers also acquire an unhealthy character, and are difficult to cicatrize. It is in such cases that the dark livid spot, mentioned by Bateman, remains; and is long of acquiring the natural hue of the surrounding skin.

This aggravated variety of the disease occurs chiefly in persons who have suffered from the evils of extreme penury, and who have, consequently, been badly clothed, and worse nourished; or in those who have impaired their constitutions by intemperance, or who have been inervated by some chronic disease. I have had opportunities of confirming Mr. Plumbe's observation, that it occasionally occurs in those who have been the subjects of Syphilis*; thence mercurial alteratives are more indicated in this variety of the disease than in the former; but I have never found it necessary to push them to the point of salivation. It is a fact that evil has resulted from their indiscreet employment, even when the disease has been a sequel of Syphilis.

CASE I. (Rupia *prominens*).

George ——, a groom, aged 34 years, was admitted a patient into University College Hospital, 23rd January 1840. He is a married man, of good conformation, but of irregular habits. He says his lodgings are damp. He has been subject to inflammatory diseases; and six years since he laboured under gonorrhœa. He affirms that he had no chancre, nor

* Practical Treatise on Diseases of the Skin, 2nd edit. p. 445.

sore throat, nor nodes, nor any pains in the bones; and he denies having had any subsequent syphilitic affection; nevertheless, the cartilaginous septum of the nose is perforated, and he speaks with a slight nasal twang.

The present eruptive disease appeared six weeks ago; first on the back of the hands and on the neck. It commenced in distinct small, red, points, resembling those depicted in Plate 1, *a a*, fig. 1, on which flat vesicles rose with a slightly inflamed base, containing a semi-opaque, whitish fluid (fig. 1, *b b*). The vesicles then gave way, and a flat crust formed over them, from the borders of some of which a moisture oozed. Similar vesicles appeared on the thighs about three weeks since; but they were larger, and the crusts more elevated than those which showed themselves on the hands, and which have now disappeared, with the exception of one at the root of the thumb of the right hand.

At present, the eruption occupies the thighs. It is in various states of progress, from the primary red point to the complete, accumulated, conical crust (Pl. 1, fig. 1, *a* to *h*). Fresh vesicles appear daily: they itch on their first appearance, during the time he is in bed and especially towards morning. The pulse is 80, soft and natural; the skin moist and cool. The tongue is coated with a white mucous fur; but the appetite is good, and there is no thirst. The bowels are torpid. The urine is copious, and does not deposite any sediment.

The idea that the patient has laboured under general Syphilis is favoured by the condition of his nose; the septum being red, hot, and painful, as well as perforated by an opening of considerable size, which lays the two nostrils into one, and affects, as I have already stated, the sound of his voice.

He was directed to take a six-grain calomel pill, and a purging draught.

Jan. 25. He remains in the same state; he sleeps badly; the bowels are confined.

℞ Ricini Olei, f ʒiii.
Aquæ, f ℥i. M.
Haustus primo mane quotidie sumendus.

℞ Hydrargyri c. Creta, gr. xii.
Conii pulveris, gr. vi.
Sit pulvis, horâ somni, quotidie, sumendus.

℞ Magnesiæ, ℈iv.
Ipecacuanhæ comp. pulveris, ℈i.
Misturæ Amygdalæ Amaræ, f ℥vi. M.
Sumatur 4ta pars bis quotidie.

Let him be placed on a milk diet.

Jan. 31. There is no change, except that the pulse is sharper, and fresh points of eruption have continued to appear. Omittantur Medicam. ult°. prescrip.

Extrahatur sanguis brachio, ad ℥viii.

℞ Hydrargyri pilulæ, gr. iii.
Jacobi pulveris veri, gr. iii.
Micæ panis, q. s.
Ft. pilula, h. s. quotidie sumenda.

℞ Potassii Iodidi, gr. iii.
Decocti Sarzæ, f ℥ii.
Haustus bis quotidie sumendus.

℞ Sodæ Chloridi, f ʒi.
Aquæ Distillatæ, f ℥iv. M. fiat injectio, cujus cochleare amplum naribus, ter quotidie, injiciendum.

Feb. 10. The eruption began to improve on the 3rd, when the gums became slightly tender. The crusts are falling off and leaving a sound surface; but the nose has pained him, and it is still red and inflamed. Pergat in usu pilulæ et misturæ; omittatur injectio.

℞ Argenti Nitratis, gr. vi.
Aquæ Distillatæ, f ʒiii.
Ft. lotio, naribus, ope spongiæ, subinde applicanda.

Feb. 19. He has continued to improve in every respect; the crusts of the eruption on the thighs have all fallen off, and no fresh vesicles have appeared. The nose is also much better. The pills have produced no tenderness of the gums, nor any mercurial fœtor of the breath; but, nevertheless, the cachectic hue of the skin is nearly gone, and the countenance has lost its anxious expression. The tongue is still too red.

Omittantur medicamenta.

℞ Potassæ liquoris, m. xxx.
Potassii Iodidi, gr. iv.
Conii tincturæ, m. x.
Decocti Sarzæ, f ℥ii. M.
Haustus ter quotidie sumendus.

March 5. He has continued to improve, and he is now free from every trace of the eruption, except the coloured portions of the cuticle whence the crusts have fallen; the nose is also well.

He was permitted to leave the Hospital for a couple of hours on the 3rd instant; and it is probable that he committed some irregularity in diet; for, after returning, he was attacked, in the evening, with violent symptoms of colic, without any apparent cause. He was purged, fomented, and took half a grain of Hydrochlorate of Morphia, which relieved him. On the following day, as some fresh vesicles had appeared on his face, he was again purged, and directed to resume his former mixture.

March 9. Convalescent.

March 10.—He left the Hospital on account of improper conduct; but he was free from every vestige of the eruption.

In this case, the advantage of the continued use of the small doses of the mercurial alteratives was conspicuous. As soon as the gums became *slightly* affected, the improvement in the aspect of the eruption commenced; and it continued to advance with an equable and steady pace. The salutary influence of the Iodide of Potassium in the sequela of syphilitic affections is now well ascertained; and, undoubtedly, the effect which it produced on the capillaries in this instance had a considerable share in hastening the cure.

In a case of Rupia, in private practice, in which there was no reason for suspecting the previous existence of Syphilis, or the slightest syphilitic taint affecting the constitution, the Iodide of Potassium, in conjunction with Sarsaparilla, proved equally beneficial as in the above instance.

GENUS III. PSORIASIS*.

Psoriasis is a chronic inflammation of the skin, followed by exfoliations of scales of various shapes and sizes. The primary spots coalesce into patches of an irregular outline, flat, and frequently crossed by fissures; and occasionally producing excoriations, discharging a thin serous fluid, which concretes into flat crusts (Pl. 2, fig. 2, *c*), and are accompanied sooner or later with a thickening of the true skin. The eruption is sometimes diffuse, sometimes in distinct spots or patches. It commences in the form of minute, red, or inflamed spots (Pl. 1, fig 1, *a*), the cuticle over which changes into scales, which are pushed off by others beneath them; a new layer being rapidly produced. By the repetition of these exfoliations, the scales thicken and enlarge, and the patches extend by coalescence. When this is the case, and the

* The term *Psoriasis* was imposed by Dr. Willan, from the word Ψώρα, having been employed by the Greek writers to designate a rough, scaly eruption, which they distinguished by the adjunct *leprosa* (Ψώρα τραχυτερα, λεπίδες, τελαμενη). Paulus Ægineta (lib. iv, cap ii) treats of it under this name, distinguishing it from Lepra by the irregular form of the patches—"Ψώρα autem magis in superficie hæret, et varie figurata est." The term *Psoriasis*, however, is used by Galen, to denote a scaly affection of the eye-lids and the scrotum (de Oculo, cap. vii). The term *Psora leprosa* is also employed by Hoffman: whilst Mercurialis, Haffenneffer, Plater, and others, have described it under the name of *Psora* and *Scabies sicca*; but many, both ancient and modern writers, have classed it with Impetigo. Celsus, describing his second species of Impetigo (lib. v, cap. 27, § 17), says, "Alterum genus pejus est, simile papulæ fere, sed asperius, rubicundiusque figuras varias habet; squammulæ ex summâ cute decidunt, rosio major est, celerius et latius procedit, certioribusque etiamnum quam prior, temporibus et fit et desinit Rubra cognominatur." It is the Hasef of Avicenna, which is translated Scabies *sicca* by Miniński and Golius (see Good's Nosology, p. 473). Mr. Plumbe (Practical Treatise on Diseases of the Skin, Lond. 1824) and Dr. Duffin (Edin. Med. and Surg. Journal, 1826) have endeavoured to prove its identity with Lepra, to which undoubtedly it has a close affinity.

Ver. Syn. Dartre ecailleuse (F.): Kleinaussatz (G.): Saphat *(Hebrew)*: Sahafati *(Arabic)*: Scaly Tetter *(Eng.)*.

Nos. Syn. Ψώρα *(Auct. Græcor.)*: Ψωριασις *(Dioscorides, Galen)*: Psora leprosa, et Scabies sicca *(Hoffman; Etmuller; Mercurialis; Haffenneffer; Plater, et alia)*: Scabies *(Celsus)*: Impetigo *(Celsus; Sennert; Pleuck, et alia)*: Hasef *(Avicenna)*: Psoriasis *(Willan; Bateman; Swed.; Rayer; Cazenave; Schedel)*: Lepidosis Psoriasis *(Young, Good)*: Dartre squammeuse lichenoide *(Alibert)*.

disease has been of long continuance, the skin becomes harsh, rough, and chappy (Pl. 3, fig 1, *c*). In some instances, the patches assume a regular uniform arrangement, forming spirals (see P. *gyrata*).

Psoriasis rarely displays itself without being preceded by some degree of febrile disturbance of the habit, accompanied with languor, and a feeling of weariness; headache, and sometimes pains of the epigastrium; symptoms which are most obvious when the attack is sudden. There is frequently a sensation of heat, and always itching, in the parts covered with the eruption; and the latter is augmented when the patient gets warm in bed, or sits near a fire, or takes violent exercise, or is exposed to any cause which can elevate the temperature of the surface of the body. In severe cases of the disease, the tongue is red and adhesive, indicating subacute inflammation of the gastro-intestinal mucous membrane.

Psoriasis, in some one or other of its various forms, is a very common disease. It attacks all classes of people; although some of its varieties are almost confined to persons exercising particular trades. It is, in some instances, undoubtedly connected with hereditary predisposition. Women are more liable to it than men: and "those of a sanguineo-melancholic temperament," as Bateman remarks, "with a dry skin, and languid circulation, are most liable to it*." He adds, "it affects them more particularly after lying in, or during a state of chlorosis;" an observation, however, which my experience has not confirmed; although, in those predisposed to the disease, I have seen it more severe during pregnancy than at other times. It is most common in adult age; but infancy and youth are not exempt from it. I have at this time under my care a child, two years old, whose back and thighs are covered with the diffuse form of the eruption.

I have no reason for considering Psoriasis contagious, although Dr. Willan states that he had observed it to occur among children in the same family or school, a circumstance which might, perhaps, be traced to some impropriety in diet. It is liable to cease in the summer and winter, and to return in spring and autumn. In general, it is most severe in autumn.

* Synopsis, 7th edit. p. 56.

The eruption sometimes extends over the greater part of the body; at other times, it is confined to distinct portions of it; as, for instance, the lips, the angles of the eyes, the hands, the præputium, and the scrotum. The immediate seat of the inflammation is the rete mucosum, and the subjacent vascular tissue.

D. Psoriasis, especially that variety of it which is termed P. *guttata*, bears a strong resemblance to Lepra. It is, however, an error to suppose that the one disease changes into the other. Psoriasis resembles Lepra chiefly in its commencement, which is a minute, red, solid pimple, forming a scale on its apex; and, as the speck expands, it presents, for a short time, almost the same circular appearance as Lepra*. Psoriasis, however, differs from Lepra, in the spots soon losing the circular form, and becoming irregular in their shape: and, as they enlarge, they do not display the elevated border and depressed centre so conspicuous in those of Lepra. The scales in Psoriasis are less white, and the margins of the patches of a less vivid red, whilst the surface under them is more inflamed and more tender than in Lepra. When the spots in Lepra coalesce into patches, we can still trace their primary circular form in the outline of the patch: but the patches in Psoriasis are always irregular, and more or less angular. In Psoriasis, also, the scales do not accumulate and adhere so firmly as in Lepra; on the contrary, they readily separate. When the disease yields to the influence of remedies, the affected parts sooner acquire the natural hue of the skin than those in Lepra.

Psoriasis differs from *Pityriasis* in the greater degree of inflammation which gives origin to the scales; and these not having the minute micaceous or branny character of those of Pityriasis.

In the decline of some of the species of *Lichen*, a scaly exfoliation occurs: but the previous history of the case at once leads to a correct diagnosis. There is one of the scaly syphilitic eruptions, also, which somewhat resembles Psoriasis: but the dull copper-colour of the spots, the thin and little distinct character of the scales; the soft and scarcely

* Many writers, amongst whom we find Vogel, Sauvages, Linnæus, Cullen, and Dr. Falconer, include Psoriasis in their description of Lepra; whilst Plumbe and Dr. Duffin regard the two diseases as varieties of the same affection.

raised spots; their disposition to form crusts, and the absence of itching, as well as the nature of the previous symptoms, enable us readily to distinguish Psoriasis from it.

Psoriasis is said to be sometimes associated with Lepra*. I have never met with a decided case of both existing at the same time in the same person; nor have I ever seen an instance of Psoriasis and Pityriasis appearing together on the same individual at the same time. The appearance of phlyzacious pustules, however, are by no means uncommon, especially in long-continued and obstinate cases of Psoriasis *inveterata* (Pl. 3, fig. 2, *a*): Psoriasis and Eczema *impetiginodes* may exist together; and Cazenave and Schedel mention a case they witnessed in the Hospital of Saint Louis, in which Psoriasis of the hairy scalp was co-existent with Porrigo *favosa*†. I have frequently observed several of the forms of Psoriasis present in the same person.

C. If we consider that Psoriasis appears most commonly in persons of a languid habit, and suffering under a congestive state of the capillary circulation, it is not surprising that, in almost every instance, the disease can be traced to some deranged condition of the stomach and chylopoietic viscera. Whatever, consequently, can produce this state, and augment to a morbid degree the irritability of the stomach, is likely "to be accompanied by a corresponding irritable condition of the skin, which, inducing subacute inflammation of the superficial capillaries, causes the cuticle to be secreted in that state which characterizes the disease‡" in all its forms. In children, if it do not directly originate from the irritation of dentition, the exciting cause, undoubtedly, of several other cutaneous eruptions, at that period of life, it is at least rendered more severe and difficult of management in this condition of the habit, which, it is unnecessary to remark, exerts a powerful influence over the digestive organs. In adults, especially those in which there is an hereditary predisposition, one of the most frequent exciting causes is mental depression, arising from anxiety, grief, and apprehension.

* Abrégé Pratique des Mal. de la Peau. Paris, 1828, page 316.

† Ibid.

‡ In Bateman's Synopsis, 7th edit. p. 55, which I edited, the above is the opinion which I hazarded respecting the cause of Psoriasis.

In the case of a female at present under treatment, I have been enabled to trace three distinct attacks of P. *diffusa* to anxiety of mind. The disease has also been supposed to be connected with the gouty diathesis; and, in as much as gout results from a deranged condition of the alimentary canal, both diseases may be regarded as concurring consequences of the same exciting cause. Whatever can derange the stomach, such as acescent and indigestible food; unripe acid fruits; vinegar; drinking cold water when heated*; the unseasonable employment of the cold bath; overheating the habit by violent exercise†; may be regarded as occasional causes of Psoriasis. It is not less common among those who lead a luxurious and indolent life, than the poor who are scantily nourished and clothed. Some of the local varieties have been referred to the irritating influence of substances employed in certain trades: but it is probable that these operate only where there is a predisposition to the disease.

We may safely regard Psoriasis as not contagious; although from Dr. Willan, as already noticed, having observed Psoriasis *guttata* to occur among children in the same school or family, Dr. Bateman thinks that species of the disease is probably contagious‡. Dr. Cumin, also, mentions the case of two ladies who had the disease in their necks, and were impressed with the opinion that they had received it from their female attendant§. But, rejecting the idea of contagion, there is no difficulty in accounting for its appearance in individuals of the same family; especially in children in the same school; if the opinion, that it occasionally depends upon certain articles of diet, be correct. I have never observed the disease to be communicated from one person to another; and I have witnessed very severe cases of it in women living with their husbands, who have not been infected.

Willan‖, Bateman¶, and Rayer**, remark that P. *guttata* and P. *diffusa* are sometimes the sequel of Lichen; and Dr. Cumin states that he has seen P. *inveterata* a sequel of Ec-

* Memoirs of the Med. Soc. of London, vol. iii.

† Bateman's Synopsis, 7th edit. p. 56. ‡ Ibid.

§ Cyclopædia of Practical Medicine, vol. iii. p. 543.

‖ On Cutaneous Diseases, vol. i. p. 57. ¶ Ibid. p. 156.

** Traité Théorique et Pratique des Mal. de la Peau, tome ii. p. 59.

zema *rubrum ;* and even this disease degenerate into P. *guttata**. Rayer also says that he has seen it supervene the application of a blister. My experience has not afforded examples of a similar description.

P. Although some of the forms of Psoriasis are extremely difficult of cure, in some instances continuing for a life-time, yet it rarely proves dangerous. Cases of long-continued P. *diffusa* and *inveterata* have terminated fatally ; but this seems to have been the result rather of the condition of the gastro-intestinal mucous membrane, on which the cutaneous affection depends, than of the cutaneous irritation. I know an instance in which P. *inveterata* has existed for upwards of twenty years, yet, in other respects, the patient, who is seventy-eight years of age, enjoys good health.

When the disease yields to remedies, the scales gradually drop, and are not reproduced, the cuticle of the affected spots softens and displays only a somewhat darker hue than that of the healthy skin, and a slight depression : the fissures and thickening of the skin, when these exist, also gradually disappear, and by degrees the surface assumes its natural and healthy texture. These favorable appearances, however, are sometimes fallacious ; thence a cautious prognosis should be given respecting the termination of the disease ; as, after an apparent cure, it often returns on the application of some slight occasional cause, or a change of season.

T. Although the treatment of Psoriasis requires to be modified according to the form which the disease assumes, and its duration, yet, in a general point of view, the antiphlogistic plan should be pursued ; except when the disease attacks naturally delicate or chlorotic females, or persons in whom the powers of the habit have been lowered from defective nourishment, bad clothing, and the other deprivations attendant on poverty ; or from long-continued mental-depressing influences.

Regarding the disease, as it most commonly displays itself in the commencement, three objects are to be especially kept in view in its treatment—namely—

1. To subdue inflammatory action.
2. To allay the morbid irritability of the mucous membrane.

* Cyclopædia of Practical Medicine, vol. iii. p. 544.

3. To stimulate the capillaries to renewed activity ; so as to change morbid into healthy action in those of the skin, and to improve the cuticular secretion.

1. *Blood-letting.*—In fulfilling the first indication, moderate general bleedings, with a judicious administration of purgatives, and a mild, unstimulating diet, are required ; and, in almost every case, are essential to the cure of the disease in all its forms, whether general or local. Willan and Bateman, whose authority must always be respected in everything connected with affections of the skin, have regarded bleeding and repeated purging injurious ; but I have witnessed few cases which have not required the use of the lancet ; and Rayer*, Duffin†, Dr. Wallace, and Dr. Graves, have borne testimony to its salutary influence. We must be regulated by the degree of tendency to plethora in the patient, and the appearance of the blood, which is usually buffed, and more or less cupped, as well as the form of the disease, in determining the repetition of the operation and the quantity of blood to be abstracted. In the most severe cases, with a few exceptions, I have seldom found it requisite to order more than ten ounces of blood to be taken at one time, or to repeat the bleeding sooner than six or eight days. The eruption always appears paler on the following day ; and the scales separate spontaneously in greater quantity, leaving the subjacent surface less red than before the bleeding ; the itching is also always abated. I have seldom seen any decided advantage derived from topical bleeding, even in the local varieties of Psoriasis ; nor is this remarkable, if my opinion—that the local affection is developed by accidental causes operating upon a habit in which there exists, at the time, a general predisposition to the disease—be correct. Local blood-letting is generally thought to be adapted for children labouring under Psoriasis *diffusa ;* yet my own experience does not authorize me to concur in this opinion. Unless great care be taken to check the flow of blood in due time, leeches debilitate children more than the abstraction of a moderate quantity of blood by the lancet ; and, by employing the latter, we have the farther advantage

* Traité des Maladies de la Peau, tome ii. p. 49.
† Edin. Med. and Surg. Journ. No. 86.

of being able to regulate the quantity of blood to be taken. When leeches are employed, they should be placed near the most inflamed patches.

Purgatives.—With respect to the employment of purgatives in Psoriasis, although my experience is at variance with the opinion of Willan and Bateman, yet I am not prepared to go the length to which Biett recommends purging to be carried*. On the contrary, the employment of drastic purgatives, such as jalap, colocynth, and gamboge, appear to me to be decidedly contra-indicated in the irritable condition of the mucous membrane, which always more or less exists in Psoriasis; and I have found this opinion practically correct. When the disease is an accompaniment of Anæmia or Chlorosis, I have found a combination of small doses of calomel, ipecacuanha, and aloës, an excellent purgative; but, in these cases, the bowels share the general torpor of the habit: whereas, in Psoriasis, independent of these states of the habit, the chief utility of purgatives is to remove half-digested, consequently irritant ingesta, from the intestinal canal; the mild saline purgatives are, therefore, the best adapted for that purpose. When the papillæ of the tongue are red and elongated, indicating an acescent state of the stomach, a combination of magnesia and the sulphate of magnesia is well adapted both to neutralize the acid, and, by stimulating the orifice of the ductus communis choledochus, to bring down an adequate quantity of bile into the duodenum†. When the tongue is red, smooth, and adhesive, purgatives have always appeared to me to be injurious.

Diet.—In every case of Psoriasis, in aid of the remedies for fulfilling this indication, the diet should be light, nutritious, and not stimulant. Milk combines in itself all these properties; and where patients can be confined to a milk diet, with a proper quantity of bread, or other farinaceous matter, the

* See Abrégé Pratique des Mal. de la Peau, par Cazenave et Schedel, p. 303. The bias of Biett in favour of purgatives seems to depend, in a great measure, on his opinion that the same treatment is requisite for Psoriasis and Lepra: but, in the latter disease, the mucous membrane never displays the state of irritability in which it exists in the former.

† To produce this effect, the fluid employed in making the draught should not be more than is absolutely requisite for the solution of the sulphate of magnesia; and the dose should be followed, an hour afterwards, by the administration of some tepid demulcent, to dilute the bile in the duodenum, and to sheath its acrimony on the highly irritable mucous membrane.

disease more rapidly yields to the influence of remedies than when an animal diet is employed: a more permanent cure is obtained. No cutaneous affection is so powerfully swayed by sympathy with the condition of the alimentary canal as Psoriasis; thence, even when more stimulant diet is admissible, pork, fish, especially shell-fish, highly seasoned dishes, pastry, baked and fried meats, vinegar, acid fruits, pickles, wine, spirits, porter, ale, and every description of fermented liquor, should be interdicted. When the condition of the habit demands the use of animal food, mutton, poultry, and game are to be preferred; and to any of these, a moderate share of well-boiled vegetables may be conjoined.

2. For fulfilling the second indication, namely, to allay the morbid irritability of the mucous membrane, sedatives, narcotics, and simple tonics, present themselves as proper for internal administration; and baths, either of simple tepid and hot water, or medicated, or of aqueous vapour, are the best external means.

Sedatives and *Narcotics.*—In another place*, I have stated, that, "from my own experience, I can confidently assert," that the best sedative in Psoriasis, "is the Liquor Potassæ," in conjunction with diluted hydrocyanic acid, and administered in the emulsion of bitter almonds, when idiosyncrasy does not interfere with the employment of the bitter almond. It corrects acidity, by allaying the irritable condition of the mucous membrane, sooner than any other remedial agent with which I am acquainted. In general, the dose of the solution of Potassæ which is ordered is too small: I usually commence with thirty minims, and gradually augment the dose to that which the stomach of the patient can bear. I have carried the dose to eighty, and on two occasions to one hundred and five minims twice a day, with the most beneficial result. When the patient is strong, and presents a tendency to plethora, the best vehicle for the solution is the bitter-almond emulsion, itself a sedative; if delicate, the infusion of yellow Cinchona, or of Cascarilla, or the decoction of Sarsaparilla, or of Elm-bark, is preferable to the almond emulsion.

Among the narcotics employed in this disease, the decoction of twigs of the Bitter-sweet (Solanum *dulcamara*) has

* Bateman's Synopsis, 7th edit. p. 68.

been much lauded. I have frequently prescribed it; but candour obliges me to acknowledge that it has rarely realized the anticipations which its eulogists* have led us to form of its remedial influence.

Tonics.—The most powerful of this class of medicines, exhibited alone, are of little value in Psoriasis, unless in extremely delicate individuals, or females labouring under Anæmia or Chlorosis. The best tonic, assuredly, for such cases is the Iodide of iron, in doses of from two to five grains. If it cause headache, or excite too powerfully, the Iodide of zinc, in doses of a grain to two grains, may be substituted for it.

Baths.—Nothing tends more to aid sympathetically the internal means already mentioned, for allaying the irritability of the mucous membrane, and directly diminishing the sensibility of the surface, as well as abating the burning pain and itching of the affected portions of the skin, in the early and inflammatory stages of this disease, than the tepid water or the aqueous vapour bath†. But, in general, the time of remaining in the bath is too limited to prove permanently useful: it should be limited only by the patient becoming faint. The addition of decoction of bran, or linseed, or gelatine, as recommended by some continental practitioners, is unnecessary. The soothing effect of the simple warm-water bath, and the vapour bath at a moderate temperature, in allaying irritations of the gastro-intestinal membrane, has been long known; indeed, from observing the sympathy which exists between the skin and that membrane through the medium of the nervous system, we might have been led to anticipate the effect which experience has amply confirmed. But, besides this soothing influence, these baths tend to remove intestinal congestions, and to equalize the circulation by their derivative influence; whilst at the same time, by imparting a gentle stimulus to the skin, they aid in restoring the healthy action of the cutaneous capillaries, and, consequently, in effecting the secretion of a sounder cuticle. The efficacy of the simple warm-water bath is

* Chrichton, in Willan on Cutaneous Diseases, p. 145. Gardner, Med. and Phys. Journ. May 1830.

† The temperature of the tepid water best adapted for the above purpose is from 90° to 95° Fahr.; that of the vapour bath, if the vapour be breathed, from 95° to 100°; if not breathed, from 100° to 106°.

increased by several saline matters, which shall be mentioned under the next head of indications to be fulfilled; I may only add here, that the beneficial influence of both kinds of baths is augmented by moderate friction whilst in the bath.

The tepid douche, or tepid shower bath, combines in some degree the influence both of the warm bath and of friction. It is the regular repetition of the effect, not the power of the agent, however, which is the source of the benefit. Even the inveterate form of the disease is ameliorated by this mode of employing warm water; the scales are loosened; the itching is soothed; and the influence of the general remedies, in restoring the sound state of the cuticle, is aided. These baths display their salutary influence most obviously when they are employed immediately after venæsection. It is scarcely requisite to observe, that some caution is necessary in employing them where a tendency to apoplexy exists.

Ointments.—I have seldom witnessed much advantage derived from the application of cream, oil of almonds, the bread and milk poultice, or decoction of bran; and, as Bateman justly remarks, "any admixture, even of the oxide of zinc or preparations of lead, is commonly detrimental." Neither have I witnessed any benefit to follow the application of cataplasms of narcotic herbs*.

3. For fulfilling the third and last indication, to be answered in the general treatment of Psoriasis, alteratives, revulsives, and stimulants of various kinds, have been employed.

Alteratives.—The decided effects produced by the preparations of mercury upon the capillary system has pointed them out as well adapted for converting diseased into healthy action in many chronic affections of the skin; and, notwithstanding the anathema of Willan and Bateman, there is sufficient proof of their beneficial influence when they are judiciously prescribed in the severer forms of Psoriasis. It must, however, be admitted, that mercurials, pushed to the extent of causing salivation, prove not only useless, but injurious, in Psoriasis—a fact which was ascertained more than a century and a half

* Rayer gives the following formula for a narcotic cataplasm:—℞ Poudre de Feuilles de Jusquiame, Feuilles de Cigue de Morelle, Farine de Lin, aa ℥i. Delayez dans quantité suffisante de decoction de têtes de pavot et de fleurs de coquelicot.

ago by Willis*. But their efficacy as alteratives, administered in minute doses, for restoring the healthy condition of the digestive organs when these are deranged, and for improving the secretions of the alimentary canal, is undoubted; and it is upon this principle that they prove salutary in Psoriasis. The Bichloride is usually prescribed, in doses of from one-tenth to one-sixth of a grain, in the decoction of bitter-sweet, given twice or thrice a day; but I have found that the Hydrarg. c. Creta, in doses of gr. v to gr. viii, when the stomach is overcharged with acid, or the Biniodide of mercury, in doses of the sixth of a grain, twice a day, better adapted to answer the above intention than any other of the mercurial preparations. When the former is employed, the Iodide of Potassium may be administered, in combination with the Liquor Potassæ, in the bitter-almond emulsion; when the latter, the Iodide of Potassium may be combined with it in the form of a pill. In both cases, the alterative influence of the mercurial on the capillary system is promoted by that of the Iodide of Potassium; and, in delicate persons, it does not interfere with the administration of Cinchona, Cascarilla, or any other tonic required to maintain the powers of the habit. Iodine, indeed, in combination both with sulphur and with arsenic, in the form of Iodides, exerts a most salutary influence in Psoriasis as well as in Lepra. It carries both the sulphur and the arsenic more completely into the system; and, acting directly upon the cuticular vessels, it sets up a new action adequate to overcome the morbid one which constitutes the disease.

Sulphur.—Sulphur itself, or in combination with Potassium in the form of a Sulphuret, has been long employed as a revulsive in Psoriasis. The dose may be carried to a scruple; but it is preferable to commence with grain doses. The Harrowgate, the Moffat, and the numerous other sulphurous waters in this country and on the continent, owe their therapeutical properties to a combination of this kind. They prove either sudorific or diuretic, according to the temperature of the surface of the

* In a severe case, which he details under the name *Impetigo*, where the scales accumulated nightly in heaps in the bed, "unaquaque nocte, squamæ instar fufurum magna copia intra lectum deciduæ, in acervos colligi potuerint," he salivated repeatedly, and apparently cured the disease: but he adds, "verum intra tres menses, idem morbus repullulans brevi ad pristinam feritatem pervenit."—*Willis*, Pharmaceutice Rationalis, sect. iii, c. vii, p. 496.

body at the time of their exhibition. All of them have effected cures in severe cases of this disease, both when taken into the stomach and employed as baths. The sulphuric acid, the salutary influence of which I have witnessed in several very obstinate cases of P. *inveterata*, is supposed to undergo decomposition in the habit, and its base to operate in the same manner as if it had been given in the form of simple sulphur*. This may be true; but I am disposed to think that the beneficial influence of this acid, as a tonic, is felt before any decomposition takes place: the one action, however, is not at variance with the other; and the fact of its beneficial property is of more importance than the knowledge of its mode of operating. To secure this advantage, the dose of the acid should be carried much beyond that which is usually prescribed. The Iodide of sulphur† has not been long known to the profession: it operates decidedly upon the skin as a diaphoretic; and both its components—the one as hydro-sulphurous gas, and the other as Iodide of sodium—can be readily detected in the perspired matter. It is said to have proved beneficial in Psoriasis; but, although I have witnessed its salutary influence in Scabies, yet I have had no experience of it in this disease.

Iodide of Arsenic.—For my opinion of the value of Iodide of Arsenic, as a remedial agent in severe scaly eruptions, I must refer my readers to what has been said of it under the head of Lepra. It operates in the same manner, producing the same beneficial results, and requiring the same precautions in its administration, in Psoriasis as in Lepra: but it is only in long-continued and very obstinate cases that it is required. I cannot agree with Rayer, that arsenical preparations are productive of only temporary benefit; nor in his concluding remark—"avec la crainte non moins fondée de porter quelque funeste atteinte à des organes intérieurs plus irritables que la peau, et sur lesquels ces remèdes énergiques exercent

* *Smyth*, Medical Communications, vol. i. p. 191.

† This preparation is formed by rubbing together four parts of iodine and one of sulphur, then exposing the mixture in a flask to a moderate heat, until it fuses. On cooling, it forms a crystallized mass, somewhat resembling antimony, but of a darker colour. It is decomposed, if too high a temperature be employed for its fusion. The dose is from five to ten grains.

une action plus directe*." I have seen it fail in relieving P. *inveterata*, which afterwards yielded to large doses of diluted sulphuric acid in the decoction of Cinchona bark; and, on the other hand, I have witnessed the disease permanently eradicated by it, when that acid and all the other usual remedies had been productive of no benefit.

General Stimulants.—Those remedies of this class which have been already spoken of in Lepra,—namely, Tincture of Cantharides†, Turpentine, tar pills and tar water, the compound decoction of Sarsaparilla, and some other stimulant vegetable decoctions,—are equally serviceable in Psoriasis and in Lepra; but their value is more questionable than that of the Iodide of Potassium, the mercurial alteratives, the arsenical compounds, especially the Iodide; and, above all, the Liquor Potassæ, on which I have every reason, from numerous opportunities of witnessing its powerful influence in recent cases of all the forms of the disease, to place the greatest reliance.

Such are the general remedies employed in the treatment of Psoriasis. In ordinary cases, with the exception of baths, topical applications are seldom required; and indeed their action sometimes produces a delusive idea of improvement which is not realized. The state of the eruption, like a barometrical guide of atmospherical changes, is the best method which we possess of judging of the efficiency of the general means employed for curing the disease; and topical remedies can only be regarded as adapted to alleviate the sufferings of the patient, rather than affording any positive aid to the general remedies for obtaining a satisfactory result. Many practitioners, however, rely chiefly on external applications, in every form of Psoriasis. It is, therefore, necessary to investigate, in this place, the properties and value of those that exert a stimulant influence. I shall examine them under the heads—Vesicants and Suppuratives; Stimulant Ointments; and Lotions and Baths, natural and artificial.

Vesicants, Suppuratives, Ointments.—In long-continued

* Traité des Mal. de la Peau, tome ii. p. 45.

† Rayer informs us that the dose of this tincture, at first five drops, may be increased until sixty are taken daily; and that its use may be continued daily for even four months without causing any obvious derangement of the digestive, the respiratory, or the urinary organs.—*Traité des Mal. de la Peau*, tome ii, p. 44.

and inveterate cases of Psoriasis, the diseased condition of the skin is as it were maintained by habit; consequently, attempts have been made to change this, by the action of a new irritant; and, for this purpose, blisters and the tartar emetic ointment have been used. Their effect, although apparently satisfactory, is not permanent; as I have, on several occasions, witnessed. Dr. Cumin has suggested the employment of the strong acetic acid, where there is a "solid thickening both of the cuticle and cutis, sometimes seen particularly in the knee and elbow." He adds, "the results of our trials (of it) has been highly satisfactory—the diseased cuticle separating in flakes, and a new surface being exposed of a much more healthy character*." I have never seen any occasion to order so powerful an escharotic; as, in the most inveterate cases, the thickening has yielded to the tar ointment combined with calomel, or with the Iodide or Biniodide of Mercury:—marked benefit also has been obtained from the ointment of the Iodide of Sulphur†.

In using these ointments, as brisk friction on the affected part is employed each time before their application, it is difficult to determine how far the benefit may not be due to the friction and the exclusion of the air which the ointment effects. Dr. Morrison treated successfully several cases of the disease by friction, and excluding the air. He dipped a sponge in tepid water, then squeezed it hard, and covered it with oatmeal. With this prepared sponge, the affected parts were briskly rubbed for a considerable time, occasionally renewing the oatmeal on the sponge; and after this operation, when the parts were well washed and dried, he applied

* Cyclopædia of Practical Medicine, vol. iii. p. 548.

† The following are the forms in which these ointments may be prescribed:

℞ Calomelanos, ℈i. Unguenti Picis Liquidæ, ʒiv.
Unguenti Cetacei, ʒi. M. ut fiat Unguentum.

℞ Hydrargyri Iodidi pulveris subtilissimi, gr. xv.
Unguenti Picis Liquidæ, ʒiv.
Unguenti Cetacei, ʒi. M. ut fiat Unguentum.

℞ Hydrargyri Biniodidi in pulvere subtilissime, gr. xii.
Unguenti Picis, ʒiv.
Unguenti Cetacei, ʒi. M. ut fiat Unguentum.

℞ Iodidi Sulphuris pulveris tennissimi, ʒss.
Unguenti Cetacei, ʒi. M. ut fiat Unguentum.

neatsfoot oil over them with a varnishing brush*. Decided benefit has also resulted from covering the affected parts with oiled silk, when no friction has been employed. As the ointments, however, are powerfully stimulant, there is no reason for doubting that they operate specifically by exciting the cutaneous capillaries. A question here arises: how far is it safe to repel the eruption in Psoriasis? Alibert mentions a case in which it apparently was repelled by hot flour applied over the eruption: great irritability and unquenchable thirst were induced, "sa salive;" the patient was a lady—"est devenue épaisse, fétide, et comme platreuse. Pour comble d'infortune, ses yeux sont totalement perdus†."

Lotions.—The chief stimulant lotions employed in Psoriasis have been composed of the hydrosulphurets of the alkalies, in the proportion of ℈i to a pint of water. I have occasionally witnessed considerable benefit result from a lotion consisting of twelve grains of the Bichloride of mercury and eight fluid ounces of almond mixture; but, in general, lotions are remedies of equivocal value in Psoriasis.

Baths.—The natural sulphur baths operate in the same manner in Psoriasis as in Lepra; but it is only in long-standing cases, or after the inflammatory symptoms have been alleviated, that these baths are proper. When the natural baths cannot be resorted to, an artificial bath, composed of ℈iv of dry sulphuret of potassium and thirty gallons of water, may be substituted; and this may be used every other day. On the same principle, the tepid sea-water bath has been employed; but it should be continued daily for two or three months, in order to effect any permanent benefit. The sulphur fume baths are recommended by Dr. Green: they certainly assist the influence of general remedies; but, as I have already stated, in noticing their effects in Lepra, I have seen no instance of a permanent cure effected by them without the aid of internal remedies.

There is perhaps no affection of the skin so liable to return as Psoriasis; thence, when the disease has been cured, the patient should be cautioned against abuses of diet, and

* Edin. Med. and Surg. Journ. vol. xxvi. p. 525.
† Maladies de la Peau, p. 84.

subjecting himself to the influence of the known exciting causes of the disease. When all ordinary efforts have proved unavailing, the removal to a warm climate has been judiciously recommended, on the principle that "the habitually increased activity of the cutaneous function, and the change which the constitution is likely to undergo, may render successful the modes of treatment which were previously without effect*."

Dr. Willan has described the various forms which Psoriasis assumes under eleven species, each of which he has named. In the seventh edition of Dr. Bateman's Synopsis, I ventured to reduce Willan's species to five; but, if we are to be guided by the physical character of the eruption in forming species, I am of opinion that they may be farther reduced to three, under which all the others should be placed as varieties. The genus may, therefore, be arranged as follows:

Species i. Psoriasis *diffusa*.
Var. a. —— *guttata;*
b. —— *ophthalmica;*
c. —— *labialis;*
d. —— *lotorum;*
e. —— *pistoria.*
Species ii. Psoriasis *inveterata.*
Var. f. —— *palmaria;*
g. —— *præputii;*
h. —— *scrotalis.*
Species iii. Psoriasis *gyrata*†.

Species i. Psoriasis *diffusa.* Diffuse Psoriasis‡.

This species of Psoriasis (Pl. 1, fig. 1) is the most com-

* *Dr. Cumin*—Cyclopædia of Practical Medicine, vol. iii. p. 539.

† I have not placed in the above arrangement that variety which is an accompaniment of syphilis, and which has been denominated *Syphilitic* Psoriasis.

‡ Ver. Syn. Diffuse Scaly Tetter.—Spreading dry scale.
Nos. Syn. Dartre squammeuse humide—Dartre squammeuse orbiculaire *(Alibert).*

mon; it is also more inflammatory than any of the other species of the disease. The eruption is usually preceded by some constitutional derangement, namely, a general uncomfortable feeling, headache, pains in the stomach and bowels; and the eruption is frequently ushered in by a sensation of heat, tingling, or itching over the skin. The eruption first displays itself in the form of small, distinct, somewhat elevated points (Pl. 1, fig. 1, *a a*), on the apex of which dry scales form. These are rapidly connected, and form small scaly irregular patches (*b c*), which, in their turn, coalesce, and constitute broad extended patches, in which the original spots are lost (*d d*). The skin is hot, red, and tender; in some cases, the inflammation is great, and the patches display fissures and excoriations, the former containing a dry powder or scurf. The scales are less numerous than in the other species; they adhere by a central point, although they appear to be placed edgewise on the surface. They are very irregular, both in shape and in thickness. The patches feel rough and harsh under the finger, when it is passed over them. When they are rubbed, the scales separate, and leave the surface beneath them red and moist, whilst the heat and pain are greatly aggravated by the friction; and this is also the consequence of going near a fire, or exposure to an increase of temperature, or the use of stimulants.

Psoriasis *diffusa* appears on every part of the body. I have seen it covering the hairy scalp, the face and the ears, the shoulders, and greater part of the back, and both the upper and lower extremities at the same time. A scaly incrustation occasionally surrounds the fingers down to the nails, which become brittle, crack, and exfoliate. The scales in some instances, instead of being white, have a pale yellowish hue. The eruption, sometimes, suddenly disappears upon one part of the body and reappears upon another part. The scaliness is usually greater upon the extremities than upon the trunk of the body.

When the disease yields to the influence of remedies, or spontaneously disappears, the eruption first leaves the scalp and the arms; and, contrary to what happens in Lepra, it remains longest upon those parts which are most fleshy. As the cure progresses, the centre of the patches are first freed

from the scales, and assume a dull reddish hue, rendered more striking by the scales which still remain on the margins forming whitish, irregular crescents (Pl. 1, fig. 2).

This species of Psoriasis generally attacks adults; but neither childhood nor infancy is exempt from it. When it appears during dentition, the disease is aggravated: it is accompanied with inflammation of the mucous membrane of the nostrils; and the patches often pass into sores, and form scabby incrustations; or it displays an admixture of smooth, shining, red elevations, with the scaly patches, which, in the clefts of the nates and other parts in fat children, exude moisture. Dr. Willan* regarded this a distinct species, and named it Psoriasis *infantilis*; but there is no reason for regarding it otherwise than as P. *diffusa*, modified by infancy and the irritation of dentition. Dr. Underwood says—"These (the sores) die away, and the like appear successively in other parts, sometimes for two or three months, leaving the skin of a dirty or dusky hue†. He had observed it attack the suckling mother or nurse, and apparently spread to other children who slept with the nurse or child; he therefore adds, "I have now no doubt of its being contagious in that way, though not by a more distant intercourse." The disease is certainly not contagious in adults.

Psoriasis *diffusa* is, occasionally, a severe disease; and, when of long continuance, the diseased condition of the mucous membrane, and the itching and unremitting irritation, wear down the powers of the habit; and, in a few instances, it has terminated fatally. In general, however, it yields to the influence of remedies; but it is apt to recur in spring or in autumn, or during deranged states of the digestive organs from irregularities of diet.

The other forms of this species of Psoriasis are regarded as varieties, on account—either of some difference in the physical appearance of the eruption;—or on its being stationary and confined to certain parts or particular organs of the body;—or to some connection between the disease and the occupation of the patient.

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* On Cutaneous Diseases, vol. i. p. 170.

† Treatise on Diseases of Children, 4th edit. vol. i. p. 97.

VARIETIES OF P. DIFFUSA.

A.—*Depending on the Aspect of the Eruption.*

Var. a, P. *guttata** *(Willan)*, (Pl. 4, fig. 1), is a less severe form of the disease than P. *diffusa*, but equally common. It usually appears in spring, after some degree of feverish disturbance in the habit, accompanied with muscular pains; and it is apt to recur, for many successive years, at the same time. It is characterized by the small patches of the eruption not coalescing so extensively as those in P. *diffusa*, but remaining distinct; and the intervening skin being healthy. Cazenave and Schedel describe it as resembling "assez bien à des gouttes d'un liquide que l'on aurait projetté sur la peau†;" but this description is equally applicable to the first appearance of P. *diffusa*. (See Pl. 1, fig. 1, *a a*.) Indeed, it is to the diffuse form of Psoriasis what Lepra *alphoides* is to common Lepra; namely, the same disease appearing in a less plethoric or inflammatory state of the habit.

Psoriasis *guttata* first displays itself in the form of minute, solid, red points, closely resembling those which characterize the commencement of P. *diffusa*: they enlarge and coalesce; seldom, however, to an extent exceeding an inch in diameter; and become covered with small, dry, white scales. They display much less inflammation than those of P. *diffusa*, even when the disease assumes its acute form in children, in whom it spreads rapidly over the body in a few days. In adults, it is a chronic form of the disease, and is slow in its progress.

This variety of P. *diffusa* appears on every part of the body; but most commonly on the back, and on the exterior part of the fore arms. The itching and sensation of burning are much less severe than in P. *diffusa*: the scales do not adhere so firmly; but, when they fall, the surface, which is prominent to the touch, is painful.

The diagnosis, in this variety, is less obvious than in P. *diffusa*. In the distinctness of the patches; their

* Ver. Syn. Drop-like Scaly Tetter.

Nos. Syn. Dartre Squammeuse orbiculaire—Herpes Squammosus madidans et orbicularis (*Alibert*).

† Abrégé Pratique des Maladies de la Peau, p. 308.

somewhat orbicular form; and their becoming first healthy in the centre, on the decline of the disease, it resembles *Lepra*: but it differs from it in their elevated centre; and, when they coalesce, in the components of the patch not retaining their orbicular form so characteristic of Lepra.

The treatment of Psoriasis *diffusa* and its variety P. *guttata* is that which has been already detailed. I may, however, remark, that it is in reference to them especially that Rayer* urges his purgative plan, in conjunction with tepid bathing: and, indeed, there is no donbt that whatever reduces general excitement, may, in some cases, effect a cure: but a continued course of saline purgatives is likely to derange the digestive organs, and consequently to maintain rather than to cure the disease. When P. *guttata* occurs in children, besides scarifying the gums, the secretions thould be improved by the mild alterative influence of moderate doses of Hydrargyrum cum Creta; and the acescent and irritable condition of the stomach corrected by the Liquor Potassæ and Hydrocyanic Acid, in appropriate doses, administered in infusion of Rhubarb and Calumba.

B.—*Depending on the Locality of the Eruption.*

Var. b, P. *ophthalmica*.—This local variety of Psoriasis derives its name from the scaly eruption being confined to the eye-lids, to the angles of the eyes, and intermixed with the eye-lashes. The inflammation is sometimes considerable, and the itching is always great: it is productive of an acrid watery discharge, and a thickening of the eye-lids, which somewhat impedes their motion.

Old people and children are the subjects of this variety. When it occurs in the latter, the constant rubbing of the eye, on account of the itching, frequently causes inflammation of the conjunctiva with swelling of the eye-lids. As Galen long since remarked, it differs from Psorophthalmia in being an external affection†. It requires the same internal treatment as the general forms of the disease. The best local applications are

* Traité des Mal. de la Peau, tome ii. p. 44.

† "Psoriasis autem exterior est; Psorophthalmia internam palpebram superiorem præcipue afficit."—Galen de Oculo. cap. vii.

leeches on the angles of the eyes, warm fomentations, and covering the part afterwards with the following ointment:

℞ Liquoris Plumbi diacetatis diluti, f℥ss.
Unguenti Sambuci, ʒiss.
Aquæ Rosæ, f℥ii.
Unguentum leni calore liquiscat; dien, assiduè cum aqua et liquore agitatur, ut fiat unguentum.

I have never seen the disease permanently cured by only topical treatment.

Var. c, P. *labialis*—PSORIASIS *of the Lips.*—This is an obstinate variety of this species of the disease. It is, sometimes, present when no traces of the eruption can be observed on any other part of the body. It is confined to the immediate vicinity of the lips, completely encircling the mouth; but seldom extending more than half an inch in breadth. It affects chiefly the prolabium of the under lip, the epithelium of which becomes thickened, dry, cracks, and forms large scales, which exfoliate repeatedly for a considerable length of time; nevertheless the scales adhere more firmly, and they are only detached when the new cuticle beneath them is completed, to crack and exfoliate in its turn. It is very common in young girls of a delicate, nervous frame of body, before the catamenia occurs; but it is not confined to early life. It gives a peculiar, unpleasant expression to the face, "un aspect froncé*." It renders the lips so stiff and harsh, that the patient is constantly obliged to moisten them with saliva, by licking them with his tongue. It may be confounded with *Eczema*; but the absence of vesicles, the size and the firm adhesion of the scales, and the thickness of the epithelium, are sufficient to elucidate the diagnosis. This variety of Psoriasis has been occasionally traced to the bad habit of biting the lips, which some people acquire.

The ointment of Oxide of Zinc, and many other ointments, are daily employed in this form of Psoriasis with very little benefit. A leech or two applied near the margin of the eruption; with a course of Liquor Potassæ in the decoction of Sarsaparilla; and the simple Ceratum Plumbi Acetatis

* Abrégé Pratique des Mal. de la Peau, p. 312.

applied over the affected parts; constitute the treatment from which the greatest benefit has been derived, in those cases for which I have been consulted.

C.—*Depending on the Occupation of the Patient.*

Var. d, P. *lotorum*—*Washerwoman's Scale.*—I have never witnessed this variety as a distinct disease, but, very often, as the result of employing carbonate of soda and acrid soap, by washerwomen who were predisposed to Psoriasis *diffusa*, and in whom the arms were slightly affected by the ordinary form of the eruption. When Psoriasis is not present in the habit, the eruption caused by carbonate of soda displays more of the characters of Eczema *impetiginodes* (*Willan*), than of Psoriasis; the cuticle becoming thickened, rough, red, and cracked: and, instead of the itching of Psoriasis, there is the constant stinging sensation of Eczema. The change, from the ordinary form of the eruption of Psoriasis *diffusa*, produced by soda in washerwomen, is accurately displayed in Pl. 2, fig. 2, of the ATLAS, in reference both to the original disease and to the modification of it caused by the irritant. It is aggravated by the alternate exposure of the skin to the hot soap suds and the cold air: it scarcely ever extends to those parts of the arms which are not immersed in the suds.

Besides the general treatment, the local affection in this variety is alleviated by narcotic fomentations and the partial vapour bath. I have witnessed much benefit derived from the employment of a lotion composed of f℥i of Liquor Potassæ, f℥ii of diluted Hydrocyanic Acid, and f℥viii of Bitter-Almond Emulsion. The arm should be swathed by a calico bandage wet with the lotion, and then encased in oil-silk. When the latter is used alone, it frequently brings out a crop of psydracious pustules. I need scarcely remark that the occupation of the patient should be discontinued until the general disease, or the predisposition to it, be overcome.

Var. e, P. *Pistoria*—*Bakers' Scale or Itch.*—Although this variety most frequently appears on the hands of bakers, and other individuals who work in dry powders, yet, like the foregoing variety, it is a mere modification of P. *diffusa*, in a person predisposed to the disease. It is developed by the irritation of the dry powders acting on an already morbidly irritable sur-

face. I have seen many cases of it in persons labouring under the general disease who have never worked in flour, nor in any other substance that could operate as an irritant to the back of the hand; and, even when the eruption exists exclusively on that part of the body, there is no reason for regarding it otherwise than the external indication of P. *diffusa*, limited in its locality.

The hands swell, and display, on their posterior aspect, one or more rough, scaly patches, which are in some instances interspersed with deep fissures, and extend to the dorsum of the fingers. The scales are larger, drier, and firmer, than those on other parts of the body, and give a sensation of tension and pain on moving the fingers.

The treatment is the same as that for the former variety; securing the affected parts from the influence of the irritating powders.

Species II. Psoriasis *inveterata*, Inveterate Psoriasis*.

This is the severest form of Psoriasis. It has been supposed, not without probability, to be the same disease as P. *diffusa*, aggravated by age, or poverty, or misery, or irregularities and excesses of various kinds. It is also said to be the sequel of Prurigo *senilis*†. I have witnessed it as the primary form of the disease, in females under thirty years of age: it is, nevertheless, most common in old people.

It commences in distinct red points, which rapidly enlarge and form irregular scaly patches, the number and coalescence of which are, in some instances, so extensive as to encrust nearly the whole of the body, with the exception of the face, the palms of the hands, and the soles of the feet. The skin throughout is thickened (Atlas, Pl. 3, fig. 1, *c*, *d*), sometimes even to a state of hypertrophy; and the scales of the eruption differ from those of the other forms of the disease (Pl. 3, fig. 1, *b*), being firm, and in close, compacted layers; and whitish, variegated and glistening, not unlike fish scales. The patches are traversed by deep fissures with inverted edges, which

* Vern. Syn. Inveterate Dry Scale.

Nos. Syn. Psoriasis agria (*Auct. vet.*). Dartre squammeuse lichenoide. Herpes squammosus lichenoides (*Alibert*).

† Bateman, Synopsis, 7th ed. page 62.

sometimes ooze out a thin viscid fluid; at other times appear filled with a powdery substance. The desquamation and the reproduction of the scales are occasionally so rapid, that large quantities of them are found every morning in the patient's bed. In some instances, entire patches of agglomerated scales separate, leaving a red, tender surface, exuding a thin, acrid, viscid discharge, which concretes into exfoliating plates. In places where the clothes rub against the affected parts—as, for example, on the thighs, the nates, or the scrotum—these excoriations are most common and severe. Around the joints of the fingers, when they are not covered with the eruption, the skin is thickened, appearing almost like bands tied around them (Pl. 3, fig. 1, *d*): when they are encrusted, the nails become yellow, thickened, rocky, and opaque, and are frequently renewed. Pustules of a phlyzacious kind are sometimes intermixed with the patches of the eruption; but, usually, they appear upon the unaffected parts of the skin (Pl. 3, fig. 2, *a*); and, occasionally, they coalesce (Pl. 3, fig. 2, *b c*).

This form of Psoriasis, when the patches are distinct, resembles the severest forms of Lepra; but the component spots which constitute the patches do not present the circular shape, nor the depressed centre and raised border of those of Lepra. The deep fissures, also, in P. *inveterata*, form an excellent diagnostic feature.

Psoriasis *inveterata* is much under the influence of weather, being invariably aggravated by a moist state of the atmosphere, and during the prevalence of east and north-east winds; the heat and itching, more especially, are increased at such times. It rarely or never declines spontaneously. When it yields to remedies, the new cuticle is at first red, harsh, shrivelled, and still bears traces of the fissures (Pl. 3, fig. 4, *a b b*); and it is often many weeks before it regains its natural aspect, even when the cure is permanent. In numerous instances, it resists obstinately the most judicious treatment for many years; and at length the patient falls a victim to chronic inflammation of the gastro-intestinal mucous membrane. It is in this form of Psoriasis, however, that the Iodide of Arsenic, and other arsenical preparations, promise the greatest benefit, in conjunction with small repeated bleed-

ings, and the daily use of the aqueous vapour bath. The sulphur fume bath is also likely to prove beneficial in long-standing cases of this inveterate disease.

Besides constituting the general affection just described, Psoriasis *inveterata* appears as a local disease, under the denominations P. *palmaria*, P. *scrotalis*, and P. *præputii*.

Var. e, P. *palmaria*—Psoriasis *of the Palm**.—In many cases of Psoriasis *diffusa*, as well as *inveterata*, the palms of the hands and the wrist become the seat of the eruption, in common with the other parts of the body; but this does not constitute the variety now under investigation: it is only when the palms are exclusively affected, that it acquires the name P. *palmaria*. Even when this is the case, as I have more than once hinted, the disease must still be regarded as generally present in the habit, and the variety depending solely on the locality of the eruption, developed by an accidental cause on the part which it covers. Some constitutional disturbance generally precedes the eruption, which displays itself, at first, in the form of small, flat, or slightly elevated, hard, papillary points, soon covered with dry, whitish scales, and surrounded by an inflamed border. The affected parts are hot and itchy; and as the scales fall in one place, the eruption spreads to another, until the whole palm of the hand is partially denuded of cuticle, swelled, red, shining, cracked, and so fixed in a semiflexed state, that the hand cannot be opened without much pain. As the disease proceeds, the cuticle in the centre of the palm acquires more or less of its natural character, except that it remains smooth, dry, and glistening, whilst deep fissures traverse each side of the hand, and occasionally also the sides of the fingers; and, the exfoliation still extending, the disease is bounded by a ragged margin of cuticle. This margin feels dry, harsh, horny, and white (Pl. 3, fig. 1, *e*); forming a strong contrast with the deep, violaceous-red of the rest of the palm. Sometimes the march of the disease is less regular, and patches of sound cuticle remain on various parts of the palm, surrounded by the disease in its various stages. The fissures are sometimes so deep and tender, that they bleed on any attempt to extend the hand. The eruption sometimes extends up the wrist; but it rarely spreads to the back of the hand. In severe attacks, the hands swell, and are painful; and the cuticle frequently exfoliates and is renewed; whilst the palm appears of a dusky hue, as if it were dirty.

* Ver. Syn. Scale of the palm.

Nos. Syn. Dartre squammeuse centrifuge: Herpes squammosus centrifugus (*Alibert*).

This form of Psoriasis *inveterata* is often developed by the occupation of the patient. For instance, it is not uncommon in shoe-makers, cabinet-makers, and others who exert much pressure with the palm, or who work in irritating substances. I have at present under my care a clergyman whose right hand only is affected, which he attributes to the frequent use of the spade in gardening, his favorite amusement. This form of Psoriasis occasionally affects the soles of the feet.

Psoriasis *palmaria* is extremely obstinate, and difficult to manage. It is much aggravated by ointments of every description, and only yields to general remedies. The topical treatment which has proved productive of the greatest benefit in my practice, is bleeding with leeches, applied to the wrist and around the inflamed spots; the vapour of hot water; the application of the Liquor Plumbi diacetatis dilutus, by means of lint; confining it on the part by means of an oil-silk glove, which keeps the hand moist, and operates like a perpetual, local, tepid bath. It has yielded to blisters, after long resisting other remedies, both general and topical*. The same attention to diet and to the regulation of the bowels, as in the general form of the disease, is required in this variety. It is scarcely requisite to say that all pressure upon the affected part should be carefully avoided.

Var. f. g. P. *præputii*, and P. *scrotalis*—Psoriasis *of the Prepuce and of the Scrotum*.—These varieties are sometimes very obstinate, and resist every species of treatment for a long period of time. As their names imply, the prepuce and the scrotum are the seats of the disease in males, and the labia pudendi in females. Both varieties often occur simultaneously; but sometimes only one of them is present without the eruption

* Medical Repository, vol. iii. *New Series*, p. 58.

appearing on any other part of the body. The eruption commences in the same manner as in the other varieties of the disease; but the skin reddens, soon thickens, becomes rugose, is covered with numerous chaps, and sometimes with excoriations; and the eruption is accompanied with the most distressing itching. The scales are less easily detached than in the other local varieties. When the prepuce is the part affected, it usually causes phymosis; and the least effort to uncover the glans penis is followed by a flow of blood.

These varieties may be confounded with the eruption of secondary syphilis, which resembles Psoriasis; but the patches not presenting a copper-colour, and the absence of the other symptoms of syphilis, readily distinguish them.

The same general treatment requisite in the other varieties of Psoriasis is necessary in these. Sponging with hot water is the best means of allaying the inflammation. The ointment of white precipitate (*Ung. Hydrargyri Ammoniochloridi*, P. L.) is well calculated to soften the skin and to prevent attrition*.

Species III. Psoriasis *gyrata*. Tortuous Psoriasis.

This is the rarest form of Psoriasis. All the cases of it which I have seen have been in females. It appears chiefly upon the trunk of the body, most commonly occupying both the back and the breast. The constitutional affection which precedes the appearance of the eruption is usually less severe than in the two other species; and the aspect of the eruption is so striking as to prevent it from being confounded with them. The patches present serpentine or tortuous, or vermiform figures or rings, of greater or less magnitude (Pl. 4, fig. 2, *a a a*); and, when closely examined, they are found to be composed of scales overlapping one another transversely; and the bands, which they form, separated by pale, superficial, reddish lines. These tortuous patches are moderately elevated above the skin, and feel rough under the fingers.

This form of Psoriasis demands no particular mode of

* I have seen much comfort derived from the following domestic prescription:—"Boil one ounce of sulphur and four ounces of fresh butter in one pint of water for two hours: strain, and use the liquor as a wash."

treatment: both the general and the local remedies indicated in the other species being applicable to this form of the disease.

CASE I. (Psoriasis *diffusa*.)

Sarah Palmer, aged 23 years, was admitted into University Hospital, 13th November, 1839. She is an unmarried woman, of good general conformation, with a fair complexion, and of the sanguine temperament. She has latterly lived in service, in Great Portman Street. Her food has always been good, and in sufficient quantity. The house is an open situation, and free from damp. Her habits have been regular. Her father is alive, and enjoys good health. Her mother died twelve years ago in childbed. She enjoyed excellent health until about seven years ago, when she had a bad leg, which was cured without much trouble. Shortly afterwards she was attacked with an illness which continued for three months; during which, she was prohibited the use of animal food and fermented liquors. About three months ago, she caught cold from sitting in a draught when she was much heated: and the cough was much increased, a fortnight since, by sitting in a cold room for two hours, after a long run in order to reach the railway train, by which she afterwards travelled on the outside, and felt very cold. Two days afterwards, she experienced a tingling in her arms, accompanied with slight redness. This she attributed to the action of some soda with which she had been washing; but, on the next morning, she experienced the same sensation on the back of her neck, and an eruption soon appeared, and extended to between her shoulders and over the greater part of her back. Her legs, from the knees downwards, were next attacked; and the eruption became generally diffused over her whole body; but it was less visible on the abdomen and thighs.

On her admission into the hospital, she presented a fine specimen of Psoriasis *diffusa*. Upon her back, the character of the eruption was most perfect, and seen in all its stages, from its commencement to its acmé (Atlas, Pl. 1, fig. 1). The eruption on the legs slightly inclined to the character of Psoriasis *guttata*, the spots being scarcely surrounded by an inflamed base. The face and the forehead were

of a deeper red than natural. Her hands and feet were not affected. Her sleep was good; but sometimes it was interrupted by the severe tingling of the eruption. Any violent exercise produced slight cough and difficulty of breathing, with palpitation of the heart; but there was no pain of the side. Her tongue was slightly furred. There were no uneasy sensations nor eructations after taking food. She complained of pain of an anomalous character about the back and shoulders; but was elsewhere free from uneasiness. Her bowels were open, and the catamenia was regular. The sensation caused by the eruption is that of tingling, not of positive itching. It is greatly alleviated by sponging the part with very hot water. V. S. ad ℥xii.

℞ Calomelanos, gr. iv.
Pulveris Opii, gr. i.
M. fiat pilula post venæsectionem sumenda.
Haustus purgans niger hora post pilulam sumendus.

℞ Liquoris Potassæ, m. xxx.
Potassii Iodidi, gr. ii.
Acidi Hydrocyanici diluti, m. ii.
Infusi Gentianæ, f ℥xii.
Haustus ter quotidie sumendus.
Let the arms be sponged with hot water.

Nov. 15th.—The blood which was taken on the 13th was slightly buffed, but not cupped. The tingling is increased on approaching the fire and by the warmth of the bed. The bowels are open; the pulse is soft, small, and compressible. The sleep of the patient was much disturbed on the first night of her admission into the hospital: this she attributed to the strange bed. Pergat in usu medicamentorum. Milk diet.

Nov. 18th.—The eruption on the back is greatly improved; but the tingling still continues. The arms are in the same state as at the last visit. The tongue is white: the bowels are regular. Pergat in usu misturæ, addendo liq. potassæ, m. x, singulis dosibus.

Nov. 20th.—She continues improving; but complains of cough and headache. V. S. ad ℥vi. Pergat in usu med.

Nov. 22nd.—The blood drawn on the 20th was quite free from the buffy coat, and the cupped appearance. The eruption is better, and is disappearing on the forehead. The

tongue is white; and the patient complains of a bad taste in her mouth. Her bowels are open. Let her take an emetic this evening; and let the head be shaved.

Nov. 23rd.—The emetic acted freely. She feels much better.

Nov. 25th.—The eruption on the back is greatly improved; that on the arms is much the same as before. The head, which has been shaved, presents all the appearance of a *furfuraceous* disease, being covered with a thick scurf. Her tongue is clean.

Pergat in usu medicamentorum addendo, liquoris potassæ m. v., et potassii iodidi, gr. i, singulis misturæ dosibus.

Nov. 29th.—The eruption on every part of the body is greatly improved. The back is much less scaly, and the head is nearly clear. The tongue is slightly furred and red at the point; the bowels are open; the pulse is soft and regular. Pergat.

Nov. 30th.—She complains of considerable tingling on her back. Let the following lotion be applied:

℞ Liquoris Potassæ, f ℥ii.
Misturæ Amygdalæ Amaræ, ℥vi.

Dec. 3rd.—She is rapidly improving in every respect. The tongue is, however, rather white; the bowels are regular; the pulse is soft, round, and full.

Pergat in usu misturæ addendo liquoris potassæ, m. v, singulis dosibus.

Let her take an emetic at bed-time.

Dec. 6th.—There is rather more inflammation on the back than at the previous visit. The head is greatly improved; as is also the eruption on the arms, which indeed are nearly clear. The bowels are confined. The pulse is small, sharp, and incompressible. V. S. ad ℥viii.

℞ Calomelanos, gr. v. Pilula h. s. sumenda.
℞ Haustus niger, cras mane sumendus.
Pergat in usu misturæ.

Dec. 9th.—The blood taken at the last visit was slightly cupped. The inflammation on the back is much lessened. The arms are nearly well; the head is less scaly; the tongue is clean; and the bowels are regular.

Dec. 11th.—The face and the head are quite free from

any eruption. The head is covered with a white scurf, giving it much the appearance of dandriff. Let it be brushed with a soft brush, and washed with soap and water, night and morning. The back and the arms are much improved; the tongue is clean; and the bowels are regular.

December 13th.—She continues to improve in every respect. Pergat. Let her have full diet.

December 17th.—Since the last report, she has retrograded, a circumstance depending undoubtedly on the change of diet. The eruption on every part of the body is more visible than it was four days ago. There is also a small favous pustule on the head: she has had a severe cold; and her medicine has been discontinued, for the last two days, on account of the presence of the catamenia, which no doubt also contributes to the unfavourable state of the eruption. The tongue is slightly congested; the bowels are confined; the pulse is quick. Omittatur mistura.

℞ Pulv. Ipecac. ʒss. Emeticus vespere sumendus.
℞ Potassii Iodidi, gr. iii.
Liquoris Potassæ, m. xxxvi.
Infusi Calumbæ, f ℥iss.
Ft. haustus ter quotidie sumendus.

The head to be slightly scarified around the pustule.

December 26th.—She gradually continues to improve in every respect: the back is now perfectly free from scales; and between the shoulders the skin has assumed its natural aspect. The arms and the legs are free from any trace of the eruption; and the head from scales and scurf. Let her hair be allowed to grow, brushing it with a soft brush. Pergat in usu medicamentorum.

Dec. 31st.—She has gradually improved, and is now so well that she might be discharged from the hospital; but she is kept to ascertain how far the cure is permanent.

Jan. 6th.—Discharged cured.

CASE II. (Psoriasis *diffusa*, displaying the varieties P. *palmaria* and P. *lotorum*.)

J——— C———, aged 27, was admitted into University College Hospital, June 18th, 1839. She is of the sanguineous temperament, with a fair complexion; a washerwoman, and

married. She says that she is of temperate habits; but since her marriage she has not been in good circumstances. She resides in an open, dry situation: she has no hereditary predisposition to disease; nor has she had any previous disease.

She has lately used carbonate of soda in washing, and she does not dry her hands and arms afterwards; to which custom she ascribes the eruption—namely, Psoriasis *diffusa*—under which she is labouring. The eruption first appeared on the back of the hands, eight months ago, and then extended up the arms; it was accompanied with itching. No eruption has appeared on any other part, except the face and neck. There has been much itching of the face. Her husband and her child are quite free from the disease; and she is not aware of having caught it from any one. Her general health, she says, is pretty good; but the catamenia has not appeared since her confinement, eight months ago. She has used sulphur-ointment a few times without benefit.

℞ Calomelanos, gr. v.
Micæ Panis, q. s. Ft. pilula statim sumenda.
℞ Magnesiæ Sulphatis, ℥i.
Infusi Sennæ, f ℥iii.
Misturæ Camphoræ, f ℥iii. Fiat mistura, cochlearia iii majora, horâ post pilulam, et sextâ quâque horâ, sumenda.

June 24th.—No fresh patches have appeared. She is much better in every other respect.

June 28th.—The eruption is increasing on the neck. The bowels are much purged; the tongue is red at the apex. Omittatur mistura.

℞ Liquoris Potassæ, m. xxiv.
Infusi Calumbæ, f ʒii. Haustus ter quotidie sumendus. Common diet.

July 3rd. She is improving; the bowels are confined.

℞ Calomelanos, gr. v.
Micæ Panis, q. s. Ft. pilula h. s. sumenda.
Haustus purgans niger cras mane sumendus.

July 10th.—The eruption is still very itchy, and it has rather increased. Omittantur medicamenta.

℞ Acidi Hydrocyanici Diluti, m. iii.
Liquoris Potassæ, f ʒss.
Infusi Calumbæ, f ℥ii. Misce ut fiat haustus, ter quotidie sumendus.

℞ Magnesiæ, ℈i. Sulphuris Præcipitati, gr. x.
Pulvis h. s. quotidie capiendus.

July 15th.—Much improved: the tongue is better; but it still exhibits red points at the apex. Omittatur mistura.

℞ Liquoris Potassæ, m. xxxvi.
Acidi Hydrocyanici Diluti, m. v.
Infusi Quassiæ, f ℥iss. Misce ut fiat haustus ter quotidie sumendus.

Pergat in usu pulveris. Let her have a chop daily.

July 22nd.—She is much improved. Pergat in usu misturæ, addendo Liquoris Potassæ, m. x, singulis dosibus.

℞ Calomelanos, ʒss.
Unguenti Picis, ʒi.
Unguenti Cetacei, ʒiv. Tere ut fiat unguentum quotidie utendum.

July 26th.—She is altogether much better; but the bowels are torpid. The ointment fretted the eruption. Pergat in usu pulveris. Omittantur mistura et unguentum.

℞ Potassæ Liquoris, f ʒii.
Decocti Aloës, f ℥iii.
Infusi Cascarillæ, f ℥iii. M. 4ta pars bis quotidie sumenda.

August 2nd.—Improving but slowly; the pulse is a little sharp. The catamenia have not appeared for ten months; and this is about the time they should appear. Omittantur medicamenta. Pergat in usu Lotionis. V. S. ad ℥viii.

℞ Calomelanos, gr. i.
Pulveris digitalis, gr. i.
Extracti Conii, gr. iii. Fiat pilula horâ somni quotidie, ad tertiam vicem, sumenda.

℞ Potassæ Liquoris, m. xxxvi.
Decocti Aloës Compositæ, f ʒxii. Fiat haustus primo mane quotidie sumendus.

August 5th.—Improving rapidly. The blood last taken was cupped and slightly buffed. Let her use the ointment (pitch with calomel) again; and wear an oil-silk glove on the right hand, on the palm of which the disease has appeared. Let her have full diet, namely, a chop and oiss of milk.

August 16th.—The eruption is much improved, no fresh spots have appeared. The tongue is still coated, and red, with enlarged papillæ at the sides and apex.

℞ Hydrocyanici Acidi Diluti, f ʒi.
Liquoris Potassæ, f ʒx.
Tincturæ Calumbæ, f ʒiii. Cochlearia ii minima, ex cyatho aquæ bis quotidie sumenda.

Aug. 26th.—The hands are nearly well; the skin is much softer.

September 6th.—She is nearly convalescent: the catamenia is present. Omittantur medicamenta.

September 20th.—Some days ago, she relapsed, and was bled to ℥xii: the serum of the blood was milky. The cuticle of the hands is exfoliating; but the hands are moist.

Repetatur mistura cum Liquoris Potassæ, f ʒii. Full diet and oi of milk.

September 23rd.—The right hand only is now affected.

℞ Unguenti Picis, ʒiv.
Calomelanos, ℈i. Fiat unguentum nocte maneque utendum. To wear the oil-silk glove.

September 25th.—The ointment irritated the hand, causing heat and redness, and a fresh eruption has appeared on the back of the hand. Let her leave off the ointment.

September 30th.—The eruption is gone; but the skin is rough on the backs of both hands; the tongue is still a little red, and the papillæ are enlarged. The pulse is natural; the skin is moist and cool; the bowels are confined.

℞ Pilulæ Hydrargyri, gr. x.
Pulveris Ipecacuanhæ, ℈i.
Extracti Aloës, ℈iv. Fiant pilulæ xx æquales, e quibus sumatur una, horâ somni quotidie.

October 2nd.—There is no trace of eruption present, except the roughness on the hand, and that is extremely slight. Pergat in usu medicamentorum. Common diet; milk a pint and a half daily.

October 16th.—She was discharged cured.

CASE III. (Psoriasis *inveterata.*)

S——— B———, aged 27, a middle-sized woman, of spare habit of body, was admitted into University College Hospital, March 27th, 1838. She had never enjoyed good health, having been subject to headaches, cough, shortness of breath, and pain in the region of the heart. For the last seven

years, she has been afflicted with Psoriasis *inveterata*, which has extended over almost every part of the body.

On examining the eruption, it presented the appearances displayed in Plate 3 (fig. 1, 2, 3); whilst extensive patches, also, existed on the loins, nates, and thighs. The skin, under and in the vicinity of the patches, was harsh, stiff, and thickened. The stinging and burning sensation was so intolerable, especially at night, as to prevent sleep. The appetite was indifferent, and the tongue red, smooth, and adhesive; the bowels were torpid; and the catamenia irregular in period, and scanty; but they had never been altogether absent. Although the pulse was small, yet, it was sharp and incompressible.

She was bled to the amount of six ounces. The blood displayed a buffy coat. On the following day, the face and arms were redder than before; but the tongue was less adhesive, although it was still too red at the apex. The pulse was 88, slightly jerking, and incompressible. The bowels were opened in the morning. The night had proved restless. The appetite was better. She was ordered the following medicine:

℞ Acidi Hydrocyanici diluti, m. iv.
Liquoris Potassæ, m. xxxvi.
Aquæ, f ℥iss.

M. ut fiat haustus, ter quotidie sumendus.

℞ Pilulæ Hydrargyri, gr. i.
Pulveris Ipecacuanhæ, gr. i.
Extracti Conii, gr. iii.

M. ut fiat pilula, horâ somni quotidie sumenda.

She continued this medicine until the 3rd of April. The face was much improved, and there was less irritation generally; but there was no change in the appearance of the eruption on the arms and the hands. The bowels were open: the secretion of urine was in sufficient quantity, but it was highly coloured. The tongue was loaded.

℞ Pergat in usu haustus et pilulæ. Pulveris Ipecacuanhæ, ℥ss, pro emetico cras mane.

On the 5th of April, she was again bled to eight ounces. The blood had lost its buffy coat; but the serum was turbid. She was directed to omit the former medicines, and to take the following:

℞ Hydrargyri Bichloridi, gr. i.
Decoctionis Sarzæ simplicis, f ℥viii.

Cochlearia quatuor majora ter quotidie sumenda.

℞ Magnesiæ Sulphatis, ℥iv.
Infusi Cascarillæ,
Infusi Sennæ, a a f ℥i.
Acidi Nitrici diluti, m. v.

M. fiat haustus mane quotidie sumendus.

April 7th.—The cutaneous eruption is much improved: but a small ulcer appeared on each tonsil two days ago. The pulse is sharp and 108. Let her omit the medicine. Ten ounces of blood were taken from the arm; after which, a pill, containing six grains of calomel and one of opium, was administered, and was followed, in three hours, by a purgative draught. She was ordered to take immediately ℥ss of ipecacuanha in powder; and, after the vomiting, to apply eight leeches on the throat.

April 8th.—The right tonsil is very much swelled; the pulse is improved, but it is still hard. She was feverish towards the beginning of the night, and perspired towards morning.

℞ Calomelanos, gr. vi. Micæ Panis, q. s.

Fiat pilula quamprimum sumenda.

To be followed by a purgative, an hour afterwards.

April 24th.—She complains of soreness of the tongue; the papillæ are enlarged; the throat is much better; the pulse is soft and natural. The eruption is worse than it was before the attack of sore throat. Let her omit the medicines.

℞ Pilulæ Plummeri, gr. ii.
Hyoscyami Extracti, gr. iii.

Fiat pilula, horâ somni quotidie sumenda.

℞ Liquoris Potassæ, f ℥ii.
Iodidi Potassii, ℥ss.
Decocti Dulcamaræ, f ℥vi.

Mist. fiat mistura—sumatur quarta pars ter quotidie.

℞ Hydrargyri Bichloridi, gr. i.
Spiritûs Vini, f ℥i.
Aquæ distillatæ, ℥v.

Fiat lotio, nocte maneque quotidie applicanda.

April 30th.—The tongue is still tender: the eruption on the face and hands is improved: the bowels are rather too

open. Intermingled with the eruption upon the hands, some phlyzacious pustules have appeared. The face looks better; the tongue is not so sore. She was again bled yesterday to eight ounces: the blood was slightly buffed. Continuetur mistura.

℞ Hydrargyri Biniodidi, gr. i.
Antimonii Tartarisati, gr. i.

Fiant pilulæ iv, e quibus sumatur una, horâ somni quotidie.

May 1st.—The face is greatly improved; the tongue is getting quite natural; the enlarged papillæ have almost disappeared. The bowels are regular. She is still annoyed by stinging and itching; but she sleeps better.

May 6th.—The pustules on the hands continue to come out in the morning, and burst in the course of the day. The eruption on the hands, and the eruption generally, has itched more for the last two days; and it seems retrograding. The tongue is better; she sleeps well; the pulse is sharp and 84. Let her have milk diet. Omittantur medicamenta.

℞ Sulphuris Præcipitati, ℈i.
Potassæ Nitratis, gr. xii.

Sit pulvis, mane nocteque sumendus.

℞ Acidi Hydrocyanici diluti, m. iii.
Magnesiæ Sulphatis, ʒiss.
Misturæ Amygdalæ, f ℥ii.

Haustus bis quotidie sumendus.

Mittantur sanguinis brachio, ℥iii.

May 12th.—The eruption is disappearing from the face; that on the hands is less, but on the legs it is spreading. There is still heat and tingling at night. The pulse is regular, but sharp.

Mittantur sanguinis brachio, ℥iii.

Pergat in usu medicamentorum.

May 18th.—She is greatly improved as to the appearance of the eruption, both on the face and on the hands. She took an emetic yesterday: the vomited contents of the stomach were extremely sour. The tongue is better; but the papillæ are still enlarged.

℞ Liquoris Potassæ, ʒii.
Acidi Hydrocyanici diluti, m. xii.
Infusi Calumbæ, f ℥vi.

Sumatur quarta pars bis quotidie.

June 1st.—The face is better; the eruption is altogether paler and less inflamed; but it is more irritable, and a few fresh pustules have appeared. The tongue is more natural.

℞ Liquoris Potassæ, ʒii.
Misturæ Amygdalæ Amaræ, f ʒvii.

Fiat lotio, mane nocteque quotidie utenda.

Pergat in usu misturæ. Let her have a mutton chop daily at dinner.

She now requested permission to go into the country, which was granted. On returning, fourteen days afterwards, the eruption did not appear so well as when she left the hospital. Mittantur sanguinis brachio, ʒviii.

℞ Calomelanos, gr. v.
Micæ Panis, q. s. ut fiat pilula hora somni sumenda.

Haustus purgans cras mane sumendus. Pergat in usu misturæ cum potassæ liquore.

June 20th.—The eruption is greatly better; but it has not wholly disappeared.

℞ Sulphuris, ℈i.
Potassæ Nitratis, gr. vi. Pulvis h. s. quotidie sumendus.

Pergat in usu misturæ addendo Liquoris Potassæ m. vi singulis dosibus.

℞ Ricini Olei, ʒiii.
Unguenti Hydrargyri Nitratis, ʒi.
Adipis, ʒi. Fiat unguentum, pauxillum partibus affect. horâ somni quotidie applicandum.

After this time, S —— B—— became an out-patient, and underwent a course of the Iodide of arsenic, with minute doses of the bichloride of mercury, in the simple decoction of sarsaparilla. Small bleedings were also occasionally resorted to, but without much benefit. I then prescribed for her an emetic, to be taken once a week; and, in the interval, the diluted sulphuric acid in the decoction of yellow cinchona bark; the doses to be augmented to as great an extent as the stomach could support. The acid was commenced in doses of ten minims three times a day, and carried to thirty-five minims for a dose. The food was ordered to be light, but nutritive; and all slops, sugar, and pork, and fish, were interdicted. No topical applications were recommended. Under this plan

she rapidly improved; and, although she is not yet (Jan. 1, 1840) perfectly cured, yet the eruption has almost disappeared; her spirits are good; and her strength is invigorated to a degree which leads me to anticipate a perfect cure.

CASE IV. (P. *palmaria.*)

The Rev. Mr. ——— consulted me respecting a disease in the palm of the right hand, which had greatly annoyed him for more than eight months; and had attained to such a degree of severity that he could not close the hand without suffering a considerable degree of pain; and the pain was still greater when he attempted to extend it. He stated that his health had been good throughout, with the exception of an occasional slight attack of dyspepsia, which was soon relieved by his usual medical attendant. It was, however, accompanied by a feeling of despondency for which there was no mental cause.

On examining the palm of the hand, it presented all the most striking characteristics of Psoriasis *palmaria*. The whole hand was swelled, the cuticle peeled off, and the skin red, glazed, thickened, and crossed with deep fissures with inverted edges. The palm itself was free from scales; but the cuticle around the margin was ragged in its edges, and covered with thick, firm scales, and exfoliating plates; whilst the parts denuded of cuticle were tender to the touch. The patient informed me that the first commencement of the disease was patches of papillæ, which were soon covered with harsh scales; and, as these exfoliated, they left the part beneath them red, tender, glazed, and cracked, similar to that which the hand now presented. He could not recollect having suffered any constitutional disturbance prior to the appearance of the eruption. The heat and itching were intolerable at times. His bowels were torpid; his appetite irregular; his tongue red at the edges, and covered with firm, red, elongated papillæ. He had undergone a course of mercury and sarsaparilla; had taken a few sulphur baths, and used various ointments and other topical applications without any permanent benefit.

He was directed to apply twelve leeches on the wrist, and afterwards to keep up the bleeding by holding the hand in warm water for an hour, and to repeat this operation every sixth day.

℞ Hydrargyri Biniodidi, gr. v.
Ipecacuanhæ Pulveris, ℈i.
Aloës Extracti, ℥i.
Fiat pilulæ xx. Sumatur una h. s. quotidie.

℞ Arsenici Iodidi, gr. iii.
Conii Extracti, gr. xxxvi.
Fiat pilulæ, xii. Sumatur i, 8va. q. q. horâ.

℞ Potasii Iodidi, gr. iii.
Decocti Sarzæ, f℥ii.
Fiat haustus cum singulis pilularum dosibus sumendus.

The patient was advised to live on a milk diet; to forbear using the hand, which he was directed to steam twice a day for an hour at a time, and afterwards to cover it with an oil-silk glove.

He continued this plan for six weeks, at the end of which time the palm of the hand had recovered its natural aspect and pliability; and his general health was completely re-established.

Psoriasis *syphilitica.*

Referring to the remarks which have been advanced under the head Syphilitic Lepra (p. 43), little requires to be said respecting this modification of Psoriasis by the syphilitic virus. It is always the sequel of the true callous, venereal ulcer, or chancre; but it may also be congenital.

S. The eruption is preceded by constitutional disturbances; namely, fever, assuming a hectic character, sore throat, and that form of roseola which usually ushers in secondary syphilitic eruptions. It appears at first in the form of small dusky-red or copper-coloured, soft points, somewhat resembling those of P. *diffusa*, which gradually flatten, and form irregular, scarcely elevated patches, seldom half an inch in diameter, which, almost always, remain distinct, except on parts covered with hair. They soon form a few small greyish scales, on a copper-coloured base; and these repeatedly exfoliate. Spots appear on the forehead, the chest, the shoulders, the back, and the surface of the pubis (Pl. 5, fig. 1, 2, 3): and, very frequently, the palms of the hands and the soles of the feet are also affected. On the latter parts, the cuticle separates in

large flakes, and is rapidly succeeded by another, which peels off in its turn; but no true scales form on these parts. This eruption is always attended with a muddy appearance of the conjunctiva.

D. When the eruption subsides, under the influence of mercury, the scales fall, and are not reproduced, the copper colour disappears; but the spots, in assuming the natural hue and texture of the skin, do not leave behind them any pit or depression, as in Syphilitic Lepra.

There is no difficulty of distinguishing this modification of Psoriasis from the usual form of the disease. In the syphilitic eruption, the patch is small, soft, smooth, level with the surface, and copper-coloured; in common Psoriasis, it is firm, rough, red, elevated, and scaly, to a much greater extent than in the syphilitic eruption.

T. Syphilitic Psoriasis requires, in every respect, the same management as Syphilitic Lepra. Mr. Carmichael has published two cases of this eruption successfully treated without mercury; and with Sarsaparilla alone, in the form of decoction and powder. They tend to confirm the opinions and practice of Rose, Hennen, Dr. J. Thomson, and Mr. Guthrie, respecting the successful management of syphilis without mercury; but, admitting the success of that treatment, the process is tardy; and in many instances the disease has resisted the strictest antiphlogistic means and diet. But without criticising the non-mercurial plan, I have no hesitation in affirming that a combination of mercurials and the Iodides, administered in alterative doses, cure the disease as effectually, and much sooner, than the non-mercurial plan: consequently, in my opinion, they should be preferred; the great object, in all such cases, being to cure the disease as quickly as possible. In addition to the judicious administration of the Iodides of mercury and the Iodide of potassium, the warm bath employed in the morning aids greatly the other remedial measures. I have had no experience of the influence of the sulphur-fume bath in such cases; nor can I satisfactorily explain upon what principle it can prove beneficial. As in every other form of secondary syphilis, sarsaparilla is useful; and after the use of the mercurials is discontinued; indeed no medicine tends so effectually to restore the natural energy of the habit, and re-establish the health of the system.

I have selected the following case, from several cases treated on the same plan, on account of its brevity, and the rapidity with which the disease yielded to the remedies.

CASE I. (Psoriasis *Syphilitica.*)

Marianne Simpson, aged 22, was admitted into the University College Hospital, April 23, 1838. She was a single woman, of a melancholic temperament, and of temperate habits, in reference to spirituous liquors. She had a primary venereal affection two years ago, which was cured with Sarsaparilla alone; and she has had no appearance of any venereal symptom remaining, from that period until six weeks since, when she became affected with pains in the shins, which terminated in nodes, attended with œdema of the ankles, and an eruption on the back and shoulders. This eruption has every character of syphilitic Psoriasis. She complains much of headache, thirst, and fever; the tongue is furred and dry; the bowels are natural.

℞ Hydrargyri Biniodidi, gr. i.
Antimonii Tartarisati, gr. i.
Conii Extracti, gr. xviii.
Ft. pilulæ sex, capiat i 6ta quaque horâ.

℞ Potassii Iodidi, gr. ii.
Decocti Sarzæ, f℥iii.
M. ter quotidie sumendus.

Let her shins be blistered, and let the blistered surfaces be dressed with a grain of hydrochlorate of morphia in fine powder, night and morning. Let her be put upon a milk diet.

She pursued this plan with evident improvement. On the 26th of April, the dose of the Iodide of Potassium was increased *one grain*. It was again increased on the 1st of May; and, on the 3rd, the Biniodide of Mercury was augmented to one fourth of a grain for a dose. At this time, the state of the mouth demonstrated the general influence of the mercurial on the habit. The pains of the shins, the nodes, and the eruption, had disappeared; but the mouth was not severely affected until the 13th, when the mercurial was gradually diminished, and ultimately discontinued. On the 29th of the month, she was discharged cured.

The dressings with the Hydrochlorate of Morphia had a most decided influence in abating the pains in the shins.

In commenting upon this case, I must again express my conviction of the powerful influence of a completely non-stimulating diet in aiding the efficacy of the mercurials. The Biniodide was the mercurial chosen in the present instance, from my previous knowledge of its rapid influence in secondary affections, especially when it is aided by the Iodide of potassium. This Iodide itself exerts the most powerful influence in such cases as the foregoing; but the permanency of the cure is better secured by its combination with the Biniodide of mercury.

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GENUS I. PITYRIASIS*.

Pityriasis is a slight, superficial, chronic inflammation of the skin, occurring in irregular patches; productive of very thin, small, branny, white, micacious-like scales, which are easily detached, and rapidly reproduced: it never terminates in ulceration. During the successive desquamations of the scales, a new cuticle forms, which undergoes the same process, and, in its turn, becomes scaly, whilst the branny scales enlarge, but never to any great extent. The patches of Pityriasis sometimes are dispersed generally over the body†. In most instances, in children, it is confined to the hairy scalp, extending down upon the forehead and the temples; sometimes to the cheeks, the lips, and the chin. In old people, it occupies the scalp chiefly; but, occasionally, it appears on the eyebrows. I have seen it upon the sides, the axillæ, the pubis;

* The name Pityriasis is derived from the Greek word Πιτυρον, signifying *bran*. Dr. Bateman has justly remarked, that all the translators of the Greek writers have rendered the Greek term Πιτυριασις by the word Porrigo, "which," he adds, "according to Celsus, comprehended the ulcerations, pustules, or achores of the Greeks." (Synopsis, 7th edit. p. 71.) The passage in Celsus, however, is extremely obscure, and leads to the supposition that the two diseases were confounded together. "Porrigo autem est, ubi inter pilos quædam quasi squamulæ surgunt, eæque a cute resolvuntur; et interdum *mordent*, multo sæpius siccæ sunt. Idque evenit sine ulcere, modo exulcerato loco: hinc malo odore modo nullo accendente." (Celsus de Medicina, lib. vi. c. ii.) Paulus Ægineta, gives the following correct definition of the disease. "Pityriasis is an eruption of small furfuraceous substances on the skin of the head, or the rest of the body, without ulceration." (Lib. iii. c. iii. trans. by Francis Adams, Esq. vol. i. p. 239.) Alexander Trallianus describes it as consisting of "thin and branny corpuscules, exfoliated from the scalp, and also from other parts of the body, without ulceration." (Alex. Tral. lib. i. c. iv.) Lorry and Joseph Frank both mention it under the name Porrigo: "Porrigo, Græcis Πιτυριασις," says Lorry, "morbus est capitis cuti proprius." (De Morbis Cutaneis, cap. iv. art. iv. p. 458.) Frank thus expresses himself:—"Desquamatio epidermis, nulla prævio, aut præsenti, vitio originem debens, relicta abnormi pellis subjacentis conditione, porrigo dicitur." (Frank Prax. Med. Universæ Præcepta.)

VER. SYN. Πιτυριασις (G.); Porrigo (*Lat.*); Schuppen; Hamptschuppen G.): Zemelagtheid (*Dut.*); Dartre (F.): Shoondoo (*Tam.*): Buffa (*Duk.*): Tsoondoo (*Tel.*): Dandriff (*Eng.*).

NOS. SYN. Pityriasis (*Alex. Tral.*; *Actuar*; *Paul. Ægineta*; *Willan*; *Bateman*; *Swed.*): Tinea porriginosa (*Astruc*): Ephelis (*Auct.*): Furfurisea (*Gilbert*): Tinea furfuracea (*Sennert*): *Rayer*; *Biett*; *Cazenave et Schedel*): Porrigo (*Celsus*, *Lorry*, *Frank*): Alvarati (*Avicenna*): Crusta capitis numatorus (*Frank*): Lepidosis Pityriasis (*Young*, *Good*): Dartre furfuracée volante (*Alibert*): Herpes furfuraceus (*Paget*).

† Green on Diseases of the Skin, p. 233.

and, in a few instances, confined to the legs. It is a very common disease of children, in every class of society: it displays itself very early, and often increases with the years of the individual. It is confined to neither sex. It is not, to my knowledge, hereditary; nor is it contagious.

Four species of Pityriasis are described in the Synopsis of Dr. Bateman; namely, P. *capitis*, P. *rubra*, P. *versicolor*, and P. *nigra**. I reject the two latter altogether from the genus, for the following reasons. P. *versicolor* does not seem to be the result of any inflammatory condition of the surface, either acute or chronic; and, as Rayer† properly remarks, it has a greater affinity with Cloasma than with Pityriasis. The P. *nigra* of Willan I consider altogether out of place here; for, although it is attended by a furfuraceous desquamation of the cuticle, yet it originates in a papulated state of the skin; consequently it rather approximates to Lichen than to Pityriasis‡. I am also of opinion that the P. *capitis* and P. *rubra* of Willan and Bateman are merely varieties of the same disease; consequently, that there is only one species of the disease, which may be named

Pityriasis *vulgaris*.

That variety of the disease which, regarded as a species, has been named Pityriasis *capitis*, may be aptly designated P. *alba*. It appears most commonly in infancy and in old age.

S. The first or inflammatory stage is so slight, that scarcely ever is it recognized until the desquamation, which is attended with itching, commences. The scratching which this induces detaches the scales; and these, becoming entangled in the hair, afford the first indication of the presence of the disease. If the head be then examined, patches of extremely small, thin, white, dry scales will be seen scattered over the scalp, sometimes separate, at other times confluent, so as to cover a considerable portion of the surface (Pl. 1, fig. 1, *a*). The scales, which partially adhere by one edge, constitute several layers; and it is only after forcibly removing these that we observe a somewhat moist and inflamed spot: but the moisture, as well as the inflammation, is slight. The exterior layer of scales is detached with the slightest touch; and, if the whole be rubbed off, a new cuticle, redder than natural, rapidly forms, and undergoes the desquamating process. But, before this takes place, the redness disappears, and the patch seems paler than the rest of the scalp. When the scales of the earlier patches are separately examined, they closely resemble, both in size and aspect, those of bran. But, after many successive desquamations, when the eruption has acquired a chronic character, they are much larger and thicker; but they never assume the form of crusts or scabs. In infancy, as the disease progresses, the itching sometimes becomes so great as to irritate, and prevent the child sleeping, from the constant necessity of rubbing the head upon the pillow. In advanced age, also, the itching is a source of considerable irritation, especially when the eruption attacks the eye-brows. The patches which appear on the forehead, the temples, and other parts of the face, itch much less than those upon the hairy scalp, or on other parts of the body covered with hair.

The second variety, Pityriasis *rubra* of Willan and Bateman, is a more severe form of the disease. It appears in adult age and advanced life, generally upon the trunk of the body and the extremities. I once saw the disease, however, in a young lady of twelve years of age. The primary inflammation is more decided in this than in the former variety. The spots are of a dull red, almost approaching to a livid hue; but certainly not resembling those of Psoriasis *diffusa*, to which Bateman compares them*. They are small at first, smooth or oily looking, and slightly elevated, so that the cuticle feels rough to the hand when it is passed over it. These spots soon coalesce into patches; and when the scales fall, a reddish cuticle remains, which undergoes a similar process; the quantity and the adhesiveness of the scales increasing with each successive exfoliation. The branny scales adhere by their centre, and curl up at each side. When the disease yields,

* Synopsis, 7th edit. p. 71.

† Traité Théorique et Pratique des Mal. de la Peau, t. ii. p. 56.

‡ The disease described by Cazenave and Schedel, as it occurred in Paris in the years 1828 and 1829, which Dr. Green (Practical Compendium, p. 232) regards as a true Pityriasis *nigra*, I have never seen.

* L. c. p. 72.

either spontaneously or to remedies, both the scales and the redness of the cuticle disappear; but the patches often acquire a dull brownish-yellow hue, not unlike that of a faded leaf, which remains for some weeks.

This variety of Pityriasis is more connected with constitutional disturbance than the former. The symptoms are, usually, much languor and depression of spirits, with low fever; considerable restlessness, but nevertheless an aversion from bodily exertion; an uncomfortable feeling of tension or stiffness; a dry and unperspiring surface; and the most distressing itching. In one case, a sensation of heat or burning was felt extending along the spine. These symptoms appear, run their course, decline, and reappear at short intervals; thus prolonging the disease, and leaving the patient little repose.

D. Several cutaneous affections terminate in desquamation, from which, consequently, Pityriasis must be distinguished. On examining the exfoliations in these diseases, however, it will be found that, instead of the thin branny scales of Pityriasis, they are farinaceous. Such is the case in scarlatina and some other exanthemata, in which the cuticle exfoliates on the decline of the eruptions. But the previous symptoms, and the history of the cases, are sufficient to prevent them from being confounded with Pityriasis. The desquamations which follow Lichen, chronic Eczema, and some of the Ephelides, are more likely to mislead the inexperienced; but the diagnosis is cleared by the scaliness not recurring a second time, or in successive crops, as in Pityriasis. The colour which sometimes remains after Pityriasis *rubra*, may cause it to be mistaken for an eruption depending on secondary syphilis; but the absence of the other usual symptoms, and the disappearance of the coloured spots in a short time, without any mercurial remedy, are sufficient diagnostic distinctions to prevent any mistake of this kind. There is no difficulty in distinguishing Pityriasis from Lepra, by the irregularity of the patches, their flat surface without a central depression, and the branny nature of the scales.

From Psoriasis *diffusa* the diagnosis is difficult; especially when the previous general symptoms in this form of Psoriasis have not been severe, nor very obvious, and when the scales are smaller than usual: but the inflamed bases on which the scales form, their greater thickness, and their adhesiveness, are sufficient to characterize that disease from Pityriasis.

The scurf which sometimes forms on the heads of infants from uncleanliness, and that on the heads of dirty old men, is readily distinguished from Pityriasis, by not being a cuticular production, nor the result of inflammation.

C. The causes of Pityriasis are not always obvious. When it is confined to the hairy scalp, it seems to depend on congestion of the capillaries, as the nutriment from the bulbs of the hair is decidedly rendered defective by its presence, and the hair falls off; thence it is a frequent accompaniment of convalescence from acute diseases*. Whatever may be the proximate cause, want of cleanliness, sudden alternations of heat and cold, a tropical sun, certain kinds of food, especially that which is of an acrid nature or highly seasoned—and, above all, painful and depressing moral influences—may be regarded as the exciting causes of Pityriasis. Almost every case of the variety P. *rubra* which I have seen has been traceable to the last-mentioned source.

P. It is scarcely necessary to remark, that although Pityriasis is a disease sometimes of long continuance and resisting obstinately the means employed to remove it, yet, in no case can it be regarded as involving danger. In some instances, however, it is indicative of states of the constitution, which render the individuals susceptible of hazardous diseases. The longer it has existed, the more difficult it is to be removed. The prognostic signs which characterize the decline of the disease, whether it occurs spontaneously or from the influence of remedies, are an abatement of the itching, a less abundant desquamation, the slower formation of the scales, and the skin gradually assuming its natural colour and smoothness. In addition to these, in P. *rubra*, the spots assume the faded hue which has been already described.

T. The treatment of Pityriasis *vulgaris* depends on the age and the general health of the patient. In infants, if they are nourished solely upon the breast, the nurse should be changed, if the eruption can be traced to no particular cause; and a moderate dose of rhubarb and magnesia should be daily administered. As the general health and the vigour of the child improve, the cure may be left to topical means, the chief of which

* Paulus Ægineta refers it to depraved humors, which have been determined to the head, or to saltish phlegm, or bilious, or melancholic blood (l. c. lib. iii, c. iii).

are daily ablution with tepid water and soap, and giving activity to the scalp by the regular use of a *soft* hair brush. In older children, and in adults, besides regulating the bowels, and avoiding an acescent or a fluid diet, it is sometimes requisite to remove the hair, and to employ a lotion, consisting of a fluid drachm of the solution of pure Potassa (Liquor Potassæ P. L.) in eight fluid ounces of Bitter Almond emulsion; or three grains of Bichloride of Mercury in the same quantity of the emulsion. In severe cases, in adults, when the eruption is seated on the trunk of the body, or on the extremities, a brisk cathartic should be administered once in two or three days; and the Carbonate of Potassa, in doses of eight to ten grains, with three grains of the Iodide of Potassium in two fluid ounces of any light bitter infusion, should be given twice or three times a day; and the warm vapour bath employed every morning. Dr. Green recommends the sulphur fume bath; and he adds, that "he never knew one instance of Pityriasis which resisted a few exposures to it*." He recommends the administration of a few doses of purgative medicine as a preparation for the use of the bath. I have never seen any cases that required the employment of so powerful a local stimulant†.

In the variety P. *rubra*, the condition of the general health requires to be enquired into. If the patient be advanced in years, and if a low febrile state is wearing down the strength, a combination of minute doses, namely, a sixth of a grain of Calomel, with three grains of James's powder, should be given at bed time; and from two to three grains of Iodide of Potassium, and twenty minims of solution of Potassa in three fluid ounces of the decoction of Sarsaparilla or of Elm-bark, administered three times a day. Bateman says, "I have also seen it materially relieved by small doses of the Tinctura Veratri‡." I have seen the mineral acids, more especially the diluted Hydrochloric, in doses of eight minims,

* Green on Diseases of the Skin, p. 236.

† The ancients were fond of employing topical stimulants in Pityriasis. Paulus Ægineta (lib. iii. c. iii.) recommends Cimolian earth, mixed with water and the juice of the Beet, to be left on the part to dry; and, after washing it off, to anoint the part with frankincense, wine, and oil. On the following day, the part was to be rubbed with staveacre and oil.

‡ Synopsis, 7th edit. p. 73.

in two fluid ounces of decoction of yellow Cinchona bark, prove useful, when the alkalies failed to afford relief. The diet should be light, but nutritive: both fish and pork should be avoided.

Pityriasis *rubra* does not admit of topical applications of the same stimulant nature as those which are found beneficial in P. *vulgaris*. The itching is the most troublesome symptom, and requires the employment of sedatives rather than excitants. I have found the following lotion more rapidly and permanently useful than those containing either the Biborate of Soda, or Alum, or the Acetate of Lead.

℞ Potassæ Liquoris, f ʒi.
Hydrocyanici Acidi diluti, f ʒi.
Misturæ Amygdalæ amaræ, f ℥vii. M.

The simple vapour bath is always beneficial, especially in the evening, when the itching is most troublesome. Dr. Green regards the sulphur fume bath equally useful in this variety of the disease as in the former. I have had no experience of it. The Bath waters as a bath, in two cases, which I afterwards treated, augmented the itching and general restlessness. The tepid sea-water bath, however, is not liable to the same objection. As the beneficial result which follows, when it is judiciously employed, depends on the improvement to the general health, whatever augments the general tone of the system, and consequently allays nervous excitability, cannot fail to prove beneficial.

The following case is selected to illustrate the treatment of the severest variety of Pityriasis.

CASE I. (Pityriasis *rubra*.)

Mr. S——, a gentleman, seventy-eight years of age, of a melancholic temperament, tall, and of a spare habit of body, applied to me on account of an eruption which had for many weeks greatly annoyed him, and prevented him from sleeping, by the heat and itching with which it was accompanied. He was dyspeptic, with a tendency to hypochondriasm, which led him to imagine that he had caught the disease from his man servant who had been sent to an hospital on account of some cutaneous affection, the nature of which I could not ascertain from the description given of it. On examining the body, I

found that the eruption was seated on the back and thighs. On the lower part of the back and loins, it presented its nascent form, namely, small, dull, reddish spots, slightly elevated above the cuticle, each a few lines only in breadth, coalescing into irregular patches scarcely so large as a crown piece. The spots appeared somewhat unctuous: some were exfoliating thin, shining, branny scales. On the shoulders, where the eruption had run its course, were many pale, brownish-yellow patches, or maculæ, perfectly level with the cuticle, and free from scurf. On enquiring respecting the general health of the patient, I found that his spirits were much depressed; he had occasional tremors, and palpitation of the heart; his bowels were torpid, the stools pale; and his appetite had failed. His pulse was firm, but intermitting; and his tongue covered with a white fur, and indented on the margin.

From these symptoms, and his account of himself, I concluded that the eruption originated in a deranged state of the nervous system, which had terminated in dyspepsia, the immediate cause of the disease. The following medicines were ordered:

℞ Hydrargyri Pilulæ, ʒss.
Ipecacuanhæ Pulveris, ʒss.
Aloës Extracti, ʒiss.
Hyoscyami Extracti, ʒi.

Ft. Massa in pilulas xxx, dividenda, e quibus sumatur una hora somni quotidie.

℞ Potassæ Liquoris, m. xxiv.
Potassii Iodidi, gr. ii.
Decocti Sarzæ, ſ ʒii. M.

Ft. Haustus bis quotidie sumendus.

He was directed to sponge the affected parts with hot water when the itching was violent: to live upon a light, digestible diet, such as should leave very little fæculent matter behind it; and to use the vapour bath every other day. After ten days, the mouth became slightly affected by the blue pill, and the alvine evacuations resumed their natural aspect. In six weeks every vestige of the eruption had disappeared. He has had two or three slight attacks since; but they readily yielded to the use of the draught.

EXTR. DES ANNALES DE LA SOCIÉTÉ DE MÉDECINE DE GAND.

ANNOTATIONS CLINIQUES
SUR
LA PHTHISIE PULMONAIRE,

D'APRÈS LES CAS
QUI ONT ÉTÉ TRAITÉS A LA CLINIQUE DE L'ÉCOLE DE MÉDECINE DE ROTTERDAM, PENDANT LE COURS DE 1846-1847;

PAR

M. LE DOCTEUR G. P. F. GROSHANS,

LECTEUR A L'ÉCOLE DE MÉDECINE DE ROTTERDAM, MEMBRE CORRESPONDANT DE LA SOCIÉTÉ DE MÉDECINE DE GAND.

(Traduites du hollandais par M. le docteur Ozeren, membre résidant.)

GAND,
IMPRIMERIE ET LITHOGRAPHIE DE F. ET E. GYSELYNCK,
Éditeurs des Annales et Bulletin de la Société de Médecine de Gand.
—
1849.

ANNOTATIONS CLINIQUES

SUR LA

PHTHISIE PULMONAIRE,

D'APRÈS LES CAS

QUI ONT ÉTÉ TRAITÉS A LA CLINIQUE DE L'ÉCOLE DE MÉDECINE DE ROTTERDAM, PENDANT LE COURS DE 1846-1847.

Dès le début de mes études médicales la phthisie pulmonaire a particulièrement fixé mon attention. De là est venue chez moi l'habitude de me livrer à quelques considérations sur cette maladie, dans le rapport que je publie chaque année, en terminant mon cours. J'ai pris la liberté de présenter à l'estimable Société de Médecine de Gand les feuilles suivantes, qui renferment les remarques que j'ai faites sur la maladie dont il s'agit, d'après la nature des cas observés durant le cours de 1846-1847. Puisse le public médical les accueillir avec intérêt.

Sur 145 malades, qui, durant le cours clinique, furent choisis dans les autres salles de l'hôpital pour servir à l'enseignement, 15 étaient atteints de phthisie pulmonaire. A ce nombre il faut encore ajouter deux autres malades, dont l'un fut traité pour une

hémoptysie à laquelle il succomba, et dont l'autre, atteint, au moment de son entrée à l'hôpital, d'une pleurésie, mourut phthisique pendant les vacances. Nous nous occuperons donc spécialement de ces 17 cas, bien que dans nos considérations nous parlions également de quelques autres maladies.

Les 17 personnes, atteintes de phthisie pulmonaire, ont succombé. Un homme a quitté l'établissement et est mort quelques jours plus tard dans sa demeure. La femme qui figure dans le tableau comme non guérie, a succombé au mois d'août, dans la grande salle. La personne qui, sous le titre *pleurésie,* est inscrite comme non guérie, est morte en juillet.

L'âge des morts se présente dans l'ordre suivant :

Age.	Hommes.	Femmes.
17	»	1
18	1	»
19	1	»
22	1	»
23	2	»
25	1	»
26	2	»
27	»	1
29	»	1
30	1	»
32	»	1
36	1	»
41	»	1
43	1	»
66	1	»
	12	5

Total 17 morts.

Quant à la question de l'hérédité, sept hommes et quatre femmes ne nous ont pu fournir aucun renseignement. Un homme nous a dit que sa mère était morte d'une maladie de poitrine; un autre que ses parents et toute sa famille ont souffert d'affections de poitrine et que dernièrement un des membres de la famille en était mort. Il était à notre connaissance que la phthisie pulmonaire régnait héréditairement dans la famille d'un autre, et que le père d'un jeune homme avait été enlevé par la même affection. Une jeune fille de dix-sept ans nous a rapporté que sa mère était morte phthisique. L'observation suivante, considérée sous le rapport de l'hérédité du mal, est de la plus haute importance : Quelques jours après la mort du malade, qui est inscrit comme atteint d'hémoptysie, sa mère mourut dans la salle de clinique des femmes.

A l'autopsie de cette femme, nous avons trouvé les preuves les plus évidentes que sa vie avait été menacée antérieurement par une tuberculisation étendue. Cette altération offrait un tel développement, que nous nous sommes demandé avec étonnement, comment un si haut degré de tuberculisation n'avait pas été mortel. Le lobe supérieur du poumon droit, à l'exception du sommet, offrait une dureté rappelant celle du cuir. Dans un tissu qui avait sa couleur normale, nous avons trouvé un grand nombre de tubercules et une caverne de la grandeur d'une noisette; elle était vide à l'intérieur, la surface en était unie, et ses parois pressées l'une contre l'autre étaient revêtues d'une membrane lisse. Le lobe moyen était intact, et le lobe inférieur altéré en partie. La plèvre était partout complètement transparente. Le poumon gauche était entièrement libre; il n'y avait ni épaississement de la plèvre, ni fausses membranes. Vers la partie moyenne de la partie postérieure du lobe supérieur,

on remarquait une cicatrice; cependant, ici encore, la plèvre ne pouvait être considérée comme épaissie. La coupe nous montra un tissu remarquable par sa grande dureté et dont quelques parties étaient d'une couleur très-noire. On n'y vit pas, il est vrai, de cavernes ni de véritables tubercules; mais une incision profonde et un examen plus attentif, nous y firent découvrir çà et là une matière puriforme, caséeuse. Les portions du tissu pulmonaire où l'on trouvait cette matière allaient immédiatement au fond de l'eau. Cette femme est inscrite sur le tableau sous le titre : *anasarca*. Plus loin sa mort sera mentionnée d'une manière expresse et donnera lieu à quelques réflexions.

Il résulte de cette observation que l'affection tuberculeuse, existante chez les parents peut, sous l'influence de circonstances que nous ne pouvons pas toujours déterminer, s'arrêter chez eux dans son développement et même rétrograder; tandis que les enfants, issus de tels parents, peuvent hériter d'eux la prédisposition aux tubercules et à la phthisie pulmonaire. Nous trouvons un exemple analogue rapporté par Andral : Un homme de soixante-quatre ans, avait été atteint d'un fort crachement de sang, à l'âge de trente-cinq ans; on était persuadé qu'il mourrait à la suite d'une phthisie pulmonaire. Il se rétablit néanmoins complètement, gagna une santé robuste; rien n'indiqua plus tard qu'il existait une affection pulmonaire. Mais il eut cinq fils et déjà deux étaient morts phthisiques (1).

(1) Andral, *Clin. Méd.*, t. IV, p. 168.

Quant aux causes occasionnelles, les rapports que nous firent les malades eux-mêmes, touchant leur maladie, ne nous manquèrent pas; mais en général nous ne pûmes leur accorder une grande importance. Les uns invoquèrent le froid comme cause de leur maladie, qui d'abord n'avait consisté que dans un simple dérangement de l'économie et qui s'était, plus tard, insensiblement aggravée. Chez le jeune homme, atteint de pleurésie et qui, plus tard, mourut phthisique, on rencontre, parmi les causes occasionnelles, la masturbation, vice auquel il se livrait encore pendant le cours de sa maladie. L'une des femmes avait mené une vie de débauche et avait été atteinte de syphilis. Cette affection avait été traitée dans la salle de clinique par le sublimé corrosif; et comme nous ne pouvons pas déterminer jusqu'à quel point l'usage de ce médicament a pu donner lieu au développement de la phthisie tuberculeuse, nous transcrivons ici quelques-unes des notes recueillies sur ce sujet.

S. N., femme publique, âgée de trente-deux ans, fut admise, au commencement du cours, dans la salle de clinique des femmes comme atteinte de syphilis constitutionnelle, et fut, comme nous l'avons déjà dit, traitée par le sublimé corrosif. Non seulement il n'y avait alors chez elle, aucune trace d'une affection pulmonaire quelconque, mais la poitrine était si bien conformée et la constitution de la malade si bonne, que plus d'une fois nous l'avons indiquée à nos élèves comme point de comparaison, dans l'enseignement de l'auscultation et de la percussion. Étant rétablie elle quitta l'hôpital; mais elle y retourna quelques mois plus tard, atteinte de phthisie pulmonaire, accompagnée d'une inflammation chronique de l'estomac. De retour

chez elle, elle avait repris sa vie antérieure. Il est certain que l'usage du sublimé n'a porté aucune atteinte à sa santé, aussi longtemps qu'elle a séjourné chez nous; elle a quitté l'établissement dans un état de santé complète.

La phthisie pulmonaire se développa pendant l'allaitement chez une femme qui antérieurement avait été atteinte de crachement de sang; chez une autre, immédiatement après l'accouchement. Parmi les hommes morts phthisiques, un seul avait été atteint d'une hémoptysie légère.

La femme dont je viens de parler eut un fort crachement de sang, quatre ans avant qu'elle fût admise à l'hôpital pour sa dernière maladie. Chez une femme de quarante-et-un ans, le crachement de sang fut le premier signe de la maladie.

Le diagnostic fut porté d'après la marche générale des symptômes, mis en rapport avec l'examen physique. Et de même qu'autrefois, cette année aussi a fourni plusieurs cas où la maladie n'aurait pu être reconnue sans le secours de la percussion et de l'auscultation. Mais dans quelques cas, ces moyens de diagnostic peuvent nous conduire à un jugement erroné; l'observation suivante en est une preuve.

J. V. D. V., âgé de trente-quatre ans, est admis dans la salle de clinique des hommes, le 25 février 1847. Il nous dit que toujours il avait souffert d'un serrement de poitrine, de gêne de la respiration et de toux. Il se fatiguait au moindre travail, et ne pouvait se livrer à aucun effort. Sa femme, qui était présente à la visite, confirma ces renseignements.

De temps en temps il avait réclamé le secours de l'art et il s'était rétabli tantôt rapidement, tantôt plus

lentement. Il y a à peu près quatre semaines qu'il devint tellement malade qu'il dut garder le lit; il attribua cette maladie à un froid. Il est couché sur le dos, la poitrine et la tête étant soutenues par des coussins. Il tousse sans discontinuer et expectore abondamment; les crachats vont pour la plupart au fond de l'eau et offrent tous les caractères du pus. La langue est très-rouge et couverte d'un léger enduit blanchâtre; le pouls qui est accéléré offre en même temps un certain degré de plénitude qui nous frappe. Il y a inappétence, constipation, insomnie et même des sueurs nocturnes. A l'auscultation on entend clairement le bruit respiratoire dans toute la partie antérieure de la poitrine; en arrière au contraire, à l'omoplate du côté gauche la percussion donne un son tout-à-fait mat; on n'y entend même pas le murmure respiratoire; mais la voix et la toux sont très-clairement répercutées.

Ce cas rendait le diagnostic obscur. D'un côté, on trouvait dans l'état du pouls une indication pour la saignée; de l'autre, il y avait une contre-indication dans l'aspect des crachats qui étaient évidemment puriformes, dans les sueurs nocturnes, dans le résultat qu'avaient fourni l'auscultation et la percussion. Un léger crachement de sang, qui eut lieu plus tard, me confirma davantage dans l'idée que j'avais affaire à une phthisie pulmonaire; et avant que j'aie pu arriver à un diagnostic satisfaisant, le sujet expira le 5 mars.

A l'autopsie, qui fut faite huit heures après la mort, à une température de 46° F., on remarqua aux chevilles des pieds un léger œdème. L'ouverture de la cavité pectorale montra des poumons d'un volume considérable, remplissant complètement la cavité et couvrant

presque entièrement le cœur, de manière qu'une très petite portion de cet organe était accessible à l'œil de l'observateur. A leur face antérieure, partout leur tissu crépitait sous la pression et renfermait une plus grande quantité d'air que dans l'état normal. Le poumon droit n'offrait de l'adhérence avec le péricarde que dans une faible partie de son étendue. Par contre, le lobe inférieur du poumon gauche adhérait d'une manière intime avec le diaphragme, il était uni à la partie inférieure du lobe supérieur et tous deux étaient indurés en arrière. La partie inférieure passée à l'hépatisation grise, offrait çà et là des traces de suppuration; tandis que le reste était encore à l'état d'hépatisation rouge. Cependant la partie antérieure était saine. La partie interne de la trachée-artère était d'un rouge foncé; mais à mesure qu'on explorait plus avant les subdivisions bronchiques, cette couleur rouge devenait plus vive.

Des cas où tant de causes concourent pour faire croire à l'existence d'une phthisie pulmonaire sont certes très-rares. Cependant cette histoire prouve de nouveau que, si dans plusieurs cas il est facile de reconnaître cette maladie, il existe souvent des circonstances où le diagnostic devient difficile à établir et où il est très-possible de la confondre avec d'autres affections.

Dans cette observation nous avons envisagé une inflammation partielle du poumon pour les suites d'une tuberculisation de l'organe.

Il suffit d'avoir fait des autopsies cadavériques de personnes mortes phthisiques, pour comprendre qu'il est possible de trouver chez elles une matité de son, s'étendant à tout un côté. D'ailleurs, il arrive maintes fois que tout un poumon et plus particulièrement le gauche, comme c'est le cas dans cette observation, sont le siége

de l'induration; et alors la partie postérieure de cet organe devient imperméable à l'air; ce fluide ne pénètre plus alors que dans les grandes divisions des bronches. Lorsque toute la partie antérieure de la poitrine donne un son mat à la percussion et que par conséquent les résultats de l'examen physique feraient soupçonner l'existence d'un empyème; l'expérience clinique nous a prouvé que cette matité de son peut dépendre d'une grande caverne qui s'étend à tout un poumon. C'est ce que nous avons constaté, en 1845, chez un homme de soixante-cinq ans; l'étendue du son mat nous a laissé, pendant un certain temps, dans l'incertitude sur l'existence d'un empyème ou d'une caverne. L'ouverture du cadavre nous montra que cette dernière lésion avait été la cause du mal. Il résulte de là que la matité du son, qui s'étendait à tout le côté gauche de la partie postérieure de la poitrine, ne suffisait pas pour nous faire diagnostiquer l'absence de tuberculisation.

Convaincu que de pareilles erreurs sont loin d'être rares, nous nous sommes déterminé à traiter ce point d'une manière toute spéciale. Il nous paraît de la plus haute importance, tant pour le diagnostic de la phthisie pulmonaire que pour la question de sa curabilité et pour celle de son traitement. Faisons d'abord remarquer que les indurations pulmonaires peuvent produire un grand nombre des symptômes propres à la phthisie pulmonaire, sans qu'à l'autopsie on constate l'existence de tubercules.

Andral (1) relate une observation qui, sous ce rap-

(1) Andral, *Clinique Médicale*, t. IV, p. 229. Le docteur John F. Evans cite la même observation pour prouver la même chose; voyez Evan's *Lectures on Pulmonary Phthisis, delivered in Jevirs street hospital*. Dublin, 1844, 8°, p. 193, seqq.

port, offre de l'importance. Mais les recherches du docteur Thomas Addison sur la pneumonie et la phthisie pulmonaire (1) serviront spécialement à jeter du jour sur cette question. Nous ferons connaître les résultats auxquels cet auteur est arrivé pour autant qu'ils ont trait à notre sujet; nous croyons d'autant plus devoir le faire parce que le journal (*Guy's hospital reports*), dans lequel ce mémoire a été publié, est peu répandu dans notre pays. D'après Addison la pneumonie ordinaire, qui consiste dans une inflammation compliquée des bronches et des poumons, ne serait point la forme la plus simple que revêt cette maladie. Il n'est pas rare d'observer, même chez des individus jeunes et bien portants, une inflammation du tissu pulmonaire, sans participation des tuyaux bronchiques; dans ce cas, il y a absence de toux, d'expectoration et de douleur, du moins ces symptômes ne se présentent pas à un degré d'intensité tel qu'ils fixent l'attention. Il considère comme non fondée l'opinion de Laennec et d'autres qui admettent que la pneumonie latente se rencontre principalement chez les personnes âgées, chez les individus de mauvaise constitution, menant une vie déréglée, et vers la fin fatale de plusieurs maladies qui offrent une prostration de forces quasi-typhoïque (2).

La matière, qui, en cas de pneumonie, s'est déposée dans le poumon (3), se trouve dans un rapport intime avec la constitution du malade et la nature de

(1) *Observations on pneumonia and its consequences in Guy's hospital rep.* 1843, p. 365. seqq, et : *On the pathology of phthisis*, l. l. 1845, p. 28. seqq.
(2) L. l. 1843, p. 366.
(3) L. *Permanent effects.*

l'inflammation. Elle dépend donc surtout de la faculté que possède l'épanchement albumineux de subir un travail d'organisation (1). Il en admet trois variétés :

a. L'induration entièrement albumineuse.
b. L'induration granuleuse.
c. L'induration grise.

Quand une pneumonie aiguë atteint un individu d'une bonne constitution, les tissus malades ramollis s'unissent quelquefois si exactement avec l'épanchement albumineux et se confondent si intimement (2) qu'à la longue ils finissent par se changer en une matière jaune, homogène et plus ou moins transparente, dans laquelle on ne retrouve quelquefois plus les traces des cellules aériennes et du tissu cellulaire qui réunit les lobules. Parfois, cette substance de nouvelle formation s'observe sur une étendue considérable du poumon, de manière qu'elle atteint un grand nombre de lobules et même un lobe entier; plus rarement, mais des cas semblables existent, se borne-t-elle à un seul ou à un petit nombre de lobules (3).

Mais si l'inflammation est suivie de l'épanchement d'une matière albumineuse moins compacte, comme cela arrive souvent chez les personnes scrofuleuses, alors le changement qui en résulte dans le tissu pulmonaire offre un aspect tout différent. Alors on remar-

(1) L. l. p. 376. L'auteur donne ici une note, que nous reproduisons pour faciliter l'intelligence du passage. Il dit : « Whenever the albuminous » products of inflammation become consolidated and contracted and remain » permanently, J. perhaps, with little propriety, use the terms « organised » and « organisation. »
(2) « So blended with or assimilated to the permanent albuminous depo- » sit » p. 376.
(3) Pag. 376.

que souvent, bien que ceci ne soit pas une conséquence nécessaire, que le tissu cellulaire interlobulaire se distingue très-clairement des lobules qui sont envahis par une matière albumineuse compacte, d'un blanc pâle, quelquefois jaunâtre, se ramollissant sous la pression des doigts. On distingue encore les cellules et cela aussi bien à la surface qu'à l'intérieur des poumons. En incisant un lobule on voit que la matière albumineuse offre un aspect granuleux, parce que les cellules ont conservé leur intégrité. C'est cette forme qu'Addison désigne sous le nom d'induration granuleuse.

Cette espèce d'épanchement est moins susceptible de s'organiser. Elle a l'aspect ordinaire de la matière tuberculeuse, et paraît liée à une constitution moins forte du malade; on la désigne parfois sous le nom de *tubercule inflammatoire* (1).

L'induration grise (2) résulte du mélange d'une matière terne, jaune-blanchâtre et noire; elle offre un aspect variable, puisque la couleur sera plus pâle ou plus sombre selon que l'une ou l'autre de ces couleurs y prédominera. La partie gris-pâle passe quelquefois insensiblement à l'induration uniformément albumineuse; la portion foncée est tantôt grise comme le fer, ou bien se rapproche de la couleur noire. En général, la variété à couleur pâle est d'une densité médiocre; l'autre est ordinairement plus foncée et parfois d'une densité qui se rapproche de celle du cartilage. A ce degré variable d'induration se rattache la différence qui existe entre l'induration grise et l'induration pu-

(1) Pag. 377.
(2) « The grey induration, » p. 377.

rement albumineuse, puisque l'albuminisation (1) des tissus est moins complète, et parce que l'induration granuleuse possède plus de plasticité dans l'épanchement albumineux et partant plus d'aptitude à passer à l'état d'organisation (2). On pourrait dire, en peu de mots, que l'inflammation pulmonaire était passée à l'adhésion, parce que la matière albumineuse épanchée avait subi une organisation partielle et une condensation assez forte pour déterminer une adhérence entre les tissus des cellules aériennes, et de cette manière une induration. Il en résulte donc une obstruction des cellules aériennes et une coloration noire de la substance pulmonaire. L'auteur croit que, sous l'influence de pareilles conditions, le tissu cellulaire, qui réunit les lobules, subit un changement analogue (3).

Dans un autre ouvrage, publié en 1847, par le même auteur (4), nous trouvons un passage qui a de grands rapports avec ce qui précède, et que pour ce motif nous rapporterons. Il dit, en parlant des changements opérés dans les poumons par la pneumonie, que souvent la matière albumineuse, qui s'épanche dans le tissu pulmonaire, n'est pas entièrement résorbée, mais qu'une partie en reste fixée dans l'organe. C'est ce qui arrive lorsqu'elle possède un plus grand degré de plasticité, ou une aptitude plus grande à s'organiser : plus tard elle se présente ou en petits fragments séparés, ayant une forme plus ou moins

(1) « Albuminisation, » p. 378.
(2) Ibidem.
(3) Pag. 378.
(4) *Element of the Practice of medecine*, p. 237.

arrondie, ou elle est répandue sur une plus grande largeur du poumon, et cela sous une forme moins régulière que lorsqu'elle est éparpillée en petits fragments isolés. Dans ce cas, elle se montre sous une des formes de l'épanchement albumineux, que l'on désigne, à tort, par le nom de tubercules. On pourra la confondre également avec l'une des formes de l'infiltration tuberculeuse, lorsqu'elle se répand dans le poumon, sur une étendue plus grande, et sous une forme moins régulière.

Dans plusieurs cas, l'histoire de la maladie, aussi bien que l'aspect général de la lésion, nous portent à conclure qu'elle constitue seulement une suite d'une attaque antérieure de pneumonie. En effet, un examen plus circonstancié nous apprend souvent que le malade avait été antérieurement, et cela peut-être à une époque très-éloignée, atteint d'une inflammation des organes respiratoires; et s'il succombe à une autre maladie, l'autopsie nous fait voir des traces non équivoques d'une inflammation antérieure du poumon. Elles consistent dans l'épaississement et l'adhérence des plèvres, surtout à proximité des altérations dont nous parlons, ainsi que dans une induration et un aspect ridé du tissu pulmonaire qui circonscrit l'épanchement albumineux. Si cet épanchement est irrégulier et occupe une grande étendue, la plèvre est déformée et plissée dans cet endroit.

L'observation a démontré que ces épanchements peuvent exister pendant un temps illimité, sans donner lieu à l'un ou à l'autre symptôme, sans subir aucun changement d'une certaine importance. Quelques-uns dégénèrent en une matière pierreuse ou calcaire, ce qui a surtout lieu lorsqu'ils ont leur siége dans le lobe supérieur du poumon. Il paraît néanmoins

que le principe vital, qui réunit leurs molécules, est si faible, qu'ils perdent leur cohésion et se ramollissent, du moment qu'une inflammation se développe dans leur proximité, surtout si alors les forces du malade sont beaucoup affaiblies (1).

Chacun reconnaîtra que de pareilles circonstances sont bien propres à favoriser le développement de symptômes qui auront la plus grande ressemblance avec ceux de la phthisie tuberculeuse. D'ailleurs, le plus grand nombre des symptômes de la phthisie pulmonaire dépendent certainement des lésions locales, qui se développent dans le poumon; cependant d'autres doivent leur origine à l'altération générale des humeurs et à la chute des forces qui en résulte.

Ainsi donc, il arrivera fréquemment qu'on ne pourra porter un diagnostic certain; et l'examen physique même sera insuffisant pour nous éclairer, lorsque ces inflammations et ces épanchements albumineux auront leur siége au sommet du poumon.

Le ramollissement de ces épanchements albumineux sera donc souvent, comme les auteurs et principalement Addison en rapportent des exemples, suivi des phénomènes de la phthisie pulmonaire; et à l'autopsie, on rencontrera des cavernes tantôt remplies de matière, tantôt vides, comme dans les cas de phthisie tuberculeuse. En outre, on trouvera dans les poumons maintes altérations qui ont la plus grande ressemblance avec celles qu'on rencontre chez des personnes mortes de phthisie tuberculeuse. Nous désignerons cette

(1) Pag. 2.

forme de phthisie pulmonaire, comme Addison, sous le nom de *phthisis pneumonica* (1).

La raison qui fait que l'examen physique est impuissant pour nous éclairer dans de pareilles circonstances, se trouve dans la nature même des choses. Dans divers cas il ne fournit d'autres signes pour reconnaître l'existence des tubercules et de leurs terminaisons, que ceux qui appartiennent également à d'autres maladies du tissu pulmonaire; alors leur degré plus ou moins grand d'importance résulte de l'endroit où on les observe.

Par cet examen, on acquiert la connaissance des propriétés physiques des organes, et on tâche d'établir le diagnostic en se basant sur la nature des lésions pathologiques, mises en rapport avec les phénomènes qui se manifestent. Si maintenant l'on observe les indurations au sommet du poumon, où en principe les tubercules prennent généralement naissance, et où la lésion qu'ils produisent prend le plus d'extension, alors l'examen physique peut même nous confirmer dans une idée erronée sur la nature de la maladie.

Qu'on se garde donc de demander à l'examen physique plus qu'il ne peut donner; on se tromperait, si, dans chaque cas donné, on voulait par ce moyen acquérir des signes pathognomoniques. De cette manière, on s'engagerait en plein dans les doctrines ontologiques, et on ne saurait trop blâmer l'habitude où sont quelques commençants, et que certains manuels contribuent à entretenir, d'apprendre, pour chaque maladie, les signes de l'auscultation par cœur.

(1) Pag. 11.

Sous un certain rapport, on arrive au même résultat en palpant le bas-ventre. Découvre-t-on une dureté dans le foie ou la rate, il en résulte que l'organe a acquis plus de volume et plus de densité que dans l'état normal. Mais pourra-t-on toujours conclure à une altération organique? Ceci serait souvent téméraire. La dureté du foie dans l'inflammation, la physconie qui se développe à la suite des fièvres, et tant d'autres états démontrent le contraire.

Il en est de même de l'examen des organes renfermés dans la cavité de la poitrine. La structure propre à la cavité pulmonaire nous empêche de retirer quelque avantage de la palpation; on a donc eu recours à l'intermédiaire d'un autre organe des sens, c'est-à-dire, à l'ouïe. Que si maintenant on trouve, qu'une portion du poumon admet moins d'air que dans l'état habituel, ou qu'elle est devenue entièrement imperméable, alors on saura que les propriétés physiques sont modifiées dans cette partie, mais on ne pourra pas perdre de vue que cet état peut n'être que passager. Cette dernière considération s'applique particulièrement aux affections aiguës; mais on n'est pas autorisé à en inférer que les changements survenus dans les maladies chroniques soient toujours permanents. L'expérience nous a démontré qu'une différence de son, obtenue par la percussion sur les deux côtés de la poitrine, et qui est assez notable pour faire soupçonner une infiltration tuberculeuse étendue, peut dépendre d'une simple congestion, qui plus tard peut disparaître. Durant le cours de 1842-43 nous traitions un homme atteint d'hémoptysie. La percussion donna un son mat, très-circonscrit sous l'une des clavicules. Nous nous croyions en droit de diag-

nostiquer l'existence d'une infiltration tuberculeuse. L'individu guérit et retourna à l'hôpital quelques mois plus tard, pour une diarrhée à laquelle il succomba. L'autopsie nous montra les poumons dans leur état normal. Il est probable que la partie, qui avait fourni le son mat à la percussion, se trouvait à l'état de congestion ou de pneumonie qui a disparu plus tard. Ce qui prouve combien l'homme de l'art doit être prudent lorsqu'il s'agit de porter un pronostic un peu défavorable.

De ce qui précède, il résulte qu'il peut y avoir un grand nombre de cas, dans lesquels la pneumonie ou sa terminaison peut offrir une si grande ressemblance avec la phthisie pulmonaire, qu'il y a impossibilité complète de distinguer ces deux maladies l'une de l'autre. Et s'il est prouvé qu'un grand nombre des signes, que fournit l'examen physique, doivent uniquement leur valeur diagnostique au lieu, où on les observe, ce qui d'ailleurs ne sera point contesté, on devra également admettre que plusieurs affections de la plèvre et des divisions bronchiques peuvent être confondues avec la phthisie pulmonaire, surtout si elles ont leur siège sous les clavicules (1).

(1) Addison dit à ce sujet: « At a time, when so much is said respecting the facility of recognising and curing consumption, it may not, perhaps, be without its ure, to append a brief recital of the several forms of thoracle disease, which, withim myown knowledge and experience, have been pronounced to be phthisis. 1. Recent pneumonie hepatisation, especially when situated at the apex of a lung. 2. Recent pneumonie hepatisation, supervening upon ancient or recent bronchitis. 3. The various forms of pulmonie induration. 4. Pulmonie induration with bronchial irritation. 5. Suppurative, sloughing or gangrenous pneumonie. 6. Simple bronchitis, especially when confined to the apex or otherwise circumscribed. 7. Dilataton of the bronchial tubes with or without induration. 8. General but recent pleuretic effusion. 9. Partial or

Pour arriver à une connaissance exacte de la maladie, il est donc indispensable de se livrer à un examen souvent répété, et à une comparaison continue des phénomènes et des signes.

Nous avons vu que les indurations qui persistent après certaines pneumonies, donnent lieu à des phénomènes qui ont la plus grande ressemblance avec ceux d'une phthisie tuberculeuse, de manière qu'au lit du malade on reste quelquefois dans le doute. Même à l'autopsie, on peut confondre ces deux états, puisque les épanchements albumineux subissent les mêmes changements que les tubercules. Ce point est de la plus haute importance pour l'étude de la phthisie pulmonaire. Ce n'est qu'en envisageant les choses de cette manière qu'on trouvera une solution à une série de questions qui, nonobstant les efforts les plus louables d'hommes très-distingués, sont restées jusqu'ici sans réponse. L'examen de cet objet est surtout indispensable pour la question de la curabilité de la phthisie pulmonaire, question que nous allons maintenant examiner.

Faisons observer d'abord, que s'il n'est pas rare de rencontrer cette forme d'inflammation pulmonaire, que nous venons de décrire d'après Addison, sans qu'il y ait des tubercules dans les poumons, il est

« circumscribed but recent pleuretic effusion. 10. The flattening of the « rib, and compression of the lung, occasioned by ancient pleuretic disease, « especially when associated with bronchial irritation. 11. Emphysematic « crepitation, especially when coupled with dilated bronchi. 12. Pulmonary « apoplexy. 13. Aneurism of the aorta. 14. Malignant disease of the lung « or neigh bouring parts. » Addison, *On the pathology of phthisis in Guy's hospital reports*. 1845, p. 28. Comparez Addison, *On the difficulties and fallacies attending physical diagnosis in diseases of the Chest, in Guy's hospital rep.* 1846, p. 1. seqq.

cependant certain qu'on la rencontre plus fréquemment dans des poumons tuberculeux que dans d'autres. Ainsi, à la forme de phthisie, désignée sous le nom de *phthisis pneumonica*, nous en ajouterons une seconde qu'on peut désigner par le nom de *phthisis tuberculo-pneumonica*, où les poumons sont en même temps atteints et de tubercules et d'une inflammation sui-generis (1). La troisième forme sera la véritable *phthisis tuberculosa*, où les tubercules constituent l'unique lésion et où le tissu pulmonaire n'est atteint ni d'inflammation, ni d'effet de l'inflammation. Il est tout simple que la première et la troisième forme se rencontrent rarement, sans aucune complication; tantôt on trouve une *phthisis pneumonica* avec quelques rares tubercules, tantôt une *phthisis tuberculosa* avec des traces légères d'inflammation. Les autopsies viennent confirmer cette circonstance de la manière la plus évidente. Durant le cours qui fait le sujet de notre travail, nous avons observé un phthisique où, à l'autopsie, nous vîmes de grands tubercules jaunes, mais en très-petit nombre, accompagnés d'indurations très-étendues dans les deux poumons; aux sommets il y avait de petites cavernes. Par contre, nous écrivions, dans notre précédent rapport, que dans quelques cas nous avions été frappé de la transparence complète de la plèvre, quoiqu'il y eût des fausses membranes; ce qui prouve que ces organes avaient été rarement atteints d'affections inflammatoires. Il serait difficile d'admettre une phthisie tuberculeuse des poumons sans quelque trace d'inflammation, soit dans les plèvres, soit dans le

(1) Pag. 12.

tissu pulmonaire. Elle peut d'ailleurs être si minime et de si peu d'importance, que dans un sens scientifique on ne peut admettre l'existence d'une véritable inflammation. Certes, personne ne niera que la première forme, la *phthisis pneumonica* ne soit susceptible de guérison. On pourrait d'ailleurs le prouver en se livrant à des considérations critiques sur l'histoire des maladies qui de temps en temps ont été données comme des guérisons de phthisie pulmonaire. Car ce sont presque tous des cas qui devaient leur origine à une pneumonie négligée, sans que l'on ait pu fournir des preuves de la présence de tubercules. Quant à la troisième forme, nous ferons observer qu'aussi longtemps que les tubercules, encore en petit nombre, restent isolés, séparés les uns des autres, ou bien ils peuvent rester stationnaires ou ils diminuent et se rappetissent par une absorption partielle. Mais aussi longtemps qu'ils seront en si petit nombre, ils ne développeront guère les phénomènes de la phthisie; tandis que d'un autre côté on ne peut dire qu'une phthisie est guérie, alors qu'il existe encore des tubercules indurés ou rappetissés.

Les guérisons de phthisie pulmonaire appartiennent donc en majeure partie à la seconde forme; mais ici se présente la grande difficulté de savoir, si, dans tous ces cas il est possible de déterminer, sans un examen microscopique, si les tubercules ont été l'origine de la maladie. On peut encore se demander, si cet examen serait suffisant pour donner de la certitude relativement aux cas qui ont été publiés? Mais comme généralement il a été négligé, on voit que l'entière certitude manque, à l'égard d'un grand nombre, et que plusieurs observations ne sont probablement que des exemples de

phthisis pneumonica. Nous examinerons ce point d'une manière spéciale.

Les terminaisons les plus ordinaires des épanchements albumineux et des tubercules sont les dégénérescences calcaires et les cavernes. Dans les premières les parties liquides disparaissent peu à peu par absorption, qui n'a pas de prise sur les solides; celles-ci augmentent probablement encore en quantité. Toute la substance, diminuant en étendue, prend par là l'aspect du plâtre, offrant un degré de dureté en rapport avec le laps de temps qui s'est écoulé depuis le début du travail de transformation. Le tissu pulmonaire prend alors ordinairement une couleur noire et une plus grande densité, ce qui est probablement le résultat d'une inflammation antérieure. Le tissu du poumon est en outre, dans son pourtour, plus ou moins contracté, et il en résulte, comme conséquence inévitable, que la plèvre, qui maintenant occupe moins d'étendue, se ride, à moins qu'un épaississement notable de la séreuse ne rende ce froncement impossible.

Ce changement est certes le plus favorable que l'épanchement albumineux et les tubercules puissent subir, car l'expérience a prouvé que ces indurations plâtreuses et calcaires n'occasionnent pas de symptômes morbides. Une autre terminaison, qui est très-fréquemment mortelle, est celle en cavernes; dans ce cas, l'épanchement albumineux aussi bien que les tubercules se ramollissent, ce qui excite dans le tissu environnant un travail suppuratif et ulcératif. Considérée en elle-même, cette terminaison est encore susceptible de guérison; et il arrive en effet que la matière albumineuse ainsi que la tuberculeuse soit évacuée par les tuyaux bronchiques et que la caverne se

vide entièrement. Si maintenant la vie se conserve, si les circonstances dans lesquelles le malade se trouve sont favorables, alors les parois de la caverne tendent à se rapprocher insensiblement à mesure que la matière, qui s'y trouve, diminue en quantité, jusqu'à ce qu'enfin elles s'agglutinent et contractent une adhérence de plus en plus intime par suite d'une inflammation adhésive. Il résulte de là, comme conséquence inévitable, une dépression dans le poumon avec froncement de la plèvre. Il en est ici comme de l'épiderme qui offre également un aspect froncé ou rayonné dans les cicatrices anciennes, où le tissu cellulaire sous-cutané a été détruit. Ces deux changements et terminaisons ont été généralement considérés comme des suites de tubercules, et il est impossible de nier qu'on les ait observés dans cette maladie; mais ce serait une grossière erreur de croire, que ces terminaisons sont exclusivement propres à la tuberculisation. Elles ne constituent que les modes ordinaires suivant lesquels tous les épanchements des poumons finissent tôt ou tard par se transformer. C'est ainsi que la guérison d'un épanchement de sang dans le poumon, produit par une apoplexie pulmonaire, s'opère par la formation d'une caverne qui, une fois vidée, peut se cicatriser de la manière indiquée. Le même phénomène peut s'observer dans d'autres viscères, et la guérison par cavernes n'est pas seulement propre aux poumons, mais elle a été constatée aussi bien dans les cas de ramollissement du cerveau que dans les abcès du foie. Dans le dernier cas, le pus a-t-il pu heureusement se frayer une issue, les parois de l'abcès s'affaissent et doivent se rapprocher, ce qui a pour effet inévitable que la séreuse du foie est

attirée en dedans et qu'elle prend également un aspect rayonné et plissé.

Les dégénérescences calcaires qui ont leur siège au sommet des poumons, aussi bien que les cicatrices, ont été, comme nous venons de le dire, envisagées comme des terminaisons de tubercules; c'est ce qui a fait croire que les tubercules se sont dans un immense nombre de cas, terminés par la guérison et aussi que cette maladie est beaucoup plus commune qu'elle ne l'est en réalité.

D'après Boudet, on trouverait chez la 6/7 partie des personnes, mortes à l'âge de 15 à 76 ans, des tubercules ou des terminaisons de cette altération (1). Nous n'avons pas besoin de déclarer que nous doutons de l'exactitude de pareilles données, mais nous sommes au moins convaincu qu'ici des terminaisons d'autres maladies ont été confondues avec celles de tubercules.

Le grand nombre d'autopsies, que l'on invoque dans de pareilles communications, mis en rapport avec la durée du temps pendant lequel elles ont été faites, constitue à nos yeux un motif suffisant pour nous méfier des résultats obtenus. Il est avéré que beaucoup de médecins étrangers, qui sont à la tête de grands hôpitaux, s'appuient souvent sur des recherches nécroscopiques, faites, à leur demande, par des internes ou autres jeunes gens, sans qu'ils y aient assisté en personne. Il est dans la nature des choses que de pareils résultats doivent toujours être exceptés avec une certaine méfiance, sans que pour cela à distance

(1) Boudet, *Acad. de Méd. de France*, du 16 janvier 1846.

il faille admettre une supercherie intentionnelle. Un examen cadavérique superficiel peut donner lieu à un grand nombre de méprises, et même nous n'oserions affirmer que, dans des recherches plus exactes, toutes les dégénérescences calcaires et les cicatrices des poumons seront toujours convenablement distinguées, de manière à pouvoir déterminer avec quelque certitude, si leur existence dépend ou non de tubercules. En effet, admettez l'exactitude des recherches de Boudet, il en résultera immédiatement que des tubercules dans les poumons permettent de porter un pronostic très-favorable, puisque un petit nombre seulement de malades succombent à cette maladie, ce qui est contraire à ce que nous apprend l'expérience clinique.

Il est donc important d'étendre nos considérations et d'approfondir davantage ce point de science. Déjà, dans le courant de notre argumentation, nous avons parlé de la possibilité de trouver des épanchements albumineux au sommet des poumons. En effet, quoique la pneumonie occupe de préférence les parties inférieures de ces organes et que les tubercules établissent généralement d'abord leur siège au sommet, cette différence de siège est insuffisante pour servir à distinguer l'origine des dégénérescences calcaires et des cicatrices.

Notre propre expérience clinique, à l'égard de la pneumonie, est très-bornée; mais nous possédons néanmoins des observations, où l'inflammation avait évidemment son siège au sommet de l'organe. Le professeur Wunderlich, de Tubingen, donne dans son manuel (1) une statistique de 660 cas de pneumonie,

(1) Dr C. A. Wunderlich, *Handb. der path. en therapie*, in drei Bände, III Bd. Zw. Abth. Stuttgart 1847, 8°, pag. 462.

recueillis dans les rapports d'Andral, de Barth, de Pelletan, de Briquet, de Hughes et de Grisolle; les lobes inférieurs étaient atteints dans 397 observations, le sommet dans 180 et tout un poumon dans 83 autres.

Addison dit également que la pneumonie a très-fréquemment son siège dans les lobes supérieurs et que cela arrive surtout chez des personnes scrofuleuses.

L'existence de dépôts calcaires dans les deux côtés est également insuffisante pour permettre d'en conclure, qu'ils ont été précédés par des tubercules. Si, au contraire, ils se bornent à un seul poumon, cette circonstance, loin d'avoir une valeur suffisante pour le diagnostic, ne donne qu'une médiocre probabilité qu'ils ne se sont pas développés à la suite de tubercules. Comme la pneumonie scrofuleuse, de même que la lobulaire, atteint fréquemment des parties éparses des poumons, il s'en suit que les dépôts calcaires peuvent se former dans les deux poumons et cela indépendamment d'une origine tuberculeuse; en outre, il existe un grand nombre d'observations où la tuberculisation s'est bornée à un seul poumon.

Il est donc de la plus haute importance de rechercher, dans de pareilles affections pulmonaires, si à côté de ces dépôts calcaires et de ces cicatrices, il n'existe point d'autres traces de tubercules. Dans la négative, nous croyons que presque jamais on n'aura une certitude suffisante pour considérer ces lésions comme des guérisons de tubercules, et que tout au plus on n'obtiendra qu'une probabilité plus ou moins grande sur la nature de la lésion. Un examen superficiel nous fera souvent croire, à tort, à l'existence de tubercules, tandis qu'en poussant nos investigations plus loin, nous verrons bientôt qu'on a pris pour des tubercules de petits tuyaux bronchiques épaissis, qui sur la coupe d'un poumon ont avec eux la plus grande ressemblance. On peut s'en convaincre par l'introduction d'un poil très-fin (1). Si maintenant il est si difficile de reconnaître l'origine de ces dégénérescences calcaires et de ces cicatrices, si, après la mort, on peut trouver dans les poumons des cavernes tant vides que remplies de matière, et cela sans qu'il y ait des tubercules, s'il y a des cas où l'épanchement albumineux ne peut presque pas être distingué des tubercules, si enfin, dans un examen superficiel, ceux-ci peuvent être confondus avec des ramifications bronchiques épaissies, alors il devient très-probable que la tuberculisation se rencontre moins fréquemment qu'on ne le croit généralement et que la phthisie tuberculeuse, quoique nous ne doutions aucunement de la possibilité de sa guérison, est loin d'avoir aussi souvent cette terminaison heureuse, qu'on ne pourrait le croire d'après les données de quelques écrivains. Un examen plus approfondi de ces dépôts calcaires et de ces cicatrices pourra, j'espère, éclaircir cette question. Nous ne nous appuierons que sur les résultats que nous avons trouvés nous-même dans nos autopsies. Déjà dans notre précédent rapport nous en avons cité plusieurs cas que nous avons alors rapportés aux tubercules, bien qu'alors aussi, à l'égard de quelques-uns, nous ayons élevé des doutes sur une pareille origine (2).

A. Chez une femme qui succomba à une hypertrophie du cœur, à l'âge de trente-sept ans, nous trou-

(1) Voyez notre rapport précédent, pag. 68 et 69.
(2) Rapport de 1845-46, pag. 89-91.

vâmes une adhérence complète du poumon droit. A la partie inférieure du premier lobe il existait une induration étendue, entièrement calcaire, de la grandeur d'une grosse noix. D'autres lésions de même nature, mais d'une étendue moindre, étaient éparpillées dans les poumons, entr'autres dans la partie la plus basse du lobe inférieur, tandis qu'elles ne furent point observées à la partie supérieure, où on les chercha d'une manière spéciale. Dans le poumon gauche, à un endroit où la plèvre présentait une cicatrice rayonnée, nous vîmes une portion de la grandeur d'un pois, qui se faisait reconnaître au toucher par sa dureté et qui offrait sur sa coupe, à une inspection attentive, une masse blanche plus dense que ne le sont ordinairement les tubercules, mais cependant beaucoup moins dure que les concrétions dont il vient d'être fait mention. Cette dernière partie siégeait dans un parenchyme pulmonaire qui se distinguait par une densité plus grande et une couleur plus foncée.

Ces deux caractères étaient beaucoup plus saillants dans le poumon gauche que dans l'autre, parce que la congestion, peu intense dans le premier, s'était élevée à un bien plus haut degré dans le second (1). Je crois nécessaire de faire observer encore que cette femme avait été fortement atteinte de rachitisme qui avait produit une difformité de la cage thoracique.

B. A l'autopsie d'une des femmes mentionnées comme mortes, sous le titre *morbus Brigthii*, nous trouvâmes les lésions suivantes : au sommet du poumon droit, qui était fortement adhérent aux parties

(1) Rapport 1845-46, pag. 89.

environnantes, on voyait une dépression, offrant à la surface un aspect très-irrégulier. Le doigt y fit découvrir une induration et en l'incisant on vit un endroit de la grandeur d'un pois chiche, entièrement rempli d'une matière granuleuse d'un blanc jaunâtre. Écrasée entre les doigts, elle offrait de la ressemblance avec du mastic. Elle n'était point unie aux parois de la caverne qui la contenait. Après avoir enlevé cette matière à l'aide du doigt et du scalpel, on s'aperçut que les parois de la cavité étaient couvertes d'une membrane luisante d'une couleur blanche-bleuâtre, et assez transparente pour laisser voir çà et là l'origine de ramifications bronchiques qui avaient existé antérieurement (1).

C. A l'ouverture cadavérique d'une femme, inscrite dans le rapport actuel comme morte de péritonite, nous avons trouvé le poumon droit entièrement libre; le gauche adhérait en haut, en arrière, sur les côtés et en avant. Au sommet du dernier, on voyait au milieu un parenchyme dur et noir et une grande quantité de concrétions blanches, dont les unes offraient une consistance calcaire et dont les autres paraissaient pierreuses. Cette partie était couverte de fausses membranes très-épaisses. La femme avait l'âge de trente ans.

D. Une femme, âgée de cinquante-quatre ans, avait une conformation de la poitrine qui, d'après la plupart des auteurs, dénote une prédisposition à la phthisie pulmonaire, mais qui, d'après des recherches plus récentes, serait le signe d'un degré déjà très-avancé de cette maladie. Elle est morte à la suite d'un *scir-*

(1) Rapport 1845-46, pag. 90.

rhus pylori, titre sous lequel elle figure sur notre tableau. A l'autopsie, nous fûmes frappé du grand volume des poumons qui offraient tout-à-fait le même aspect que s'ils avaient été fortement insufflés. Le sommet du poumon droit présentait une adhérence lâche avec les parties environnantes; le gauche était entièrement libre. En examinant le poumon droit, on aperçut au sommet quelques points indurés, tandis que le reste avait conservé sa mollesse ordinaire. A l'incision du premier lobe, on trouva une caverne, remplie de pus et de la grandeur d'une noix, dont les parois étaient couvertes d'une membrane lisse. Un peu plus loin, il y avait une induration pierreuse de couleur blanchâtre, au milieu d'un parenchyme noir, qui crépitait sous la pression du couteau. Il existait plusieurs endroits, où le tissu était mou et crépitant. Tout près de la circonférence de l'induration plâtreuse, que nous avons décrite, il existait encore une petite caverne qui n'avait rien de commun avec la précédente et qui était également remplie de matière. Tout au sommet du poumon gauche, on trouva deux ou trois indurations plâtreuses et de couleur noirâtre, et puis une autre à la partie supérieure du deuxième lobe, de la grandeur d'un pois.

E. Un homme de quarante ans avait été antérieurement atteint d'un empyème du côté droit, dont toute sa constitution offrait encore les indices les plus manifestes, ce que d'ailleurs l'autopsie confirma à la dernière évidence. Il mourut d'une hydropisie générale et il est annoté, sous le titre *morbus Brightii*, sur la table annexée à ce rapport. Les poumons n'étaient point affaissés; le gauche était d'un volume double du droit. Ce dernier était fortement adhérent

aux côtes; la plèvre était épaissie et enflammée. Les deux poumons adhéraient au péricarde; le droit cependant plus que le gauche. Ce dernier s'étendait au-delà du péricarde jusque dans le côté droit de la poitrine, et entraînait évidemment le cœur et le médiastin du même côté. Les deux poumons étaient unis aux parties environnantes en arrière et vers le sommet, le droit toutefois d'une manière plus intime que le gauche. La partie supérieure du poumon droit était entièrement indurée, et la plèvre y était épaissie d'une manière extraordinaire. En arrière on voyait des tubercules et une caverne à parois inégales, remplie d'une matière sanguinolente. Des fragments de la partie dure mis dans l'eau n'allaient point entièrement au fond. Dans le même poumon on vit encore une autre petite caverne, tandis que tout l'organe était plus dense qu'à l'ordinaire, et que les ramifications bronchiques étaient dilatées. En général, il y avait moins de tubercules qu'il n'y en a d'ordinaire dans les cas de cavernes. Le poumon gauche n'en a pas offert de traces.

Comme preuve de l'existence antérieure d'un empyème, nous notons ce qui suit : Le foie offrait, vers la onzième côte, un sillon avec épaississement considérable de la séreuse, tout-à-fait semblable à celui qu'on rencontre souvent sur les cadavres des femmes, et que l'on attribue à l'usage du corset (1). Il y a donc eu une époque de la vie où le foie, pressé par le poids d'un liquide qui s'était épanché dans le côté droit, avait été poussé en bas et avait fait saillie en dehors,

(1) Comp. Cruveilhier, *Anat. path. du corps humain*, livr. 29, pl. IV, p. 2.

au-dessous du rebord des fausses côtes. C'est ainsi que s'était formé ce sillon qui devait plus tard rester visible lorsque l'organe eut repris sa place.

F. Pour éviter des répétitions, nous citons en passant le résultat de l'inspection cadavérique de la femme morte d'anasarque et dont le fils mourut à la suite d'une hémoptysie. Comme ce cas a été indiqué plus haut, nous y renvoyons le lecteur.

Nous nous bornerons, pour le moment, à ces six observations, quoique nous en possédions un bien plus grand nombre. Nous croyons d'ailleurs que l'examen de ces faits suffira au but que nous avons voulu atteindre. Si nous pesons attentivement ces six observations, nous verrons que le premier n'a pas de rapport avec l'existence de tubercules. Tout l'aspect de la dégénérescence le prouve; de plus, la poitrine était déformée par suite d'un rachitisme antérieur. D'après Rokitansky (1), il n'y a pas d'exemple connu où une déformation de la poitrine, due au rachitisme, a coexisté avec des tubercules. Quoique la théorie d'exclusion de ce célèbre écrivain, ne soit pas, d'après notre avis, que nous émettons du reste avec réserve, entièrement confirmée, nous pouvons cependant, d'après notre propre expérience, nous rallier à lui sur ce point. Rokitansky hésite à admettre comme certain, que le rachitisme soit une cause qui préserverait plus tard celui, qui en a été atteint, du développement de tubercules. Mais il considère comme positif que la plus grande densité du parenchyme pulmonaire, produite par le rétrécissement de la cavité thoracique, et

(1) *Handb. der pathol. anatomie*, 1 Bd, s, 427, 429.

qui peut être une suite du rachitisme, est la raison de cette heureuse circonstance. Cette opinion se trouve confirmée par ce fait remarquable, que du moment que la cavité de la poitrine se rétrécit à la suite de la carie des vertèbres, produite par des tubercules, la tuberculisation cesse d'être possible pour toute la vie.

Cette manière de voir est encore corroborée par l'action favorable que l'affaissement des parois de la poitrine, après un empyème, exerce sur les tubercules existants. Nous en avons cité un exemple à la lettre E.

L'influence favorable de la grossesse sur cette maladie, influence qui a été observée de tout temps, se rapporte peut-être à cette cause. Dans cette dernière condition, la cavité de la poitrine diminue de capacité, parce que le diaphragme est refoulé en haut. Nous croyons donc pouvoir admettre comme certain que les dégénérescences calcaires, décrites au paragraphe A, ont une toute autre origine que les tubercules et n'ont point été précédées d'une altération de cette nature.

Il devient plus difficile de se prononcer avec une certaine assurance relativement aux cas qui ont été relatés aux paragraphes B et C. Nous croyons pourtant qu'il y a plus de motifs pour considérer l'altération comme le résultat d'un épanchement d'une autre nature, que pour la rapporter à des tubercules. Les fausses membranes très-résistantes donnent quelque présomption en faveur d'une affection de nature inflammatoire, et l'existence isolée de la caverne, sans qu'on ait pu trouver des traces de tubercules, paraît en quelque sorte confirmer notre opinion. On ne peut cependant

pas perdre de vue que des tubercules sont souvent, comme nous le démontrerons plus amplement, précédés ou suivis d'une inflammation, et qu'ils se bornent quelquefois à envahir un seul endroit. C'est que prouvent surtout plusieurs observations, où l'on n'a même trouvé qu'un seul tubercule, qui souvent était entièrement racorni, de manière qu'à l'autopsie on voyait à peine, dans le parenchyme, un petit point noir. C'est ce que nous avons plus d'une fois constaté.

Dans l'observation décrite au paragraphe C, on peut croire à une origine tuberculeuse, parce que les concrétions y étaient en plus grande quantité, bien que l'épaisseur considérable des fausses membranes milite plutôt pour une origine inflammatoire.

S'il est douteux que dans les observations B et C, les altérations aient été précédées de tubercules, nous n'hésitons nullement à admettre cette origine pour les cas décrits sous les lettres D, E et F. Dans l'observation D, nous ne trouvons que quelques légères adhérences du poumon droit, le gauche étant entièrement libre, ce qui dénote qu'une inflammation, du moins de quelque importance, n'a pas précédé, tandis que l'aspect des altérations donne, au contraire, des signes évidents de tubercules. Ceci est d'ailleurs confirmé par la structure propre de la cavité pulmonaire. Nous rencontrons ici un cas de cancer, développé après une affection tuberculeuse, et où les tubercules se sont pour la majeure partie terminés par la guérison.

Cette observation est donc loin d'être défavorable à l'opinion de Rokitansky, qui pense que les tubercules et le cancer s'excluent mutuellement, et cela de telle manière que lorsqu'un cancer se développe chez

des malades atteints de tubercules, ceux-ci cessent de se développer et guérissent (1).

L'observation E nous fournit un exemple d'affection tuberculeuse où la formation des tubercules s'est arrêtée par la pression à laquelle le parenchyme pulmonaire avait été soumis, après la guérison de l'empyème et le rétrécissement de la cavité pulmonaire, sans que pour cela il y ait eu guérison immédiate. Nous pouvons affirmer ceci avec certitude, puisque nous avons encore trouvé des tubercules.

Dans l'observation F, l'absence des traces d'une inflammation antérieure, ainsi que l'existence simultanée de tubercules et de cavernes guéris, donnent, comme dans le cas précédent, la plus grande certitude possible qu'il y avait eu guérison d'une phthisie pulmonaire. Il est digne de remarque qu'on ait trouvé ici une légère hypertrophie du cœur et que le sang avait pris les caractères du sang veineux, ce qui, d'après Rokitansky, n'est pas compatible avec l'existence de tubercules (2).

Ce dernier point ne nous paraît pas suffisamment prouvé, et nous fournira peut-être, dans un prochain rapport, matière à quelques annotations ou remarques, et cela d'après ce que nous avons vu nous-mêmes dans les autopsies.

D'après ce que nous avons dit sur la guérison des tubercules, nous croyons pouvoir établir les propositions suivantes, et que nous croyons devoir présenter sous forme d'aphorismes afin de les rendre plus courtes:

1° Les cicatrices et les dégénérescences calcaires,

(1) Rokitansky, l. l. Bd. I. S. 424.
(2) L. l. S. 425. flg.

que les autopsies font découvrir dans les poumons, ne peuvent pas toujours être considérées comme produites par la guérison de tubercules, puisque nous ne possédons pas de signes certains pour reconnaître, quand ces lésions appartiennent à une cause tuberculeuse, et quand elles doivent leur origine à une cause d'une autre nature.

2° Une comparaison exacte de toutes les circonstances, qui se présentent en même temps que les lésions dont nous venons de parler, peut donner un degré plus ou moins grand de probabilité pour porter un jugement décisif.

3° Les signes d'une inflammation antérieure ont surtout une grande importance. Leur absence rend très-probable qu'on a affaire à des tubercules guéris.

4° Toutefois le seul signe, qui à lui seul donne une plus grande certitude, se trouve dans les tubercules, qui existent dans les poumons simultanément avec les cicatrices et les dégénérescences calcaires, surtout lorsqu'il n'y a pas de traces d'une forte inflammation.

5° S'il est permis d'élever encore des doutes sérieux relativement à la question de savoir si les tubercules sont des affections aussi communes et se terminent aussi fréquemment par la guérison, que quelques auteurs le soutiennent, toujours est-il que la possibilité de leur guérison est un point qui est actuellement incontestable.

Si ces considérations sont, comme nous osons le croire, importantes pour le diagnostic de la phthisie pulmonaire, ainsi que pour la question de sa curabilité, elles ne le sont pas moins, à notre avis, pour le traitement de cette maladie. Elles répandent beaucoup de lumières sur la valeur de la méthode antiphlogistique, qui

est si souvent préconisée dans le traitement de la phthisie pulmonaire. Car ici aussi on a invoqué les résultats de l'expérience. Si on réfléchit qu'un grand nombre de maladies inflammatoires de la plèvre, des tuyaux aériens, des poumons peuvent être confondues avec la phthisie pulmonaire, il en découle clairement qu'un traitement antiphlogistique, dans des cas douteux, s'il est institué avec ménagement, peut avoir souvent un effet si favorable qu'on reste étonné du résultat obtenu.

Les déplétions sanguines générales trouveront rarement leur application dans des cas semblables; les saignées locales, au contraire, suivies de l'usage des moyens révulsifs, pourront souvent être très-utiles. On pourra souvent encore y ajouter avec avantage des médicaments internes qui agissent en diminuant la rapidité de la circulation sanguine ou qui appartiennent plus spécialement à la série des antiphlogistiques. Les résultats obtenus par ce traitement serviront quelquefois beaucoup à éclairer le diagnostic. Dans des cas semblables on se trouve devant des conditions analogues à celles qui se rencontrent si souvent dans la pratique de la médecine. Il se présente ici deux éventualités possibles et même également probables; ou l'affection peut être combattue par les moyens ordinaires, ou bien la maladie est de nature à offrir peu d'espoir de guérir le malade. Un exemple rendra ceci plus clair. Toute une série d'affections de l'estomac offre les mêmes symptômes et elles ne peuvent être distinguées les unes des autres que par le résultat du traitement. Une inflammation chronique de l'estomac, des ulcères dans sa muqueuse, le squirrhe et le cancer de cet organe, donnent souvent lieu à des symptômes tellement semblables que même un homme de grande expérience,

un praticien consommé ne peut se prononcer d'une manière positive. Soupçonnera-t-on dans chaque cas l'existence d'un squirrhe ou celle d'un cancer? Certainement non. Et dans les cas mêmes où la crainte pour l'existence de ces maladies paraît entièrement fondée, on essaiera encore ce que peut un léger traitement antiphlogistique aidé d'un bon régime. Il ne manque pas d'exemples où tout fit prévoir une terminaison malheureuse et où cependant le malade se rétablit sous l'influence de ces moyens. Il peut de la même manière se présenter des cas où tout fait soupçonner une phthisie pulmonaire, où l'on croit devoir annoncer une terminaison fatale comme très-prochaine et où cependant, par un traitement très-simple, le malade revient si rapidement à la santé qu'on acquiert la certitude du peu de fondement de l'opinion qu'on avait conçue d'abord.

Considérée même sous ce seul point de vue, la méthode antiphlogistique appliquée au traitement de la phthisie pulmonaire mériterait encore notre sympathie et donnerait assez souvent de bons résultats.

S'il est incontestable que, dans les cas où l'on prétend avoir guéri la phthisie pulmonaire par un traitement antiphlogistique, on a souvent eu affaire à une maladie qui lui ressemblait, il est vrai, plus ou moins, mais qui était en réalité d'une toute autre nature, nous croyons cependant qu'il se présente un grand nombre de cas de phthisie pulmonaire dans lesquels un traitement antiphlogistique et contre-stimulant, uni à un bon régime et à une alimentation de facile digestion, peut être de la plus grande utilité, et cela surtout au commencement de la maladie. Mais si l'on veut que ce traitement soit profitable au malade, il est de la plus

grande importance qu'on l'emploie comme s'il était dirigé contre une affection locale.

On doit se laisser guider ici entièrement par l'examen physique et il est indispensable qu'on le répète presque journellement. En agissant ainsi, on acquiert une connaissance exacte du véritable siège de l'inflammation intercurrente et de son extension. Si l'application de quelques sangsues et l'emploi des révulsifs sur l'endroit même du mal peuvent être très-utiles ou même indispensables, l'usage de ces moyens pourra être infructueux et même nuisible, si on se trompe sur le siège du mal. On peut joindre à ce traitement local, comme il a déjà été dit, les moyens que l'on combine ordinairement avec la méthode antiphlogistique.

L'observation suivante, qui a été recueillie pendant l'année dont notre rapport rend compte, pourra peut-être éclairer ce sujet.

Une jeune fille, très-hystérique, âgée de vingt-trois ans, avait antérieurement été atteinte d'un crachement de sang. Sa mère était morte phthisique. Elle était d'une constitution faible, mais son extérieur n'annonçait rien de fâcheux. Elle était maigre, mais il n'y avait pas de véritable amaigrissement. La menstruation était irrégulière et ne se faisait en général que toutes les quinze semaines. Alors elle toussait, elle transpirait la nuit, et le pouls était très-fréquent. La voix était presqu'éteinte, faible, parfois tellement rauque qu'on avait de la peine à l'entendre. En parlant elle souffrait fortement. Les selles étaient retardées. Déjà antérieurement elle avait plusieurs fois été atteinte de raucité de la voix, et pendant son séjour dans la salle de clinique elle cracha un peu de sang. Au côté droit de la poitrine, un peu au-dessous de la clavicule, on

entendait en deux endroits un bruit respiratoire faible, mêlé à un léger râle muqueux et à un bruit de frottement.

On y fit deux ou trois applications de sangsues et puis des frictions avec la pommade d'Autenrieth, au-devant du larynx, et sur la poitrine, au-dessous de la clavicule. A l'intérieur, je donnai des poudres composées de calomel et de digitale, et plus tard de ciguë, de tartre émétique et de nitre. J'y joignis une nourriture légère, surtout du bouillon en assez grande quantité. Peu à peu la raucité de la voix disparut, la respiration revint à son état normal et les règles reparurent quatre semaines après leur dernière apparition. L'évacuation de sang fut peu abondante, et ce fut en vain qu'on essaya d'augmenter l'écoulement par des pédiluves chauds. La seconde évacuation menstruelle, qui se montra pendant son séjour à l'hôpital, eut lieu trente-deux jours après la première.

De temps en temps j'eus recours à une autre médication quand l'état de la malade paraissait le réclamer ou que de nouvelles indications surgissaient. C'est ainsi que j'administrai l'huile de castor, et que pour combattre les sueurs nocturnes je prescrivis une infusion de sauge avec de l'acide sulfurique dilué. Le traitement se termina par l'usage de l'huile de foie de morue. Le 19 avril, elle nous quitta dans un bon état. A son départ elle avait acquis plus de corpulence et tout annonçait une bonne santé. Nous croyons avoir combattu, par ce traitement, l'inflammation circonscrite qui avait envahi le parenchyme pulmonaire et qui l'avait rendu impropre à la respiration. De nouveaux tubercules auraient pu se former sous l'influence de l'inflammation. Nous disons nouveaux, parce qu'à notre avis on

peut regarder comme très-probable que déjà il existait des tubercules dans les poumons. La prédisposition héréditaire, la constitution délicate de la malade, la répétition fréquente de l'hémoptysie, la longue durée de la raucité de la voix avec douleur en parlant, l'existence de sueurs nocturnes donnent à ces soupçons assez de fondement.

On a beaucoup écrit sur le traitement antiphlogistique employé chez les phthisiques, et s'il a été chaudement défendu par les uns, il a été rejeté par les autres. D'un côté, un grand nombre des symptômes de la maladie plaident en faveur de cette méthode, et les autopsies démontrent fréquemment, et cela de la manière la plus évidente, que les poumons sont atteints d'affections de nature inflammatoire; de l'autre, il faut avouer que les signes de faiblesse radicale et d'amaigrissement qui se développent souvent si rapidement dans cette maladie se concilient difficilement avec l'idée d'un traitement débilitant. Il est facile de concevoir qu'au moment actuel ce traitement trouve moins de partisans et que la majorité des médecins le rejettent, surtout en présence de la constitution épidémique régnante, qui naguère encore fut qualifiée, à juste titre, d'anémique, par un homme célèbre (Pfeufer). A notre avis on a été trop exclusif, et sans être partisan des saignées répétées chez les phthisiques, nous croyons pourtant qu'un traitement antiphlogistique raisonné, institué avec prudence peut être utile dans quelques cas et se combine facilement avec un régime légèrement nutritif. Si, d'un côté, on doit mettre le plus grand soin à ne pas affaiblir le malade, de l'autre, on doit tâcher de ne pas éveiller ou même d'augmenter, par une nourriture trop forte, les symp-

tômes de congestion ou d'inflammation. Les déplétions sanguines, quoique souvent inévitables, doivent être employées avec le plus grand ménagement, et en résumé, nous croyons que les saignées générales, quand déjà la maladie a duré quelque temps, seront très-rarement indiquées. Quant aux saignées locales, nous répèterons ce que nous avons déjà dit, que l'examen physique doit servir de règle de conduite pour le choix du lieu où on les appliquera. Dans ce cas on ne doit pas négliger les médicaments dont nous avons déjà parlé et dont quelques-uns ont été cités dans l'observation que nous venons de décrire. Le mercure doux, l'émétique, le nitre et la digitale seront avantageusement mis en usage, tandis que les révulsifs employés à des degrés différents d'énergie, depuis les plus faibles jusqu'aux plus actifs, selon les cas, peuvent être d'une utilité incontestable.

L'usage de ces moyens sera en général contre-indiqué dans les cas, où la maladie a déjà pris un certain développement; mais là, où l'on a des motifs de croire que la tuberculisation n'est pas encore devenue générale, en outre dans les cas où la maladie se montre après une pneumonie, où il se développe une autre affection inflammatoire, où la phthisie commence par des irritations inflammatoires circonscrites, nous croyons que dans ces conditions on peut prescrire avec fruit l'émétique, le nitre, la digitale et même le mercure doux. D'abord, il est souvent difficile de s'assurer si déjà il existe des tubercules, et puis les recherches anatomiques démontrent que souvent ils se forment sous l'influence des inflammations. Il est donc de la plus grande importance de se rendre maitre de ces affections et cela de la manière que nous

venons d'indiquer. L'observation que nous avons décrite peut servir d'exemple.

Nous sommes convaincu que beaucoup de phthisies doivent leur origine à de semblables affections, qui, une fois qu'elles ont pris un entier développement, deviennent alors, par la déviation que la circulation du sang peut en éprouver, chez les personnes prédisposées, une cause rapide d'une altération plus notable des humeurs et d'une tuberculisation générale.

C'est ce que nous voyons encore dans quelques maladies cancéreuses. Souvent, à son apparition, cette affection se lie déjà à une dyscrasie générale, mais il existe toutefois des cas où elle est d'abord locale. Une irritation souvent répétée d'une membrane muqueuse est souvent, même chez les personnes les mieux portantes, cause de la formation d'une induration cancéreuse. Celle-ci reste quelque temps locale et plus tard, par l'altération plus notable des humeurs, la diathèse cancéreuse se développe. Il est probable que la tuberculisation suit, dans quelques cas, une marche semblable.

Il nous serait difficile de bien déterminer les indications du traitement dont nous avons parlé. Cependant elles découlent en partie de ses contre-indications. D'abord il est nécessaire que la muqueuse de l'estomac et des intestins soit dans son état normal; le moindre signe qui indiquerait une maladie de ces organes serait une contre-indication à l'emploi de l'émétique, du nitre et du mercure doux. Non seulement l'état local de ces viscères empêche dans ces circonstances l'usage de ces moyens, mais dans les cas où il existe, outre l'affection pulmonaire, une maladie des intestins, on

a des motifs de croire qu'il existe déjà une tuberculisation générale. Or, l'usage de ces médicaments favoriserait l'altération générale, augmenterait la maladie, et précipiterait la mort.

Une seconde série d'indications et de contre-indications résulte de la cause présumée de la maladie. Quand la maladie se développe après des avortements, après des couches fréquentes qui se sont succédé rapidement, après l'épuisement par l'allaitement, après une forte hémorrhagie, en un mot, après toutes les causes affaiblissantes, le traitement dont nous nous occupons sera évidemment contre-indiqué. Si, au contraire, elle se montre à la suite de la rougeole, de la scarlatine ou même du typhus, alors notre traitement pourra peut-être trouver son application. Dans tous ces cas cependant, il faut soigneusement distinguer ceux où ces maladies ont été suivies d'une débilitation générale, comme cela arrive après le typhus, car alors ce traitement sera contre-indiqué. Toutefois, comme dans plusieurs de ces cas, on rencontre souvent des pneumonies partielles ou latentes, qui, si l'on néglige l'examen physique, sont considérées, à tort, comme guéries, tandis que leurs symptômes, lors de la guérison des affections dans lesquelles les pneumonies existaient, ont seulement rétrogradé, il est probable, que c'est là la raison principale pour laquelle ces maladies et surtout la rougeole sont si souvent suivies de la phthisie.

L'expérience nous apprend que cela a également lieu après le typhus, et cependant dans cette maladie on ne peut pas perdre de vue, qu'on est plus ou moins fondé à regarder la tuberculisation, qui se montre dans la convalescence, comme une lésion locale, au moins à son

début. D'ailleurs, sans adopter la *théorie d'exclusion* (*Ausschliessungs-theorie*) de Rokitansky, qui admet que le typhus épargne les personnes atteintes de tubercules (1), l'expérience est là qui constate que le typhus attaque de préférence les personnes d'une constitution saine et robuste. Il nous paraît probable que la prédisposition des convalescents du typhus à contracter une phthisie promptement mortelle ne provient que de ce que la pneumonie typheuse a laissé après elle un épanchement persistant, quoique circonscrit et très-limité. Cette lésion devient une cause permanente d'irritation des poumons et, en cas de prédisposition, il se développe, par la débilité générale du patient, des tubercules qui, d'abord isolés, sont plus tard souvent promptement suivis d'une tuberculisation générale. On ne perdra pas non plus de vue, que les viscères seront plus fortement prédisposés à la tuberculisation après cette maladie, parce qu'elle est souvent elle-même compliquée d'affections intestinales. Certes, si la dothinentérie, comme nous espérons le prouver dans un de nos rapports prochains, est loin d'offrir, chez nous, cette étendue dont parlent les auteurs allemands et français, en se fondant sur leurs recherches cadavériques, nous observons toutefois aussi quelques cas de typhus où les intestins sont le siége d'un état inflammatoire. Une longue expérience clinique, appuyée sur des recherches anatomiques, nous a convaincu de cette vérité.

Ces considérations, sur lesquelles nous ne pouvons

(1) Des exemples contraires sont relatés dans notre précédent rapport, pag. 7-15.

nous étendre davantage pour le moment, suffiront pour convaincre nos lecteurs de l'importance du traitement d'une maladie, généralement considérée comme incurable. Il est très-probable que même ici, un traitement bien raisonné, qui aura égard à toutes les circonstances qui ont précédé la maladie et à celles où se trouve le malade, pourra souvent être couronné de succès.

Si cette agréable et flatteuse prévision paraissait encore trop hasardée à quelques praticiens, alors au moins on nous accordera qu'un traitement rationnel peut certainement beaucoup contribuer au soulagement des longues souffrances qui, chez les phthisiques, peuvent parfois atteindre un si haut degré d'intensité. Mais que voit-on ordinairement? Les uns se bornent à ne rien faire; d'autres ordonnent à tous leurs malades, sans distinction, de prendre des aliments fortifiants, mesure qui aura certainement pour effet ou d'éveiller la fièvre ou de la faire augmenter en intensité si déjà elle existait. D'autres enfin prescrivent successivement tous les moyens qui ont été préconisés, sans se soucier si l'état de l'estomac et des intestins permet leur administration. Entretemps on s'étonne souvent de ce que tant de moyens si hautement préconisés, ne répondent nullement à leur attente! Il n'entre point dans notre but de nous étendre davantage sur le traitement de la phthisie pulmonaire; mais les remarques que nous venons de faire nous entraînent à jeter un coup d'œil sur l'état de l'estomac et des intestins.

Il y a des cas de phthisie pulmonaire où la muqueuse de l'estomac et des intestins conserve longtemps son état normal; pendant plusieurs mois ces organes n'offrent aucun symptôme de maladie; souvent leur développement se fait beaucoup plus tardivement. Il y a des cas, et ils ne sont pas rares, où les premiers symptômes d'une maladie de poitrine coïncident avec le développement des signes certains d'une affection sérieuse de l'estomac ou des intestins. Dans d'autres, cette dernière précède; la maladie offre d'abord tous les signes d'une inflammation chronique de l'estomac, qui de temps en temps peut revêtir une forme aiguë plus ou moins intense. D'autres montrent un état d'irritation inflammatoire des intestins, avant l'apparition des symptômes de la phthisie. Il n'y a pas le moindre doute que le pronostic ne soit plus défavorable dans les cas où l'estomac ou les intestins sont atteints d'une irritation inflammatoire, que dans ceux-là même où déjà existent les signes certains de tubercules pulmonaires, mais où le tube intestinal a conservé son état normal. Non seulement cet état empêche l'usage d'un grand nombre de médicaments, mais il empêche une des principales ressources de la nature, la nutrition. Sans invoquer le témoignage de plusieurs hommes célèbres, l'histoire des maladies et nos propres autopsies nous suffiraient pour prouver que souvent cette affection de l'estomac et des intestins est de nature purement inflammatoire. Cette inflammation chronique réclame le même soin, le même régime que l'on prescrit lorsqu'elle atteint ces organes d'une manière isolée et indépendante d'une maladie de poitrine. Cependant, si dans beaucoup de cas nous sommes convaincu du caractère inflammatoire de ces affections, nous nous empressons d'ajouter qu'on aurait tort d'attribuer à l'inflammation, tous les symptômes gastriques qui se montrent chez les phthisiques. Sous ce rapport les auteurs modernes, qui n'ont considéré cette question que sous un seul point de vue,

ont certainement souvent émis des préceptes nuisibles. D'après Andral, toutes ces affections devraient être traitées antiphlogistiquement (1). Tout en admettant que telle est fréquemment la ligne de conduite à suivre, cette règle nous paraît cependant énoncée d'une manière trop générale. Louis (2) même a constaté chez un cinquième des phthisiques que l'estomac était dans un état normal. Nous trouvons chez lui des prescriptions de *tisanes amères* pour ramener l'appétit, et même de préparations ferrugineuses (3).

Dans nos propres annotations, nous trouvons des exemples de phthisie pulmonaire, où la muqueuse de l'estomac était parfaitement saine, et nous sommes même porté à croire que ces cas se présentent chez nous plus fréquemment que ne l'admettent les écrivains français (4). Nous nous appuyons sur les motifs suivants :

Louis admet que l'inflammation de la partie antérieure de la muqueuse stomacale est liée à l'existence de l'état graisseux du foie (5). Or, comme cette dégénérescence est une affection excessivement rare chez nous, on peut en déduire que, dans nos provinces, les irritations inflammatoires de la partie antérieure de

(1) Andral, *Clin.*, tom. IV, p. 290, 291.
(2) Louis, *Phthisie*, éd. II, p. 78.
(3) L. l. p. 654.
(4) Un tableau statistique serait désiré peut-être par quelques lecteurs; mais comme nous nous proposons de traiter un jour la phthisie pulmonaire ex professo, de semblables relevés se trouveront mieux placés dans cet ouvrage. Tout ce que nous avons successivement écrit dans nos rapports sur la phthisie pulmonaire ne doit être considéré que comme un travail préparatoire à un ouvrage de plus longue haleine.
(5) Louis, l. l. p. 73.

l'estomac sont également plus rares chez les phthisiques. D'un autre côté, il est très-probable que l'inflammation de la muqueuse du grand cul-de-sac ne se développe que dans les derniers jours de la vie. On peut donc admettre, et nous croyons fermement, que les phénomènes dyspepsiques, qui s'observent dans la phthisie pulmonaire, n'ont pas toujours une origine inflammatoire. Il résulte aussi de là que souvent ils ont d'autres causes variées, et que partant le traitement, devant varier en conséquence, ne pourra être déterminé d'une manière générale.

Il n'est pas rare, soit dit en passant, qu'ils offrent un caractère qu'on peut nommer gastrique et alors des médicaments absorbants et des amers seront administrés avec fruit. C'est ainsi que la diarrhée des phthisiques se rattache souvent à cet état; il est donc très-irrationnel de la combattre immédiatement dans chaque cas.

Nous ne ferons que mentionner la phlétore abdominale, autre cause de ces symptômes; déjà nous en avons parlé dans un rapport antérieur, et nous nous proposons de reprendre cette question à un autre moment.

En somme, les symptômes gastriques des phthisiques, quoique reconnaissant souvent pour cause un état inflammatoire de la muqueuse des voies digestives, ont quelquefois une toute autre origine.

Quoi qu'il en soit, revenons à nos phthisiques. Comme nous l'avons dit, il y a eu 17 morts; 14 ont succombé dans l'établissement même, pendant le cours de clinique; 13 ont été autopsiés. Le cadavre du jeune homme mort à la suite d'une hémoptysie, ne nous a pu donner des résultats positifs à cause de l'état de putréfaction où il

se trouvait déjà trente-six heures après la mort. Il nous fut impossible de déterminer, dans deux cadavres, quel était le poumon où la tuberculisation avait fait le plus de progrès. Le poumon droit était le plus atteint chez 4 sujets, le gauche chez les 7 autres. Cette prédilection pour le poumon gauche s'accorde avec mes recherches antérieures et avec celles de Louis (1). Je crois, en effet, que c'est un fait exceptionnel, lorsque le poumon droit est le premier atteint, et même dans ce dernier cas je suis d'avis que des recherches cadavériques, faites avec attention, peuvent nous donner la raison de cette préférence.

Ainsi, nous avons cru trouver cette cause dans une pneumonie lobulaire, chez une femme de quarante-trois ans, dont le poumon droit était plus atteint que le gauche. Il n'offrait des adhérences qu'à la partie inférieure. Au lobe supérieur, la plèvre était épaissie, blanche et mate. La surface était inégale; quelques lobules étaient indurés, tandis que d'autres crépitaient encore. Les parties dures étaient en grande partie passées à l'hépatisation grise; çà et là on pouvait remarquer un parenchyme sain mais noir. En différents endroits, on voyait de petits points puriformes, dans d'autres des portions de bronches épaissies, et quelques tubercules qu'on pouvait distinguer de la manière la plus évidente de cette dernière lésion.

Dans la partie postérieure et le milieu du lobe

(1) Louis, *Phthisie*, pag. 6-7. « Presque toujours il y avait une plus ou moins grande quantité de tubercules dans les deux poumons. Néanmoins, j'ai vu cinq fois cette lésion bornée au poumon gauche et deux fois seulement à celui du côté droit. Le dernier serait-il un peu moins défavorable que l'autre au développement de la matière tuberculeuse? »

moyen, il y avait une petite caverne remplie de matières. Ce lobe était en général moins malade que le premier. Sous ce rapport, celui-ci ressemblait davantage au troisième, quoique la couleur de son tissu se rapprochât plus de la coloration noire qu'on trouve dans la pneumonie chronique des phthisiques. Dans le troisième lobe, on remarquait sous la séreuse deux à trois grands tubercules. Le poumon gauche était plus adhérent en arrière; son sommet, qui était induré, renfermait quelques gros tubercules, et on pouvait en observer jusque dans la partie inférieure. Le cœur notablement dilaté offrait un volume double, de manière que les poumons étaient rejetés en arrière. Les valvules et les ouvertures de cet organe étaient saines. Si maintenant on réfléchit à l'âge et à la constitution de la malade, qui annonçaient une femme forte et robuste; il paraîtra probable que la maladie a commencé par une pneumonie lobulaire qui avait atteint le poumon droit, et qui plus tard a donné lieu à une tuberculisation générale.

Chez une fille de seize ans, les lésions cadavériques étaient de nature à faire présumer que la maladie avait d'abord commencé au côté droit par une affection pleurétique, et que la tuberculisation ne s'était développée de l'autre côté que bien plus tard. Le lobe inférieur du poumon droit était poussé en arrière par l'épanchement; au sommet il y avait une grande caverne, et dans le poumon gauche il existait seulement des tubercules miliaires.

Chez un jeune homme de dix-neuf ans, nous ne trouvâmes qu'un gros tubercule dans le poumon gauche, tandis que le droit renfermait des cavernes et des tubercules. Celui-ci était entièrement adhérent

et d'une dureté analogue à celle du cuir, lésions qui étaient les suites d'une inflammation chronique.

Toutefois chez un autre jeune homme de dix-huit ans, également inscrit sous le titre *phthisis tuberculosa*, nous ne trouvâmes d'autre lésion que quelques tubercules miliaires, siégeant dans la partie inférieure du lobe supérieur du poumon droit; circonstance dont nous ne pûmes soupçonner la cause. C'est un point qui mérite d'être examiné de plus près.

Chez quelques-uns j'ai trouvé des affections du larynx; ainsi, dans un cas cet organe offrait çà et là des taches rouges. Dans un autre, l'épiglotte était épaissie; je lis même dans la relation de l'une des autopsies, qu'immédiatement au-dessous de l'épiglotte il y avait un tubercule, et que la trachée-artère en renfermait également quelques-uns. Je me suis contenté de mentionner ce fait sans y ajouter d'autres détails. Louis (1) n'a jamais trouvé des tubercules dans la trachée-artère, et sans nier la possibilité du fait, il le considère cependant comme des plus rares. Les glandes conglomérées renfermaient dans quelques cas des tubercules, dans d'autres elles en étaient exemptes. Cependant l'état de ces organes n'a pas été annoté dans toutes les autopsies. Nous trouvâmes chez quelques sujets des tubercules dans la plèvre et dans les fausses membranes, une fois dans le médiastin antérieur, et une fois dans le péricarde.

J'ai annoté qu'une fois le cœur était petit, qu'une fois il n'avait pas augmenté de volume, que trois fois il n'était *pas plus grand* que dans l'état ordi-

(1) Louis, *Phthisie*, p. 54.

naire, qu'une fois il était *assez grand*, que trois fois il était *très-grand*, qu'une fois il avait un peu augmenté de volume, qu'une autre fois il n'offrait rien d'anormal. Dans un dernier cas enfin, il n'est rien dit du volume de cet organe. Déjà plus haut, en rapportant les résultats de l'autopsie de la femme où la phthisie s'était développée à la suite d'une inflammation partielle du poumon, nous avons décrit le cœur, et nous avons dit qu'il avait un volume double de celui d'un cœur ordinaire. Dans un autre cas, dont nous n'avons pas encore parlé, ce viscère offrait les signes d'une inflammation chronique notable de la face interne du péricarde. Toute la surface du cœur ainsi que la face interne du péricarde offraient un aspect floconneux. Le péricarde était notablement épaissi et fortement distendu par une grande quantité de sérosité. Il avait entièrement repoussé les poumons et portait les empreintes des côtes. Cette affection n'avait pas été soupçonnée pendant la vie. A l'arrivée du malade chez nous, il était dans un état désespéré, et toute tentative d'examen physique le fatiguait tellement, lui était si pénible que nous crûmes ne pas devoir insister pour l'y soumettre. Il était assis dans son lit, soutenu par des coussins et entièrement enveloppé dans des couvertures et se plaignait continuellement de froid. Sur deux autres cadavres de mes phthisiques, nous trouvâmes une si grande quantité de sérosité dans le péricarde, et cette poche tellement distendue à sa partie inférieure, que nous crûmes que déjà pendant la vie il devait y avoir eu un développement d'hydropéricarde; en outre, il existait une légère adhérence entre le cœur et le sac péricardien. Si nous comparons ces

résultats avec ceux relatés dans notre précédent rapport, nous trouvons entre eux la plus grande ressemblance. Il en résulte que chez nos phthisiques, le volume du cœur a présenté une différence notable avec celui qui a été trouvé par Louis.

Nous avons constamment trouvé des ulcères dans les intestins; mais nous n'avons pas vérifié, comme quelques écrivains l'ont avancé, qu'ils auraient de préférence leur siége dans l'intestin grêle chez les jeunes gens, dans le gros intestin, au contraire, chez les personnes plus âgées. Ainsi chez l'homme de soixante-six ans, nous les avons constatés dans les intestins jéjunum et iléon; le gros intestin en était exempt. Chez une fille de seize ans, ils étaient en petit nombre vers la valvule iléo-cœcale, tandis que le cœcum et le colon en étaient presque entièrement couverts. Le rectum, de même que dans nos recherches antérieures, a souvent offert des signes d'inflammation; et dans un cas il présentait un grand nombre d'ulcères superficiels près de l'anus, qui peut-être auraient donné lieu au développement de fistules si la vie se fût prolongée davantage.

Déjà, dans un autre rapport, nous avons attiré l'attention sur la rareté du foie gras (1), et la dernière année nous a fourni les mêmes résultats. Il est digne de remarque, qu'en Angleterre aussi on a rarement observé la dégénérescence graisseuse du foie chez les phthisiques. Le docteur Thomas Hogdkin le dit clairement (2). Le témoignage de cet auteur est certes le

(1) Reproduit dans le *Journ. de méd., de chir. et de pharmacologie*, publié par la Soc. des méd. et pat. de Bruxelles. Juin 1847, pag. 448 et suiv.

(2) Hogdkin's *lectures on the morbid anatomie of the serous and mucous membranes*. In two vol. II. London 1840, p. 180.

plus important que l'on puisse invoquer ici. Le docteur Hogdkin a longtemps suivi les cours de Laennec et de Rostan, à Paris. Il a assisté à toutes les autopsies, qui furent faites à la Charité par Andral, encore étudiant à cette époque, et qui lui ont fourni les matériaux pour sa clinique médicale. Assez fréquemment il fut présent aux autopsies faites par Louis. Il vit en effet que l'hypertrophie du foie existait constamment dans les cadavres des phthisiques, et que par conséquent il n'y avait pas à douter de la justesse des assertions de Louis et d'Andral. Plus tard Hogdkin fut nommé *Inspector of the dead in Guy's hospital* à Londres, en même temps qu'on lui confia le soin de la collection anatomique de cet établissement (1). Il a occupé ce poste jusqu'en 1840, et chacun, qui a été à même de voir cette fameuse collection, telle qu'elle a été augmentée et renouvelée par Hogdkin, sera étonné de ses connaissances anatomiques et de sa grande activité. Cet anatomiste dit formellement que la dégénérescence graisseuse du foie se montre rarement en Angleterre chez les phthisiques. Il reconnaît toutefois l'exactitude des observations de Louis et il n'élève aucun doute sur ce point, de la vérité duquel il a pu se convaincre à Paris même. Il est donc probable que des recherches, faites dans d'autres pays, nous feront connaître des modifications importantes dans les altérations organiques de la phthisie pulmonaire.

(1) L. l. vol. I. Pref., pag. 7.

CLINICAL LECTURES

ON THE

PHYSICAL DIAGNOSIS OF PHTHISIS,

Delivered at the Hospital for Consumption and Diseases of the Chest.

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CLINICAL LECTURES

ON THE

PHYSICAL DIAGNOSIS OF PHTHISIS.

LECTURE I.

Explanatory introduction—Position of the lungs—Thoracic regions—Respiratory movements—Varieties of healthy respiration—Division of physical examination—General laws.

GENTLEMEN,—The prefatory remarks with which I shall trouble you will extend to little more than an explanation of my present object, which is merely to describe in succession the physical signs of pulmonary phthisis, and, as I proceed, to illustrate them upon some of the patients of this hospital.

I shall carefully avoid any thing like a scientific explanation of the various phenomena we shall meet with, as it is not my purpose to give a description or history of auscultation, and other means employed in physical examination, but to point out their practical bearing upon the detection of phthisis; and I hope, before my task is completed, to convince you so strongly of their value, that you will confess that none who really desire to do the greatest amount of good possible in our profession, can neglect to study them.

I should be as sorry to be ranked with those who are in the habit of placing their chief, or perhaps exclusive, reliance upon physical examination, as with the opposite class, who fall into the error of altogether disregarding it: in my opinion each extreme should be equally avoided—in this, as in most cases, the "juste milieu" should be sought after; and that conclusion must be the most correct which has been arrived at through the co-operation of every sense and faculty which can be brought to bear upon the subject.

Whilst it is unnecessary to enter here into the anatomical structure of the thorax, or its contents, it is indispensable to have at the commencement a sound knowledge of the position of the thoracic viscera, the character of healthy respiration, and its peculiarities in different situations.

The apex of each lung ascends to the same level, which may be said to be about an inch and a half above the clavicles, differing, however, considerably in this respect, according to the height of these bones, and the length of the neck, but pretty generally corresponding with a horizontal line drawn just below the spine of the seventh cervical vertebra (vertebra prominens). Anteriorly, they descend to a point midway between the fifth and sixth costal cartilage, and in passing backwards are in apposition laterally with the 6th, 7th, 8th, 9th, 10th, and 11th ribs, covered by each to a decreasing extent, and protected by the last only for a short space close to its spinal attachment. For the convenience of description, the thorax may be divided into regions, as follows:—

REGIONS.

Anterior.	Supra-clavicular,	above the clavicles.
	Clavicular,	upon the clavicles.
	Infra-clavicular,	below the clavicles to the 4th rib.
	Mammary,	from fourth rib, to base of lung.
Lateral.	Axillary,	the region of axilla.
	Infra axillary,	beneath axilla to base of lung.
Posterior.	Supra-spinous,	above the spine of scapula.
	Infra-spinous,	below the spine of scapula.
	Infra-scapular,	below the scapula to base of lung.
	Inter-scapular,	between the bases of scapulæ.

In some of these divisions healthy respiration has peculiarities which it is necessary to remember, and will be spoken of presently. I need not refer to the mechanism of respiration further than in reminding you that it is performed chiefly by the diaphragm and abdominal muscles, assisted by a slight elevation of the ribs, by the combined action of which, the capacity of the chest is augmented in all directions. In tranquil respiration in men the diaphragm is principally concerned, the costal movement being scarcely evident to the eye, but in women the latter is increased, and the former lessened, in consequence, as I believe, of the restrictions to the natural movements which fashion inflicts upon them. In children the movement of the ribs is comparatively great, from the larger amount of their respiration, and the flexibility of their costal cartilages; whilst in old age, and particularly in the male sex from the rigidity of the cartilages, the breathing is chiefly abdominal. It appears that the chief service of the ribs is one of reserve, to be called into action during any increased effort of respiration; for whilst this is taking place, they may be seen to act to a much greater extent comparatively, than the diaphragm and abdominal muscles.

The lung itself takes but a small part in the respiratory act, being entirely passive during inspiration, but contributing slightly by the elasticity of its tissue to the force of expiration. What has been termed its resiliency, or the power it possesses of resuming its form after having been pressed upon, is due only to the elasticity of the air within it; for if a lung be entirely compressed, it will not regain its form unless blown into, which may be readily attested by those cases of hydrothorax, where the whole lung has been flattened against the vertebræ, and remains a compact mass, until by forcible injection of air into the bronchus it may be made to resume its natural dimensions. The muscular fibres of the bronchi are incapable of aiding the respiratory muscles, being endowed merely with the property termed "simple contractility," which can be called into action only by the presence of an irritant, as in the discharge of sputa.

The passage of air into the lungs is attended by a sound, the character of which is determined by the form and texture of the several parts: thus in passing onwards, it is said to be nasal, buccal, pharyngeal, laryngeal, tracheal, bronchial, and pulmonary, in succession. As the lungs are bad conductors of sound, if the ear be applied to any part of the thoracic walls with which the pulmonary tissue is in immediate contact, only the last of these (pulmonary) will be heard, and to distinguish the rest, it is necessary to listen to the vicinity of each part respectively. It happens, however, occasionally, that the pharyngeal murmur, from unusual loudness, or the high position of the clavicle, can be heard in the infra-clavicular regions, and from its resemblance to bronchial respiration might lead to an error in diagnosis; but in such cases a similar condition invariably occurs on the opposite side, and both can be made to disappear by directing the patient to breathe with the mouth widely open.

Wherever the larger bronchi approach the surface, or are separated from the parietes of the chest by a very small amount of pulmonary substance, the respiration will be bronchial. Much discussion has arisen as to the points where this occurs,—probably, from the circumstance that it varies in different individuals: in some it is found for an inch or more on each side of the upper portion of the sternum, and in the axilla; the only parts in which it is invariably met with, are—the interscapular region over the roots of the bronchi, and, (to a somewhat less extent,) the middle of the upper part of the sternum.

Pulmonary respiration is made up of two murmurs, inspiratory and expiratory: the former is a sound of a softly blowing and breezy character, slowly and continuously produced; the latter immediately follows it, and differs only in being of shorter duration, and less loud. The relative length of the two has been variously estimated, and, without doubt, varies considerably; but that proposed by Dr. Walshe is the most accurate: in it the entire respiration is represented by the figure 10; 5 of which are devoted to inspiration, 4 to expiration, and 1 to a pause before the next respiratory act.

Bronchial respiration is easily recognised by being entirely free from the softness of the pulmonary, and more or less harsh, loud and dry: its inspiratory and expiratory murmurs are of equal length, and slightly separated from each other, and both have a distinctly tubular character, which may be well imitated by blowing gently through a stethoscope.

The tracheal, laryngeal, pharyngeal, buccal, and nasal forms of respiration, vary in different persons, but have the common character of being louder, more dry, shrill, and blowing, and of longer duration, than the preceding: their two murmurs are of equal length, and divided from each other by a considerable interval.

But little practical benefit can result from anything more than a general knowledge of these latter sounds, and I shall trouble you no longer with them. Auscultation of the trachea, however, has been insisted upon by some writers; but I confess it has afforded me no assistance: for whenever that part is diseased, the symptoms are but too evident, and I doubt the possibility of learning its precise pathological state by the character of the tracheal sound.

It will be necessary to take a general survey of the means employed for physical diagnosis: but I shall endeavour to avoid unnecessary detail, by dwelling only upon those points in immediate connection with our subject.

They may be said to consist of—

1. Inspection.
2. Application of the hand.
3. Mensuration.
4. Percussion.
5. Auscultation,

the relative value of which in the detection of phthisis, I shall endeavour to point out.

In connection with each of these, it is important to recollect the following rules:—

1, *a*. In a well-formed healthy chest, there is no visible difference in *the form of the two sides*.

b. There is no relation between the dimensions of the upper and lower parts of the same side.

c. During ordinary and forced respiration, the motions of the two sides are equal.

d. In angular curvature of the spine, the movement is the same on both sides; but in lateral curvature the side on which the convexity exists exceeds the other in size and extent of motion.

2, *a*. The amount of vibration communicated to the hand placed lightly on the chest during speaking or coughing, (vocal or tussive fremitus) is subject to variation, but is always greater on the right than on the left side, and before than behind.

b. It is more distinctly marked in thin than in fat or muscular persons.

3, *a*. It is rare to find a chest which, on careful measurement, does not exhibit a slight difference in the two sides; the excess being generally on the right, but in left-handed persons on the left.

4, *a*. Percussion is the more clear where the respiration is the most audible—viz. at the apices than at the bases of the lungs, and before than behind.

b. One side strictly corresponds in resonance with the other, except at the point where the heart touches the thoracic walls.

c. The natural resonance varies in different individuals, frequently ascribable to varying thickness of the walls of the chest, but often to causes difficult to determine, and arising from individual peculiarity: hence, as there is no precise standard of comparison, it is necessary to compare one side with the other, and at corresponding points.

d. Percussion between the ribs will yield a clearer sound than upon them: hence, the pleximeter should be placed in corresponding parts on each side, with regard to the situation of the ribs.

e. During calm breathing, the chest is at all times equally resonant; consequently percussion may be usually performed without reference to the period of the respiratory act.

5, *a*. There is a somewhat greater intensity of respiration at the apices than at the bases of the lungs, and at the anterior than posterior parts; but always an equality in this respect in the two sides.

b. Respiration is modified by age: in children it is louder and more frequent than in adults, and in old age the inspiration is weak and short, whilst the expiration is much prolonged.

c. In some persons the respiration is naturally weak; whilst in others, under precisely similar conditions, it is equally loud and distinct—consequent upon some individual peculiarity; but the audibleness of the breathing is greatly dependent upon the thickness or otherwise of the thoracic walls.

d. Every variety is met with in the length and loudness of expiration: it never exceeds four-tenths of the whole respiration, and may not amount to one-tenth; in many cases it is perfectly inaudible even during forced breathing, and when the other murmur is very loud.

e. The resonance of the voice (bronchophony) is generally greater throughout the right than the left lung; but constantly so in the infra- and supra-clavicular regions.

LECTURE II.

The first stage—Changes in the form and movements of the chest—Rules for percussion and auscultation—Varieties of morbid respiration, and their relation to tubercle—Position of tubercular matter.

The morbid conditions in Phthisis, discoverable by physical examination, have their different stages as distinctly marked, and pass as regularly from one to the other, as the more general and visible symptoms of the disease; both travel onwards *pari passu*, and one may often be used to confirm or correct the other. They are divided into first, second, and third stages; the first corresponding to the crude tubercle, the second to its period of softening, and the third to its elimination, with the formation of cavities. I must beg you to bear in mind that physical signs, as a general rule, will only determine physical states,—or, in other words, will declare the physical, and not the pathological condition of the lungs: consequently we need further evidences, and amongst them, the history and general symptoms of the case, as well as the knowledge of certain laws, to determine whether the change we may discover depends upon tubercular deposition, or other diseases equally interfering with the act of respiration.

On the first appearance of tubercles in the lungs, in the majority of cases, there is no visible deviation from the healthy form of the chest, and mensuration with callipers will fail in detecting any dissimilarity in the two sides. In a few instances bulging to a variable extent may be discovered in one infra-clavicular region; but its rarity will be manifest when I mention that I have met with it but three times in examining about 400 phthisical patients. In each of these it preceded for some time the general symptoms, and co-existed with rather an increase than otherwise of healthy resonance, a feebleness of respiration, and absence of rhonchi: hence, it may be inferred that the pathological condition producing it is a local and temporary hypertrophy of the air-cells, in consequence of some of them compensating, by increased capacity, for the impaired functions of others in their vicinity. One of these patients left the hospital, calling himself cured, after six weeks' attendance, with the bulging unchanged; a similar result attended the second case; but the third remained under treatment about three months, during which time the enlargement gradually disappeared, and was succeeded by hardness on percussion, and dry crackling rhonchi.

I suspect that bulging would be more commonly seen, had we the opportunity of examining a greater number of cases at their very beginning: it cannot be considered a very important sign, because a slight difference might in some persons be natural; but when strictly localized, and coinciding with other doubtful symptoms, it may justify a suspicion of incipient phthisis.

As the first stage advances, the lung in the vicinity of tubercle usually contracts, either from atrophy of its cells, chronic inflammatory induration of its structure, or contraction of false membrane from secondary pleurisy; and, as a consequence, there is more or less depression in the neighbourhood of the clavicle, sometimes evident to the eye, but readily ascertained by using the callipers. As might be supposed, there is great variety in this respect, many cases not offering the least difference in the two sides until softening has begun, whilst others display a visible falling inwards very early in the disease. Any depression either in the supra- or infra-clavicular region of one side should be regarded as suspicious: in my notes of 100 cases in the first stage, I find it recorded fifteen times, in all of which, however, the disease was considerably advanced, and at no great distance from the second stage.

No information can be gained at the earlier periods by watching the movements of the chest, as the two sides, from long habit, are pretty equally expanded,* although one lung may have rather less power of distension than the other: it is not until a later stage that any important difference in this respect can be ascertained: moreover, a slight dissimilarity might be natural, or result from lateral curvature; but whenever the case is sufficiently advanced to exhibit any depression, there is less mobility in that region.

Unless the tubercular deposit be considerable, or the neighbouring part of the lung much condensed, application of the hand will not detect any morbid amount of vocal fremitus in the infra-clavicular region; and as an excess on the right side is natural,

* This applies only to the *appearance:* it is more than probable that careful measurement of the respiratory movements by the Chest-measurer of Dr. Sibson, would, in the majority of cases, detect a slight difference.

its employment is nearly limited to the examination of the left, where, if the vibration be greater than on the other, phthisis may be fairly suspected.

At a very early period careful percussion will generally detect a slight difference in the resonance of the diseased part, growing more and more evident as the case advances, until the sound produced becomes perfectly dull; at the same time the healthy elasticity of the thoracic walls is diminished, and a sense of resistance, passing into perfect hardness, given to the finger employed as the pleximeter. It is practice alone which can enable us to form a correct opinion of the shades of difference thus presented; but the senses of hearing and touch may be so familiarized to their varieties, as to render the most minute changes invaluable evidence of disease. The mode of employing percussion is important, and will justify a few words respecting it.

The best method is to tap upon the centre of the middle finger of the left hand pressed steadily upon the intercostal spaces, parallel to the ribs, with the extremities of the united fore- and middle-fingers of the right hand,—the movement being made solely by the wrist-joint, and the elbow kept perfectly motionless. Not only is a sharper and better sound produced in this way, but the appearance of striking the patient is avoided. I have seen many persons not only frightened, but seriously injured, by the clumsy practice of lifting the entire arm. The pleximeter-finger may sometimes be placed upon, and parallel with, the ribs, and often at right angles with them; and it is useful in doubtful cases to employ all these methods, as one may afford evidence which another does not; but in all instances one side must be compared with the other, at corresponding points, and by the same means.

Percussion of the clavicle is highly important, and is best performed directly,—that is to say, without the intervention of a plexímeter; it must be practised at points precisely similar on the two sides, as the natural resonance decreases with the increase of distance from the sternum. Although the supra-clavicular regions often pass unnoticed, they are very important, and should be examined by tapping with the fore-finger of the right hand, the extreme joint of the middle finger of the left hand, pressed firmly downwards. The supra-spinous regions, also, are instructive parts, and may be examined in the ordinary way.* A very different result follows a gentle tap, and a more forcible one: the former yielding a sound from the superficial, and the latter from the deeper portions of the lung; hence it is frequently useful to practise both.

Where tubercles are few in number, or diffused, a difference otherwise imperceptible may be often detected by using the united four fingers of the left hand as the plexímeter, and tapping with the ends of the four fingers of the other hand.

In doubtful cases it is useful to percuss whilst the patient is holding the breath after a deep inspiration, during which, the affected lung being less distended than the other, may exhibit more or less comparative dulness. Diminished resonance is one of the earliest and most characteristic signs of phthisis, and I have met with but two cases in which it was calculated to mislead. These were patients labouring under sub-acute bronchitis, in each of whom one infra-clavicular region was decidedly dull, as I believe, simply from an accumulation of mucus. In these instances, however, this character changed even at each visit; and such examples are so rare as scarcely to detract from the value of percussion.

By far the most valuable evidence of phthisis is afforded by auscultation, which, to the practised ear, will rarely fail to reveal it at a very early period. As I have often seen persons utterly unable to appreciate the best-marked sounds, from their imperfect manner of using the stethoscope, I shall say a few words on this subject.

Although, in many cases, the ear may be applied directly to the chest (immediate auscultation) for all minute examinations, and where the upper lobes are concerned, the use of the stethoscope (mediate auscultation) is indispensable, as it enables us to isolate any one point from another. If too lightly applied, it fails to convey sounds to the ear; and, if too firmly, the respiratory movements of the patient are impeded. It should be steadily and evenly pressed, not to interfere with the costal motion, and not touched with the fingers;—a little experience makes this matter very simple. In exploring the upper regions of the chest, it is not sufficient to place the stethoscope upon one point only, as early tubercle may be very limited in position; every part in the infra-clavicular region should be listened to, and compared with the opposite side. I have found it a good plan to examine first the acromial extremity on one side, and then on the other,—afterwards the centres, and lastly the sternal end of each; for if these three parts be examined on the same side in succession, the peculiar character of any one is lost, before compared with its corresponding one on the opposite side. In the great majority of cases the acromial angle will give the earliest indication of disease.

* In children the interscapular region should be percussed, as it will often be found the only seat of dulness, owing to the frequency with which their bronchial glands become tubercular.

The changes in respiration caused by tubercle are various, and depend upon its extent and position, as well as on the physical state of the surrounding lung; but they may be all included under the following heads:—viz. weak, jerking, harsh, bronchial, expiration prolonged;—which will be spoken of separately.

Simple weakness, without any other alteration, is very often met with, and may be found over the whole apex, or only in spots: in the latter case, the intensity of breathing in the immediate neighbourhood is generally increased to compensate for the deficiency; and, in the former, the other lung frequently presents the respiration termed compensative or supplementary,—which is merely a highly-developed natural type, to make up for loss of energy on the other side. In some cases the weakness passes almost into the absence of respiratory murmur; but I have never yet met with a case of its total suppression,—that is to say, in which a sound more or less loud could not be heard during forced breathing. Where feebleness of respiration depends upon tubercle, it is singular to observe how progressively the sound increases in descending, until, towards the middle of the lung, it becomes similar to the other side. Weakness may be a healthy peculiarity, but as such, it is found precisely alike in all parts of the chest; therefore, unless this character is determined comparatively, no dependence can be placed upon it. When the breathing is naturally weak, slight changes are not easy of detection; but if by percussion and other general signs, suspicion be excited, it is useful to listen whilst the patient takes some deep inspirations, when a very manifest difference is often discovered. It is so difficult to make many persons understand how to breathe forcibly, that care must be taken that the same amount of effort be made whilst each side is examined: but by practice it is easy to tell from the movement of the stethoscope, whether the breathing is performed evenly.

Where, in suspicious cases, the respiration is equally feeble at both apices—the result of an equal amount of tubercle in both lungs (an unusual occurrence), I have formed a correct diagnosis from ascertaining that at the bases it was comparatively strong; recollecting the rule previously mentioned, of there being in health a somewhat greater intensity in the former than in the latter.

In jerking respiration, the inspiration, but little changed in intensity, instead of being uniformly developed, occurs in irregular puffs; whilst the expiration is scarcely affected. This is a very distinctive and common sign, and early in its appearance, often remaining for weeks or months, and generally followed by the harsh variety,—or, if the disease does not advance, gradually subsiding, or passing into the weak type.

It is not difficult to understand the cause of weak and jerking respiration: an impediment exists to the free expansion of the lung, which in the former is partially and gradually overcome, but in the latter only by intermitting efforts.

Harshness may be a quality added to either of the above, or occur as an independent variety: in the former case, no particular explanation is required, but in the latter, a frequent and important condition obtains.

Harsh respiration is known by being louder than that of health, and conveying to the ear a distinct idea of air passing over a rough surface: it is either limited in position, or diffused over the whole infra-clavicular region—the latter generally happening with the progress of tuberculization, and is at length superseded by the bronchial form. The harsh quality exists in every degree, from the simple loss of the smoothness peculiar to health, to its passage into indistinct and small crackling sounds; as it would seem, the commencement of rhonchi, characteristic of phthisis, which will be explained hereafter. Its intensity is variable, sometimes amounting to a sound positively blowing, at other times scarcely above the healthy standard: when once established, it is but too apt to increase, whilst the general symptoms betray a corresponding advance in disease: by proper treatment, however, it may often be arrested and lessened, although, when once fully established, I have never known it entirely lose its characteristic quality.

Alteration in the relative length of the two respiratory murmurs is generally owing to an increase in the expiration; but sometimes the inspiration is shortened, which gives to the other an appearance of prolongation. Whether the expiration be lengthened actually or relatively, it is equally a sign of disease; but a decrease is of no importance, since it may vary in duration from the usual standard, until it is quite inaudible. Prolongation of the expiratory murmur may exist separately, or be associated with the weak and harsh varieties: it is rarely much increased in length without being changed in intensity or quality; sometimes it is louder than in health, at others harsh, or bronchial. If one or more of such changes be limited to the ordinary seat of tubercle, they become valuable evidence of phthisis, and with the concurrence of other general and physical signs, leave no doubt as to the disease.

The cause of prolonged expiration may be explained, either by the mechanical obstacle to the exit of air afforded by the tubercular matter, or the diminished contractility of the pulmonary tissue; it is probable that both may act in combination: the inspiration may be at the same time shortened, by the decreased capacity, and imperfect expansion of the lung.

Bronchial respiration commences either from an almost imperceptible transition of the harsh variety, or a gradual extension of the bronchial quality of expiration into both murmurs: even in the former case the first change is often observed in the expiratory sound, and it may be a long period before the other becomes affected; but this is not an invariable rule, for occasionally the inspiration alone is bronchial, and remains so throughout.

The respiration is naturally bronchial in some parts of the chest, but elsewhere it can only become so from the conduction of sound from more or less deeply seated bronchi, by solidity of the lung. M. Fournet, a great authority in auscultation, has taken pains in explaining the distinction between the healthy and morbid kinds, but from the varying character of both, I have failed to discover the practical utility of his conclusions: when, however, the latter has been long established, it is easily recognized by its greater harshness, dryness, loudness, and tubular character. On this subject the following rules may be found useful:—

Bronchial respiration, however slight, where it does not occur naturally, is a sign of disease; if in, or near, those parts where it may do so, its value consists in the presence or otherwise of a corresponding condition on the opposite side, since the natural kind is never found on one side only, and the morbid rarely on both, or if so, not in the same degree. Whenever the respiration is bronchial over the ordinary seat of tubercle, it may be taken as presumptive evidence of phthisis; but it is far from being a constant attendant upon the first stage, as a considerable amount of pulmonary condensation is necessary to its production: when fully established it is generally permanent, until superseded by symptoms of breaking up of the lung; although, by proper treatment, its progress may be often stayed, and the amount considerably lessened.

The following table has been formed to show the relative frequency of the preceding conditions in 100 cases in the first stage:—

Respiration.

Weak.	Jerking.	Harsh.	Expiration prolonged.	Bronchial.	Harsh with Expir. prolonged.	Weak with Expir. prolonged.
33	12	7	16	10	5	17

It is important to recollect that these changes in the respiration are not, *per se*, a proof of phthisis, since they indicate merely disordered function of the lung, and are common to any alteration in its physical state, impeding the free entrance and exit of air. The lung may be thus influenced either by tubercles alone, from their number,—inflammatory consolidation, from their irritation,—idiopathic inflammation,—or mechanical obstacles in the air-passages.

Two circumstances will generally determine their dependence or not upon tubercular disease—viz. (1) position; (2) co-existence of other signs.

1. *Position.*—It is well known that tubercles, as a general rule, are first deposited in the superior lobes; in very rapid and acute cases they may be distributed equally throughout the lung, but in chronic cases the bases are seldom implicated, and then not until the disease is in an advanced stage: in 500 out-patients I have met with but four cases where the lower parts seemed chiefly affected, and only one instance of a tubercular cavity in the inferior lobe. They appear at first equally disposed either to occupy but one side, or to occur in one to a much greater amount than in the other: in 100 cases in the first stage, they were found, on the right side only, 27 times; on the left only, 51 times; and on both sides, 22 times.

Situation of Tubercle in 100 Cases of Early Phthisis.

Right Apex.	Left Apex.	Both Apices.	
		Equally.	Unequally.
27	51	8	14

If, therefore, the morbid respiration show a corresponding limitation, it is a valuable sign of phthisis; if, on the other hand, it occur in other situations, it is probably produced by other diseases, of which the following is a brief sketch.

The respiration is weak over the greater part of the chest whenever an obstacle exists to the free entrance of air into the pulmonary cells: it is harsh when the surface of the latter has lost its smoothness: hence, the first is met with in bronchitis and emphysema—in many nervous affections—whenever the calibre of the bronchi is changed by spasm, as in asthma, or the pressure of tumors; whilst the latter accompanies bronchitis, and emphysema (from attendant bronchitis).

Expiration may be prolonged in any region by a mechanical impediment to the exit of air, and by diminished elasticity of the lung itself; hence it is common in bronchitis from accumulated mucus, and in emphysema from permanent dilatation of the air-cells.

Jerking respiration may attend incipient pleurisy, and pleurodynia, when it is limited to the seat of disease, and is often heard in hysterical females over the entire chest.

Bronchial respiration may occur over any part of the lung, in dilatation of the bronchi, pleuritic effusion, and pulmonary consolidation.

To afford a more ready view of the value of position, the following table has been constructed, and for practical purposes will be found sufficiently accurate: it can only be founded upon extreme probability, as exceptions will arise under special circumstances:—

Respiration.

	Weak.	Jerking.	Harsh.	Expiration prolonged.	Bronchial.
Occurring in the upper part of one, or sometimes both lungs.	Tubercle. Pneumonia and Pleurisy (from tubercular irritation?)	Tubercle. Pleurisy (from tubercular irritation?)	Tubercle. Capillary Bronchitis (from tubercular irritation?)	Tubercle. Bronchitis (from tubercular irritation?)	Tubercle. Dilated Bronchi. Pneumonia (from tubercular irritation?)
Occurring in the chest generally, or in the lower part of one, or both lungs.	Emphysema. Pleurisy. Pneumonia. Asthma. Pleurodynia. Hysteria.	Emphysema. Pleurisy. Asthma. Hysteria.	Pneumonia. Bronchitis. Asthma.	Emphysema. Bronchitis. Asthma.	Pleurisy. Pneumonia. Dilated Bronchi.

2. *Co-existence of other signs.*—It would be unsafe to form an opinion in all cases upon position only, because an idiopathic inflammation may occupy the upper lobes, and the physical state of the lungs be thus rendered analogous to that produced by tubercle; although such an event is comparatively rare. Other signs, therefore, should be sought for—such as the form and mobility of the chest, and some yet to be considered: percussion and application of the hand should be practised, as they will remove any uncertainty as regards nearly all affections but pneumonia, which causes dulness of sound and increase of vocal fremitus. Lastly, in all cases, and especially where there is a doubt, the patient's general history should be taken into account, when it will rarely happen that we form an incorrect diagnosis.

LECTURE III.

The first stage (continued).—Description of rhonchi and other sounds resulting from morbid secretion, and altered physical state of the lung—their pathological classification, and division into direct and indirect signs of phthisis—the relative value and frequency of each—Importance of dry crackling rhonchus—Pulmonary crumpling sound examined.

The earliest indications of tubercular disease are chiefly connected with changes which have been already considered; but as the first stage advances, others are met with, consisting of sounds depending either upon the altered physical condition of the lung, or the presence of morbid secretion. I shall not enter minutely into the characters of all these; but, referring for detail to the various works on the subject, and particularly recommending clinical observation, I shall limit myself to their distinctive peculiarities, dwelling chiefly upon those most connected with phthisis.

1. Sounds depending upon morbid secretion:—

Dry.
- Sibilant rhonchus.
- Sonorous ,,
- Dry crackling ,,
- Crepitant ,,

Humid.
- Sub-crepitant rhonchus.
- Mucous ,,
- Humid crackling ,,
- Cavernulous ,,
- Cavernous ,,

2. Sounds depending upon altered physical state of the lung:—

Friction murmurs.
Pulmonary crumpling sound.

Sibilant and sonorous rhonchi are produced by mucus in the bronchial tubes, and differ from each other only in tone, the former being shrill, and the latter grave; the existence of one or the other is determined by the quality and quantity of the secretion, and the calibre of the tubes: they include every variety of intonation, from a shrill whistle to a deep snore; are usually very audible; accompany both murmurs, but especially the inspiratory; frequently disappear at one moment, to reappear the next; and can be altered by coughing.

Dry crackling rhonchi consist of a succession of clear and dry clicks; varying in number (generally from one to five); irregularly evolved; distinctly separated from each other; and chiefly, but not exclusively, heard during inspiration.

Crepitant rhonchus, which is essentially dry, although usually placed with the humid class,* is composed of a number of minute, clear, and crepitating sounds, precisely resembling each other; regularly and rapidly produced; and existing at first only with inspiration, but afterwards with both murmurs.

Sub-crepitant rhonchus conveys the idea of humidity; occurs chiefly in inspiration; and consists of a succession of dissimilar bubbles, changeable in number, and alterable by coughing.

Mucous rhonchus is much allied to the sub-crepitant, but differs from it in being of larger size, more distinctly bubbling, and more readily removed by coughing.

Humid crackling rhonchus agrees in all respects with the dry crackling, except in being of larger size, and distinctly humid.

Cavernulous and cavernous rhonchi are degrees of each other, and give to the ear an idea of hollowness,—the former of a small, the latter of a larger cavity: they are humid and bubbling; more or less metallic in sound; constantly change as the patient coughs; and attend both respiratory murmurs.

Friction sounds depend upon a morbid state of the pleural surface, and vary in character, but always convey a sense of rubbing: they are irregular in occurrence, and accompany either one or both murmurs, but more frequently the inspiratory.

Pulmonary crumpling sound, according to its discoverer, M. Fournet, sometimes resembles the noise of creaking leather; is occasionally a plaintive murmur, varying with the state of the patient, and the force of respiration, but most commonly imitates the peculiar sound produced by blowing upon tissue paper.

If these sounds be arranged according to their accompanying diseases, they would appear thus:—

* The mechanism of crepitant rhonchus is not well understood, but there seems no reason for retaining it amongst the humid class, even admitting that it proceeds from a moist and not a dry state of the lung. As well might sibilant and sonorous rhonchi be called *humid*, as the mucus producing them is certainly anything but *dry*. All sounds should be termed *dry*, or *humid*, with reference to the idea they convey to the ear, and not to their supposed origin.

Bronchitis.	Sibilant rhonchus.
	Sonorous ,,
	Sub-crepitant ,,
	Mucous ,,
Pneumonia.	Crepitant rhonchus.
	Sub-crepitant ,,
Pleurisy . .	Friction murmurs.
Phthisis.	Dry crackling rhonchus.
	Humid crackling ,,
	Sub-crepitant ,,
	Cavernulous ,,
	Cavernous ,,
	Crepitant ,,
	Pulmonary crumpling sound.
	Friction murmur.
Pulmonary congestion.	Sub-crepitant rhonchus.
	Mucous ,,
Dilated bronchi.	Cavernulous rhonchus.
	Cavernous ,,

In this arrangement the only sounds not occurring in two divisions are the varieties of crackling rhonchi, and the pulmonary crumpling: these are consequently *direct* signs of phthisis, trustworthy under any circumstances*; the rest become so only under certain conditions, such as position, and co-existing symptoms, and may be called *indirect*, as indicative of disease which may or may not be secondary to tubercular irritation.

The period during which tubercle seems to act merely mechanically, by impeding the proper function of the lung, varies considerably; in rapid cases inflammatory action takes place almost simultaneously with their deposition, but in the chronic form it may not happen for months or years, when the tubercles are said to be latent. When inflammation occurs, it is generally limited to the neighbourhood of the tubercular matter, but may extend more or less over the entire lung: in the former case its presence, as indirect evidence of phthisis, is highly valuable, and when according with the general symptoms, conclusive; but in the latter some uncertainty may prevail, although the history and progress of the case will generally lead to a right diagnosis.

I shall now describe in succession the relation of the preceding sounds to the first stage of phthisis: and first, of those which act *indirectly*.

Phthisical patients are very liable to general bronchitis, known by sibilant and sonorous rhonchi in most parts of the chest, whereby the respiration is masked, and the tubercular affection liable to be overlooked, especially as percussion here loses something of its value, because it is just possible that slight dulness may depend upon accumulated mucus: such cases should be examined as the inflammation declines, when some rhonchi will be found lingering about the upper part of the lungs;—exactly the contrary to what happens in idiopathic bronchitis. Sibilant and sonorous rhonchi, unless under such circumstances, are of little importance as evidence of early phthisis, because the local bronchitis resulting from the irritation of tubercles is seldom seated in the larger bronchial tubes.

Subcrepitant rhonchus, indicative of inflammation in the smaller bronchi (capillary bronchitis), is a valuable sign of tubercles, and, although more common after softening has commenced, may occur during any stage of the disease, particularly amongst the poor, and those most exposed to changes of temperature. Capillary bronchitis may be idiopathic, as well as secondary to tubercle; but the former invariably attacks both sides pretty equally, and begins at the base of the lungs, whilst the latter is strictly local, or occupies only the diseased side: hence comes the following practical rule,—subcrepitant rhonchi, either at the apex or base of one lung only, declare the presence of tubercles in that side; but when at both bases, or throughout both lungs, they point rather to an idiopathic inflammation: in the latter case, however, the conclusion is less certain than in the other, inasmuch as if tubercles exist to a tolerably equal extent at both apices, a similar result might happen. When capillary bronchitis attacks the base of a tuberculous lung, in most cases the upper lobe is likewise affected, and the inflammation may be heard extending from each point, until, by meeting towards the centre, the whole lung becomes filled with subcrepitant râles.

I have never heard a mucous rhonchus in the situation of tubercles before softening has commenced; unless it be the variety called "submucous," occurring in the smaller tubes, and hardly distinguishable from the sub-crepitant,* which may sometimes be met with after hæmoptysis has taken place, not only in the seat of the disease, but in distant parts of the lung,—when it is probably due to the presence of blood.

Crepitant rhonchus (fine crepitation)—the characteristic of pneumonia—is of rare occurrence with tubercular disease; simply because the local inflammation caused by tubercle is much more frequently of the smaller bronchi than the parenchyma of the lung, and when the latter is affected it would seem to be more often in a congestive than inflammatory state. In 400 out-patients examined at this hospital, I have not met with an unequivocal fine crepitation in the vicinity of tubercle—in other words,

* Although I believe this applies to all three, it does so perhaps with greater certainty to the two former, as M. Fournet mentions having found the latter in three patients not phthisical.

* MM. Barth and Roget include mucous and subcrepitant rhonchi under one description.

with tubercular pneumonia; but, without doubt, it occasionally exists: I can only speak practically of its rarity. Fine crepitation at the apex of either lung should always excite strong suspicion of phthisis; but since idiopathic pneumonia sometimes occupies the upper lobes, further evidence, and particularly the general history of the case, would be required to determine its real signification.

Friction murmurs are more commonly met with during the first stage than crepitant rhonchus—that is to say, local pleurisy is less rare than pneumonia: in the same number of cases I have discovered them about ten times; they were invariably of a creaking character, and very transient. It is singular that in every instance other symptoms were but indistinctly marked, which might lead to the inference that the tubercles were situated superficially, and the pleura consequently irritated, whilst the lung itself was but little implicated—circumstances naturally favourable both to the existence and detection of local pleurisy. Whenever an unequivocal friction murmur is limited to the apex of the lung, it becomes a valuable sign, and justifies the suspicion of pleurisy resulting from tubercular irritation.

The relation of cavernulous and cavernous rhonchi to phthisis will be considered hereafter, in treating of the third stage.

We now come to the varieties of crackling rhonchi—viz. dry and humid, which, unlike any of the preceding, are *direct* indications of phthisis, and never occur in any other disease. Fortunately there are none better named, more readily recognised, or more easily remembered; and although their mechanism is unexplained, they have been so universally found to co-exist with tubercles as to leave no doubt of their relation as cause and effect. The dry rhonchus belongs to the first stage, and the humid to the second; therefore, at present, I shall only dwell upon the former. This râle is never heard at the very commencement of the disease, but it is probable that there are few or no cases which do not present it for a shorter or longer time towards the latter part of the first stage. Its general origin may be thus stated:—after many weeks, or even months, of the earlier signs—such as diminished resonance, jerking, harsh, or weak respiration, one or two dry clicks are heard during inspiration, and about the same time the breathing becomes more impaired—either less complete, or bronchial, with prolonged expiration. One single click is enough for diagnosis, and upon such evidence alone I have often founded it; but two, three, or more are usually heard: at first they are only with inspiration, but as the case advances they may attend both murmurs, and in proportion to their abundance with the expiratory is the increase of the disease declared. I always regard dry crackling as an unfavourable sign, as it seems to indicate either the passage of tubercles from their state of latency, or a sudden increase in their number; for, when once established, it invariably remains, until superseded by the humid variety, or other moist rhonchi, and may be heard at every subsequent examination, if not in tranquil, at least in forced respiration. Its duration is variable: in some cases it is rapidly transformed, and in others remains many weeks; but I cannot remember having heard it in the same spot longer than three months.

Pulmonary crumpling,—said by its discoverer to occur in one-eighth of all cases of phthisis,—has had its very existence denied by subsequent writers. Having had unusual opportunities of examining early cases, I have particularly attended to this subject, and can, without hesitation, declare, that, whilst I am somewhat sceptical as to his first two varieties, I have no doubt of the third, although I believe he has overstated its frequency. I have often heard a rhonchus at the upper part of the chest of a dry plaintive character, much resembling the new leather friction sound, and have thought that to something of this kind were to be referred the first two varieties; but in all such instances there have always been sonorous or sibilant rhonchi in other parts of the lung, and the murmur has not only been absent at a subsequent examination, but disappeared at the time by coughing; hence, I have generally attributed it to their modification.

Of the third variety, resembling the sound of crumpling tissue paper, I have met with several instances. According to my experience, it occurs only at the apices of the lungs, distinctly conveying the idea of their expansion under difficulty; is most audible posteriorly in the supra-spinous regions; is limited to inspiration, and sometimes heard only during forced breathing; appears to accompany only the early stage, usually before other symptoms are much developed; remains but a short period (hence, perhaps, the infrequency of its detection); and is invariably succeeded either by harsh respiration, or dry crackling rhonchus. In consequence of the doubt attending it, I once called the attention of two Physicians, well practised in auscultation, to three well-marked examples, when they admitted that the sound was neither a friction murmur nor rhonchus, and that no title could convey a better idea of its character than that adopted by M. Fournet. From its rarity and short duration, it ranks not amongst the most important signs of phthisis; but, when distinctly ascertained, it may be regarded as pretty conclusive evidence of the disease.

LECTURE IV.

The first stage (concluded).— Bronchophony—its position and modifications in health—rules for ascertaining if morbid, and the value of the latter—Bronchial cough—Situation of the heart's sounds—their healthy limit; and employment in the detection of phthisis — Subclavian murmur— its usual cause; accidental production; and relation to tubercles—Recapitulation of the physical signs of the first stage.

The condition of vocal resonance communicated either to the ear placed directly on the chest, or through the stethoscope, whilst the patient is speaking (broncho-hony), is an additional sign of some value, but mainly so as confirmatory of the preceding, since it can scarcely exist to any degree as a morbid state, unaccompanied by other evidence of physical change in the lung. It is best ascertained by directing the person to count up to any given number, in a distinct and rather loud voice, twice over, during which, each side may be examined under similar circumstances.

Bronchophony is found naturally in some parts of the chest, assuming many varieties both in position and degree. In all persons it is heard, often very loudly, on the sternum, and in the interscapular region, over the larger bronchi, and with less intensity in the supra-clavicular spaces: in most persons it occurs as a distant and indistinct sound in all parts of the chest, being louder in the upper than the lower regions, and before than behind; very frequently it is more audible throughout the right than the left lung, but always so in the supra- and infra-clavicular regions. The character of the voice, and the thickness of the thoracic walls, have considerable influence in its modification: in many females, and frequently in young children, it is scarcely audible (unless over the bronchi), from weakness of voice; and the same often happens in males, from extreme muscular development; and from various combinations of such circumstances, the greatest variety is met with,—the only constant rule being, that when it exists, it is most audible beneath the right clavicle.

When it is the result of disease, one of two pathological conditions is declared—either a portion of the lung is consolidated, and the sound of the voice thereby better conducted to the surface, or a bronchial tube is considerably dilated. Although the latter is a comparatively rare affection, it is possible to lead to erroneous diagnosis, since percussion in both cases furnishes the same result—viz. more or less dulness*; but the history of the case, and the state of the patient, would in most instances declare the real nature of the disease.

Morbid bronchophony varies in intensity, and is sometimes so loud as to be positively painful to the ear, but in other respects it is not distinguishable from the natural type, and oftentimes can be called morbid only from its position. It is in the neighbourhood of the clavicles, and in the supra-spinous regions, that its importance lies in connection with phthisis: if found equally loud on the two sides, the left is probably morbid; if there be any excess on the left, it is undoubtedly so; but a greater amount on the right is unimportant, unless it be very considerable, when tubercular disease may be suspected. Bronchophony seldom appears until the first stage is somewhat advanced, and, in the great majority of instances, is accompanied with bronchial respiration: but this is not necessarily the case; for often it is distinctly marked when there is merely a slight dulness and resistance on percussion, and the respiration is weak or jerking. When once established, it will generally continue, but, under proper treatment, may sometimes be lessened; too frequently, however, it increases, and passes by insensible degrees into pectoriloquy, which, as a sign of the third stage, will be considered hereafter. On the whole, I consider bronchophony, compared with other physical signs, as of secondary importance, from the circumstance, that in health it is subject to great variation, and in disease is usually accompanied by evidence far less equivocal; but cases may sometimes occur in which it may be brought into use as a not unimportant auxiliary.

If a patient exhibiting bronchophony, instead of speaking, be directed to cough, a sound (bronchial cough), varying in intensity, and often most painfully loud, will be communicated to the ear. Similar remarks will apply to this as to the bronchial voice, or bronchophony, and, for the same reasons, its importance may be estimated at the same amount. I confess that I rarely employ this sign, simply because there are others more easily recognised, and less liable to variation; but when the case is obscure, and our diagnosis must depend rather upon the coincidence of a number of symptoms, than the unequivocal character of any one, its employment may be useful.

* In some instances of dilated bronchi, a clear sound attends percussion; but this is the exception.

The extent of the heart's sounds is another sign, and of some importance, as it may be used when others are ill-developed, and at an early period of the disease. The position in which they are heard in healthy individuals varies considerably, but, as a general rule, may be thus stated. In adults with well formed chests, they are distinct only immediately over the heart, but may be detected more or less over the greater part of the left side, particularly in the vicinity of the large vessels; but in the infra-clavicular region they are rarely sufficiently loud to interfere with the auscultation of respiration, and generally escape observation, unless particularly attended to. Over the whole of the right side, however, they are almost, if not quite, inaudible. In nervous persons, and particularly hysterical females, they are often audible over the whole chest, varying in loudness according to the distance from the heart. The same thing may occur to some extent in aged persons, and those whose thoracic walls are much emaciated. When the lung is consolidated, the sounds may be conveyed to any distant spot, and thus their occurrence in either infra-clavicular region, when inaudible in other parts equally distant from their seat of origin, is, under certain rules, presumptive evidence of phthisis. If heard at all on the right side, unless the heart be beating very strongly, suspicion should be excited, even if the other side be in the same condition. When there is any excess beneath the right clavicle, it is a pretty sure indication of tubercle, but a similar discovery under the left is of little importance, for, if unattended by other signs, it would probably be natural; whence it follows, that this sign is chiefly available in examining the right lung, being exactly contrary in this respect to vocal fremitus.

It is necessary to recollect that aneurismal and other tumors, and many diseases of the heart, cause an extension of the sounds, but these have their distinctive marks; the preceding observations applying only to cases in which the organs of circulation are known to be unaffected. I do not consider the heart's sounds so important as to declare the non-existence of tubercle by their absence, or even by their presence under apparently morbid circumstances, but unattended by other signs, to justify our pronouncing a patient phthisical; but, taken with other evidence, they may be often turned to useful account.

A murmur of the subclavian artery, generally of the soft and blowing kind, but sometimes rough or rasping, is enumerated amongst the signs of the first stage of phthisis, but is not of sufficient importance to merit much confidence. It is natural to suppose that any thickening of the pleura, or consolidation of the lung about its apex, might be so related to the subclavian artery, as to cause its compression to a slight amount, and give rise to a murmur; but I am disposed to think such an occurrence rarely takes place, and that when a murmur really exists, it is generally due to other causes.

Arterial and venous murmurs, independent of structural change in the heart or blood-vessels, are owing to anæmia, or that peculiar nervous and dyspeptic condition chiefly occurring in males, in which the larger arteries, and especially the abdominal aorta, are so influenced, as often to give rise to the suspicion of an aneurism. In all such cases a murmur may be heard on one side, without being discovered in the corresponding artery of the other side (although it is more commonly found in both); and when it is recollected how very numerous are such patients, it is manifest, that a murmur in either subclavian artery can have but little value in the diagnosis of phthisis. But when it is evident that a patient has been hitherto healthy and robust, and there is a subclavian murmur on one side, without any abnormal sound in any other part of the circulatory system, it would, to other signs of phthisis, form additional evidence; but such cases, I believe, will be rarely met with. Where, from the state of the system, there is a tendency to arterial and venous murmurs, one may be often made unintentionally, by pressing too firmly with the stethoscope,—a circumstance detracting much from their diagnostic value.

I have found a few cases of early phthisis, in which, whilst no murmur was audible during ordinary respiration, one became manifest by deep inspiration, and remained so until the lung was again contracted; which may have been produced by the indurated part coming in contact with the artery as the lung expanded; but having since met with the same phenomenon in persons quite free from tubercle, and believing, that great distension of a sound lung in an anæmic, or even a perfectly healthy person, might cause a murmur by producing slight pressure upon the artery, or changing its position, I am not disposed, as at first, to place much confidence in it.

Having now completed the consideration of the physical signs of the first stage, I may remark that every possible variety will be encountered in their association and sequence; one patient may afford sufficient proof of the disease chiefly on percussion; another, by the

character of respiration, or the presence of rhonchi; a third, by thoracic vibration and vocal resonance; and a fourth may have the whole of these combined. The amount and situation of the tubercles, the state of the patient, and the period of the stage, will, perhaps, account for such diversities.

I shall now briefly recapitulate, by an imaginary description of the examination of a patient in the first stage of the disease.

A person presents himself with some one or more of the general symptoms of consumption, but too obscure and equivocal to determine the real nature of his malady. Upon examining his chest, it is possible that one side may be found slightly bulged beneath the clavicle; but more probable, either that there is no visible difference in the two sides, or that one is somewhat more depressed than the other,—in other words, that one clavicle appears to stand out more than its fellow. Either of these excites suspicion, but is not sufficiently important to justify any conclusion, and we proceed further. We watch the ordinary movements of the chest, and direct the patient to take a full inspiration, when, perhaps, the upper regions of the two sides are not equally expanded, and if the diminution correspond with the preceding sign, there is reason to suspect phthisis; but as it will generally happen that no very evident difference is discoverable, we proceed onwards in the examination. Upon the suspected part we place the hand lightly, whilst the patient speaks, when there may be an increase of vocal fremitus;—or we ascertain whether the heart's sounds are unduly conducted to that point, recollecting that the former is chiefly applicable to the left side, and the latter to the right;—or we listen for a murmur in the subclavian artery, taking care not to place too much reliance upon its discovery. We then percuss, and find more or less dulness and resistance above, upon, or beneath the clavicle, or in the supra-spinous region. It may be that we have now the first indication of the disease, most of the preceding signs having been deficient; but should ordinary percussion be somewhat doubtful in its results, we order the patient to take a deep breath, and percuss whilst he is holding it, when a difference is perhaps more readily detected.

The stethoscope now comes to our assistance to determine the value of the previous evidence: the respiration is found weak or jerking; the expiration is prolonged beyond its healthy limits; or perhaps the case is sufficiently advanced to render it harsh, or even bronchial. It is possible that we now discover the pulmonary crumpling sound, but its absence is unimportant; and very likely there are a few dry crackling rhonchi. If it should happen that our patient is suffering from bronchitis of the larger tubes, we must not be too hasty in arriving at a conclusion; but if the smaller bronchi only are implicated, we shall find subcrepitant rhonchi either all over the suspected side, or chiefly seated in the upper lobe. A friction murmur may perhaps be heard at the apex; and it is just possible, even the fine crepitation of pneumonia. If further proof be desirable, from the absence of some of the preceding, we direct the patient to speak or cough whilst the stethoscope is applied, when bronchophony or bronchial cough may be present.—And thus have we arrived at the positive conclusion that our patient is in the first stage of tubercular disease.

In the next lecture I hope to include all the physical signs of the second stage.

LECTURE V.

The second stage—Signs indicating a general advance of the disease—Humid crackling, subcrepitant, and mucous rhonchi—metallic mucous rhonchus—Combination of the first with the second stage.

An acquaintance with the physical signs denoting the commencement of tubercular softening, is of great importance in relation to prognosis, because, under proper treatment and favourable circumstances, it may often happen that the first stage will extend over months or years, producing, perhaps, but little effect upon the health and enjoyment of the patient; but so soon as softening begins, the disease commonly progresses in an enormously increased ratio, and medical treatment becomes of diminished usefulness.

Although, about this time, the general symptoms will declare a considerable advance in the malady, there is nothing about them to point out, with any degree of certainty, even to the most practised observer, the real state of the lungs,—a circumstance showing at once the high value of physical examination.

Of the great majority of signs attending the second stage, little more will be requisite than a brief enumeration, since they consist merely of a greater and more unequivocal development of those already explained as belonging to an earlier period,—the result of an increased amount of tubercular deposit, which for the most part immediately precedes and accompanies the softening process. In the present lecture, therefore, I need only dwell upon those signs peculiar to the changed condition of the tubercular matter; and this will occupy but a short time, as they are fortunately equally simple as important.

A patient in the second stage will generally have the infra-clavicular region of one side visibly flattened, and less capable of expansion during ordinary and forced breathing, than the other. If the hand be applied to that part, both vocal and tussive fremitus will be found increased; and, on percussion, it will exhibit more distinctly than formerly, both dulness and resistance. The respiration will probably possess some of the morbid characters already described,—most frequently it is harsh or bronchial. The sounds of the heart are now often heard unnaturally on the diseased side; bronchophony and bronchial cough are much more developed; and the pulmonary crumpling, if it has existed, ceases to be heard. Such a catalogue of symptoms is given merely as an illustration of what may be expected, to a greater or less degree, in the majority of cases. Great variety will be observed in their association, and none of them can be regarded as any proof of the tubercles having softened. I sometimes meet with patients unquestionably in the second stage, exhibiting them so slightly, that were it not for other indications, they might hardly be suspected of being tubercular, or, at most, only in the commencement of the disease; whilst, on the other hand, it is as common to encounter others, in whom these deviations from health are sufficiently evident to lead to the suspicion of a much more advanced period. There is at this time a greater probability than formerly of the occurrence of the disease on both sides,—but this will rarely take place to an equal extent; if one side be previously unaffected, it will often now begin to exhibit symptoms of becoming tubercular.

It should always be recollected that there is no distinct line of separation between any of the stages of phthisis, the first gliding insensibly into the second, and the second into the last; that the difference between them is only one of degree, in all respects except the altered state of the tubercles; and that all signs not directly depending upon the latter, may consequently be met with, at any period of its duration.

Fortunately, there is nothing in the whole practice of auscultation more easy than to detect the very beginning of the softening process; the dry crackling rhonchus has simply to become humid, and the evidence is complete: a number of bubbling subcrepitant, or large mucous rales, have but to occupy the diseased part, and the transformation becomes more than probable.

A knowledge of the humid crackling rhonchus is therefore of the greatest importance, but is easily acquired, as it resembles the dry one, in all respects than its moistness, having the same characteristic click. They are found to pass gradually into each other, and every intervening state, from the perfect dryness of the one, to the well-marked humidity of the other, is constantly heard; so that it is sometimes difficult to determine to which the sound should be referred. It is impossible, however, to doubt its tubercular origin; and any deviation from positive dryness, justifies the conclusion that transformation has begun.

On the first appearance of the liquid rhonchi, they seldom exceed the others in frequency, but with the advance of the case, they become much more numerous, and, at the same time, more frequent with expiration,—more distinctly liquid and bubbling,—until at length they acquire a somewhat metallic quality, and pass into others distinctive of the last stage; these changes being as gradual as in the former case. Nothing is more variable than the period of their duration, but it may be said to be decidedly shorter than that of the dry variety. The mode of their production is not thoroughly understood, but for all practical purposes this is not important: it is sufficient to know that a humid crackling rhonchus, under all circumstances, tells of softening tubercle.

The value of this sound is well shown by the case now before us. Here is a patient whose chest is, to all appearance, scarcely changed from what may be taken as its healthy form; there is, however, a slight falling in, beneath the right clavicle, extending downwards for three inches, but it requires careful measuring to detect it; and on deep inspiration the movement of the whole right side is manifestly less than the other. Percussion announces slight hardness and resistance over the entire infra-clavicular region, but not to any great amount: as we descend, dulness is more evident, until at the base the sound is absolutely dull and flat. The respiration at the apex is weaker and harsher than on the opposite side; at the base it is entirely absent, unless on forced inspiration, when it is strongly bronchial. With such signs, there can be no doubt of the lung being greatly consolidated, but principally at its lower part, which would lead to the idea rather of pneumonia than phthisis. The general history points somewhat to the latter, but no definite conclusion can be formed without further evidence. At the very base posteriorly, there are two or three humid crackling rhonchi with every inspiration; and from these alone I have no hesitation in deciding the case to be one of phthisis in the second stage, showing itself principally in the lower lobe—a very unusual occurrence.*

When softening begins, and during the whole of the second stage, patients are more than ever liable to inflammation in the neighbouring parts of the lung. It is not often that the parenchyma itself is attacked, hence the fine crepitation of pneumonia is seldom heard; but, perhaps, at this period it may be expected more frequently than formerly. The pleura is occasionally the seat of secondary inflammation, and friction sounds are sometimes met with. The larger bronchi are somewhat more predisposed than formerly to inflammatory attacks; sonorous and sibilant rhonchi are consequently not uncommon attendants; but they merely announce the presence of bronchitis, and are usually heard over the whole chest. The smaller bronchi are very often implicated; and subcrepitant rhonchus is a very frequent accompaniment to the second stage.

This râle may be found in the apex only, or scattered throughout the whole of the diseased lung; in either case there can be little doubt of the presence of phthisis, the only difficulty lies in determining the stage. If the subcrepitant rhonchi be limited to the apex there is the greater probability of it being the second stage, because, unless in very acute cases, softening hardly ever goes on at the same time in different parts of the lung. I believe, however, that the character of the rhonchi will be sufficient generally to decide the question, as I have invariably found them, when resulting from the breaking up of tubercle, more bubbling and abundant, and of larger size, than when depending either upon an idiopathic inflammation, or one arising from tubercular irritation. But it may sometimes happen, from the varying size and loudness of the râles, that there is much uncertainty in any conclusion: and here we must be satisfied with naming the disease, without speculating as to its stage; or we may be guided by the extent of other physical signs, and the patient's general history. Should there be, as sometimes happens, a few crackling rhonchi intermixed, their dryness or otherwise would decide the matter.

Mucous rhonchus (of the larger kind, and not that in the minute tubes, which, as already stated, is scarcely separable from the subcrepitant) is not an unfrequent attendant upon the second stage, and is distinguished from the other two by its greater size, inferior frequency, and the idea of adhesiveness it communicates to the ear: it may occur either separately or in union with the others. When alone it would not justify the positive decision that tubercles were breaking up, as it might depend either upon an attack of bronchitis, or (if hæmoptysis had happened), the presence of blood in some of the larger bronchial tubes; but whenever it is strictly limited to the ordinary seat of tubercle, and all other symptoms indicate an advanced period of phthisis, it may be taken as presumptive evidence that softening has commenced.

Humid crackling—the large and moist subcrepitant—and the larger kind of mucous rhonchi, therefore, are signs announcing the second stage, but they differ in their value. The first is positive and unequivocal, never occurring under any other circumstance; the second and third are of less importance, since they require, like other indirect signs, considerations similar to those spoken of in a previous lecture—viz. their position and the co-existence of other signs, to determine their signification. Either of them may occur alone, or be so intermixed with each other, as to make their distinction impossible. With regard to their comparative frequency, the humid crackling by itself is the most common; next to this, is its combination with the sub-crepitant; but the latter is often found alone, or in conjunction with the mucous;—great variety in this respect constantly takes place.

There is a variety of mucous rhonchus with a clear metallic note, very liquid and bubbling, which, although difficult to describe, is so peculiar as to render its recognition, after having once been heard, a very easy matter. I have reason to believe that the humid crackling rhonchus generally passes into it, and that the others sometimes do the same: it pronounces with great certainty that the second stage is much advanced, and not far distant from the third. When once established, I have invariably found it permanent, until, by gradually increasing, it has become lost in rhonchi characterising the last stage, or, if the secretion has diminished, it has been succeeded by cavernous respiration. I have long regarded this sound as the sure forerunner of tuberculous excavations, and have too often been able to verify the accuracy of the conclusion.

The part where softening first shows itself, will generally be found to be that in which there were the earliest signs of crude tubercle; and, if the lung be now examined, those parts where there was formerly no appreciable deviation from the healthy conditions, will exhibit more or less evidence of incipient tuberculosis. It appears that there is at this time a tendency to the rapid deposition of tubercle,—the effect of some further reduction in the resisting powers of the patient, under which, those tubercles which are the oldest undergo transformation.

It often happens that we can observe upon the same patient the blending of the two stages, and, at the same time, the distinctive marks of each. There is, perhaps, a mucous rhonchus of the clear metallic variety at the very apex; surrounding and beneath it, a humid crackling, sub-crepitant, or mucous one; and still lower down, a few dry clicks. The percussion sound will probably show a corresponding gradation,—the dulness which was greatest at the summit decreasing gradually in descending, until it becomes lost in the clear sound over the yet unaffected basis. The respiration is perhaps equally changed, being bronchial where the sound was the dullest; harsh, weak, or jerking, lower down; until in the inferior parts it is found healthy; or, if altered, either weaker than on the opposite side, or slightly exaggerated, according to the state of the other lung.

Great variety in the grouping both of the direct and indirect signs of the second stage will of course be met with: fortunately, however, a few only are absolutely necessary to diagnosis; and, whilst the passage of the first into the second stage is of such importance in connection with prognosis, happily there is nothing more easy than to detect it by auscultation.

Having now included all that is important in this division of the subject, I hope at our next meeting, to complete the physical examination of phthisis, with a general description of the signs peculiar to the last stage.

* Subsequent events have proved the correctness of this conclusion: the patient is now attending the hospital with undoubted signs of a large cavity, where the humid crackling rhonchus formerly existed.

LECTURE VI.

The third stage—Changes in form and resonance of the chest—Signs of small cavities; cavernulous rhonchus—Signs of large cavities; percussion sounds; their variety; amphoric resonance; cracked-pot sound; circumstances necessary to their production—Character of cavernous respiration; its distinction from bronchial—Amphoric respiration—Whether the size of cavities can be ascertained—Distinction between vomicæ and dilated bronchi—Cavernous rhonchus; sonorous rhonchus; friction murmurs—Metallic tinkling in large cavities; its rarity—Pectoriloquy; its relation to bronchophony—Cavernous cough—Amphoric voice and cough—Distinction between large vomicæ and pneumo-thorax—Acute phthisis—Conclusion.

The third stage of phthisis, or that in which cavities exist in the lungs, is in general very easily recognized by physical examination.

Although as a general rule, at this period of the disease, the symptoms are so conspicuous as scarcely to leave a doubt as to the pathological condition, it is not very uncommon to find patients with large vomicæ, whose appearance is so deceptive, that without the stethoscope, the existence even of phthisis might not be suspected. Such cases, after a long combat with the disease, generally terminate suddenly and unexpectedly: hence, a familiarity with the physical signs of pulmonary excavations becomes of equal importance with those of the earlier stages.

There is no positive line of separation between the second and third stages; one passes imperceptibly into the other, and cases often occur in which it is difficult to decide between the two; but so soon as there is proof of the smallest excavation, the latter is said to have commenced.

It is unnecessary to describe minutely all the signs of the last stage, because the majority consist merely in an increase of those met with in the second. In most instances there is an evident falling inwards of the supra- and infra-clavicular regions, giving an appearance of prominence to the clavicle; on measuring the antero-posterior diameter, the difference between the two sides is very apparent, and on deep inspiration the movement of that part of the chest, and often of the whole side, is considerably diminished, and sometimes imperceptible: on percussion the sound is usually dull and flat, and the resistance of the thoracic walls strongly marked: the vocal and tussive fremitus are likewise increased.

Inspection, mensuration, and percussion (except over very large cavities, which will be mentioned presently), cannot do more than announce an advanced period of the disease, and it remains for auscultation to decide the actual stage.

For the sake of convenience I shall describe the stethoscopic signs of small and large cavities separately, wishing it, however, to be understood, that the main difference between them consists only in degree, and that every intervening state will be constantly discovered.

Where the cavities are small.—I have already said that the humid crackling, mucous, and subcrepitant rhonchi pass into one nearly allied to the mucous, but essentially metallic in its quality: when this is fully established the commencement of very minute cavities may be safely diagnosed. If a patient in this condition be examined from time to time, the rhonchus will be found more and more characteristic, until, by increasing in size and humidity, it at length becomes decidedly cavernulous.

The true cavernulous rhonchus is a clear, bubbling, and metallic sound, taking place both with inspiration and expiration, but especially the former; varying in loudness and frequency according to the amount of secretion; and giving to the ear the impression of being produced in a small and hollow space: it is easily recognised, and declares unequivocally the establishment of the final stage. The respiration at this time is usually more or less bronchial; sometimes merely harsh; but often distinguished with difficulty, from being masked by the rhonchi. I have observed that the heart's sounds, especially the second, now become more than ever distinct on the diseased side, which although not amongst the positive signs of excavations, may be sometimes recollected with advantage. Bronchophony is now more positive than formerly, and oftentimes so loud, as to be painful to the auscultator,—the result of increased conducting power of the lung, with emaciation of the thoracic walls.

Where the cavities are large.—When vomicæ are of some size, there arise a new set of signs, not yet mentioned, and with

which it is highly necessary, but happily equally easy, to be familiar: they consist of still further modifications in the percussion sound, the respiration, the rhonchi, and vocal resonance,—all of which I shall explain separately.

Every variety of sound, from absolute dulness to what is termed amphoric resonance, may attend percussion over a cavity, according to its size, position, and the state of the surrounding parts: the force employed also makes a considerable difference, since, if if gentle, it will proceed from the superficial, and, if hard, from the deeper parts. Positive dulness of sound, with perfect inelasticity of the thoracic wall, is by far the most common. Not unfrequently, however, the sound is so little altered from that of health, owing probably to the morbid clearness of the cavity balancing the dulness of the neighbouring induration, that it is not very easy, without other evidence, even to ascertain which side is diseased. Amphoric resonance is heard only over large cavities seated close to the surface, or separated from it by indurated lung, and in the latter case requires rather strong percussion for its production: it is very characteristic, and exactly imitated by filliping the cheek when the mouth is inflated. When the percussion sound is more or less amphoric, it frequently happens that by directing the patient to keep his mouth open whilst the chest is struck somewhat smartly, a new character is developed, so peculiar, as to decide at once the history of the case,—I allude to the cracked-pot sound, first described by Laennec under the name of "bruit de pot fêlé." It is impossible by description to do justice to its peculiarity; but this is well expressed by its own designation, as it exactly resembles the noise produced by striking an empty and cracked pipkin. It seems necessary to its development that the cavity should be large, tolerably dry, and communicating freely with the bronchi; and that the mouth should be widely open. In no case have I heard it clearly marked in the absence of the last condition. Such a combination, however, does not invariably produce the cracked-pot sound, for reasons, perhaps, difficult of explanation; and if I were to hazard an opinion as to its frequency, I should say, that it may be met with in about one-third of such cases. On the whole, percussion is a capricious guide to vomicæ;—more frequently affording no evidence of their presence; sometimes calculating to mislead even as to the nature of the disease; but occasionally announcing them in the most unequivocal manner.

By the respiration alone, cavities of tolerable size may generally be detected, from the air in passing through them giving rise to a sound which is properly termed cavernous, easily distinguished by its hollow and metallic character, and at once telling of its production in an empty space.

Cavernous respiration often has its origin in a gradual increase of the bronchial type—the one passing into the other—but it may succeed any other morbid variety, or begin in spots, where, during the second stage, scarcely any respiration could be heard. Intense bronchial respiration is very closely allied to cavernous, and from a confusion of the two by inexperienced auscultators, I have seen patients unnecessarily alarmed, and most undeserved discredit thrown upon the stethoscope. They may be distinguished by the bronchial giving rise to the idea of its originating in a dry tube, whilst the cavernous seems to be produced in a hollow space, and is distinctly metallic; but it must be confessed that cases now and then occur, in which the most experienced have some difficulty in deciding between them.

Where the cavity is of very great extent, and tolerably free from secretion, the respiration undergoes another change, and is said to be amphoric,—a quality easily recognised by its resemblance to the sound caused by blowing into an empty bottle.

Amphoric respiration is generally, but not invariably, attended by amphoric resonance on percussion, and, like the latter, requires for its development, that the cavity should be large, and situated near the surface. There is in reality no line of separation between cavernous and amphoric breathing; the one merges into the other.

It is a question of some interest, whether we can form a tolerably correct estimate of the size of a cavity, from the quality of the respiration. To a certain extent I believe it to be possible, by its loudness, tone, and extent; but where there is much surrounding consolidation, we may easily be misled by the sound becoming more diffused. After a little experience, however, it becomes in a great measure the suggestor of its place of origin; but to prescribe rules for such distinctions, would be utterly vain. How *small* a cavity may cause cavernous respiration, is a point upon which I am not quite decided,—much must of course depend upon its position,—but I have several times seen one diagnosed, which after death was found scarcely larger than a hazel-nut: although I believe that vomicæ of this size will more generally pass unobserved.

Cavities free from secretion, even of considerable size, may sometimes escape detection, if only one examination be depended upon, owing to the absence of cavernous respiration, either from the closure of bronchi communicating with them by secreted matter, or a temporary cessation of breathing in the diseased part of the lung, apparently for the purpose of affording it a short

respite from duty;* accordingly, whenever other physical signs, and the general symptoms and duration of the disease, indicate an advanced period of phthisis, it is prudent not to declare the absence of cavities in consequence of not detecting cavernous respiration, until after a second, or even a third examination.

The only condition at all likely to be mistaken for vomicæ, from the evidence of cavernous respiration, is extreme dilatation of the bronchial tubes—a very rare disease, more common in the centre than at the apex of the lung, and in its attendant symptoms so different from the last stage of phthisis, as scarcely to justify the one being ever mistaken for the other. Cavernous respiration is dry or humid, according to the absence or otherwise of secretion in the cavity, and in the latter case is associated with, and even frequently masked by, a very characteristic rhonchus termed cavernous, or, from another of its properties, gurgling.

Cavernous rhonchus has many varieties, according to the amount and consistence of the secretion, and the size of the cavity: sometimes it resembles the bursting of large bubbles, at others, the agitation of some thick and viscid substance in contact with air, but in all instances it conveys the idea of metallic hollowness, and can scarcely fail, even to the most inexperienced, to tell at once of the seat of its production. It varies in tone, and is sometimes heard by the patients themselves, who are thus enabled to point out the exact situation of the cavity; and not unfrequently it is loud enough to be distinguished at some distance from the patient's chest. Persons with cavities will sometimes describe a sensation like the ticking of a clock, and if the stethoscope be applied, an indistinct impulse is communicated to the ear, apparently produced by the agitation of fluid by the heart's action.

Sonorous rhonchus is now and then heard within, or in the neighbourhood of large cavities, either separately or mixed with gurgling, but, unless in the latter case, is a sign unworthy of dependence, since it might result merely from inflammation lingering in the larger bronchial tubes, at the upper part of the lung, from tubercular irritation.

Pleural friction murmurs, generally of the creaking variety, are occasionally heard over vomicæ, but are of course valueless, as regards their diagnosis, because they may happen at any period; but during the whole of the third stage the patient is more than ever liable to secondary pleurisy in distant parts: hence friction sounds of various kinds are frequently met with where pain is complained of.

When amphoric resonance, or the cracked-pot percussion-sound, or amphoric respiration, announce a very large cavity, gurgling rhonchus will seldom be heard, except perhaps at the very bottom, but a new sound may be developed by any effort of the patient, such as coughing, speaking, or breathing loudly, and sometimes without it—termed metallic tinkling.

It would be useless to enter into the many speculations as to the cause of this phenomenon; it will suffice to state that the sound exactly resembles the falling of a sharp metallic substance into a glass or metal jar;—sometimes reverberating and giving rise to what has been called metallic echo; and that it declares the existence of a hollow space filled with air, and containing a fluid. I regard it as a very rare attendant upon tuberculous cavities, never having met with it in the numerous cases I have examined: in hydro-pneumothorax it is very common, and the anatomical analogy between the two diseases would lead to the supposition of the former occasionally giving rise to it; I can only affirm that it seldom does so.

The last sign to be considered is pectoriloquy, which is a yet further modification of vocal resonance, and bears the same relation to bronchophony as cavernous respiration does to bronchial, and cavernous rhonchus to the crackling varieties. Pectoriloquy signifies the cavernous voice, and if, instead of speaking, the patient cough, the tussive resonance will be similarly modified (cavernous cough). In pectoriloquy the sound is more circumscribed than in bronchophony, the words are more articulate, and seem produced within the stethoscope, and close to the ear. Very often, although there is abundant proof of a cavity, there is but little pectoriloquy, or it is hardly separable from bronchophony, which may arise from a want of certain circumstances indispensable to the production of the former—viz. a moderate size, emptiness, and closeness to the surface, of the vomica. The loudness of the voice has but little influence in its production; but if the patient be directed to whisper, it becomes more distinctive (whispering pectoriloquy).

Of all the signs of pulmonary excavations, I believe pectoriloquy is the least to be depended upon; because, in the first place, it is not very often met with in a perfect form; and, in the next, many healthy persons, with thin chests and peculiar intonation of voice, have what may really be termed a natural pectoriloquy. I have especially observed this amongst French persons, and attributed it to the peculiar tone of their

* I have often observed the sudden loss of cavernous respiration, and its subsequent return, when there was an entire absence of secretion: the above offers the best explanation, and may easily happen, by the remaining portion of the lung increasing its activity.

language; and it was in the French hospitals that I first began to distrust pectoriloquy. I confess that I am now seldom in the habit of employing it in diagnosis, both for these reasons and because other signs are generally sufficient, although I admit, that when well marked, it is very characteristic: whenever I desire its assistance, I invariably listen for "whispering pectoriloquy."

The tussive resonance in cavities (cavernous cough) is of the same value as the vocal, and for the same reasons, but when well developed is perhaps even more characteristic. It is a ringing and metallic sound apparently produced close to the ear, often of sufficient intensity to cause a very painful sensation to the auscultator, and requires for its production the same conditions as pectoriloquy.

When the cavity is of very large size, and under circumstances favourable to the production both of the amphoric sound on percussion and amphoric respiration, the resonance of the voice and cough is attended with still further modification. When the patient speaks, the voice (amphoric voice), instead of being close to the ear and articulate, as in pectoriloquy, has more the character of bronchophony, but is hollow and metallic, and resembles the sound produced by speaking into an empty vessel. Precisely the same quality of sound attends coughing (amphoric cough), and the two will generally be found together. On the whole, I believe the amphoric voice and cough are of more value than the cavernous, being more peculiar—impossible of imitation in any healthy condition—and, under favourable circumstances, more constant in occurrence. There are but two pathological states which can produce these amphoric sounds—viz. large vomicæ and pneumothorax; but with the aid of other signs, and the history of the case, one can rarely be mistaken for the other; for whilst the former is nearly always at the upper part of the lung, and of comparatively limited extent, the latter exhibits itself over the greater part, if not the whole, of one side: the sudden invasion and severity of the attack would also suggest the idea of pneumo-thorax, by contrasting strongly with the chronic course of a large vomica.

I shall say but little on that form of phthisis which is termed acute, as it differs from the other chiefly in severity and duration, and the physical signs must undergo a corresponding modification. I have lately seen a person previously in good health suddenly attacked with this fatal malady, and dead within between six and seven weeks. Such cases, however, are happily very rare, and I can say but little of them from personal observation, but I should expect them to exhibit most of the phenomena, and the same transformation of rhonchi, as the chronic form, and these not limited to the apices, but more or less diffused throughout the lungs, and associated with considerable secondary bronchitis. The case just alluded to may serve as an example of what we should anticipate. The appearance of the chest was unchanged; diminished resonance, with bronchophony, were found nearly everywhere; there were dry and humid crackling rhonchi at both apices, almost from the beginning, and abundant subcrepitant râles throughout the lungs; and the patient sank from asphyxia and exhaustion, without any symptoms of cavities, apparently from general tuberculosis and rapid softening. Such cases might be easily mistaken; but if there be any means of detecting their nature, it can only be looked for in the practice of auscultation.

Having now brought my subject to a close, I have only to beg of you not to be alarmed at its apparent complexity, but to believe that it is as easily mastered as any other of equal importance; and, whilst I thank you for the attention you have given, I have only to lament that it has not been more worthily bestowed. The leading points I have discussed do not of course look to me for their parentage, but are collected from various authorities, and generally recognised. I have merely been showing their applicability to practical purposes, and venturing to praise or dispraise, omit or modify them, in accordance with my own observations made under the very favourable circumstances afforded by this excellent Charity; and if it has appeared that I have offered opinions in opposition to those of others far more experienced than myself, I can only tender them my respect, and fall back upon the consciousness of having stated nothing which I do not fully believe, and have not myself observed.

[During the progress of these lectures, the various points under discussion were practically illustrated upon the hospital patients.]

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ON THE NATURE, CAUSE, AND PREVENTION OF SCURVY.

By ALFRED B. GARROD, M.D.,

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FROM THE MONTHLY JOURNAL OF MEDICAL SCIENCE, JANUARY 1848.

HAVING for many years paid considerable attention to the application of chemistry in the investigation of disease, the subject of scurvy has frequently presented itself to my mind; and, as there is but little doubt that the disease arises from some alteration in the animal fluids and solids from error of diet, I have always considered that it was in the power of chemistry to unravel the mystery. During the early part of the present year, many cases came under my care at University College Hospital: this led me again to pay particular attention to the subject, and to examine the peculiarities of the food, and other causes, which could have produced the disease at that time; for until then I had scarcely seen a case of scurvy in London.

It is not my intention to detail the symptoms which presented themselves in my scorbutic patients. I have however noticed, that the solid effusions in the ankles, with petechiæ and discoloration of the lower extremities, have, in several cases, preceded the spongy condition of the gums; there has also been the sallow skin, great muscular weakness, with rheumatic pains; but these have been so recently and ably described in *The Monthly Journal* by Drs Christison, Ritchie, Lonsdale, &c., and in many other recent periodicals, that it is unnecessary to recapitulate them.

Causes of Scurvy.—From the different writers on scurvy it appears, that although impure air, cold, moisture, age, and condition of

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habit, may favour the occurrence of this disease; yet no one of them can be regarded as the real cause, which must be sought for in the nature of the food. This is fully proved in the writings of Lind, Trotter, Budd, Christison, Curran, Ritchie, &c. It appears also, that it is due to the *absence* of some essential ingredient in the food, and not from the *presence* of any noxious substance; for the use of salt in large quantities is certainly not a cause, many of the most severe cases of disease having occurred where no such diet had been used, and sea water has never been found to aggravate the symptoms of the sufferers. The causes of the disease are thus reduced to one of the two following, viz.:—

1*st*, To the absence or deficiency of some *organic* substance in the food.

2*d*, To the absence or deficiency of some *inorganic* constituent.

There are many facts to support the opinion, that it is some organic constituent that is deficient in the food, and this is usually believed to be of an acid nature; for it is generally found that scurvy has appeared when there has been a want of succulent vegetables, and that the disease is easily cured whenever they can be supplied in abundance: these succulent vegetables mostly contain some organic acid. It has also been found that fruits, from the order Aurantiaceæ, containing much of such acids, are highly anti-scorbutic. But there are many objections to this view; for although fruits and vegetables containing these acids are exceedingly useful, yet the acids themselves, when separated, are not so, and I am informed, on good authority, that citric acid has been used and found not to be anti-scorbutic; the same remark applies to acetic acid. Again, carnivorous animals live entirely on meat without suffering from such disease, and infants will sometimes live for eighteen months on milk and not show any scorbutic symptoms. Milk is also found to act as an excellent remedy in scurvy, although, when fresh, it contains no organic acid. These facts are therefore sufficient to show, that it is not to the absence or deficiency of organic acids in the food that scurvy is due.

Dr Christison thinks that the main peculiarity in scorbutic diet is the deficiency in the quantity of animal nitrogenized principles, and that this may be effectually counteracted by milk, and other nitrogenized articles of food from the animal world. He also thinks that potatoes may owe their anti-scorbutic properties to the albumen contained in them; but if we only examine the diets under which some patients become scorbutic, and others under which they remain in a healthy condition, we must be at once convinced that it is not from the want of nitrogenized principles that the disease arises; for we observe in the diet of sailors who become scorbutic, abundance of these principles, and in many of our union workhouse and prison dietaries, they are very much reduced in quantity; yet no such disease arises when a few pounds of potatoes are added per week, although the amount of albuminous matters contained in them is far

from sufficient to make the total quantity of such principles equal to that found in many scorbutic diets. Again, if this theory were true, why should so very small an amount of fruits, and succulent vegetables, act in so surprising a manner in curing the disease?

Some have supposed that vegetable acids are not required, but that there exists a *something* in fresh vegetables which acts by a kind of catalytic power, and which is necessary to cause certain changes to take place in the body by its presence; but as there is no proof of such an hypothesis, we will not stop to consider it.

We have not, then, found that the absence or deficiency of any organic constituent of the food can be proved to be the real cause of scurvy.

The analyses of blood hitherto made, have not thrown any light on the cause or nature of this disease. Recent examinations have shown that the blood is not in a dissolved state as was formerly supposed, but that the globules are normal in appearance, and the clot firm, and frequently buffed and cupped. The fibrin has been found in excess by Busk, Becquerel and Rodier. I have also observed a small firm clot in scorbutus, sometimes also it has been cupped and buffed. The red globules and organic matters of serum have been generally observed to be deficient, so that the blood appears to be *impoverished* in its nature.

The saline matters in the serum have been found in about the normal proportions. In the analyses which I made—one of healthy, the other of scorbutic blood—I found in the former 100 parts of dried serum gave 7·609 of inorganic matters—in the latter, 8·125; but if the density of the serum in scurvy is less than in health, the 100 parts of dried matters corresponded to a larger amount of serum.

Finding that all the theories of scurvy hitherto advanced were imperfect, I was led to examine more minutely the composition of food under the use of which scurvy was capable of occurring, and also of such substances as had been proved beyond doubt to be anti-scorbutic, and afterwards to seek for the absence or deficiency of certain normal substances in the blood; and from such examinations I was led to the following conclusions:—

1st, That in all scorbutic diets, *Potash* exists in much smaller quantities than in those which are capable of maintaining health.

2nd, That all substances proved to act as anti-scorbutics contain a large amount of *Potash*.

3d, That in scurvy the blood is deficient in *Potash*, and the amount of that substance thrown out by the kidneys less than that which occurs in health.

4th, That scorbutic patients will recover when *Potash* is added to their food, the other constituents remaining as before, both in quantity and quality, and without the use of succulent vegetables or milk.

5th, That the theory which ascribes the cause of scurvy to a

deficiency of *Potash* in the food, is also capable of rationally explaining many symptoms of that disease.

Before attempting to prove any of these propositions, I will give a table containing the amount of potash contained in several articles of diet. The potash was determined by forming the double salt with the bichloride of platinum ($KC + Pt Cl_2$), $\frac{19\cdot53}{100}$ giving the per centage of potash (KO).

Analyses showing the amount of potash (KO) in 1 *ounce avoirdupois of the following substances :—*

	Grains
1 oz. of Baker's Best Bread (City),	0·259
1 oz. of Best Bread (West End),	0·257
1 oz. of Home-made Bread, probably containing potatoe flour,	0·262
1 oz. of Best White Flour	0·100
1 oz. of Bran,	0·609
1 oz. of Rice,	0·005
1 oz. of Rice,	0·011
1 oz. of Oatmeal	0·054
1 oz. of Split Peas,	0.529
1 oz. of Raw Beef,	0.599
1 oz. of Salt Beef, raw,	0.394
1 oz. of Salt Beef, boiled (slightly salted),	0·572
1 oz. of Boiled Mutton,	0.637
1 oz. of Dutch Cheese,	0.230
1 oz. of Boiled Potato of large size,	1·675
1 oz. of Raw Potato (small),	1.310
1 oz. of Boiled Potato, without peel and well done, water containing much potash,	0.529
1 oz. of Onion (small),	0·333
1 fluid oz. of London Milk,	0·309
1 oz. of Orange (not ripe) including septa,	0.675
1 fluid oz. of Lime Juice,	0·852
1 fluid oz. of Lemon Juice,	0.846

(1.) *Potash is deficient in scorbutic diets.*—This is easily proved by examining some of the dietaries of Union workhouses and prisons, when the inmates have become scorbutic. Thus in the Crediton Union, see *Provincial Medical and Surgical Journal*, June 1847, the usual weekly dietary consisted of—

	Men.	Women.
Bread, . . .	102 oz.	85 oz.
Cooked Meat, . .	12 —	12 —
Soup, . . .	3 pints,	3 pints.
Broth, . . .	4½ —	4½ —
Cheese, . . .	8 oz.	8 oz.
Rice, or Suet Pudding,	14 —	14 —
Potatoes, . . .	4½ lbs.	4½ lbs.

If we estimate the amount of potash taken by the inmates of this workhouse, we shall find the men's food to contain about 186 grains, and the women's about 181 grains. This amount would be much influenced by the mode in which the potatoes were cooked; if not too much boiled, and with the skins on, they would contain a much

larger amount of potash than if boiled without their skins, and much done. Under this diet the inmates remained healthy; but, owing to the scarcity of potatoes, boiled rice in equal weights was substituted, and in a few months the inmates became scorbutic. When the substitution was made, the weekly amount of potash taken by the men was about 51 grains, and by the women 46 grains, or a reduction of more than two-thirds took place. Rice and potatoes do not differ much in their composition, except in the salt of *potash* contained by the latter. Both contain starch and vegetable albumen. In the weekly diet list for the military prisoners at the Milbank Penitentiary, when they were subject to scurvy, (see Dr Baly's paper in *London Medical Gazette*, Vol. I. 1841–2,) we find the amount of potash taken by each prisoner during the first three months of imprisonment to be about 44 grains; during the second three months, about 50 grains; after six months, about 68 grains. At present, when potatoes are added, the weekly amount of potash is from 210 to 230 grains, and no case of scurvy has arisen since the change.

Again, if we examine some of the diets used by the labourers suffering from scurvy, and detailed in the last July number of this Journal, we shall perceive that the weekly amount of potash varied from 20 to 80 or 90 grains, and that this was contained chiefly in the bread, the analysis of which gave a much greater amount than the corresponding quantity of flour, thus indicating some admixture, as of alum and potatoe flour.

In the cases which have occurred under my care, the diets have consisted chiefly of bread, butter, little or no milk, and no potatoes, occasionally a small piece of meat, bacon, or a salt herring, and a similar diet has been found to have been used by most patients who have become scorbutic within the last year. (See paper on scurvy by Dr Curran, in *Dublin Quarterly Journal* for August 1847, and by Dr Shapter, in the *Provincial Medical and Surgical Journal*).

In the diet of sailors we find abundance of meat (salted beef and pork); but no doubt the quality of these provisions is often much impaired by the prolonged action of the salt, causing the gradual exosmosis of the potash salts, and the substitution of those of soda. In an analysis of beef which has been exposed for only a few days to the action of brine, but where the thickness of muscle was not more than 1½ inch, there was found to be a considerable diminution of the potash. One oz. of fresh beef gave 0·599 grains of potash, one oz. of salted beef 0·394 grains; and there can be little doubt but that a prolonged action of the brine would reduce very greatly the amount of potash salts in the largest joints. So that the sailors' weekly dietary, when no vegetables can be procured, consisting of 9¾ lbs. of salted meat, about 7 lbs. of flour in the form of biscuits, and 1½ pints of peas, would contain about 90 grains of potash, supposing the meat such as stated above.

(2.) *That all bodies proved to be anti-scorbutic contain a large*

amount of Potash.—All fruits contain this substance in abundance, as oranges, lemon, limes, grapes, gooseberries, &c., and these are all highly anti-scorbutic. Potatoes also, which perhaps are the most valuable as an addition to a dietary for the purpose of preventing scurvy, and owing to the scarcity of which article this disease has been so prevalent within the last two years, contain, as the above analyses prove, a very large amount of potash, and when boiled (not too much, and unpeeled), still retain most of that ingredient; this also accords with the fact, that potatoes, when cooked in the ordinary way, are anti-scorbutic, and at the same time explains why the hard core of that tuber, which is so much liked by the Irishman, is most powerful in preventing the occurrence of scurvy, (see Dr Lonsdale in August number of this Journal). Milk, which is undoubtedly a good anti-scorbutic, and upon which the younng of animals are for some time sustained, contains a very large proportion of potash salts compared with those of soda, being an exception to the relation between these two classes of salts which is found in the other animal fluids,—a pint of milk (London) and having a sp. gr. of 1·021, containing 6·180 grains. This was probably considerably diluted, as the usual sp. gr. is from 1·026 to 1·030. Berzelius's analysis gives about 9 grains; but the sp. gr. of the milk which he analyzed was much greater, about one-third. Fresh meat also contains potash in rather large proportion; and there is no doubt that animals, such as the carnivora, living entirely on this substance in its uncooked state, take an amount of potash quite sufficient for the wants of the system. When we examine other articles noted for preventing or curing the disease in question, we find that potash enters into the composition of all in considerable quantities; this is true with regard to cabbages, turnips, onions, garlics, leeks, and hence their efficacy, and also of pickles and sour-krout made from them; the same is the case with the young tops of plants, as of the Pinus sylvestris, &c., when a decoction is made. Potash is also found in spruce beer, wort, malt liquors, wines, especially the lighter description, which contain this substance in the form of a bitartrate, but which becomes deposited in the stronger varieties.

(3.) *In scurvy the blood is deficient in potash, and the amount of that substance thrown out by the kidneys is less than what takes place in health.*—100 grains of the dried serum of healthy blood, when incinerated and heated with the bichloride of platinum, gave 1·582 grains of the double chloride of potassium and platinum. 100 grains of dried serum of scorbutic blood, treated in the same way, gave only 0·627 grains of the same salt; so that the amount of potash in scorbutic blood was little more than one-third that contained in the blood in health, although the total amount of saline matters was nearly equal. In one case, a female, at 50, complaining of great prostration of strength, spongy gums, effusion in both ankles, &c., the amount of urine passed was 22½ fluid ounces in the twenty-four hours —sp. gr. 1·015. Reaction *very* acid, and on standing deposited mucus

intermixed with uric acid crystals. The amount of potash excreted in twenty-four hours was much less than in health, being less than 7 grains; but a slight accident prevented a very accurate determination of the quantity.

In another case, the amount thrown out in twenty-four hours was 40 oz. Sp. gr. 1·010, and acid in its reaction.

(4.) *Scorbutic patients, when kept under a diet which gave rise to the disease, recover, when a few grains of Potash are added to their food.*—In several cases which came under my care, the treatment consisted in the daily administration of a few grains (from 12 to 20) of some salt of potash mixed with syrup and water. Sometimes the bitartrate, at other times the acetate, and also the carbonate and phosphate were used. All the salts appeared to act alike, and I have little doubt but the chloride of potassium would be found equally efficacious. When the cases were thus treated, all vegetables, milk, and malt liquors were strictly prohibited; and yet the patients rapidly recovered. Other cases were treated by fresh vegetables and milk; these also recovered, but certainly not more quickly than those from whom these substances were withheld, and potash salts substituted. On looking over the works of several writers on scurvy, I have frequently found that some *Potash* salt has been administered with *marked* benefit; thus, nitre has been recommended, nitre dissolved in vinegar, the bitartrate of potash, the oxalate of potassa; but the efficacy has always been ascribed to the acid contained in these substances, and no attention has been paid to the base.

(5.) *The theory which ascribes the cause of scurvy to a deficiency of Potash in the system, is capable of explaining some of its symptoms.*—Both soda and potash are constant constituents of the animal body, and it appears that they are not capable of replacing each other; for example, we always find the potash to exist in large quantities in the ash of muscle, soda in very small quantities (Berzelius, Liebig); in the ash of the blood we find the relation reversed. It appears also, that the muscular system requires the presence of potash, and we should therefore expect to find that where there is a deficient supply of this base, the effect would soon be manifested in the functions of that system. This we find to be the case in scurvy; without any amount of wasting of the body we find marked muscular debility, and this perhaps is one of the earliest symptoms of the disease.

Conclusion.—I have ventured to make public this theory of the cause and nature of scurvy sooner than I otherwise wished, both on account of the difficulty of procuring cases of this disease at the present time, and from the conviction that its being made known to the profession at large would be the most ready mode of having it confirmed or disproved. If true, it will be seen at once that its applications will be of the utmost importance, and the occurrence of scurvy, both at sea and on land, can be most readily prevented, by the introduction of a few grains of some potash salt, as the phosphate, chloride, tartrate, &c., into the food, or by these being taken in a separate

state. At sea, its applications would be invaluable, from the cheapness, stability, and the small space occupied by the remedy, when compared with lime juice; from its being able at all times to be procured from the ashes of wood or plants, especially tobacco, which contains it in abundance. If found to be a mere hypothesis, I have this apology to make, that in my mind it accounts better for the occurrence of this disease than any other yet offered; and it will still be an interesting fact, that *Potash* always accompanies the *real* anti-scorbutic principle, was found deficient in scorbutic blood, and that several cases of scurvy rapidly recovered under the use of some of its salts, without the administration of any other remedy, dietetical or medicinal.

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ON THE

MODE OF COMMUNICATION

OF

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ON THE

MODE OF COMMUNICATION

OF

CHOLERA.

BY

JOHN SNOW, M.D.

LONDON:
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MDCCCXLIX.

ON THE

MODE OF COMMUNICATION

OF

CHOLERA.

It is not the intention of the writer to go over the much debated question of the contagion of cholera. An examination of the history of that malady, from its first appearance, or at least recognition, in India in 1817, has convinced him, in common with a great portion of the medical profession, that it is propagated by human intercourse. Its progress along the great channels of that intercourse, and the very numerous instances, both in this country and abroad, in which cholera dates its commencement in a town or village previously free from it to the arrival and illness of a person coming from a place in which the disease was prevalent, seem to leave no room for doubting its communicability.

It is quite true that a great deal of argument has

been employed on the opposite side, and that many eminent men hold an opposite opinion; but, besides the objection that negative evidence ought not to overthrow that of a positive kind, the instances that are believed to oppose the proofs of communication are reasoned upon in the opinion that cholera, if conveyed by human intercourse, must be contagious in the same way that the eruptive fevers are considered to be, viz., by emanations from the sick person into the surrounding air, which enter the system of others by being inhaled, and absorbed by the blood passing through the lungs. There is, however, no reason to conclude, *à priori*, that this must be the mode of communication of cholera; and it must be confessed that it is difficult to imagine that there can be such a difference in the predisposition to be affected or not by an inhaled poison, as would enable a great number to breathe it without injury in a pretty concentrated form (the immunity not having been earned by a previous attack, as in the case of measles, &c.), whilst others should be killed by it when millions of times diluted. The difficulties that beset this view are of the same kind, but not so great, as those which surround the hypothesis of a cholera poison generally diffused in the air, and not emanating from the sick.

Reasoning by analogy from what is known of other diseases, we ought not to conclude that cholera is propagated by an effluvium. In all known diseases in which the blood is poisoned in the first instance, gene-

ral symptoms, such as rigors, headache, and quickened pulse, precede the local symptoms; but it has always appeared, from what the writer could observe, that in cholera the alimentary canal is first affected, and that all the symptoms not referable to that part are consecutive, and apparently the result of the local affection. In those cases in which vertigo, lassitude, and depression precede the evacuations from the bowels, there is no reason to doubt that exudation of the watery part of the blood, which is soon copiously discharged, is already taking place from the mucous membrane; whilst in the cases in which the purging comes on more gradually, there is often so little feeling of illness that the patient cannot persuade himself that he has the cholera, or apply for remedies until the disease is far advanced,—this being a circumstance which increases the mortality. The quantity of fluid lost by purging and vomiting, taking into consideration the previous state of the patient, the suddenness of the attack, and the circumstance that the loss is not replaced by absorption, has seemed sufficient, in all the cases witnessed by the writer, to account, by the change it must occasion in the quantity and composition of the blood,* for the collapse, difficulty of breathing, and, in

* The valuable analyses of Dr. Garrod have recently fully confirmed what had been stated in the former visitation of Europe by the cholera, viz., that the solid contents of the blood of patients labouring under this disease are greatly increased in pro-

short, for all the symptoms, without assuming that the blood is poisoned, until it become so by the retention of matters which ought to pass off through the kidneys, the functions of which are, however, suspended by the thickened state of the blood, which will scarcely allow it to pass through the capillaries.

It is generally assumed that the blood becomes so altered by the cholera poison, that its watery and saline parts begin to exude by the mucous membrane of the alimentary canal; but it is more consonant with experience, both therapeutical and pathological, to attribute the exudation to some local irritant of the mucous membrane; no instance suggesting itself to the writer in which a poison in the blood causes irritation of, and exudation from, a single surface, as in cholera; for the sweating, as the patient approaches to collapse, is only what takes place in other cases from loss of blood, during fainting, and in any state in which the force of the circulation is greatly reduced.

Having rejected effluvia and the poisoning of the blood in the first instance, and being led to the conclusion that the disease is communicated by something that acts directly on the alimentary canal, the excretions of the sick at once suggest themselves as containing some material which, being accidentally swallowed, might attach itself to the mucous membrane of the

portion to the water—a state of the blood that is not met with in any other malady.

small intestines, and there multiply itself by the appropriation of surrounding matter, in virtue of molecular changes going on within it, or capable of going on, as soon as it is placed in congenial circumstances. Such a mode of communication of disease is not without precedent. The ova of the intestinal worms are undoubtedly introduced in this way. The affections they induce are amongst the most chronic, whilst cholera is one of the most acute; but duration does not of itself destroy all analogy amongst organic processes. The writer, however, does not wish to be misunderstood as making this comparison so closely as to imply that cholera depends on veritable animals, or even animalcules, but rather to appeal to that general tendency to the continuity of molecular changes, by which combustion, putrefaction, fermentation, and the various processes in organized beings, are kept up.

Whilst it is matter almost of certainty that intestinal worms are in this way communicated, it is never possible to trace the communication from one person to another: hence, if this be the mode of the propagation of cholera, there must often be great difficulty in detecting it. That a portion of the ejections or dejections must often be swallowed by healthy persons is, however, a matter of necessity. The latter even are voided with such suddenness and force that the clothes and bedding scarcely fail to become soiled, and being almost devoid of colour and odour, the presence of the evacuations is not always recognised; hence they

become attached unobserved to the hands of the person nursing the patient, and are unconsciously swallowed, unless care be taken to wash the hands before partaking of food: or if the person waiting on the sick have to prepare food for the rest of the family, as often happens, the material of communication here suggested has a wider field in which to operate; and where the patient, or those waiting on him, are occupied in the preparation or vending of provisions, the disease may be conveyed to a distance, and into quarters having apparently no communication with the sick.

All the observers who have recorded their opinions on the subject, agree in attributing a great influence to want of personal cleanliness in increasing the prevalence and fatality of cholera. Dr. Lichtenstädt, in a work on Cholera published in 1831, states, "that at Berditscher, in Volhynia, a place of a few thousand inhabitants, no less than 900 were attacked in thirty-one days. Amongst 764 of these were 658 Jews, and only 106 Christians, although the Jewish population is far from being proportionally so great; and among the Christians attacked the deaths were 61·3 per cent., while among the Jews they were 90·7 per cent. The only reason assigned by the reporter for these extraordinary differences is the excessive disregard of cleanliness among the Jewish inhabitants."* The first appearance of cholera in many of the towns of this country

* Edin. Med. and Surg. Journal, vol. xxxvii.

in 1832 was in the courts and alleys to which vagrants resort for a night's lodging, where it often lingered for some time before spreading to the more cleanly part of the people.

The views here explained open up to consideration a most important way in which the cholera may be widely disseminated, viz., by the emptying of sewers into the drinking water of the community; and, as far as the writer's inquiries have extended, he has found that in most towns in which the malady has prevailed to an unusual extent this means of its communication has existed. The joint town of Dumfries and Maxwell-town, not usually an unhealthy place, has been visited by the cholera both in 1832 and at the close of last year with extreme severity. On the last occasion the deaths were 317 in Dumfries, and 114 in Maxwell-town, being 431 in a population of 14,000. The inhabitants drink the water of the Nith, a river into which the sewers empty themselves, their contents floating afterwards to and fro with the tide. Glasgow, which has been visited so severely with the malady, is supplied, as I understand, with water from the Clyde, by means of an establishment situated a little way from the town, and higher up the stream, and the water is professed to be filtered; but as the Clyde is a tidal river in that part of its course, the contents of the sewers must be washed up the stream, and, whatever care may be taken to get the supply of water when the tide is down, it cannot be altogether free from contamination. In

the epidemic of seventeen years ago, the cholera was much more prevalent in the south and east districts of London, which are supplied with water from the Thames and the Lea, where these rivers are much contaminated by the sewers, than in the other parts of the metropolis differently supplied. And this is precisely what has occurred again, as will be shewn further on.

The opinions now made known have been entertained by the author since the latter part of last year, and were mentioned by him to several medical gentlemen in the winter,—amongst others, to Dr. Garrod and Dr. Parkes; but he hesitated to publish them, thinking the evidence in their favour of so scattered and general a nature as not to be likely to make a ready and easy impression. Within the last few days, however, some occurrences have come within his knowledge which seem to offer more direct proof, and have induced him to take the present course.

In Thomas Street, Horsleydown, there are two courts close together, consisting of a number of small houses or cottages, inhabited by poor people. The houses occupy one side of each court or alley—the south side of Trusscott's Court, and the north side of the other, which is called Surrey Buildings, being placed back to back, with an intervening space, divided into small back areas, in which are situated the privies of both the courts, communicating with the same drain, and there is an open sewer which passes the further end of both

courts. Now, in Surrey Buildings the cholera has committed fearful devastation, whilst in the adjoining court there has been but one fatal case, and another case that ended in recovery. In the former court the slops of dirty water poured down by the inhabitants into a channel in front of the houses got into the well from which they obtained their water, this being the only difference that Mr. Grant, the Assistant-Surveyor for the Commissioners of Sewers, could find between the circumstances of the two courts, as he stated in his report to the Commissioners. The well in question was supplied from the pipes of the South London Water Works, and was covered in on a level with the adjoining ground; and the inhabitants obtained the water by a pump placed over the well. The channel mentioned above commenced close by the pump. Owing to something being out of order, the water for some time past occasionally burst out at the top of the well, and overflowed into the gutter or channel, afterwards flowing back again mixed with the impurities; and crevices were left in the ground or pavement, allowing part of the contents of the gutter to flow at all times into the well, and when it was afterwards emptied a large quantity of black and highly offensive deposit was found in it.

The first case of cholera in this court occurred on July 20th, in a little girl, who had been labouring under diarrhœa for four days. This case ended favourably. On the 21st July, the next day, an elderly

female was attacked with the disease, and was in a state of collapse at ten o'clock the same night. This patient partially recovered, but died of some consecutive affection on August 1. Mr. Vinen, of Tooley Street, who attended these cases, states that the evacuations were passed into the beds, and that the water in which the foul linen would be washed would inevitably be emptied into the channel mentioned above. Mr. Russell, of Thornton Street, Horsleydown, who attended many of the subsequent cases in the court, and who, along with another medical gentleman, was the first to call the attention of the authorities to the state of the well, says that such water was invariably emptied there, and the people admit the circumstance. About a week after the above two cases commenced, a number of patients were taken ill nearly together: four on Saturday, July 28th, seven or eight on the 29th, and several on the day following. The deaths in the cases that were fatal took place as follows:—One on the 29th, four on the 30th, and one on the 31st July; two on August 1st, and one on August the 2d, 5th, and 10th respectively, making eleven in all. They occurred in seven out of the fourteen small houses situated in the court.

The two first cases on the 20th and 21st may be considered to represent about the average amount of cases for the neighbourhood, there having been just that number in the adjoining court, about the same time. But in a few days, when the dejections of these

patients must have become mixed with the water the people drank, a number of additional cases commenced nearly together. The patients were all women and children, the men living in the court not having been attacked; but there has been no opportunity hitherto of examining into the cause of exemption, as the surviving inhabitants had nearly all left the place when the writer's attention was called to this circumstance.

In Albion Terrace, Wandsworth Road, there has been an extraordinary mortality from cholera, which was the more striking, as there were no other cases at the time in the immediate neighbourhood; the houses opposite to, behind, and in the same line, at each end of those in which the disease prevailed, having been free from it. The row of houses in which the cholera prevailed to an extent probably altogether unprecedented in this country, constituted the genteel suburban dwellings of a number of professional and tradespeople, and are most of them detached a few feet from each other. They are supplied with water on the same plan. In this instance the water got contaminated by the contents of the house-drains and cesspools; the cholera extended to nearly all the houses in which the water was thus tainted, and to no others.

These houses are numbered from 1 to 17 in Albion Terrace, and are supplied with water from a copious spring in the road in front of the terrace, the water of which is conducted by a brick barrel drain between

Nos. 7 and 8, to the back of the houses, and then flows right and left to supply tanks in the ground behind each house, the tanks being made of brickwork and cement, covered with a flat stone, and connected with each other by stoneware pipes six inches in diameter. A leaden pipe conveyed water from each tank to a pump situated in the back-kitchen. There is a cesspool behind each house, under the privy, and situated four feet from the water-tank. The ground was opened, and the drains examined under the superintendence of Mr. Grant, the Assistant-Surveyor, behind the houses No. 1 and No. 7. The cesspools at both these places were quite full, and the overflow-drain from that at No. 1 choked up. At this house the respective level of the cesspool and the water-tank were measured, and the top of the overflow-drain from the cesspool was found to be fifteen inches above the top of the tank, and the intervening ground was very wet. The overflow-drain mentioned above had no bottom, or one so soft that it could be penetrated with a stick; and it crossed at right angles above the earthenware pipe of the water-tank, the joints of which were leaky, and allowed the water to escape. Behind No. 7, Mr. Grant found a pipe for bringing surplus water from the tanks, communicating with a drain from the cesspool; and he found a flat brick drain laid over the barrel drain before mentioned, which brings the water from the spring. It appears, from a plan of the property, that this drain, which is continued in a direction

towards the sewer in Battersea Fields, brings surface-drainage from the road, and receives the drains from the cesspools, the house-drains from the sinks in the back kitchens, and the surplus water, or some of it, from the tanks. There is every reason to believe that this drain is stopped up, but that has not yet been ascertained; at all events, it was unable to convey the water flowing into it during the storm on July 26th, as it burst near the house No. 8, and inundated the lower premises of that and the adjoining house, No. 9, with fœtid water; and it was from this time that the water, which had occasionally been complained of before, was found by most of the people in these seventeen houses to be more or less impure or disagreeable. The water broke out of the drain again at No. 8, and overflowed the kitchens, during a heavy rain on August 2d. It should be particularly remarked, that the tanks are placed on the same level, so that pumping from one will draw water from the others, and that any impurity getting into one tank would consequently be imparted to the rest.

The first case of cholera occurred at No. 13, on July 28th (two days after the bursting of the drain), in a lady who had had premonitory symptoms for three or four days. It was fatal in fourteen hours. There was an accumulation of rubbish in the cellar of this house, which was said to be offensive by the person who removed it; but the proprietor of the house denied this. A lady at No. 8 was attacked with cho-

leraic diarrhœa on July 30th: she recovered. On August 1st, a lady, aged 81, at No. 6, who had had some diarrhœa eight or ten days before, which had yielded to her own treatment, was attacked with cholera; she died on the 4th with congested brain. Diarrhœa commenced on August 1st, in a lady, aged 60, at No. 3; collapse took place on the 5th, and death on the 6th. On August 3d, there were three or four cases in different parts of the row of houses, and two of them terminated fatally on the same day. The attacks were numerous during the following three or four days, and after that time they diminished in number. More than half the inhabitants of the part of the terrace in which the cholera prevailed were attacked with it, and upwards of half the cases were fatal. The deaths occurred as follows; but as some of the patients lingered a few days, and died in the consecutive fever, the deaths are less closely grouped than the seizures. There was one death on July 28th, two on August 3d, four on the 4th, two on the 6th, two on the 7th, four on the 8th, three on the 9th, one on the 11th, and one on the 13th. These make twenty fatal cases; and there were four or five deaths besides amongst those who were attacked after flying from the place.

The fatal cases were distributed over ten out of the seventeen houses, and Mr. Mimpriss, of Wandsworth Road, who attended many of the cases, and to whose kindness the writer is indebted for several of these particulars, states that cases occurred in the other seven

houses, with the exception of one or two that were empty, or nearly so. There were five deaths in the house No. 6, and one of a gentleman the day after he left it, and went to Hampstead Heath. The entire household, consisting of seven individuals, had the cholera, and six of them died.

There are no data for showing how the disease was probably communicated to the first patient, at No. 13, on July 28th; but it was two or three days afterwards, when the evacuations from this patient must have entered the drains, having a communication with the water supplied to all the houses, that other persons were attacked, and in two days more the disease prevailed to an alarming extent.

The water was found to be polluted by the contents of the drains and cesspools to a great extent. That removed by Mr. Grant from the tank behind No. 1, had, when first taken out, an odour distinctly stercoraceous. It is less offensive now, at the end of twelve days, than when it was removed. It does not become clear on standing, owing to a kind of fermentation going on in it, which prevents the mud from entirely settling to the bottom of the vessel. After being filtered through paper, it is quite clear, but retains a slightly disagreeable taste, and froths on being agitated. On evaporating 1000 grains to dryness, there is a residue of nearly two grains over and above the residue of salts obtained by evaporating water obtained from a pump which is supplied from the same spring. This

excess consists, there is no doubt, of soluble organic matters, the exact nature of which has not been determined. In the water-tank behind No. 7, there was a dark-coloured offensive deposit, six to nine inches deep, although the depth of the tank was only two feet. There was also a scum on the surface of the water. Some of the deposit, which was removed, has been undergoing putrefactive fermentation, and giving off sulphuretted hydrogen, ever since, having a tendency to expel the cork from the bottle in which it is kept. It possesses the odour of privy-soil very distinctly. Various substances have been found in it which escape digestion, as the stones and husks of currants and grapes, and portions of the thin epidermis of other fruits and vegetables. Little bits of paper were likewise found. Some of the water removed from this tank continued to ferment till a day or two ago, but is now quite clear and transparent; and although there are some portions of the fibrous structures of vegetables lying at the bottom of the bottle in which it is contained, the water itself has neither taste nor smell, and cannot, by either physical or chemical examination, be distinguished from that of the spring whence it originally proceeded. This circumstance shews, in a remarkable manner, the power of spontaneous putrefaction to free water from all impurities of an animal or a vegetable nature.

Many of the patients attributed their illness to the water: this is here mentioned as shewing that they had

drank of it, and at the same time found that it was impure. As explaining how persons might drink of such water before finding out its impurity, it may be stated that the grosser part of the material from drains and cesspools has a tendency, when mixed with water, to settle rapidly to the bottom. The only houses supplied with the same water, after passing the tanks in Albion Terrace, were four in Albion Street; but three of these have been empty for months, and the fourth is inhabited by a gentleman who always suspected the water, and would not drink it. There were two or three persons attacked with cholera amongst those who came to nurse the patients after the water was condemned, and who, consequently, did not drink it; but these persons were liable, in waiting on the patient, to get a small portion of the evacuations into the stomach in the way first pointed out; and there might be food in the houses previously prepared with the tainted water. It is not here implied that all the cases in Albion Terrace were communicated by the water, but that far the greater portion of them were; that, in short, it was the circumstance of the cholera evacuations getting into the water which caused the disease to spread so much beyond its ordinary extent.

The mortality in Albion Terrace is attributed by Dr. Milroy, in a published report to the General Board of Health, chiefly to three causes: firstly, to an open sewer in Battersea Fields, which is 400 feet to the

north of the terrace, and from which the inhabitants perceived a disagreeable odour when the wind was in certain directions; secondly, to a disagreeable odour from the sinks in the back kitchens of the houses, which was worse after the storm of July 26; and lastly, to the accumulation in the house No. 13 before alluded to. With respect to the open sewer, there are several streets and lines of houses as much exposed to any emanations there might be from it, as those in which the cholera prevailed, and yet they were quite free from the malady, as were also nineteen houses situated between the sewer and Albion Terrace. As regards the bad smells from the sinks in the kitchen, their existence is of such every-day, and almost universal prevalence, that they do not help to explain an irruption of cholera, like that under consideration; indeed, offensive odours were created in thousands of houses, in London, by the same storm of rain on July 26th; and the two houses in which the offensive smell was greatest, viz. Nos. 8 and 9,—those which were flooded with the contents of the drain,—were less severely visited with cholera than the rest; the inhabitants having only had diarrhœa or mild attacks of cholera. The accumulation in the house No. 13 could not affect the houses at a distance from it. It remains evident, then, that the only special and peculiar cause connected with the great calamity which befel the inhabitants of these houses, was the state of the water, which was followed

by the cholera in almost every house to which it extended, whilst all the surrounding houses were quite free from it.

Although there are a great number of pumps, supplied by wells, in this metropolis, yet by far the greater part of the water used for drinking and for culinary purposes is furnished by the various Water Companies. On the south side of the Thames the water works all obtain their supply from that river, at parts where it is much polluted by the sewers; none of them obtaining their water higher up the stream than Vauxhall Bridge, —the position of the South London Water Works. Now as soon as the cholera began to prevail in London, part of the water which had been contained in the evacuations of the patients would begin to enter the mains of the Water Works: whether the materies morbi of cholera,—which, it has been shewn, there is good reason for believing is contained in the evacuations,— would be sent round to the inhabitants, would depend on whether the water were kept in the reservoirs till this materies morbi settled down or was destroyed; or whether it could be separated by the filtration through gravel and sand, which the water is stated to undergo. Notwithstanding this filtration, the water in this part of town is not always quite clear, and sometimes it has an offensive smell when clear. The deaths from cholera in this district, which contains a very little more than a quarter of the population, have been more numerous

than in all the other districts put together; as will be seen by the following table, taken from the reports of the Registrar-General. Out of the 7466 deaths in the metropolis, 4001 have occurred on the south side of the Thames, being nearly eight to each thousand of the inhabitants.

Deaths from Cholera in London, registered from September 23d, 1848, to August 25th, 1849.

Districts of London.	Population in 1841.	Deaths from Cholera.	Deaths to each 1,000 inhabitants.
West . .	300,711	533	1·77
North . .	375,971	415	1·10
Central . .	373,605	920	2·48
East . . .	392,444	1,597	4·06
South . .	502,548	4,001	7·95
Total . .	1,948,369	7,466	3·83

That division of London called the East District in the registration reports, is supplied with water entirely by the East London Water Company. In the cholera of 1832 and 1833 the reservoirs of the company at Old Ford were entirely filled from the river Lea when the water flowed up with the rising tide from the

Thames, in the neighbourhood of Blackwall; and the river Lea itself receives some large sewers. The Company have since obtained water from near Lea Bridge, above the reach of the tide; but whether they still supply themselves in part from the river at Old Ford, where their chief works and reservoirs are still situated, and if so, to what parts of their district the water so obtained is sent, cannot be here stated, for want of exact information.

The cholera has prevailed to a considerable extent in the East districts, as will be seen by the Table, though not so much as on the south of the Thames.

The North districts have suffered very little from cholera as yet. St. Pancras and Islington, which comprise a great portion of this division, are supplied with the New River water, which is brought from Hertfordshire. Hackney is supplied by the East London Water Works; Hampstead by sources of its own; and Marylebone, which will again be alluded to, chiefly by the West Middlesex Water Works.

The whole of the Central Districts are likewise supplied from the New River, and this part of the town has suffered much less from cholera, hitherto, than the south and east divisions; although many portions of it are quite on a par with the worst parts on the south of the Thames as regards overcrowding and bad smells.

The West Districts, together with Marylebone, are supplied with Thames water by the West Middlesex,

Grand Junction, and Chelsea Water Works. The West Middlesex Company obtain their water above Hammersmith, and the Grand Junction at Brentford; both these places, and especially the latter, are, by the meandering course of the river, several miles above London; and unless, perhaps, at certain parts of the tide, are free from sewage water, except that of certain towns,—as Richmond, Barnes, &c.—in which the cholera has not yet been prevalent. The Chelsea Company, which supply Chelsea, Pimlico, Westminster, and part of Brompton, get their water at Chelsea, only one or two miles above Vauxhall; but they take great pains to filter it carefully. It will perhaps be remarked that the dilution of the cholera poison in the Thames would most likely render it innocuous; but as far as can be judged from analogy, the poison consists probably of organized particles, extremely small no doubt, but not capable of indefinite division, so long as they retain their properties.

It will probably be objected to the views advanced in this paper, that animal poisons, when swallowed, are generally destroyed in the stomach by the process of digestion; and, indeed, it is not improbable that the material which gives rise to cholera is often thus destroyed, and its effects resisted, since the complaint is very often observed to come on when the digestive powers have been weakened by a fit of drunkenness.

It should be observed, that the mode of contracting the malady here indicated does not altogether preclude

the possibility of its being transmitted a short distance through the air; for the organic part of the fæces, when dry, might be wafted as a fine dust, in the same way as the spores of cryptogamic plants, or the germs of animalcules, and entering the mouth, might be swallowed. In this manner, open sewers, as their contents are continually becoming dry on the sides, might be a means of conveying the cholera, independently of their mixing with water used for drinking. Mr. Russell, of Horsleydown, who attended the two first cases of the disease occurring in London last autumn—that of John Harnold, a seaman just arrived from Hamburgh, where the disease was prevailing, and that of a man named Blenkinsopp, who came, after the death of the former, to lodge and sleep in the same room, and had the cholera eight days after him*—states, that the

* Some serious mistakes respecting these cases have crept into the documents furnished to Dr. Parkes by the General Board of Health, as subject matter for his inquiry into the bearing of the earliest cases of cholera on the question of contagion; as will be evident from a comparison of the following quotations from Dr. Parkes's paper, with the accompanying statement of the real circumstances:—

"The Elbe steamer left Hamburgh on the 22d September, and arrived in the river on the 25th. A seaman, named John Harnold, left the vessel, and went to live at No. 8, New Lane, Gainsford Street, Horsleydown. On the 28th of September he was seized with symptoms of cholera, and died in a few hours. It is stated in a letter to the General Board of Health, from Mr. Russell, who attended the patient, that all the characteristic symptoms of

next cases in Horsleydown, which commenced three or four days afterwards, were in a situation a little way removed from that of the two preceding, and having no apparent connection with it, except that an open sewer, up which the tide flows, runs past both places, and the sewage from the houses in the first neighbourhood is, when the tide rises, carried past those in the second.

cholera were present. Mr. Bowie, who inquired on behalf of the Board into the particulars of the case, corroborated this statement. This may, then, be considered as an undoubted case of cholera."

"If the disease was imported thus from Hamburgh, it did not spread in Horsleydown. Two days subsequently, indeed, Mr. Russell was sent for to a patient in the same house, who fancied he had cholera; but, on examining into particulars, it turned out that the individual in question had been greatly alarmed at the death of the seaman, and was suffering more from the effects of fear than anything else. He was quite well in a few hours. No other person was taken ill in the house or immediate neighbourhood, although, if the second case had not been inquired into, a vague story of communicated disease might have arisen in the neighbourhood."

Now, the illness and death of John Harnold took place on the 22nd of September, and not on the 28th, and Mr. Russell attended the next case in the same *room* on September 30th. There were, in this latter case, rice-water evacuations, and, amongst other decided symptoms of cholera, complete suppression of urine from Saturday to Tuesday morning, and the patient vomited incessantly for twenty-four hours after this, and afterwards had consecutive fever. Mr. Russell had seen a great deal of cholera in 1832, and had no doubt of this being a genuine case; and he

These opinions respecting the cause of cholera are brought forward, not as matters of certainty, but as containing a greater amount of probability in their favour than any other, in the present state of our knowledge. Nearly all medical men admit a cholera poison, whatever their opinions may be with respect to contagion; and many of them even speak of the purging as an effort of nature to get rid of the poison: they cannot, then, in either case, suppose that the evacuations are free from it, or that, being swallowed, the stomach should always have the power of destroying it, and preventing its producing its peculiar effects; therefore the views here stated seem to have a fair claim to the consideration of the profession. At all events, the mode of communication of cholera is a question of the most vital importance with respect to its prevention. Who can doubt that the case of John Harnold, the seaman from Hamburgh, mentioned above, was the true cause of the malady in Blenkinsopp, who came, and lodged, and slept, in the only room in all London in which there had been a case of

has seen a great deal of the disease lately, and still continues of the same conviction.

The mistake in the date alone at which the first case occurred, alters the bearing of all the facts submitted to Dr. Parkes, even should the particulars of all the other cases be correct. The writer accidentally detected the errors pointed out in this note by having to call on Mr. Russell in his inquiries respecting Surrey Buildings.

true Asiatic cholera for a number of years? And if cholera be communicated in some instances, is there not the strongest probability that it is so in the others —in short, that similar effects depend on similar causes?

The belief in the communication of cholera is a much less dreary one than the reverse; for what is so dismal as the idea of some invisible agent pervading the atmosphere, and spreading over the world? If the writer's opinions be correct, cholera might be checked and kept at bay by simple measures that would not interfere with social or commercial intercourse; and the enemy would be shorn of his chief terrors. It would only be necessary for all persons attending or waiting on the patient to wash their hands carefully and frequently, never omitting to do so before touching food, and for everybody to avoid drinking, or using for culinary purposes, water into which drains and sewers empty themselves; or, if that cannot be accomplished, to have the water filtered and well boiled before it is used. The sanitary measure most required in the metropolis is a supply of water for the south and east districts of it from some source quite removed from the sewers.

It would have been more satisfactory to the author to have given the subject a much more extensive examination, and only to have published his opinions in case he could bring forward such a mass of evidence

in their support as would have commanded ready and almost universal assent; but being preoccupied with another subject, he could only either leave the inquiry, or bring it forward in its present state, and he has considered it to be his duty to adopt the latter course, and allow his professional brethren to decide what there may be of value in his opinions; and he will be happy to receive any information bearing on the points discussed in his paper.

Frith Street, Soho,
Aug. 29, 1849.

THE END.

WILSON AND OGILVY, 57, SKINNER STREET, LONDON.

REPORT

OF THE

COMMITTEE OF INTERNAL HEALTH

ON THE

ASIATIC CHOLERA,

TOGETHER WITH A

REPORT OF THE CITY PHYSICIAN

ON THE

CHOLERA HOSPITAL.

BOSTON:
1849.
J. H. EASTBURN, CITY PRINTER.

In the Board of Mayor and Aldermen,
December 31, 1849.

Accepted and ordered to be printed.

Attest: S. F. McCleary, *City Clerk.*

REPORT.

In the Board of Mayor and Aldermen,
Monday, Dec. 31*st*, 1849.

The Committee on Internal Health, who have had under their charge the various arrangements which have been made by the Board of Health for the preservation of the City from Asiatic Cholera, and for the succor of persons attacked by the disease, beg leave to present the accompanying Report, prepared by Dr. Henry G. Clark, the City Physician, and Drs. Charles E. Buckingham, John C. Dalton, and Henry W. Williams, his associates in the care of the Cholera Hospital. It will be found to embrace every thing of interest to the public or the medical profession, relating to the exciting causes, peculiar characteristics, localities, treatment, and cure of this mysterious epidemic in Boston. It also furnishes a statement of deaths properly classified under the heads birth-place, age, and general habits, when known; and a detailed account of a considerable number of post mortem examinations. For this document, bearing upon its pages, as it does, the marks of unusual care and fidelity, the community is greatly indebted to the above named gentlemen, and especially to Dr. Clark, who has had the principal hand in getting

it up; and the obligation is increased by the consideration that this labor is in addition to a great amount of arduous and unrequited professional service, rendered during the whole period of the prevalence of the epidemic.

In addition to this document, the Committee are of opinion that nothing further is required than a brief statement of the precautionary measures taken by the City authorities to prevent the approach or allay the virulence of the disease,—an estimate of the expenses incurred,—and some account of the sanitary state of certain localities and the steps that should be taken to prevent a recurrence of future attacks from this and other epidemics; and to these points they at once proceed.

The attention of the Municipal authorities was called to the subject of Asiatic Cholera as early as September, 1848, by a communication from the Board of Health of Philadelphia. A Joint Committee of the City Council was immediately raised to consider the matter and the Consulting Physicians were requested to give their opinion upon the probability of the approach of the disease and the preparatory steps that should be taken in reference to it. Their report was published in the newspapers, and notices were sent out and left at all residences of the inhabitants, calling their attention to the state of their houses and yards.

In addition to these measures, the City Council resolved themselves into special joint committees, and to each of them, was assigned the custody of one of the wards of the City, for greater facility in examination, and reporting cases of nuisance. Special agents were also employed in the most exposed districts during the month of December, and much valuable work throughout the City was accomplished before the close of the year. The

further active prosecution of sanitary proceedings was suspended, during the winter months, in consequence of the coming in of a new City Government, and the diminished probability of a speedy approach of the epidemic within our limits. But, early in the spring, the attention of the authorities was again called to the subject, by the arrival of the disease at New York. The old arrangement of joint committees of the City Council having been found practically inconvenient and cumbersome, the Board of Health, consisting of the Mayor and Aldermen, undertook the sole charge and responsibility of all future measures in reference to this matter. For greater convenience, the City was divided into districts, each of which was placed under the particular care of a member of the Board, with power to obtain from the Police and Internal Health Departments as large a force as should be necessary for the effective and thorough cleansing of his district. All nuisances, not removable in a summary way, were reported to the Board, which passed the necessary orders and carried them into effect through this Committee.

The Board commenced their labors by republishing the report of the Consulting Physicians in the public journals, and leaving printed notices at each house, in the City, requesting the inhabitants to thoroughly cleanse their houses, yards, privies, and drains, and deposit all decayed vegetable and animal matter, and other deleterious substances in the streets opposite their dwellings, on certain specified days. The requisition was very generally complied with, and a large number of carts were at once employed to carry off what had thus been collected. The Police, under the City Marshal, were then detached, in squads proportioned to the size of the respective districts, to carefully inspect, from garret to cellar, every building in the City; to order and

see to the removal of every offensive substance which could readily be removed; and to report all cases of important or permanent nuisance to this Committee. They performed the laborious service with great fidelity and in the most quiet and gentlemanly manner; and, it is proper to state, that the inhabitants, everywhere, received them with kindness, and seemed anxious to aid them in the proper discharge of their duties. After this examination had been completed, and sufficient time allowed for the removal, by the authorities, of what had been collected, the whole force of the Police and Health Departments, with such other assistance as was required, were turned to the immediate removal of the nuisances which had been reported to the Board. In addition to an immense amount of filth, of all sorts, removed from houses, yards, and streets, several thousand vaults were emptied, and many scores of drains cleansed, repaired, or newly constructed. In consequence of these efforts, the City was soon in a greater state of cleanliness, it is believed, than it ever had been since its foundation; but, in order that the labor which had been expended, might not be lost, the Police were again detailed in squads to visit, in daily rounds, every part of their respective districts, and carts were assigned to them for the immediate removal of any offensive substance which they might find. Every street was swept, and the house dirt and offal were carried off from each dwelling, twice a week, through the Health Department; and, in the exposed localities, these precautionary labors were performed daily, under the direction of the Police. Many yards, lanes, and by-places, in different places, were also daily drenched with Cochituate water. The services were continued through the whole summer; and too much praise can hardly be given to the City Marshal and his numerous assistants, for the zeal, fidelity

and promptitude with which they carried out every order, or even suggestion, which they received from this Board.

On the approach of the Cholera, several additional measures were undertaken. Printed notices were published in the journals and posted up in various places, containing directions as to regimen, diet, clothing, and the treatment to be pursued on the discovery of premonitory symptoms. The Police were directed to see that houses and cellars, in exposed places, were whitewashed. Large quantities of disinfecting substances were purchased, and freely distributed wherever they were required. The inhabitants were notified to cleanse their house drains with Cochituate water, and the common sewers were ordered to be washed, at different periods, during the summer. The Board directed the large tract of marshy land, constituting the Back Bay, to be flooded from the ocean, and the water to be retained at as great a height, as the drains flowing into it, would permit. By a special order, all vessels arriving in the harbor with fruits, or other objectionable substances, were ordered to report themselves to the Hospital Physician at Deer Island, by whom they were thoroughly examined; and all decayed or deleterious portions of their cargoes were removed, or thrown overboard, before a permit was granted to come up to the City.

For the relief of the poorer classes, the Board fitted up a large building on Fort Hill, formerly a gun house, as a Cholera Hospital, and placed it in the charge of this Committee. A medical staff, under the direction of Dr. Clark, the City Physician, and all necessary nurses and attendants were speedily provided, and the whole establishment was ready for the reception of patients before its use was required. As a further measure, your Committee, with the consent of the Board and the ap-

proval of the Consulting Physicians, appointed special physicians for each ward, who were required to visit and prescribe for Cholera patients at their own dwellings, and be at their service, both day and night; with power to procure nurses and medicine. By this means great additional medical aid was afforded, and the first stages of the disease were more effectually watched and checked.

The thanks of the Board and of the whole community are due to the medical gentlemen and all their assistants, at the Hospital and elsewhere, for their promptitude, judgment, humanity, skill, and fidelity, during the whole progress of the disease. Their labors were arduous and unremitted, day and night, and those rendered at the Hospital were wholly without pecuniary compensation.

From the above account, it will be seen that the City was well prepared for the Cholera before its arrival; and, though the precautionary measures which had been taken, did not prevent the anticipated attack, there is every reason to believe that they were effective in checking its progress and diminishing its virulence. As is well known, most persons, throughout the City, were more or less, affected by the Cholera atmosphere; but few cases of the actual disease, and still fewer deaths, occurred in any of the more dry and airy portions of the metropolis. As will be seen by the topographical map, appended to the medical report, the epidemic made its first attack and spent its force, in those localities which were nearest to the level of the sea, and, in fact, rescued from it by filling up with dock mud; which were the least perfect in drainage, the worst ventilated, and the most crowded and filthy. And, though its fatality in these districts was considerable, it cannot be doubted that it would have been much more so, except for the extraordinary care and vigilance which had been

taken to put and keep them in as good condition as circumstances would permit. It ought also to be added, that personal habits seemed to be quite as important as locality, in determining an attack of the complaint. For the most part, the temperate, the moral, the well conditioned, escaped; whilst the imprudent, the vicious and the poorly fed, succumbed to its insidious influences.

The number of *cases* of Asiatic Cholera in the City cannot be given, as no account is known to have been taken of them; but, as all *deaths* are required to be reported at the Registrar's office before any permit for burial is granted, their number can be accurately ascertained. From his records, it appears that the first death from this disease occurred on the third of June, at No. 11 Hamilton street, in the person of an Irishman, and the last on the thirtieth of September, at the Cholera Hospital, in that of an Irish woman from Wharf street. The whole number of deaths between these dates was six hundred and eleven, of which one hundred and sixty-three were Americans, and seventy-nine Bostonians. The first patient at the Cholera Hospital was Rosanna Norris, an Irish woman, from Allen's Block, received June 29th; and from that time to November 15th, when the establishment was closed, the whole number of persons received were two hundred and sixty-two, of whom one hundred and sixty-six died, and ninety-six recovered: two hundred and eighteen foreigners and forty-four Americans. For detailed statements of the cases, treatment and autopsies at the Hospital and elsewhere, as well as for many interesting facts and observations in relation to the nature and progress of the disease, we must refer to the annexed medical report.

The expenses incurred on account of the Cholera Hospital, are as follows:

For fitting up, -	$898 02	
" furnishing, - -	2,055 90	
" wages, - -	2,299 03	
" stores and provisions,	997 86	
" medicines, - -	375 72	
" board of children,	139 14	
" carriages, horses, &c.	82 64	
" sundries, - -	55 28	
		$6,903 59

The expenditure for account of physicians, employed at large in the districts, and for nurses and medicine, was 1,342 28

The cost of cleansing the City and carrying out the precautionary measures, adopted by the Board of Health, cannot be ascertained with precision, for the reason that the whole service was undertaken by the Police and Health Departments, and no special account was kept of the expenses which were properly chargeable to Cholera. From a pretty careful examination, however, of the several charges in the books, we estimate the outlay of the City, over and above what is above given, at $20,000, thus making the whole expenditure $28,245 87; and we are of opinion that it does not exceed this sum.

The account books used at the Cholera Hospital, and a small book, containing an accurate schedule of all the furniture and property within its walls, remaining on hand on the day the building was closed, are herewith delivered to the Board.

Before closing their report, your Committee deem it their duty to call the special attention of the Board of Health, and their successors in office, to the present

unhealthy condition of many of the streets, in the lower parts of the City. They refer, particularly, to portions of the Neck and Harrison Avenue;—to the South Cove,—the territory bordering on the water, from South Boston upper Bridge to State Street,—the neighborhood of Ann Street,—a part of the Mill Pond lands,—and certain tracts on the northerly side of Cambridge Street, near the river. In all these localities, there are many streets, courts, and lanes which are exceedingly contracted, ill ventilated, and dirty; without any proper grade and with no, or very insufficient sewerage. This state of things is mainly owing to the fact of their having been originally laid out by private speculators, whose only object was to make a profitable investment for themselves, and who paid but very slight attention to the health or comfort of those who have to reside upon them. But in some cases, it arises from the great increase of population, which renders the space and accommodation, originally provided for a limited number of residents, wholly insufficient for the proper supply of the present necessities. In certain localities, as on the South Cove, the marshy and new made ground has settled, and the imperfect sewerage which was originally provided, has become nearly useless. The great body of the streets alluded to are private ways, over which the City exercises no special care or custody; and the policy, hitherto pursued by it, has been to refuse to accept them, until they are graded and put in good order by the abutters. It may be questioned whether this policy is a sound one. The public interest would seem to require that the Board of Health should have the power to cause all streets and ways to be laid out, of a suitable width, and to be properly graded and provided with ample sewerage, constructed and laid down in the best manner, before any buildings are erected upon them.

And, in case of neglect or refusal to comply with their requisitions, they should be authorised to proceed by their own agents; and the adjacent territory should be held answerable for the payment of the necessary expenses.

The Committee consider that the whole subject of streets and ways, in respect to width, ventilation, grade, and drainage, is one of very great and increasing importance. They would urge strongly the necessity of enforcing all existing statutes and ordinances; and, where a deficiency of power is apprehended, the propriety of an immediate application to the legislative power. A great deal, undoubtedly, has been done in reference to this subject, during the last few years, but very much still remains undone; and it is only by a long continued system of measures, patiently persevered in, that we can expect to arrive at that point of practical perfection which will secure the health and comfort of our inhabitants.

We would now refer to another subject which, in our view, also demands the attention and action of this Board. We allude to the very wretched, dirty and unhealthy condition of a great number of the dwelling houses, occupied by the Irish population, in Batterymarch, Broad, Wharf, Wells, Bread, Oliver, Hamilton, Atkinson, Curve, Brighton, Cove, Ann, and other streets. These houses, for the most part, are not occupied by a single family, or even by two or three families; but each room, from garret to cellar, is filled with a family consisting of several persons, and sometimes with two or more families. The consequence is an excessive population, wholly disproportioned to the space or the accommodations.

From the very necessities of the case, these residences soon become polluted with all manner of bad odors.

In such a state of things, there can be no cleanliness, privacy, or proper ventilation, and little comfort; and, with the ignorance, carelessness, and generally loose and dirty habits which prevail among the occupants, the necessary evils are greatly increased both in amount and intensity. In Broad street and all the surrounding neighborhood, including Fort Hill and the adjacent streets, the situation of the Irish, in these respects, is particularly wretched. During their visits the last summer, your Committee were witnesses of scenes too painful to be forgotten, and yet too disgusting to be related here. It is sufficient to say, that this whole district is a perfect hive of human beings, without comforts and mostly without common necessaries; in many cases, huddled together like brutes, without regard to sex, or age, or sense of decency; grown men and women sleeping together in the same apartment, and sometimes wife and husband, brothers and sisters, in the same bed. Under such circumstances, self-respect, forethought, all high and noble virtues soon die out, and sullen indifference and despair, or disorder, intemperance and utter degradation reign supreme.

The houses above alluded to are also insufficiently provided with the necessary in and out of door conveniences, which are required in every dwelling place. The great mass of them, particularly in the region last referred to, have but one sink, opening into a contracted and ill constructed drain, or, as is frequently the case, into a passage way or street, and but one privy, usually a mass of pollution, for all the inhabitants, sometimes amounting to a hundred. Some of them have neither drain nor privy; and the tenants are obliged to supply their necessities as best they can. Many of them were originally designed for warehouses, and have been converted to their present uses as eco-

nomically as possible; whilst others, which were once well fitted for the accommodation of a single family, have become wholly inadequate to meet the wants of the large numbers that now crowd into them. A great portion of those in Broad street and Fort Hill are lofty buildings from three to six stories high, and contain from forty to one hundred inhabitants. The rent for each room ranges from one dollar to one dollar and a half; and is generally collected by a man who hires the whole building, or several buildings, and enforces prompt payment under the threat always rigidly executed, of immediate ejection.

Appended to the medical report is a sketch of Half Moon Place, which is probably the worst locality in the City. Here the houses are built around an area from which air is almost totally excluded by the perpendicular wall of Fort Hill on one side, and the lofty buildings of Broad street on the other. A large part of the area is occupied by some twelve or fourteen privies, constantly overflowing, and by ill constructed and worn out sinks and drains, into which are hourly thrown solid substances, of all sorts, which choke them up and cause the liquid parts mixed with them to run over. Into the area there is a narrow entrance from Broad street, whilst a steep and crazy staircase affords a passage to Humphrey place, some fifty feet above. Side by side with the staircase, and fully exposed, a large, square, plank drain makes a precipitous descent, conducting, half hidden, half revealed, not only the waste water of the houses in Humphrey place, but, also, the contents of its privies to the area below; which, as may be supposed, is redolent of the fact.

Your Committee have already, in a former communication, described to the Board the state of the cellars under the houses, above described; but the importance of the subject, as well as the consideration that the duties of the existing Board will soon be transferred to others, seem to require some notice of them here, even at the risk of repetition. These cellars are generally entirely beneath the surface of the ground, and, to most of them, the only entrance for light or air, is by the passage, or cellar door way, leading down to them by steps from the sidewalk above. They are crowded with families, which lodge there and make them their sole place of abode. Besides a dwelling house, these places very generally serve the purposes of a grocery and vegetable shop; and, not unfrequently, a groggery and dancing hall are added. As might be expected, intemperance, lewdness, riot and all the evil spirits, to which poor humanity is at any time subject, enter in and dwell there. Few of the cellars have either drains or privies. Some of them are divided off into one or more rooms, into which hardly a ray of light, or breath of air passes, and where notwithstanding, families consisting of several persons reside. How the lamp of life, under such circumstances, holds out to burn, even for a day, is, perhaps, as great a wonder as that such a state of things should, in this community, be suffered to exist. That such residences become the permanent abode of fever, in some of its forms, is well known to the medical men who visit them; and, that they tend to shorten life, we may clearly infer from the statistical tables of Mr. Shattuck, who states that the average age of Irish life in Boston, does not exceed fourteen years. The number of cellars, used as dwelling houses, is, according to the return of the City Marshal, five hundred and eighty-six; and the number of persons occupying them varies from five to fifteen.

The Committee would gladly have been excused from

the task of setting before you the above most painful details, but it has been forced upon them by a sense of duty and the hope and belief that, for the large portion of the evils complained of, some adequate remedial measures can and ought to be found by the City. Great public considerations seem to them to demand, that every dwelling house should be provided with sinks, drains, and privies, that are adapted, in size, number, and construction, to the number of individuals who shall occupy it; that the owners should be compelled by law, to construct them, under the direction of the Board of Health; and, in case of neglect or refusal, that the estate itself should be held liable for the payment of all expenses which may be incurred by the City in making such provision. A just regard to the health and comfort of the poorer classes, as well as to the rights of tenants, who are unable to prosecute them, would also make it reasonable, that every landlord should be required to fit his building properly to the purposes for which it is to be used, in respect to light, air, and necessary conveniences; and that some provision of law should be made by which the number of tenants should be apportioned to its size and general arrangements. And, especially is it important, that some legal power, sanctioned by penalties sufficiently stringent, should be obtained, to prevent entirely the occupation of under-ground cellars as dwelling houses.

Your Committee submit the above subjects to the serious consideration of the Board of Health, and they recommend that an early application be made to the Legislature for such additional powers, as may be needed to abate the evils complained of.

In behalf of the Committee,

HENRY B. ROGERS,
Chairman.

CITY PHYSICIAN'S REPORT.

City Physician's Office,

December 24, 1849.

To the Mayor and Aldermen, *Health Commissioners of the City of Boston.*

Gentlemen:

Having been charged by your order of July 2d, with the care, (under the direction of the Committee on Internal Health) of superintending the "City Hospital for Cholera," during the continuance of that disease;—I have thought it an appropriate mark of respect to the Board,—an act of justice to the Physicians, whom I had the pleasure to associate with me,—and to myself,—to present you an account of my proceedings under the said order;—that you may judge for yourselves of the manner in which this trust has been fulfilled.

For this purpose, I have the honor to submit to you a detailed Report, containing a history of the Hospital and of the epidemic itself, so far as it has been connected with it.

In making this Report, I have been very much indebted to my associates; and while this insures more full and perfect statements in its various departments, it will also account to the reader for some want of unity

in its style and arrangement. Dr. Buckingham has prepared the account of the cases, and their treatment, from the Hospital records. Dr. Dalton furnishes the important portion, relating to the pathology of the disease; while Dr. Williams has supplied the topographical statistics; so that it will be seen little else has been left for me beyond the general plan of the Report, the arrangement of its materials, and its formal presentation to the City Government.

The drawings are by Mr. Billings, and are most faithful representations of the scenes they are intended to exhibit.

We have endeavored to present, in the plainest manner, the facts which have fallen under our observation, in order that they may be available in case of the recurrence of Cholera, if indeed they cannot be made more directly useful to the sanitary improvement of our City.

I have the honor to be,
Gentlemen, with great respect,
Your obedient servant,
HENRY G. CLARK,
City Physician.

REPORT.

THE HOSPITAL AND ITS ORGANIZATION.

The Hospital was fitted up under the supervision of the City Physician, and in its arrangements, no necessary expense was spared. The building was formerly used as a gun-house, by the Washington Artillery, and required extensive alterations to prepare it for occupation. A large ventilating stove was placed in the centre of the main building, and two large ventilators were put upon the top. Twenty beds were placed in it, and at a later period eight others were provided. At one time these were all filled, and by the permission of the Committee on Public Buildings, a door was cut through the wall, between the yard of this building and the yard of the Boylston School House, enabling the attendants to have free access to the Ward Room under that School House. When the Hospital was full, about a dozen beds were placed in the ward room, and occupied by convalescents and nurses. At one end of the gun house, the officers' room was fitted up, as a Dispensary, and in this room two medical students slept at night. At the other end of the house a kitchen was built, and adjoining it, in front, a space was roofed over and floored, for a dining room, the front of which was closed by sail cloth, which, during the

warm and pleasant weather, was drawn aside. The cellar beneath the house, which was filled with rubbish before its occupation as a Hospital, was cleansed, and about eighteen inches in depth of dirt, tar, &c., was dug out, and its place supplied with gravel. Over the gravel a new plank floor was built. The cellar was used as a wash room, bathing room, dead house (for the temporary deposit of the dead, until the bodies could be removed by the undertaker,) closets, &c., in various divisions. The ward of the Hospital was thoroughly cleansed and whitewashed. The floor was whitewashed as often as once in two days, during the season.

During the first week or two of the epidemic, the beds, which were palm-leaf mattrasses, upon common cot bedsteads, were covered with vulcanized rubber cloth, sheets, and quilts. Subsequently the quilts were removed and thick woolen blankets substituted. An unlimited supply of these and unbleached cotton sheets was provided by the Cholera Committee. Nothing, in fact, which was desired by the medical officers, for their own comfort, or for the comfort of the patients, was refused.

For the first ten days of the epidemic, Dr. Clark had charge of the Hospital, with the assistance of Mr. H. B. C. Greene and Mr. Charles T. Hildreth, medical students. After this time the following gentlemen were on duty at the house.

HENRY G. CLARK, M. D., *City Physician.*

CHARLES E. BUCKINGHAM, M. D.
JOHN C. DALTON, JR., M. D.
HENRY W. WILLIAMS, M. D.
} *Associate Physicians.*

HENRY B. C. GREENE,
RICHARD M. HODGES,
} *Resident Students.**

* Mr. A. F. SAWYER was also a part of the time acting as assistant.

The morning visit, at 9 o'clock, was made by Dr. Clark, the afternoon visit, at 4 o'clock, by Dr. Buckingham. To these visits all medical men were invited. Another visit was made at 9 o'clock, P. M., by all the Physicians, and this visit was private. It was the duty of Dr. Williams to remain in the house as much of the time as possible, for the purpose of visiting reported cases of Cholera in the neighborhood. To Dr. Dalton was assigned the duty of making the autopsies, and a later portion of this report will exhibit the faithfulness with which this duty was performed. Too much credit cannot be given to the resident students for their zeal and self-devotion to their duties. They were often out of bed until one o'clock in the morning, and it was not unfrequently the case that they were at their work by daybreak, besides being often called upon in the night.

No medical men could have been more united in their opinions, nor more willingly united in their action than the Hospital Staff. Their final separation was the only circumstance, which they regretted at the close of the epidemic.

It is our duty to express our satisfaction with the drugs, which were always well and punctually supplied by Mr. Thomas Restieaux.

We feel greatly indebted to the Cholera Committee of the Board of Health, and particularly to Henry B. Rogers, Esq., their Chairman, for the willingness with which our calls were answered, and the readiness with which the sick and their families were assisted.

To the Consulting Physicians of the City, who were frequently at the Hospital, we acknowledge ourselves under great obligation for the very courteous and considerate manner in which they were always ready to

favor us with their opinions and advice whenever called upon.

To his Honor the Chairman of the Board, for the very cordial support which he was at all times prompt to render, we return our sincere thanks. He was very often at the Hospital, and visited also in person many of the bad localities which originated some of the worst cases, putting into effect the most energetic measures for their removal.

The Catholic Clergy of the City have our warmest thanks for their energy and activity in their efforts to prevent the spread of the sickness among the class of persons over whom they had especial influence. Rev. Mr. O'Brien, of that Church, was almost daily in the Hospital, sometimes much more frequently, and by his advice and co-operation with us, we were often enabled to remove patients to the Hospital, who would otherwise have died at their miserable homes, neglected and forsaken.

The publishers of the several newspapers which were furnished gratuitously at the Hospital during the whole period of its continuance, will please accept our thanks for the very acceptable favor. The Police department has already been referred to by Mr. Rogers, in a manner which has our cordial endorsement.

MEDICAL HISTORY OF THE DISEASE.

CAUSES.

On the 29th of June, the day of its completion, the first patient was received at the Hospital; and the last patient was discharged on the 15th of November. During this period of time, there were under treatment in all, two hundred and sixty-two patients; of these, one hundred and sixty-six died and ninety-six recovered. Up to the 5th of July, there was not a large number of sick received. On that day five were admitted. After this until August 2d, the average number of patients was small, on some days one or two, and on others none being admitted. On the 2d of August the number of admissions was four, and on the succeeding day, which it will be remembered was the day of fasting appointed by President Taylor, the number of admissions suddenly increased to fifteen. For several days after the admissions varied from five to twelve, except on the 4th, when there was one admission only. On the 15th of August there were but three admissions. After this date the number of patients again began to increase, until the 1st of September, on which day eight were admitted. From this date the number gradually fell off again till the 19th of September, when one only was admitted, and after that day till the 29th, when the last Cholera patient was admitted, there were only five admitted in all.

It is perhaps difficult to say, what was the cause of these apparent exacerbations and remissions of the disease. We shall subjoin an account of the meteorology of this city during the epidemic, from which readers may draw their own conclusions. Days of public fasting have always been noticed in other places, as occasions for increased severity of this disease, but the cases of Cholera in this city were chiefly among that class of the inhabitants, foreigners, who pay but little attention to our public fasts. It is more likely that, as they were mostly intemperate subjects, the fast day was made with them a day of general relaxation from their usual labors, and that there was really more than the usual amount of indiscretion among them. One fact, however, is worthy of note, that at this time, Rev. Theobold Mathew was in this city, upon his temperance mission, and many of the subjects of Cholera had lately taken the pledge, had at once lost their appetites and become affected with diarrhœa, one of the first and most marked symptoms of Cholera.

No class of the inhabitants of Boston was perfectly free from the attack of Cholera, though the number of those in easy circumstances attacked was so small, that they might almost be overlooked, in the history of the epidemic.

The general opinion of physicians in this city seems to be against the contagious nature of the disease, and we have seen no reason to differ from their opinion. There were about twenty-five attendants in the Hospital exclusive of medical officers, at different times, all of whom were more or less constantly in proximity to the subjects and their excretions, and many of them were only for a very few hours at a time out of the ward. Four physicians and four medical students were engaged in the duties of the Hospital; two of the latter for a

short period only. Of the others, the students were untiring in their devotion to the sick, often irregular in their meals, and having a much smaller allowance of sleep than nature is supposed to require. The physicians spent from six to eight hours daily in the house, until about the close of the epidemic, and when the number of patients was large, were often engaged in the duties properly belonging to nurses. Of all these attendants, but two had the symptoms of the disease, and in one of these (Mr. Greene) they were not all present, and in the other (Mr. Ripley) the most marked early symptom (rice water discharges) was entirely wanting. Two of the attendants had Cholera at the time they entered the house, and neither of these had any return of the disease. The diet of the attendants was not restricted. Meat, fruit, vegetables, even salad, puddings, &c. were freely partaken of.

SYMPTOMS.

The symptoms of Cholera in our patients did not differ from those reported in other places. It usually began with purging of a yellowish fluid, with or without flocculi, soon followed by vomiting. The cramps generally began at the time of the vomiting. In some of the cases, the discharges were described as "at first bilious." Patients came in generally so late in the course of the disease, that we had no chance of seeing the early symptoms, except in private practice. In many cases, the hearing was early impaired, and always upon being particularly questioned, they expressed a sense of noise in the head, at the commencement. The sight we know but little of. The eyes were always injected, often dry, always sunken and surrounded by a dark areola. The tongue was almost always dry, when we first saw it, there being seldom enough moisture

upon it to act upon test papers. When this was not the case, the tongue was generally strongly acid. The thirst was always excessive, and was never relieved wholly by drinks. Restlessness in the fatal cases was one of the most marked symptoms, it being impossible to keep any bed-clothing upon the patients, except by a resort to the bed-strap. The voice was early husky, and towards the close, in fatal cases, was hardly perceptible. There did not seem to be any direct relation between the dryness of the fauces and the aphonia. In the favorable cases, the voice soon became improved. The urine was declared scanty in almost every case, or entirely wanting for hours previous to entrance. After it re-appeared, patients with few exceptions recovered from Cholera; those who died after its re-appearance, went into a febrile state, which lasted from one to four or five days. The first urine it was not generally our good fortune to collect, though it was attempted, as it was passed with the dejections. When examined, it was never found highly charged with albumen, sometimes not at all; its specific gravity was high, and its reaction acid. The rice water dejections were not always marked. The late period in the disease, at which we saw patients, may account for this, but in those cases when they were not seen, the dejections were frequent and liquid, with a deposit of broken down blood, resembling the grounds of an infusion of black tea, with a peculiar fleshy odor, which it was not easy to mistake or to forget. These dejections were sometimes pints in quantity, and lasted for several days before bile was excreted.

Apparent narcotism was noticed in many of the fatal cases upon entrance. The patients who exhibited this symptom had generally been many hours under treatment before entrance, and from many of them we learned that excessive doses of opium had been taken. In most of these patients there was a contracted pupil, not influenced by light or darkness, stertorous breathing, difficulty of hearing, together with the customary evacuations and occasional cramps. These appearances were the more remarkable, because in the generality of fatal cases, patients were decidedly active and intelligent until within a short time of death, which in these cases was always the speedy result.

The pulse was usually accelerated to more than one hundred in the minute, and feeble. In many cases it could not be counted, when the patients entered. Notwithstanding this, the action of the heart was violent and the external vessels of the head were much congested. In a large number of the cases, no pulse could be felt at the wrist at the time of entering, these patients being yet able to walk into the house and raise themselves without apparent effort. This was marked in one patient in whom the pulse afterwards returned. But he was very restless, constantly rising in bed. He died suddenly while drinking some water, which he got out of bed to obtain, during the momentary absence of the nurse. In one woman who recovered, no pulse could be distinguished at the wrist for two days.

The shrivelled, cold and clammy skin and its livid color were never absent throughout the whole course of the disease in any patient.

Secondary fever was almost always present in the favorable cases, and in many of the fatal ones. It was more marked in the intemperate. In the latter, whether they lived or died at a late period, delirium resembling *mania a potu* was generally present at night. The amount of valerian, brandy and opium taken by some of these patients before sleep was produced was almost incredible. In one patient (Coolidge) who died, this delirium was very remarkable, continuing without ces-

sation for several days. He was always in fear, but could be easily quieted until the last day, when his struggles and outcries were intolerable. One patient (Rogers) came into the house drunk twice, before she was admitted with Cholera. She recovered after a long illness, but for two or three days and nights she had no sleep. No patient is known to have died, except from the fever, who slept without opium.

One of the most peculiar points noticed by us in this disease, was the appearance in three patients who recovered, of a rash exactly resembling the rash of the typhus or ship fever, which prevailed here the last year and the year previous. In one case, (that of Dill) the whole body was so thickly studded with the eruption that a pin's head could not have been placed between any two of the blotches, although in most parts it was distinct. This lasted in his case for four days and was accompanied with paralysis of the bladder, rendering the employment of the catheter necessary for several days. A peculiarity noticed in this eruption was, that it was not seen, except in Dill's case, on parts when first exposed to the light. After a half minute's exposure, however, the surface became quite dusky red and again regained its former color, when recovered.* This eruption was seen also in three out-patients who recovered, and who were treated by Dr. Williams.

The perspiration was remarkable, in almost every case which lasted for several days, for staining the bed clothes of a reddish brown. It had a strong, sickly odor.

TREATMENT.

We can hardly presume to recommend any method of treatment, nor can we say positively what was the

* In this patient the desquamation of the cuticle was very remarkable.

invariable effect of different remedies. Patients came in, almost always so far gone in collapse, that we expected them to die at any rate. With this feeling it was in several instances judged best to give them no medical treatment, but to let them follow their own inclinations. In no one case, where this practice was followed, did the patient recover. Early in the epidemic a circular was issued to physicians requesting them to send their cases early, if at all. We believe, that there was hardly a fatal case when this request was acceded to. We feel it our duty to mention this, because we believe that Cholera, if early treated, is almost as manageable as any of the severe epidemic diseases, but that the stage in which it is manageable is of very short duration. One physician is reported to have said that more than three quarters of all the Cholera patients who were under his sole charge were saved, while of a large number sent by him to the Hospital not one recovered. The latter part of this statement is perfectly correct, and it is equally so, that not one patient came from him to the Hospital, who was not moribund at the time of entrance, or became so very shortly after. The cases that could not be kept under regular treatment, those which were already hopeless, were sent to the City Hospital. We should not feel that we were doing ourselves justice, if we suffered our large bill of mortality to be publicly exhibited without this correlative fact.

The remedies which were used were numerous. Of some of them it may be well to speak in detail.

Narcotics totally failed of any beneficial effect. Opium in no case, either single or combined, arrested the vomiting or purging, and it was often thought to hasten the fatal termination. *Camphor* always failed except perhaps to relieve the cramps, which it was sometimes

thought to do. In two patients, to whom it was exhibited, the whole surface became before death very dark, and the lips actually black. In these cases narcotism was very evident.

Stimulants almost always failed. To some patients brandy and water was freely given. Three of these recovered after a severe secondary fever. Very few were relieved at all, and almost every patient treated in this way had secondary fever. The same may be said of the various preparations of ammonia, of the astringent stimulants, of coffee and of tea. Those who drank freely of strong coffee and tea and had no other treatment except external heat, died early. *Electricity* failed entirely.

Emetics. The usual emetic dose was ipecac: and capsicum in powder, about forty grains to a drachm each. This was always exhibited in the early cases, and at least with temporary benefit. The pulse, which was often gone, returned at the wrist, and with it, the warmth of surface. How much our omission of this treatment, if any thing, had to do with the greater mortality in later cases, we are unable to say.

Calomel was given alone, in large doses, in a few cases. We could not perceive that it had any effect. It has been said, that if you ever give a Cholera patient a mercurial sore mouth, he will recover. This is undoubtedly true, and is equivalent to saying, that if a patient lives long enough, he will get well.

Quinia, in the form of the sulphate, was used in a very few cases. We are not positive that these patients died any sooner than others: none of them recovered. The drug was administered in five, ten, and twenty grain doses.

Tannic Acid was frequently used in enemata, in proportions of five or six grains to the ounce of fluid,

and almost always with temporary relief of the purging. By the stomach in doses of two or three grains it sometimes appeared to check vomiting.

The astringents and aromatics had usually but little if any effect. *Ginger* was almost always immediately rejected, in whatever form used. *Cinnamon* in tincture fared but little better. The aromatic powder of the United States Dispensary was oftener retained. But upon none of these drugs do we place any reliance.

Ether, could be given in large enough doses by inhalation to relieve the cramps, but we are not aware that any patient recovered, who used it to this extent, or that others were benefitted by it.

Cathartics were never used until the dangerous period was supposed to have passed. *Elaterium* was suggested by one of the Consulting Physicians, as possibly having the power to set up a new action. It was administered in one instance, but without any apparent effect.

Venous Injection. Several solutions of alkaline salts were injected into the veins, as recommended by Dr. Stevens, of the West Indies, and in one or two cases simple warm water was injected. One patient, the first one upon whom this treatment was tried, after he had become apparently moribund, lived and appeared well for two days; but the secretion of urine never returned, and he died comatose. In one or two other cases there was temporary relief, but death invariably followed shortly after. We were not inclined to make new trials of this mode of treatment after the first six weeks of the epidemic.

External Heat was freely applied, by mustard, hot sand, hot bottles, and by dry heat from a furnace; but generally after collapse was marked, none of these had any other effect than to annoy and irritate the patients. Those patients who could be induced to re-

main covered with blankets fared the best; with or without other artificial heat. Those who were restless and threw off the clothing invariably died. On this account the bed-strap was sometimes used with advantage, and we can but regret, that, notwithstanding the apparent cruelty of confining the limbs of a sick man, it was not oftener applied.

Drinks, of whatever nature, were useless. Those, who drank the least, vomited and purged the least. The call was always for cold water. When taken in quantities of more than a teaspoonful, it was speedily rejected. A draught of half a pint was sure to be followed by the ejection of a pint and a half. Those patients to whom drink was steadily refused, neither vomited nor purged freely afterwards, often, not at all. They more speedily grew warm, and those who for an hour were kept closely enveloped in blankets, took no medicine, and got no drink, suffered the least, and were the most likely to recover.

Hot baths were painful to the patient, and they generally sank speedily after their use. *Cold sponge baths* were more grateful, and even during collapse they seemed for a short time to revive the patients. Bladders of ice to the head, and the *cold affusion*, were resorted to advantageously, in cases of violent delirium.

The wet sheet, (packing, so called,) was tried faithfully, but every patient upon whom it was tried, died. Reaction did not take place in any one of them, and we soon ceased to resort to it. Our experience is against the free exhibition of water either within or without.

Bleeding by the lancet and by cups, was several times resorted to. In that stage of the disease before the cramps have gone off, great relief was experienced from the lancet. Later, like other remedies, it was of little avail, though we cannot say that the life of any patient

was shortened by it. An absent pulse sometimes returned, during bleeding, and several patients dated their relief from the opening of the vein. Several who were collapsed are among these, and two of the male nurses are examples of its innocuousness, at least. The opening of a vein was never followed by a stream of blood, but sometimes, by kneading and rubbing the limb, a thick, tarry blood was expressed, which was followed after an ounce or two was drawn, by more fluid blood. In such cases the heart which was almost always beating strongly, lost its excessive action, the pulse returned, the cramps, if they existed, disappeared, and the patient, if inclined to recovery, speedily rallied, and if inclined to die, was relieved of those terrible cramps, which no one can imagine till he has seen them. Of bleeding, in an early stage of the disease, we are inclined to speak quite favorably, though not with so much enthusiasm, as many East Indian surgeons do. The extraction of blood from the nape of the neck by cups, was, in a few cases, useful.

Kreasote was used at first in many cases. It sometimes seemed to relieve the vomiting, but of its power to do this we cannot speak so favorably as of the

Wood Naphtha. In no case, and there were many in which this was administered, did it fail, after the second or third dose, to relieve the vomiting perfectly. It was given in various doses, clear, from twenty minims to a drachm. Even, in cases which ultimately proved fatal, we were perfectly satisfied of the power of this drug to check vomiting speedily.

Much benefit was thought to be derived from the exhibition of *Saline medicines*. Stevens's mixture of the chlorate of potash, in solution, with the hydrochlorate and bicarbonate of soda, was the form in which salines were usually given. We used larger doses of

the chlorate generally than Stevens recommends, but are not able to say that this was an advantage.

Homœopathic Treatment. As the stimulating plan of treatment, the Hydropathic, and that called Allopathic, had been fairly tried, it might be asked, why we did not practice Homœopathy, in some cases. The truth is, that no one of our number understood it, and, notwithstanding offers were made to several Homœopathic practitioners, we could not find among those any, who were willing to come into the Hospital, upon equal terms, and take charge of an equal number of patients with ourselves.

Several complications ought not to be passed by without notice. We refer to pregnancy and menstruation. One woman, who was brought into the Hospital after suffering two days from Cholera, was delivered of a dead child, having the appearance of collapse, and died herself in about twenty-four hours. One woman died pregnant. One other woman miscarried, and recovered. A third, who was pregnant and nursing at the time of entrance, retained her fœtus, and the secretion of milk continued till after the stage of collapse had passed. She then had fever, delirium, and recovered. She was treated at first with stimulants, and after the first day with salines. She was intemperate.

Several women menstruated soon after entrance. They all recovered.

It was remarked that but a very small number of the children who were admitted, died. In them the state of the skin and the discharges were decidedly choleric, the cramps alone not being well marked. This is the more strange because many of them were collapsed on entrance.

Post mortem contractions were seen or could be excited in every fatal case; the time of their commencement being about fifteen minutes after death. In one case the muscular action was so great, that the nurses supposed the man to be alive, thirty minutes after actual death. The external muscles in this man were in constant action, the motions being like tides regularly progressing from one to the other of their extremities. They were strongest in the extensor muscles of the thighs.

PATHOLOGY.

Although the morbid appearances after death from Cholera are not such as to demonstrate, to any great extent, the pathology of the disease, they are yet sufficiently peculiar to deserve a large share of attention. Even purely negative facts, such as the absence of inflammation, &c., though not so satisfactory, are surely quite as important as positive ones would be. Indeed, a proper attention to the post mortem appearances, imperfect as they are, would have prevented some very serious errors which have occasionally been entertained with regard to the course and treatment of the disease. Thus, it has been supposed that an attack of Cholera was necessarily accompanied by a suppression of bile; owing probably to the circumstance, that the bile, though present in the discharges to its normal amount, was yet diluted with such an excessive quantity of fluid as not to be recognized by its color. It will be seen, however, by an examination of the following autopsies, that bile is very frequently found after death in the duodenum and stomach, almost always in the gall-bladder, and that it can generally be expressed from the small ducts in the interior of the liver without difficulty.

In the accounts of post mortem investigations, made previously to the epidemic of 1849, there has been considerable discrepancy. Some writers have even considered their results as altogether trifling and inconclusive.

In the Report of a Committee to the French Academy of Medicine, made July, 1831, it is stated that "The profound study of a great number of statements of post mortem examinations leads to the following results:

I. The pathological changes found after death by Cholera are slight, variable, different, and even opposite.

II. In a stated system of organs, these lesions have no fixed seat, and still less a determinate character.

III. In a great number of cases the most exact observers state that no important alteration has been found."

So also in Scoutteten's History of the Cholera, (Boston, 1832,) page 27, it is said that "numerous post mortem examinations have revealed to M. Gravier a violent inflammation of the œsophagus and inner membrane of the stomach;" while no fact is more completely established by other observations, made in this City and elsewhere, than that there are, as a general rule, no constant traces of inflammatory action visible anywhere. It is notorious, that redness of the intestinal canal, though unaccompanied by any other alteration, is often reported as "inflammation." The experiments of M. Magendie, with regard to this point, were repeated by M. Contour at Moscow in 1848. "Like the learned French physiologist, he saw, in injecting water into one of the gastro-epiploic arteries, the blood give place to the injected fluid, and the redness of the mucous membrane disappear; a proof that it was caused simply by a sanguineous stagnation by congestion, and not by vascular obliteration from inflammation." (Tardieu, Bigelow's Translation, page 36.)

Some of these discrepancies, no doubt, are owing to hasty or inaccurate observation. Others may be explained, by the rapidity and violence of a disease, in which death often ensues before any marked alteration can be

produced in the solid textures. It must be recollected, also, that, from the first moment of attack a process is going on within the body which rapidly passes through its successive stages; so that a patient who dies after one day's illness may present an assemblage of morbid appearances quite different from those which would have been discovered, had he lived six hours longer. We should also take into consideration the possible variation of the morbid appearances of different epidemics, or of the same epidemic in different countries. It is even quite certain that such variations take place during the course of the same epidemic in the same place. Several were noticed during the course of the Cholera last summer in this City.

Nevertheless, while making allowance for all these causes of difference, we are confident that the morbid appearances of Cholera are not, by any means, so slight and variable as they have sometimes been represented. Though there is no single lesion of any particular organ which is characteristic of the disease, yet the whole series of appearances, taken together, are sufficiently well marked and distinctive, to enable one accustomed to them to decide with certainty that such a patient died of Cholera. The disease was, in fact, thus recognized in one of the following autopsies, the case of Mary Ann Maran. This patient was in the Hospital for nine days without any choleric appearances, and with only such symptoms as were referable to a disease of the liver. She was suddenly attacked, in the night of September 7th, with purging and signs of collapse, and died early the next morning. Most of her discharges having been involuntary, and passed in the bed clothes, their precise character was not ascertained; and, as she had been in a feeble state for some time previously, no surprise was excited by the fatal termination

of her illness. She was not supposed to have been necessarily affected with Cholera. Yet the appearances at the autopsy were such as to demonstrate, beyond a doubt, that she died of a sudden attack of Cholera, which had supervened upon the old hepatic disease.

The morbid appearances are, then, sufficiently constant and peculiar. If their study has not, as yet, thrown much light on the essential nature of Cholera, perhaps the investigation of symptoms during life has, in this respect been, so far, equally unsuccessful; and although the rapidity and obscurity of the disease hitherto presents unusual difficulties to the observer, it is to be hoped that these will rather stimulate perseverance than discourage it.

The most remarkable and constant appearances were the following.

1. An unusual dryness of the pleura, particularly where the anterior edges of the lungs overlap the pericardium; so that, on raising them, the two pleural surfaces separated from each other with some difficulty, and presented a dry and wrinkled appearance, instead of their usual moist and polished aspect.

2. A nearly empty condition of the pericardium; that cavity often containing not more than eight or ten drops of fluid.

3. The peritoneum was smeared with a thin layer of slimy opaline secretion, which was drawn out into minute threads on separating the convolutions of the small intestines. When this substance was not in sufficient quantity to be visible on the peritoneal surface, it could be collected by drawing a few coils of intestine through the fingers, when its slimy, sticky feel was easily recognisable.

4. A moderate swelling and opacity of Peyer's patches, and of the solitary glands in the lower part of the small intestines;—in the large intestine, a similar developement of the mucous follicles, the mouths of which were often widely open, and sometimes marked by a black point.

5. A shrivelled condition of the spleen with deficiency of blood.

6. A completely contracted and empty state of the urinary bladder, the mucous surface of which was smeared with a thickish, creamy secretion, sometimes abundant, sometimes moderate in amount.

7. The mucous surface of the vagina was smeared with a somewhat similar secretion, but thicker and less opake than that in the bladder; rather like thick starch in consistency and aspect.

The whole number of recorded autopsies was 33. Of these subjects 12 were males and 21 females. The large majority were adults. The youngest was 8, the oldest 60 years of age. Several of the females presented signs of recent menstruation. One was in the 8th month of pregnancy. In 15 cases, there were marks of previous disease; mostly tubercular deposites, peritoneal adhesions, fibrous tumors of the uterus, &c., &c. In this list, however, are not included such alterations as old pleuretic adhesions and simple ovarian cysts;—these lesions being everywhere so frequently met with. In five cases only, was there any previous disease, in an active condition; viz., two of pulmonary phthisis, one of tubercular pleurisy, one of cirrhosis of the liver, and one of a fibrous tumor of the uterus, which had induced redness and softening of part of the uterine substance.

Rigor mortis was established in every instance. In one case it was slight, and in a few unusually strong; generally, neither deficient nor excessive.

Besides those already mentioned, several other points deserve particular attention.

I. *Blood.* The blood was not so much altered, in its gross appearances, as might have been expected from previous accounts. It has been represented as quite fluid and destitute of coagula. In point of fact the coagulum was, as a general rule, remarkably deficient in quantity, or consistency, or both; but, not by any means, universally. In two cases, the coagulum in the heart was unusually abundant, and of firm consistency;—in eight, it was moderate in amount, and of natural firmness; and, in twenty, it was "small," "trifling," or "insignificant" in quantity, and loose, gelatinous, or semifluid. In three cases, only, was it entirely wanting. Coagula, however, often existed in the heart, when they were not to be found in any other part of the body.

The consistency of the fluid part of the blood after death varied considerably. In some cases no remarkable alteration was observed; in some, it was recorded as natural; —and, in two or three, it was unusually thin and fluid. In fifteen cases it was more or less thick and tarry, either throughout the system, or in particular situations. For, what was sufficiently remarkable, the consistency of the blood often varied in different vessels in the same subject. Thus in the case of Sarah Hill, the blood in the left cavities of the heart was thick, but that in the right cavities, thin. So, in the case of Andrew Patterson, the right cavities of the heart contained "fluid blood of natural consistency," but that in the left auricle and pulmonary veins was "dark and thickish." In the case of Mary Ann Maran, the blood in the vessels of the neck was observed to be thinner than that in the heart.

No constant relation was found to exist between the consistency of the coagula, and the length of time the patient had been ill.

It will be noticed, in the case of Catharine Hurley, who died pregnant, that the coagulum in the heart of the fœtus was of moderate consistency, while that of the mother was "very black and soft."

In five cases, there was a dusky red staining of the endocardium, or some of the lining membrane of the vessels, owing to the solution of the blood globules, and consequent imbibition of the coloring matter. This took place occasionally, in certain situations, while the remainder of the vascular membrance was free from alteration. Thus the "right cavities of the heart, and the heart, and the veins throughout the chest were stained of a deep red color;"—while the "left cavities were natural." (Case of Calvin Castleman.) The "lining membrane of the venæ cavæ, and of both right cavities of the heart, was stained of a purplish red; that of the left auricle, quite white and healthy; that of the left ventricle, slightly stained in some parts." (Case of Manus McCarty.) This process had apparently some connexion with the consistency of the blood; though not, perhaps, precisely that which we should expect; the staining sometimes being most strongly marked when the blood was thickest. Thus, in the case of Margaret Ince, the "aorta was stained dull red in its thoracic portion, where it contained dark fluid blood. In the lumbar region it contained some dark brownish and slate colored blood, almost as thick as putty; and at this spot the walls were stained of a corresponding dusky red and slate color. Below this the internal surface was natural."

II. In fourteen cases, *Ecchymoses* were observed in various situations;—mostly on the pericardium and external surface of the heart, or internally, immediately beneath the endocardium;—occasionally in the cellular tissue of the lungs, on the surface of the kidney, and between the lobules of the pancreas.

III. *The Brain* was almost universally natural in color, vascularity, and consistency. In three cases, only, was there any appreciable softening of the cerebral substance, and in three, some bloody engorgement;—viz., in one case, of the hemispheres generally; in one, of their superficial parts; and in one, of the lining membrane of the ventricles. The effusion of clear or reddish fluid into the arachnoid cavity, among the meshes of the pia-mater, and into the lateral ventricles, was a much more common occurrence. This, however, was moderate in amount;—the fluid in the ventricles varying from a few drops to two drachms. In three cases, only, was the quantity of fluid in the ventricles considerable;—in one, these cavities were said to be "filled" with fluid; in another the quantity was estimated at one ounce.

The most remarkable circumstance noticed in the head, was the presence of a quantity of dark, thick, bloody fluid in the arachnoid cavity, over the posterior part of the convexities of the hemispheres, just sufficient to smear the arachnoid surfaces; the arachnoid itself remaining, at the same time, quite natural. This appearance presented itself in fifteen cases. When first observed, it was so remarkable and unexpected, that it was thought the blood might have escaped accidentally from ruptured vessels, through some carelessness in separating the skull from the dura-mater;—but it occurred so frequently afterward, and always in the same situation, as to leave no doubt that it was a true morbid appearance, and a consequence of the disease. Considering its constant situation at the most dependent parts of the brain, and the fact that the arachnoid membrane itself always retained its natural transparent and polished aspect, this appearance seemed to be, in all probability, rather a post-mortem transudation, owing to the peculiar condition of the blood, than any effusion which had

taken place during life. Pains were taken to determine this point in the case of Margaret Flarnegan. This patient lay upon her back until the moment of death. The body was then immediately turned upon its left side, and kept in that position, till the autopsy, sixteen hours afterward. In almost every other case, the exudation was similar on the two sides of the brain. In this, it was "trifling, light colored and thin" to the right of the longitudinal sinus, but on the left side "copious, dark-colored, and thick." In one case, however, (Ellen Dorety) beside the above effusion, there was a thin plate of red *coagulum* on the superior surface of the cerebellum, which had taken the form of the cavity into which it was effused. This effusion, apparently, must have taken place during life, and at an early period of the disease;—since the coagulum was considerably firmer than that in any other part of the body."

Nothing was observed in any instance like the "sticky varnish" described (by Tardieu) as coating the surfaces of the arachnoid.

IV. *The Spinal Cord* was examined in two cases. In the first, that of Ellen McCann, who died in the choleric stage, it was absolutely natural in every respect. In the other, John McCarthy, who died in the febrile stage, it was decidedly softened in the cervical portion, and a little, also, in the dorsal, with some bloody œdema of the adjacent cellular tissue. These were the only alterations observed.

V. *Congestion.* Though congestion of the heart and lungs may very possibly exist during the early stages of the disease, yet it was not generally found to any great extent after death. In a majority of cases the lungs were natural in appearance, except for that moderate degree of engorgement of the dependent parts, which we are not surprised to see in any subject.

In three cases there were marks of unnatural congestion. In six, the lungs are spoken of as "deficient in fluids," "dryish," "much collapsed," and "shrivelled." In one case, there was general emphysema; in two, ecchymoses; and in one, John McCarthy, who had secondary fever, pneumonia.

The right cavities of the heart, contained a moderate quantity of blood, in fifteen cases; and in thirteen, they were "full." They were absolutely distended, in only three; but these were not the same three cases in which the lungs were congested. In two cases, the quantity of blood in the heart, was deficient.

The left ventricle of the heart was firm and thoroughly contracted, in nine cases. It was more or less deficient in firmness, in thirteen; and, in ten, it was completely flaccid. In one case its condition was only remarked as "natural."

VI. *Contents of the alimentary canal.* These varied greatly in quantity, color and consistency. They were thick, thin, gruelly, grey, yellow, yellowish white, pink, reddish, or puriform. They were sometimes like soap and water; sometimes thickish, and dull red in color, as if "mixed with red paint." Sometimes, they presented the appearance of true "rice water;" i. e., a thin, whitish, opaline fluid, which deposited a quantity of very fine white flocculi, looking, when collected at the bottom, like a layer of pure pus. Almost always, the contents of the stomach, and the small and large intestines, differed from each other in color, consistency, or both. Thus, in the case of Ellen Dorety, they were "reddish" in the small intestines, "grey" in the large. In the case of Michael Desmond, the small intestines contained a "thin, dingy, light-colored fluid, with flocculi of a wood-brown color." The frequent occurrence of the coloring matter of bile has already been noticed.

On several occasions, the ordinary re-agents showed the presence of albumen in the fluid part of the intestinal contents, in considerable or moderate quantity. Examined by the microscope, the flocculi, suspended in the rice-water fluid, invariably consisted of columnar epithelium, floating about in larger or smaller masses, or as detached cells. These epithelium-cells were so abundant and well defined, as to leave no doubt that they constituted nineteen-twentieths of the mass of the flocculi. This extensive exfoliation of epithelium, in Cholera, has been pretty thoroughly investigated by Dr. Ludwig Boehm, who considers it as one of the most characteristic phenomena of the disease. Dr. W. T. Gairdner, of Edinburgh, however, takes a different view of the matter. He considers the exfoliation as entirely a post-mortem occurrence, owing to the maceration of the intestinal mucous membrane by the contained fluid. He states, that the Cholera stools, passed during life, contain almost no perfect epithelium; and, also, that ordinary maceration will produce upon healthy mucous membrane a separation of epithelium, entirely similar to that which is found to have taken place in the intestines of Cholera patients. If maceration, however, is the only cause of the separation of such an enormous quantity of epithelium, how shall we explain its occurrence in other situations, where no unusual amount of fluid has existed? The mucous surfaces of the vagina, and of the urinary bladder are invariably smeared with a thick, whitish, pasty, or creamy secretion, which, on microscopic examination, is seen to consist entirely of detached epithelium-cells, mostly perfect in shape, and generally distinctly nucleated. But *these* passages have not been subjected to maceration. The urinary bladder, indeed, is completely empty, and, from the first moment of disease, has been deprived of the fluid which it

contained in health. Dr. Gairdner's opinion does not, therefore, seem entirely well founded. The fact, that epithelium-cells are not so distinctly recognisable in the Cholera stools passed during life, is probably to be explained by the circumstance, that, in their passage through the intestinal canal, they become, to a certain extent, disintegrated. We have sometimes seen, mixed with the columnar epithelium, "small roundish bodies, like the nuclei of destroyed or unformed epithelium-cells." Since the violent purging, in Cholera, very commonly ceases during the last hours of life, we can easily understand why the epithelium-cells, thrown off after that period, should remain uninjured. The bowels are then comparatively quiet, and they are not so much exposed to the causes of injury, as those which were evacuated in the earlier stages of the disease.

Beside the intestinal secretions, remains of food, undigested or indigestible, were not unfrequently found in various parts of the alimentary canal. In several instances, there were cherry-stones in the intestines; in one case, as many as thirteen. Bits of wood, small seeds, potato, bits of egg shell, &c., were among the articles found. In one case there was, both in the stomach and colon, a considerable quantity of fish-bones, of irregular, angular shapes, sharp pointed and jagged; some of them between $1\frac{1}{2}$ and 2 inches long. In one case there were several lumbrici in the small intestine, and in one, the cœcum contained about twenty *tricocephali dispares*.

VII. *The internal surface of the stomach and intestines* was almost universally pale, or natural in color. Its usual appearance was that of general paleness, with "slight," or "moderate" redness in some parts. It was very common to find the small intestines, generally pale, stained yellow at their upper extremity, and moderately

reddened toward the lower part of the ileum. In no instance was the redness general. The intestinal villi were almost always unusually distinct, appearing tumefied, and whitish opake in color. The spots of redness, were not unfrequently produced, as in the case of Margaret Harnegan, by scarlet coloration of the villi, while the rest of the mucous membrane retained its natural paleness. This condition was very readily distinguishable on close examination.

VIII. *The kidneys* did not usually present any remarkable alterations in appearance;—the most common being flaccidity of tissue, without noticeable increase or diminution in volume. Beside this, the kidneys were occasionally entirely destitute of their ordinary renal odor, and exhaled from their cut surfaces, a very distinct and peculiar smell, resembling that of molasses. This was noticed in only four instances; but as our attention was not directed to this circumstance until a late period in the epidemic, it may have existed more frequently.

It might, perhaps, be expected that we should discover some relation between the condition of the heart, the fluidity of the blood, and the duration of the disease. No such relation, however, existed, as will appear from the following table.

Case.	Left Ventricle.	Coagulum.	Duration of Disease.
No. 1.	Firm.	Abundant and firm.	12 hours.
2.	Flaccid.	Moderate in amount and consistency,	$13\frac{1}{2}$ "
3.	Firm.	" " " " "	
*4.	"	Deficient and loose.	
*5.	Deficient.	Moderate.	$31\frac{1}{2}$ "
*6.	Flaccid.	"	
*7.	"	Deficient.	$13\frac{1}{4}$ "
*8.	Deficient.	"	12 "
*9.	"	Entirely absent.	$33\frac{1}{2}$ "
10.	"	" "	48 "

Case.	Left Ventricle.	Coagulum.	Duration of Disease.
11.	Deficient.	Deficient.	15 hours.
*12.	"	Moderate.	53 "
13.	Firm.	Deficient.	52 "
14.	Deficient.	"	10 "
*15.	Firm.	"	15½ "
16.	"	Abundant and firm.	17½ "
17.	"	Deficient.	17 "
18.	Flaccid.	Moderate.	240 "
19.	*Natural.*	Deficient	15 "
20.	Deficient.	"	10½ "
21.	Flaccid.	"	150 "
22.	Firm.	"	96 "
*23.	Deficient.	"	42 "
24.	Flaccid.	Moderate.	24 "
25.	"	Deficient.	28 "
26.	Deficient.	"	20 "
27.	Firm.	"	12 "
28.	Flaccid.	"	19 "
29.	"	"	18
30.	Deficient.	Moderate.	108 "
31.	"	Entirely absent.	12½ "
*32.	"	Deficient.	30½ "
33.	Flaccid.	"	9½ "

The cases marked (*) are those which presented more or less abundant ecchymoses on the heart.

Three of the cases presented peculiar appearances, in consequence of the disease, or its sequelæ, being unusually prolonged, in one, to the tenth day, in another, to the fifth, and, in another, to the seventh.

The first of these patients, John McCarthy, was in the Cholera stage for three days. He then passed into a typhoid condition, with dry tongue and skin, epistaxis, sordes upon the lips and teeth, bilious discharges, a dusky paleness of the countenance and gradually increasing stupor.† Death took place after this condition

† He did not have the typhus eruption.

had lasted for a week. At the autopsy, the whole interior of the body presented, in a marked degree, the appearances of a septic, unhealthy process, which had depressed the vital powers, as if by the influence of a specific poison. This was evident, from the dusky, leaden hue of the peritoneum and air-passages, the pneumonia unaccompanied by active pleurisy, the early generation of gas in the cellular tissue of the mediastinum, and in the blood contained in the heart; and the disagreeable putrefactive odor, and dingy brown color, of the fluid which was effused into the cavity of the chest. The deposite of ammonio-magnesian phosphate, in a chrystalline form, is also attributed by Vogel to the developement of ammonia by decomposition.

The spleen was enlarged and engorged, presenting an appearance quite different from that usual in Cholera. The appearance of the mucous surface of the small intestines was also most remarkable, as showing the close pathological connexion between the secondary stage of Cholera and spontaneous typhoid affections. The patches of Peyer, situated at the *lower* part of the ileum, were inflamed and deeply ulcerated;—two of them showing an abundant deposite of typhus matter, which projected into the intestinal cavity, like loose, granular coagula. The description, given by Rokitansky, of the patches in an advanced stage of the "typhus process" corresponds so precisely with their appearance in the case of John McCarthy, that I cannot do better than to introduce it in this place.

"The most remarkable change is now effected in the typhus patches, and in the mesenteric glands; they soften. The patches become more tumefied, and if the softening process does not affect them uniformly, they acquire an uneven, tuberculated surface. The deposite

is converted into a grayish-red, medullary mass; this may, from the imbibition of bile, be at once metamorphosed into a dirty-yellow or brown slough, involving the investing mucous membrane. The slough shrivels up in a vertical and lateral direction, becoming loose at the edges and pultaceous, splitting in various directions, and detaching itself from the lowest stratum of submucous cellular tissue, by which means it is wholly or in part discharged; or the morbid product degenerates, when the epidemy is of very intense character, *into a loose, vascular, fungous growth, which is traversed by streaks of extravasated blood*, or is entirely saturated with blood; it is the chief source of profuse intestinal hœmorrhages, and is generally discharged piecemeal without antecedent sloughing." (Rokitansky's Path. Anat., Sydenham Ed., p. 70.)

In this instance, the peculiar morbid appearances of Cholera were entirely wanting; but in the second case, that of Andrew Patterson, several remained distinct. He was sick four and a half days with symptoms somewhat mixed, but still decidedly choleric. This patient never fairly passed into the secondary stage. His was in reality a prolonged case of Cholera; and although his skin at one time became warm, and the secretion of urine was re-established, yet he never entirely lost the choleric voice and aspect. In him, the dryness of the pleura, the empty condition of the pericardium, the slimy secretion on the peritoneum, and the moderate enlargement and opacity of Peyer's patches, were all present. This case, however, corresponded with the former, in presenting an abundant secretion of bile, and decided bloody congestion of the lower parts of the alimentary canal.

In the third case, that of J. G. Coolidge, it was not

absolutely certain that the patient had had Cholera, though the account given of his condition previous to entrance, made it altogether probable. A few marked signs of the disease existed, however, on entrance; some moderate coolness of the skin being the most prominent symptom. The succeeding affection in this patient was not typhous, but presented in a high degree the characters of delirium tremens;—i. e., a capricious, talkative insanity, in which the patient was often suspicious that some injury was intended him by the bystanders, and frequently referred to transactions in which he had previously been engaged. Beside the serous effusion, &c., in the brain, there were almost no well marked, recent alterations discoverable at the autopsy; dryness of the pleura and deficiency of fluid in the pericardium, being the only appearances referable to Cholera. In this instance, the secondary disease did not appear to be a true sequela of Cholera, but merely an accidental consequence. The delirium tremens, followed the attack of Cholera, just as it might have followed an attack of bronchitis, or the fracture of an arm.

It is sufficiently worthy of notice, that decided variations took place during the course of the epidemic, in the frequency of certain post-mortem appearances, as well as of some of the symptoms during life. It will be seen, by a reference to the foregoing table, that, at first the coagula in the heart were not unfrequently moderate in quantity and consistency, and sometimes even remarkably abundant and firm. Afterward, however, they were almost invariably deficient and loose, or even entirely wanting. In the early part of the epidemic, also, spots of ecchymosis on the heart, externally or internally, were an almost constant symptom; at a later period this appearance was rarely met with. In the

above table, those cases which presented ecchymoses on the heart have been marked with an asterisk, in order to show their great preponderance in the early periods.

A similar variation was noticed by Dr. C. Müller in his second report on Cholera, (1848) quoted in the Medico Chirurg. Rev. Jan. 1849. He says "at the commencement of the epidemic, the small intestines were generally found pale and anæmic; afterward appeared throughout the whole small intestine, intense hyperæmia."

The most correct account of the post-mortem appearances of Cholera, or at least that which agrees most completely with the results of the following autopsies, is that given by Dr. W. T. Gairdner, Pathologist to the Royal Infirmary at Edinburgh.

It was published, in the Monthly Journal of Medical Sciences for July, 1849, and quoted in the American Journal of Medical Sciences for October of the same year. He notices, the occasional firm and abundant coagulation of the blood, and the fact, that it is not by any means so universally thick and tarry as had been formerly represented. He alludes, also, to the absence of pulmonary and cardiac congestion, the occasional tendency to ecchymosis in various parts, and to the frequent occurrence of bile, in the intestines and gall-bladder;—points which had not been distinctly noticed by previous observers.

Two or three circumstances, not connected with Cholera, which were observed in the course of the post-mortem examinations, are of sufficient importance to receive particular attention.

I. In the case of Nancy McFarland, a woman 60 years of age, there existed at the apex of the right lung, an old tubercular cavity, large enough to contain half an

ounce of fluid, which presented every appearance of having remained inactive for a long time.

II. In the case of Mary Ann Maran, who had disease of the liver, the tissues generally were wasted so as to give the body the appearance of advanced emaciation, there was yet a superabundance of fat in all parts of the body. The liver was also remarkable as exhibiting two different stages of the same disease (cirrhosis;) the right lobe being enlarged, the left atrophied.

III. In the case of Margaret Harnegan, a girl 22 years of age, whose body presented every appearance of perfect developement and robust health, there existed an abscess in the parietes of the chest containing one and a half ounces of pus; which apparently was remaining perfectly quiescent in its position, without any tendency to discharge itself, either externally or internally.

THE AUTOPSIES.

The following autopsies are arranged in the order of their occurrence; each one being preceded by a brief summary of the most important circumstances of the case previous to death. This method was preferred as more concise and convenient, and, on the whole, quite as likely to be useful, as a more detailed history of the symptoms and treatment.

I.

NANCY MCFARLAND. *Aged* 60. *Widow. Irish. Intemperate. Cholera for* 12 *hours, preceded by four days' diarrhœa. Treatment; opium, brandy, capsicum and cinnamon, freely. Insensibility for last two hours of life. Autopsy* 17 *hours after death.* JULY 7.

Rigor mortis natural. Much purplish discoloration of skin; not particularly of dependent parts. Abdomen prominent, resonant, but not tympanitic;—has upon it many cicatrices of pregnancy. Muscles red. Fat rather abundant.

Chest. Pericardium natural. Heart of good size, moderately contracted. Left ventricle round and prominent. Right cavities contain an unusual amount of dark red, and fibrinous coagula, of moderate consistency. Left ventricle nearly or quite empty. Left auricle filled with a dark red, moderately firm coagulum. No ecchymoses on heart.

Both lungs have nearly universal old adhesions. Moderate sanguineous engorgement of posterior parts. Left lung crepitates well every where, but has a few well-defined, inactive tubercles scattered through its substance. Right lung is solidified at apex, to the extent of three cubic inches, at which part pleuritic adhesions are particularly firm. Solidified portion is occupied at its upper part by a roundish cavity, capable of containing, at least, half an ounce of fluid. The walls of this cavity are quite smooth, reddish in color, and smeared over with a very small quantity of thin puriform fluid. The whole has an entirely inactive appearance. A bronchus, one line in diameter, opens into cavity. No other abnormal appearances in lung. Tuberculous cavity healed.

Abdomen. Peritoneum natural. Stomach and intestines, pale externally, with slight rosy tinge. Stomach contains about half a pint of turbid greyish

fluid. Mucous membrane pale; thinned and softened in cœcal extremity. No other remarkable appearance.

Small intestines moderately distended with air and fluid;—contain in all perhaps ten ounces of "rice water" fluid. Mucous membrane shows nothing unusual, except a little red injection in duodenum. Peyer's patches distinct, not much altered. Solitary glands not seen.

Colon rather distended in ascending portion, contracted in transverse, and moderately full in descending. Rectum nearly empty. Mucous membrane of large intestine quite pale and smooth.

Peritoneal adhesions.

Liver of natural size, with numerous old, and somewhat firm, adhesions to diaphragm, and some to stomach. Rather red externally. Internally it presents, in various parts, ill-defined spots of anæmia. Consistency of liver generally a little soft.

Gall bladder contains a drachm or two of green bile, of ordinary consistence.

Spleen very soft; otherwise natural.

Disease of kidney.

Left kidney natural. Right kidney much smaller than left; of a dark, rather slaty color. Its surface shows numerous strongly marked depressions, produced by atrophy, of cortical substance, which is here transformed into a finely granular mass, entirely distinct from remaining healthy parts. No marked difference in color. Lining membrane of pelvis natural. Urinary bladder completely contracted.

M. glands tuberculous.

Mesenteric glands generally enlarged and tuberculous, rather soft and cheesy, but enclosed in a thick double layer of fat.

Fibrous tumor.

The uterus has a fibrous tumor in the thickness of its walls, which is globular in shape, and about the size of a filbert. It is otherwise natural.

Right ovary, atrophied, to a considerable extent.

Ovarian cyst.

Left ovary completely atrophied, and its place occupied by a firm cyst, somewhat lobulated externally, but having a single cavity, capable of containing one ounce of fluid. This cavity encloses about half an ounce of thickish, opake, yellowish, fluid (consisting

of water, albumen, and oil,) a mass of semi-solid, granular fat, almost completely soluble in ether; and a loose knot of tangled, reddish hair. Walls of cyst, firm, and about one eighth of an inch in thickness. Internal surface, smooth and polished, and of a red color over greater part; but there is one spot, occupying about one sixth of the whole, which is rough and yellowish.

The fluid, both from the stomach and intestines, in this case, was examined. It contained albumen, chloride of sodium, and the earthy phosphates. That from the intestines was more strongly albuminous than that from the stomach.

The flocculent deposite, under the microscope, consisted almost entirely of epithelium.

The earthy phosphates were precipitated from the filtered fluids, by ammonia, in the following chrystalline forms:—

Fig. 1

Fig. 2

A drop of that taken from the stomach, evaporated on a slip of glass, left the following deposite, (principally chloride of sodium.)

Fig 3.

II.

July 14. ISABEL HASSEN. *Aged* 45. *Married. Irish. Temperate. Cholera for* 13½ *hours. Slight previous diarrhœa. Severe cramp. Insensibility, for last seven hours of life. No medicine given, owing to insensibility. Marked post-mortem contractions, and heat of body,* 15 *to* 20 *minutes after death. Autopsy* 17½ *hours after death.*

Rigor mortis well developed. Purplish discoloration very moderate. Sclerotics, when exposed to the air, dry and brownish. Corneæ not shrivelled. Nails dark purple. Skin of fingers shrivelled. Abdomen of moderate resonance, neither distended nor sunken. Muscles red.

Head. Dura-mater natural. A little fluid blood in longitudinal sinus. A small amount of fluid in arachnoid cavity, over each hemisphere. Arachnoid natural. Substance of brain, of natural color and consistency. Very small quantity of fluid in ventricles.

Chest. Some dryness of pulmonary pleura over pericardium. Pleural surface of pericardium itself
Pleura dry. quite dry, and somewhat shrivelled. Pleura otherwise natural. Pericardium internally normal, with ordinary amount of clear fluid. No ecchymoses on heart. Great veins about heart moderately distended.
Heart flaccid. Heart flaccid. Right cavities contain a moderate amount of dark fluid blood and reddish coagula, of good consistence. Blood not particularly thick. Left cavities nearly empty. Substance of heart rather soft; otherwise natural.

Lungs, of a mottled grey, anteriorly; purplish, posteriorly. Both have a considerable amount of vesicular emphysema along edges of upper and middle lobes; (upper of L, upper and middle of R.) Moderate sanguineous engorgement of posterior part of both lower lobes. Lungs crepitate well every where.

Some softening of substance universally; otherwise Lungs soft.
natural.

Larynx, trachæa, and bronchi, pale internally; smeared with a very small quantity of thickish, creamy fluid.

Abdomen. Peritoneum, which lines upper and anterior part of abdominal parietes, is rather dry;—elsewhere moist and shining. No unusual secretion on peritoneum any where.

Small intestines, show a moderate pinkish injection externally, and are everywhere about equally distended with air and fluid. They contain one pint (by estimate) of thin, reddish-grey, turbid fluid, with a faintly acid rëaction. Fluid in duodenum has a slight greenish tinge, and a neutral rëaction.

Small intestines pale internally. Duodenal glands not unusually developed. Peyer's patches, moderately developed towards lower part of small intestines, and a little softened. Solitary glands not seen. There is a considerable amount of sub-mucous emphysema, which commences three feet below the pylorus, and extends four inches downward;—the mucous membrane being raised in small bullæ, which are easily made to change their situation by scraping with the edge of the knife. Mucous membrane at this part, as in others, absolutely natural in color and consistence.

Large intestine, pale externally;—contains about one pint of greyish white, "gruelly" fluid. Internally, pale. Mucous follicles not noticeable.

Stomach contains about half a pint of dingy, olive-colored fluid, thinner than that in remainder of alimentary canal. Mucous membrane generally pale;—gelatinized (cadaveric alteration) over nearly whole of posterior half of organ, less universally, over anterior;—not otherwise remarkable.

Liver, of natural size and consistence;—mottled red and purplish, externally; brownish red, internally. Sallow color of gall-ducts, in interior of organ, well marked.

Gall-bladder contains half an ounce of rather thin, dark, olive-colored bile.

Spleen, small, firm, blue, externally. Peritoneal coat can be stripped off, leaving surface of organ smooth.

Both kidneys rather flabby;—otherwise natural. Urinary bladder not contracted, but collapsed and empty;—contains only a few drops of thickish creamy fluid.

Vagina, smeared with a whitish, sticky substance, like starch. Os uteri, reddish-purple; has imbedded in its substance several small hard nodules, which prove to be cysts, containing a gelatinous fluid. There is a similar cyst, but pedunculated, growing from inner surface of the cervix. Cavity of uterus is occupied by a purple-colored, fleshy, polypus, about the size of a raisin, which is attached to fundus of cavity by a broad base. Uterus otherwise natural. Ovaries, atrophied.

III.

July 15. Roger Ryan. *Aged* 50. *In Hospital, for* 6½ *hours, with Cholera. No previous history obtained, owing to patient's deeply collapsed situation. Treatment;—strong coffee, freely, (three pints, in* 6½ *hours;) warmth to the feet, and inhalation of ether, with relief to cramps. Pupils dilated, for last half hour of life. Autopsy,* 17½ *hours after death.*

Cadaveric rigidity strongly developed. Very moderate cyanosis, except of finger nails, where the blue color is strongly marked. Fingers wrinkled. Conjunctivæ, sclerotics, and corneæ, which have remained covered by the lids, natural in appearance. Abdomen not prominent.

Muscles have a slight slaty color.

Head. Brain and its membranes everywhere quite healthy.

Chest. Dryness of the pleura, which covers pericardium and diaphragm on right side, sufficiently marked. Pericardium, natural, internally. No ecchymoses on heart. Right auricle much distended. Both right cavities, pulmonary artery, and venæ cavæ, distended with dark fluid blood, and a large proportion of soft, red, and fibrinous coagula. Right ventricle rather flabby. Left ventricle firm, nearly empty. Left auricle contains a moderate quantity of fluid and coagulated blood. Whole heart, somewhat hypertrophied;—otherwise natural.

Both lungs similar in appearance;—mottled greyish and black, anteriorly; purplish, posteriorly. Some vesicular emphysema at upper and anterior parts of each. Moderate sanguineous engorgement of posterior portions of lower lobes. Both lungs crepitate everywhere, and are of natural consistence.

Larynx, trachea, and bronchi, internally pale. Mucous membrane covered, from immediately below vocal chords to small ramifications, with numerous minute drops of yellowish viscid secretion, which at first appear like small vesicles, but can be easily brushed off from mucous membrane. Dotted secretion in air passages.

Abdomen. Peritoneum, a little dryish where it lines anterior wall of abdomen;—elsewhere sufficiently moist. No unusual secretion on surface. Small intestines decidedly reddish, externally;—moderately distended with air;—contain a few ounces of yellowish-white, turbid fluid, with a large amount of flocculent matter. Mucous membrane generally pale;—somewhat reddened in several spots. Consistence generally natural. Duodenal glands not remarkably developed. Solitary glands visible, but not enlarged, in lower part of ileum;—not elsewhere. Peyer's patches moderately developed, and slightly softened, in ileum, to number of eight or ten. No

other remarkable appearance. Fluid in duodenum has a decided greenish color.

Large intestines, pale externally;—contain a moderate amount of air, and about one pint of thin, reddish, turbid fluid. Mucous membrane pale and smooth. Mucous follicles not seen. A few fragments of egg shell toward lower part of intestine.

Mesenteric glands not remarkable.

Stomach contains from one pint to three half pints of thin yellowish fluid, with brownish yellow flocculi, and having an odor of gastric acid. There are also a number of softish yellow masses, like half-digested cheese, or yolk of egg. Mucous membrane universally softened;—almost entirely destroyed on posterior half, toward cœcal extremity. No other morbid appearance.

Liver large, smooth, and pale;—of natural consistence.

Gall bladder contains about one ounce of very thin, fluid, greenish bile.

Spleen small, bluish externally; a little soft, otherwise natural.

Pacreas natural.

Kidneys, natural, except that rather more blood than usual flows from cut surface of right.

Urinary bladder, moderately contracted and empty, except for about half a drachm of whitish creamy fluid.

Fig. 4

The creamy-white substance from the bladder, examined under microscope, showed a multitude of flat, irregular, and elongated cells, most of them distinctly nucleated. (Epithelium from the urinary passages.)

The fluid from the stomach, examined under microscope, contained irregular masses of epithelium, oil globules, and a chain-like, cellular, vegetable (?)

growth. Chemically examined, it contained no albumen, or other protein compound, but a large amount of some chlorine compound, probably chloride of sodium. No sulphates; no triple phosphate.

IV.

MARY P. SPALDING. *Aged* 42. *American. Prostitute. Intemperate. In Hospital for two hours, with Cholera. No previous history. Treatment,—one dose of capsicum and brandy, and one of sodæ bicarb. one drachm. Ice to epigastrium and to back of neck. Coma for last half hour of life. Post-mortem contractions. Autopsy, 21½ hours after death.* JULY 16.

Rigor mortis moderate. Very little cyanosis, generally, but finger-nails are dark blue. Fingers somewhat shrivelled. Sclerotics dryish where they have been exposed to the air, but not discolored. A little œdema of both legs;—none elsewhere. Abdomen, prominent, tympanitic.

Muscles a little slaty in color.

Head. Dura-mater natural. A little fluid blood in longitudinal sinus. Arachnoid healthy. Some sub-arachnoid œdema over both hemispheres. A few bubbles of air in superficial vessels over right hemisphere. Brain slightly engorged with blood;—equally so on both sides. Consistence and color every where natural.

Chest. Well marked dryness of pleura covering pericardium on left side, but none on right. Pleuræ elsewhere quite moist and shining.

General, old, moderately firm, pleuritic adhesions on right side; none on left.

Pericardium natural internally. No ecchymoses on external surface of heart. Right cavities rather flabby; contain a considerable amount of dark blood, mostly fluid, with a little coagulum, decidedly wanting in firmness. Left ventricle firm, well contracted;—contains a drachm or two of dark fluid blood. Aorta also contains a considerable amount of similar blood. Some ill-defined ecchymoses beneath lining membrane of left ventricle. Heart otherwise healthy.

Ecchymoses.

Both lungs crepitate well every where. Upper portions of both upper lobes do not collapse, and have a lighter and more spongy feel than ordinary. Moderate sanguineous engorgement of posterior parts. No tubercle, or other morbid appearance anywhere.

Mucous follicles in lateral pouches of pharynx, and at base of tongue, hypertrophied.

Lining membrane of larynx and trachea generally pale;—but there is a circular spot of strongly marked local congestion, almost like ecchymosis, underneath mucous membrane of right side of larynx, just below vocal chords. Some redness, not excessive, of bronchi, internally, below bifurcation. A moderate amount of frothy, thickish, white secretion, in air passages.

Congestion.

Abdomen. Peritoneum generally natural in appearance. Old, but delicate, and rather tender, cellular adhesions of liver to diaphragm and to transverse colon. Also of several convolutions of small intestine to each other.

Adhesions.

Stomach much distended with air;—contains also about twelve ounces of turbid reddish fluid, having a faintly acid rëaction, and an odor of spearmint. Mucous membrane universally somewhat softened. Brownish gelatinization in great pouch. Vessels along large curvature strongly marked, and the blood in them colored brown. At pyloric extremity, vessels strongly marked, and evidently altered by post-mortem changes, but quite red in color. No other morbid appearance.

Small intestines moderately distended with air. Contain rather more than two pints of thickish, turbid, yellowish-white fluid, without fœcal odor. Mucous membrane generally pale; slightly reddened in lower eight or ten feet. Universally softened, but not any where to extent of disorganization. Duodenal glands visible, natural. Solitary glands not seen. Peyer's patches very moderately developed, to number of five or six; not particularly softened or otherwise altered. No greenish color to contents of duodenum. Mesenteric glands not remarkable.

Mucous membrane soft.

Large intestine pale, externally and internally;—contains a little over two pints of true "rice water" fluid, i. e. a thin, whitish, opaline fluid, which, on standing, deposites a layer of fine whitish flocculi, like pure pus.

Mucous follicles of large intestine visible, but not altered. Nothing else remarkable.

Liver rather pale and yellowish in color; of natural consistence. Rather over medium size.

Gall bladder contains about half an ounce of dark olive-colored bile, of usual thickness.

Spleen small, flabby; of natural consistency.

Pancreas natural.

Both kidneys quite natural, except that right has a spot of dark sanguineous congestion, about the size of half a dime, occupying whole thickness of corticle portion, at lower and posterior part of organ.

Congestion.

Urinary bladder, collapsed and empty. Has only a little whitish creamy secretion, smeared over internal surface.

Uterus has a very small, purple colored polypus, hanging from internal surface of neck.

Polypus.

Ovaries each contain one or two cavities, lined with a delicate, thin, very vascular, serous membrane, and containing a few drops of thin watery fluid. Genital organs otherwise quite healthy.

Ovarian cysts.

The secretion lining the inner surface of the bladder, examined under microscope, was entirely similar

to that described as found in the bladder of *Roger Ryan*.

The flocculent deposite from the intestinal fluids was composed entirely, or nearly so, of columnar epithelium, in larger and smaller masses.

The fluid from the large intestine, when filtered, had a light amber color. It was moderately albuminous, and ammonia produced a light precipitate of the earthy phosphates.

A drop, evaporated on a slip of glass, left the following chrystaline deposite. (Chloride of sodium.)

Fig. 5.

V.

July 19. DELIA MCLAUGHLIN. *Aged* 35. *Married. Irish. Intemperate. Cholera for* 31½ *hours, with some previous diarrhœa. Treatment,—opium and tannin, moderately; afterward, wine. Veins injected with saline solution three hours before death, with temporary reappearance of pulse. Coma for last* 2½ *hours of life. Autopsy* 20 *hours after death.*

Post-mortem heat.

Rigor mortis moderate;—most firm in hands and feet. No blue discoloration, except a little in dependent parts. Considerable heat about chest and lumbar region. Face and extremities cool. Corneæ, which have remained covered, a little dryish and

shrunken. Sclerotics natural. Abdomen somewhat prominent, moderately resonant.

Head. Dura-mater natural. Moderate quantity of red and yellowish coagula in longitudinal sinus. Arachnoid cavity contains a very little serum. Some sub-arachnoid œdema. Arachnoid healthy. Substance and color of brain and cerebellum generally natural. Lateral ventricles contain about two drachms of clear serous fluid. Lining membrane natural. No vascularity of surrounding parts, which, as well as medulla oblongata and pons varolii, are quite firm. Middle commissure requires some force to tear it apart. Nothing else remarkable.

Chest. No dryness of pleura. Pericardium contains normal amount of clear fluid, together with a small shreddy, yellowish coagulum, floating loose in the fluid. A few, sharply-defined, oblong spots of ecchymosis, one line in length, clustered together underneath lining membrane of pericardium, where it lies over anterior aspect of heart. One or two, also, circular in shape, and less defined, at junction of ascending and descending venæ cavæ.

Venæ cavæ moderately full of dark fluid and coagulated blood. Right cavities and pulmonary artery full of sufficiently firm fibrinous and red coagula. Left ventricle moderately firm;—contains a small dark red coagulum. Left auricle contains dark and fibrinous coagula. Lining membrane, valves, and substance of heart, natural.

Pleura healthy. No adhesions. A very little vesicular emphysema of anterior surface of upper right lobe. Both lungs crepitate well everywhere, and are firm in texture;—contain a moderate amount of fluids and air. No tubercles.

Trachea and bronchi contain a very frothy fluid, slightly tinged with red. Lining membrane of air-passages pale, down to lower part of trachea;—below that, considerably reddened;—otherwise natural.

Abdomen. Peritoneum natural. Small intestines ruddy, externally; moderately distended, with *pale*

contractions at some parts;—contain about six ounces of thick green, curdy fluid. Contents more yellow and fluid at upper part of intestine; more green and fluid below. Mucous membrane generally pale; in some spots moderately reddened; every where of good thickness and consistency. Duodenal glands natural. Solitary glands visible, moderately developed at lower part of small intestines. Peyer's patches same.

Green fluid in intestines.

Large intestine contains a moderate quantity of greenish-olive, pasty, fœces. Mucous membrane natural.

Liver, of moderate size and natural consistency; generally rather of a pale red color, with irregular, tolerably well-defined spots of anœmia on anterior surface.

Gall bladder contains about one ounce of very black, rather fluid bile.

Stomach contains three to four ounces of fluid, rather thin, in consistency, less green than that in intestines, but more of a yellowish-brown color. Mucous membrane has a considerable amount of bloody congestion, principally along great curvature; redder toward pyloric extremity, more brownish toward cardiac. Mucous membrane generally rather soft; natural near pylorus, softened and thinned in great pouch; not otherwise remarkable.

Congestion.

Spleen rather small, and a little flabby; not otherwise unnatural.

Both kidneys somewhat pale; and lining membrane of pelvis very much so. Organs otherwise healthy.

Urinary bladder contains about half an ounce of watery, reddish-yellow, turbid fluid, without urinary odor.

Uterus somewhat tumefied and congested, with considerable softening and vascularity of internal surface. Right ovary natural; but left contains a rather recent-looking spurious corpus luteum, from

False *corpus luteum.*

which the coloring matter of the blood has been nearly absorbed. (Patient menstruated June 15th.)

The fluid from the bladder, examined by the microscope, presented the same appearances as in the case of *Roger Ryan* and *Mary P. Spalding.*

That from the small intestines showed some fragments of columnar epithelium, but was, in general, too much broken up to be distinctly recognized.

VI.

ROBERT SHEA. *Aged* 31. *Laborer. Irish. Intemperate. In Hospital, with Cholera, for* 4¼ *hours. Previous diarrhœa, for one week. Treatment,—venesection, to eight ounces, followed by two doses of brandy, one ounce each. Coma, for last two hours of life. Autopsy* 20 *hours after death.* JULY 22.

Rigor mortis moderate; blue discolorations also moderate; most marked on ends of fingers. Sclerotics and corneæ, which have remained covered, nearly or quite natural. Genital organs very dark colored. Muscles red.

Head. Longitudinal sinus empty. A little bloody effusion in arachnoid cavity, over posterior part of right hemisphere. Some sub-arachnoid œdema on both sides; also bubbles of air in meshes of pia-mater. Substance of brain natural. A few drops of fluid in lateral ventricles;—surrounding parts pale, and firm in consistency. Cerebellum and medulla oblongata also natural.

Chest. Dryness of pleura, on both sides, well marked, but not excessive. Dryness confined to

that part where the lung overlies the pericardium. Elsewhere pleura quite smooth and moist.

Pericardium contains not more than two drachms of fluid, slightly reddish in color. A few minute, Ecchymosis. circular spots of ecchymosis on lower and anterior part of right ventricle, near point of heart; none elsewhere. Right auricle moderately full of dark fluid blood, and dark red coagulum. Right ventricle, which is flabby, contains also fibrinous clots, of moderate consistency, which extend into pulmonary artery. Left ventricle entirely uncontracted; has a "doughy" feel when kneaded with the fingers;—contains nothing. Endocardium and valves natural. Substance of heart rather soft.

Lungs natural in appearance;—crepitate well everywhere;—moderately filled with blood and air.

Trachea and bronchi contain a little frothy fluid, slightly tinged with red. Mucous membrane pale at upper part, somewhat dusky below; otherwise natural. Larynx natural.

Abdomen. Peritoneum natural;—contains about Fluid in peritoneum. two ounces of reddish colored fluid.

Small intestines greenish and reddish-yellow externally, not morbid in appearance;—considerably distended with air till within five feet of cœcum, when they suddenly become quite shrunken, collapsed, and empty; but retain their ruddy color. Intestine contains a very small quantity, not over two ounces, of whitish fluid, rather thick with yellow flocculi; beside which, inner surface of intestine is, at some parts, plastered over with moist masses of similar flocculi. Reaction decidedly acid. Internal surface of intestine generally pale or greenish;—decidedly reddened in last eight or ten feet. Promi- Sub-mucous emphysema. nent masses of sub-mucous emphysema, in circular or irregularly oval spots or clusters, having a base of three quarters of an inch diameter, downward, and resembling much in appearance the pulmonary tissue of a reptile. There is no alteration of the mucous membrane, or other intestinal coats, at these points,

in color or consistence. One of these patches is situated in the duodenum, two in the jejunum, one in the ileum. Duodenal glands well developed. No greenish contents in duodenum. Nineteen Peyer's patches visible, of which only the last eight are rather more developed than ordinary. Solitary glands moderately developed in lower portion.

Large intestines contain but little air, and no fluid. A little thin, yellowish-brown substance at lower portion, and just enough to smear the walls above. There are small black specks, like minute bits of charcoal, scattered over most of internal surface. About three inches below cœcum there is a strip of fibrous, woody substance, like half-chewed liquorice- Strips of wood (?) in intestine. root, or slippery-elm bark, 2½ inches long by ¼ inch wide, lying transversely in the intestine. Four inches lower down, there are three other similar strips, 2⅝ inches long, but narrower than the others, lying diagonally. These strips are all quite firm, and not at all digested. No appearance of irritation about intestinal walls in their neighborhood.

About twenty "tricocephali dispares" in cœcum; Tricocephali. none in other parts of intestine. One of the largest of these worms is 1¾ inches in length.

The appendix (cœci), contains a little pasty fæces at its upper part.

Mucous membrane of large intestine generally pale or greenish. A few minute red circles in middle portion, apparently the reddened edges of the orifices of dilated mucous follicles. No ulceration or other morbid appearance.

Stomach contains six ounces of thin, yellowish, dingy, turbid, flocculent fluid, with a fœtid odor and a decided acid reaction. It has, floating about in it, some small undigested bits of green leaves, like parsley. Mucous membrane, considerably thinned and gelatinized, with brownish discoloration, almost everywhere; only just at pylorus it retains its natural firmness. No other morbid appearance.

Liver, pale yellowish red, externally. Internally,

of a dusky color, inclining to olive; consistence natural. Not much blood.

Spleen small, blue externally; somewhat wrinkled and flabby. Contains less than normal amount of blood. Consistence firm. Pancreas natural.

Kidneys natural, externally. Cut surface quite bloody. Color and consistence natural. Urinary bladder collapsed; contains only a little whitish, creamy, pus-like fluid, just sufficient to smear its walls. Mucous membrane reddened near orifice of urethra. Otherwise natural. Abdominal vessels natural internally.

The fluid from the stomach, next morning, still retained an acid reaction.

Filtered clear, it was of a light yellowish color, like the serum of blood.

Albumen. It became opaline by heat, and the opalescence was cleared up by liquor potassæ. It was not precipitated by dilute or concentrated acetic or muriatic acid; but after the addition of these acids, ferro cyanide of potassium produced a feeble turbidity.

Nitric acid caused a faint white deposite.

Nitrate of silver produced a copious white deposite, which became dark on exposure to light; soluble in ammonia, insoluble in nitric acid. (Chlorine—compound.)

Fig. 6.

Chloride of barium caused a moderate whitish precipitate. (Sulphates.)

Ammonia threw down a faint precipitate of earthy phosphate, in the following chrystalline forms:

The flocculent deposite from the intestinal fluids showed, under microscope, evident columnar epithelium, but much broken up.

That from the stomach showed no distinct epithelial structure.

The creamy secretion from the bladder consisted of nucleated epithelium scales, and elongated cells, as heretofore, together with many small circular, or oval bodies, apparently the cells of a Torula.

VII.

MANUS MCCARTHY. *Aged* 45. *Laborer. Irish. Intemperate. Cholera for* 13¼ *hours. Previous diarrhœa for one week. Collapse excessive. Treatment; external heat and sinapisms. Venous injection of* 20 *ounces saline solution, with temporary re-establishment of pulse. Afterward, venesection to* 10 *ounces, and saline injection repeated, with similar effect. Second injection* 3¼ *hours before death. Insensibility for last two hours of life. Autopsy* 13 *hours after death.* July 27.

Rigor mortis well established. Fingers shrivelled, and finger-nails deep blue. Elsewhere, cyanosis not considerable. Corneæ, which have been covered, somewhat shrunken, but not dry. Sclerotics natural. Abdomen, prominent, tense, tympanitic. Body and limbs everywhere cool.

Head. Dura-mater natural. A little fluid blood in longitudinal sinus. A small amount of bloody fluid in arachnoid cavity, spread out over convexities of each hemisphere. No sub-arachnoid œdema. Arachnoid itself healthy. Substance of brain, has a natural aspect, externally. Amount of blood, in substance of brain, normal. About one drachm of bloody fluid in ventricles. Lining membrane of ventricles pale. Choroid plexus natural. Fornix, corpora

Bloody fluid in arachnoid.

and in ventricles.

striata, optic thalami, and whole cerebral substance at base of brain, considerably softened, but not so much as to destroy its shape at any part. Upper parts of hemispheres of natural consistence. Cerebellum also softened in the same manner as the cerebrum; otherwise natural. Medulla oblongata sufficiently firm.

Brain softened.

Chest. Dryness of pleura, only on anterior surface of pericardium, beneath lung; there, it is sufficiently well marked. Pulmonary pleura covering pericardium has nearly, or quite, its natural moisture. Pericardium contains about half an ounce of yellowish fluid; presents numerous spots of ecchymosis underneath the lining membrane; both beneath that portion lining sac, and that covering heart and large vessels. These spots are red or purple, mostly collected into groups of five or six, and about one sixteenth to one twelfth of an inch in diameter. They have almost no appreciable thickness. There are two or three, however, on posterior aspect of aorta, before it leaves the cavity of the pericardium, which have a diameter of three eights of an inch, and some thickness. These are quite dark and purple in color. Pericardium otherwise natural.

Ecchymosis.

The right ventricle is full of a dark, granular coagulum, very deficient in firmness. It is flabby, and contains a little dark coagulum. Venæ cavæ contain mostly dark fluid blood, with some soft coagula. Lining membrane of venæ cavæ and both right cavities of heart, stained purplish red by coloring matter of blood. Lining membrane of left auricle quite white and healthy; that of left ventricle slightly stained in some parts;—elsewhere natural. Left ventricle not contracted, but soft, and "doughy" to the feel;—empty. Left auricle contains a little soft, red, and some yellowish, coagula. Valves all healthy.

Endocardium stained.

Both lungs crepitate well throughout; somewhat dryish and emphysematous in upper lobes; dark red, rather soft, and abundant in fluids in lower lobes. No tubercles.

General pleuritic adhesions of right lung, not very firm; none of left.

Larynx, trachea, and bronchi, natural internally. Trachea contains only a very little colorless froth; Bronchi contain some yellowish watery fluid, which can be pressed up from lung.

Abdomen. Peritoneum natural. Small intestines of a pale ruddy color externally, considerably distended with air and fluid—contain nearly two pints of a yellowish, thin, flocculent fluid, of which the flocculi have a much stronger yellow color than the fluid in which they are suspended. Neutral reaction. Mucous membrane of small intestines pale;—stained of a bright yellow color in duodenum and upper two feet of jejunum; moderately reddened, in lower part of ileum. About one foot above ileo-cœcal valve, there is a circular spot, ill-defined, of a dark purple-red color, which shows through on outside of intestine, and which presents, internally, two or three small spots of ecchymosis beneath mucous membrane. M. M. everywhere of medium thickness and consistence. Duodenal glands natural. Peyer's patches visible, to number of seventeen or eighteen, the lower six or eight of which are moderately developed; not softened or reddened. Solitary glands visible, moderately developed, in last few feet of ileum. No other remarkable appearance.

Mucous membrane.

Large intestine of a slaty hue, externally and internally; somewhat distended with air. It contains about half a pint of thinnish, grey, flocculent fluid, without any yellow tinge; neutral, without odor. On standing, the flocculent portion is deposited greyish white, and the fluid part has a darker, dingy-brownish color. About midway between cœcum and anus, there is a single cherry-stone; no other solid contents. Mucous membrane of natural thickness and consistence. Mucous follicles, developed in sigmoid flexure and upper part of rectum;—not elsewhere.

Stomach contains ten ounces of a reddish-brown, watery, slightly flocculent fluid, neutral, without odor. Mucous membrane, pale and natural, near pylorus; shows red, dotted, vascular injection along small curvature and on anterior wall; moderate dusky color and gelatinization in great pouch and on posterior wall. Nothing else remarkable

Œsophagus generally pale internally; but, one inch above cardiac orifice, there commences a very dark slaty, almost black, discoloration of blood in vessels beneath mucous membrane. This extends upward for two inches. Its limits are not very well defined. Mucous membrane natural.

Liver, of natural size and consistence, and with a moderate supply of blood. Mottled, red, pale, and yellowish, externally; internally, it has a universal slaty-olive color.

Gall bladder contains about half an ounce of greenish-black fluid bile.

Spleen quite small, blue externally, sufficiently firm; contains less than normal quantity of blood.

Pancreas natural.

Both kidneys entirely natural in appearance. Urinary bladder contains about three drachms of thin, yellowish white, flocculent fluid, without urinary odor.

The vena porta contains only dark fluid blood.

Staining of vessels.

Abdominal vena cava and iliac veins stained purplish-red internally. Aorta similarly stained in abdominal portion, yellow and natural in thoracic.

The fluid from the stomach deposited a fine, whitish, pus-like sediment, which, under the microscope, exhibited many oval, nucleated, epithelium cells, together with numerous small, oval, granular corpuscles, (which were unaffected by acetic acid) like the nuclei of disintegrated or unformed cells. Little or no columnar epithelium.

Fig. 7.

When filtered clear, the fluid had a red, clarety color. It contained a considerable quantity of albumen, and ammonia caused a faint precipitate of the earthy phosphates, as follows:—

Fig. 8.

A drop evaporated on a slip of glass, left the following deposite. (Chloride of sodium.)

The flocculent deposite, from the small intestine, consists principally of long, narrow strips of columnar epithelium, with smaller detached masses of the same.

That from the large intestine, shows also columnar epithelium, but in smaller masses.

The fluid from the urinary bladder shows an abundance of elongated epithelium cells, similar to those already represented; but, for the most part, not so distinctly nucleated.

VIII.

July 29. NICHOLAS ANDREWS. *Aged* 35. *American. Intemperate. Cholera for* 12 *hours, without previous illness. Treatment,—External heat and sinapisms; Saline Mixture by mouth, (one ounce every* 15 *minutes,) and venous injection of* 30 *ounces Saline Mixture, with temporary relief to collapse. Much restlessness during last hours of life. Autopsy* 14 *hours after death.*

Rigor mortis very firm. Strong blue discoloration of ends of fingers, and of penis and scrotum; not much elsewhere. Body and limbs everywhere cool. Muscles red.

Head. Longitudinal sinus contains fluid blood. A little sub-arachnoid œdema over posterior lobes; in some spots reddish. Substance of encephalon natural in color and consistence. Little or no fluid in ventricles.

Chest. Dryness of pleura well marked on both sides of mediastinum, particularly on surface of pericardium, which is slightly shrivelled. Pericardium natural internally; no ecchymosis; contains about one drachm of clear, yellowish fluid. Right cavities of heart flaccid; contain a considerable quantity of dark, very fluid blood, with a minute quantity of loose red and yellowish coagula. Great veins contain dark fluid blood. Left ventricle moderately firm, well-contracted and empty. Left auricle and pulmonary veins contain dark red, quite fluid blood. Aorta contains also a considerable quantity of similar blood. A few spots of dark purple discoloration in interior of left auricle, caused by ecchymosis in substance of heart, beneath lining membrane, extending sometimes to the depth of about one line. No staining of any part of lining of membrane of heart, aorta, or venæ cavæ.

Both lungs crepitate well everywhere, but are unusually full of thin frothy fluid, and considerably softened in texture. No tubercles.

Larynx natural. Trachea and bronchi, pale internally, with slight greyish discoloration; contain a large amount of thin, dingy, frothy, flocculent fluid, much like that which existed in the stomach.

Abdomen. Peritoneum natural. Small intestines light colored externally; uniformly distended; contain about two and a half pints of thin, yellowish, flocculent fluid. Mucous membrane generally pale. In duodenum, where contents were of a more decided yellow color than elsewhere, mucous membrane is also stained yellow. It is reddish in lower part of ileum. Duodenal glands natural. Peyer's patches visible to number of twenty-five,—the lower thirteen of which are somewhat developed, but not decidedly softened, or reddened. Solitary glands visible, moderately developed in lower three and a half feet of ileum. Nothing else remarkable.

Large intestines, greyish externally; contain a moderate quantity of air, and about half a pint of thin, greyish-white, flocculent fluid; also, a single cherry-stone. Mucous membrane natural. Mucous follicles considerably developed at lower part of intestine. *Appendix cæci* contains, at its upper part, some fæces, bits of egg-shell, and some minute, black, hard seeds. A few bits of egg-shell, and similar little hard seeds also in colon. Cherry-stone.

Mesenteric glands generally not remarkable; one or two moderately enlarged; not softened or reddened.

Stomach, seems rather vascular, externally; contains about six ounces of thin, dingy-reddish fluid, with pus-like flocculi floating on surface, and a considerable quantity of oil globules. Mucous membrane natural near pylorus; very little softened in great pouch, where there is also brown discoloration of

Redness of mucous membrane. blood in vessels; but all along large curvature it is of a uniform bright scarlet tinge, without any appreciable softening, or other alteration of its substance. On close inspection, the redness is seen to be occasioned by injection of vascular-looking tufts (villi?) in mucous membrane. Nothing else remarkable.

Liver mottled, purplish and yellowish-red, externally; internally, reddish-brown. Consistence natural. Gall bladder contains about one ounce of thin, blackish bile.

Spleen quite small, blue, and much wrinkled. Internally, red, firm, and very deficient in blood.

Pancreas natural. Supra-renal capsules also natural.

Anomaly of kidney. Both kidneys quite natural in appearance, except that the left has the following anomaly: viz.—the longitudinal fissure, which receives the vessels and ureter, is not continuous; but is broken in its middle by interposed cortical substance of kidney, so that there are two ureters, and two sets of vessels, which emerge from upper and lower fissures, to join themselves over intervening substance of kidney.

Urinary bladder, completely contracted; contains a few drops of thin whitish substance.

The deposite, from the intestinal fluid, consisted entirely of very distinct and uninjured columnar epithelium, mostly in larger and smaller patches, partly in detached "columns," or cells.

The whitish fluid from the bladder contained scaly and elongated epithelium cells as heretofore; but many of the narrow, slender, elongated cells were collected into groups, and arranged side by side, as if still attached to a basement-membrane. There were also smaller, globular, un-nucleated cells, some transparent, some granular.

IX.

July 31. MARGARET BAKER. *Aged* 19. *Cholera for* 33½ *hours, without previous diarrhœa. Venesection to four ounces, followed by stimulants, and "Saline Mixture" by mouth. Temporary improvement in pulse. Venous injection of* 20 *ounces of Saline Mixture, followed, in course of an hour, by coma, which continued till death. Autopsy* 13¼ *hours after death.*

Rigor mortis strong. Much lividity of lips and ends of fingers; none else. Body quite warm about lumbar region; elsewhere cool.

Muscles red.

Head. Longitudinal sinus empty. Dura-mater natural. Posterior part of hemispheres smeared over with bloody fluid. Arachnoid itself natural. Similar bloody fluid over cerebellum. Substance of brain natural in consistence, and the amount of blood is normal. No fluid in ventricles. Lining membrane pale. There is a cyst, about the size of a pea, containing clear fluid, in posterior part of pineal gland. Brain and membranes otherwise natural.

Bloody fluid.

Cyst.

Chest. No dryness of pleura, but some of pericardium, in centre of anterior aspect, immediately behind mediastinum. Pericardium contains less than half an ounce of clear fluid. Numerous minute spots of dark purple ecchymosis along anterior edge of heart, and on posterior surface. Right ventricle is flaccid, and, as well as the auricle and great veins, contains only a small quantity of dark, fluid blood, without any coagula. Left ventricle, moderately, but not perfectly contracted. Left cavities of the heart also contain a quantity of perfectly fluid blood. No

Ecchymoses.

staining of endocardium. Blood elsewhere in body also quite fluid.

Lungs, natural in appearance, but rather deficient in crepitation; they have somewhat of a solid feel, but the texture is unaltered throughout. Cut surfaces red, but yielding less than the usual quantity of fluids. Trachea pale; at lower part, slaty in color. Small bronchi reddish. Larynx natural. Trachea and bronchi contain a large quantity of dingy, watery, nearly colorless fluid.

Abdomen. Peritoneum natural. Small intestines pale-ruddy externally, with a greenish tinge in some parts; contain about one pint of thick, yellow, flocculent fluid. Mucous membrane generally pale; yellowish in duodenum, reddish in lower part of ileum. Twelve Peyer's patches visible, the lower eight of which are moderately developed. Solitary glands prominent in the last seven feet of ileum. Mucous membrane natural in thickness, and consistence. A very little sub-mucous emphysema in lower part of ileum. Large intestines contain yellowish, dingy, flocculent fluid. Mucous membrane pale and natural in appearance.

Sub-mucous emphysema.

Mesenteric glands moderately enlarged; some yellowish-white in color, some slightly reddened. None softened.

Stomach contains rather less than two ounces of a thin, dingy fluid. Moderate softening of mucous membrane, especially in great pouch, without any undue vascularity, or other morbid appearance.

Liver, brownish; externally and internally. Natural in consistence.

Gall bladder contains about one ounce of thin, dark colored bile.

Spleen blue, not particularly wrinkled; natural in size and consistence. Contains the usual amount of blood.

Both kidneys quite natural in appearance. Urinary bladder, collapsed and much shrunken, nearly

empty; contains just enough of the whitish, creamy fluid to smear its walls.

Much vascularity of uterus and neighboring parts. Both ovaries are pale externally, and contain several cysts. One of them contains, also, a somewhat recent false corpus luteum. Internal surface of uterus, softened and vascular.

X.

JOSHUA COOPER. *Aged* 25. *Seaman. Indian. Temperate. Cholera for* 48 *hours, with two days previous diarrhœa. Venesection to* 16 *ounces, followed by saline mixture and carbonate of ammonia. Excessive vomiting. Much pain at epigastrium; relieved by leeches. Venous injection of* 20 *ounces saline mixture, with great improvement in pulse. Sensible till within half an hour of death. Autopsy* 20 *hours after death.* JULY 31.

Rigor mortis sufficiently strong. No blue discoloration perceptible. Finger nails pale. No heat about body or limbs. Muscles red.

Head. Longitudinal sinus empty. Some bloody fluid in arachnoid cavity, over posterior part of hemispheres; also some over cerebellum. Substance of brain, of natural consistence, but rather pale. Small amount of clear fluid in ventricles; lining membrane not discolored. Nothing else remarkable in head. Bloody fluid.

Chest. Moderately firm, cellular, pleuritic adhesions at edges of anterior mediastinum on both sides.

Pericardium, natural internally; no ecchymosis;

but about half an ounce of fluid. Right cavities of heart contain a small quantity of dark, fluid blood, absolutely without coagula. Same in left. Left ventricle, round and prominent, but not quite firm and hard; has a little doughy feel, on pressing it. No staining of endocardium. Blood, elsewhere in body, quite fluid.

Blood fluid.

Both lungs natural in appearance externally, and crepitate well everywhere; contain a sufficient amount of fluid. Trachea pale internally.

Abdomen. Peritoneum has a very little colorless, sticky, secretion on surface, just enough to pull out into slender threads, on separating the convolutions of the small intestines, which are pale and thin-looking externally. They contain about one pint of thin, greyish-white, gruelly fluid; internally pale, but stained yellow in upper two inches of duodenum. Mucous membrane very thin, so that transverse muscular fibres of intestine are very noticeable through it.

Mucous membrane thin.

Peyer's patches, visible, to the number of seventeen. The lower seven of them are highly developed and reddish. Solitary glands, visible in lower part of intestine, but not remarkably developed.

Mesenteric glands not remarkable.

Large intestines contain about twenty ounces of gruelly fluid, similar to that already described, but thicker. Mucous membrane smooth and pale. In the cœcum it is raised into numerous folds and ridges, and small elevations of considerable firmness, which are, for the most part, colored black, or dark purple. This has all the appearance of a chronic alteration. Nothing else remarkable in large intestine.

Old disease of cœcum.

Stomach contains one pint of fluid, similar to that in small intestine. Mucous membrane pale, moderately softened; no vascularity.

Liver, natural in appearance, of proper consistence. Gall bladder contains about one ounce of blackish, fluid bile.

Spleen small, blue, wrinkled; internally, red, moderately soft, and quite deficient in blood.

Both kidneys rather pale; of very firm consistence; otherwise natural.

Urinary bladder, shrunk and collapsed, contains about half a drachm of thin, dingy-looking fluid.

In this case, there was great heat of all the internal organs, though the exterior of the body was cool.

XI.

Ellen Keith. *Intemperate. Cholera* 15 *hours, with two days previous illness. In hospital one hour,—during which time she took opium, camphor, capsicum, and brandy, freely. No reaction. Autopsy* 17¼ *hours after death.* August 3.

Rigor mortis sufficiently strong. Slight general lividity of face, and some of lips. Hands and feet pale. A little œdema of both legs. Abdomen natural in form, moderately resonant. Body and limbs everywhere cool.

Head. Dura-mater adhered with great force to skull-cap, so that arachnoid cavity was torn open in removing latter, and it could not be ascertained whether any fluid existed in its cavity. Arachnoid natural. Substance of brain and cerebellum everywhere of good consistence and color, but lining membrane of all the ventricles is unusually vascular; otherwise healthy. Lateral ventricles contain a drachm or two of fluid. Nothing else remarkable.

Congestion.

Chest. Dryness of pleura well marked, particularly on right side, where it covers the pericardium, which is natural in appearance. No ecchymoses; but about one drachm of clear, serous fluid in cavity.

Right cavities and venæ cavæ, filled with dark fluid blood, and a very little dark red, and yellowish, soft, gelatinous coagula. Left ventricle moderately well contracted; contains, as well as auricle, a small quantity of dark fluid blood. No staining of endocardium or lining membrane of vessels. Blood elsewhere quite fluid.

Tubercle. Both lungs crepitate well, and have generally a natural appearance. A few, small, firm, inactive, encysted, semi-tuberculous looking masses at each apex. No alteration of pulmonary texture in vicinity. On posterior aspect of upper and lower left Ecchymosis in lung. lobes there are several dark purple stains, which extend some distance (¼ to ¾ inch) into substance of lung. These spots are very dark in color, sufficiently well defined, and very distinguishable from the surrounding red, healthy pulmonary tissue. Structure of lung, at these spots, is not materially altered, being of natural consistence and not entirely deficient in crepitation. Excised portions float in water. These spots are apparently produced by ecchymosis into the cellular tissue. There is little or no engorgement of posterior parts. Larynx natural. Trachea and bronchi moderately reddened; contain a little dingy, frothy fluid.

Abdomen. Peritoneum, dryish at upper and anterior part of abdomen; otherwise natural. Small intestines rather pale externally, and somewhat distended with air and fluid at upper part, but comparatively empty at lower. Whole of small intestines contain about one pint of moderately thick, greyish, gruelly fluid, without fœcal odor. Mucous membrane pale, with very little reddening in lower portion of intestine; of natural thickness and consistence throughout. Some red injection of villi in duodenum. No yellowish contents in this part, nor staining of mucous membrane. Twenty of Peyer's patches visible; none of them remarkably developed. Solitary glands slightly developed in lower portion of ileum. Duodenal glands natural.

Large intestine pale greenish externally and internally; contracted through greater part of its extent; contains ten ounces of thin, greyish, flocculent fluid, with a faint fœcal odor. Mucous membrane generally of natural appearance, but along middle part of intestine there is an appearance of its being deficient in minute, irregular, circular, or oval spots, as if worm-eaten. On scraping away mucous membrane, Deficiency of mucous membrane. it is evidently partially or entirely deficient at these points. At one spot, a mucous follicle is visible, surrounded by a narrow zone or *trench*, where mucous membrane is wanting. Appendix cœci nearly empty; has a Peyer's patch on its internal surface.

Mesenteric glands not remarkable.

Stomach contains about ten ounces of thin, dingy-reddish fluid. Mucous membrane natural toward pylorus; softened toward cardiac extremity over about one half its surface. Proceeding from pylorus toward cardiac extremity, softening is marked first by red injection of mucous membrane, then by blackish, ill-defined discoloration of blood in larger vessels, and finally by brownish, gelatinous disorganization of mucous membrane.

Liver quite pale; of natural consistence. Gall bladder contains about one and a half ounces of dark, yellowish-brown bile, of ordinary thickness.

Pancreas has much dark purple ecchymosis in Ecchymosis. cellular tissue on surface and in interior between lobules, but the pancreatic tissue itself is not altered. Ecchymoses occupy left half of organ.

Spleen of moderate size, blue, quite flabby. Internally red and rather soft. Deficient in blood.

Both kidneys flabby and rather pale. Left has on upper part of anterior aspect a small, dark, ecchymosis. Capsules separate with great ease from both organs, leaving surfaces quite smooth and polished. Calyces and pelves smeared with a thin, purulent-looking fluid. Urinary bladder contracted and empty; only its walls are smeared with the puriform secretion.

Uterus natural excepting some redness of its lining membrane. Ovaries contain each several serous cysts. There is also in each organ a cyst, containing dark red coagulum, the color of which shows through peritoneal covering. Nothing else remarkable.

XII.

August 6. SARAH HILL. *Aged* 28. *Prostitute. Cholera for* 53 *hours. In Hospital* 10¾ *hours. Treatment—"Saline mixture" every hour. Sage tea ad libitum, and cold bath to arms. Autopsy thirteen hours after death.*

Rigor mortis slightly developed. Hands and feet much shrivelled, and nails blue. Body and limbs everywhere cool.

Abdomen prominent, tympanitic.

Muscles red.

Mammæ moderately full; internally they are reddish and granular, and contain a considerable quantity of milk.

Strong puerperal odor about body, externally and internally.

Head. Longitudinal sinus contains a little fluid blood. Arachnoid natural. A very little bloody fluid smeared over posterior part of right hemisphere. Purplish discoloration of sub-arachnoid cellular tissue in left temporal region. Slight sub-arachnoid œdema; also a little emphysema in same situation, and some bubbles of air in veins on surface. Color and consistence of brain and cerebellum everywhere natural. Trifling amount of clear fluid in lateral ventricles; lining membrane pale.

Chest. Pericardium contains about half a drachm of clear fluid. (Hygrometric condition of pleura not noticeable, owing to adhesions.) A few small purple ecchymoses along edges and on posterior surface of right ventricle. Right cavities filled with dark red and fibrinous coagula and dark fluid blood. No coagula in venæ cavæ. Left ventricle rather deficient in firmness. Left cavities contain a moderate quantity of dark fluid blood, of thick consistence. (But fluid blood on right side is thin.) No staining of endocardium. Substance of heart a little soft.

Aorta contains dark fluid blood, and a tolerably firm, fibrinous clot.

Moderately firm, universal, cellular adhesions of right lung; very limited ditto of left. Both lungs crepitate well everywhere, but there is a remarkable difference in their color and appearance. The right is smaller than the left, in consequence of a contraction of chest. (?) It is of a healthy red color externally and internally. The left is red only at apex of upper lobe; elsewhere throughout of a very dark brownish purple, deepest at lowest part of lower lobe; contains a sufficient amount of air and fluids, but not much blood. No tubercle anywhere. Texture of left lung somewhat soft, but not otherwise altered; that of right lung natural. Difference in color of lungs.

Larynx healthy. Trachea and bronchi pale; contain a little frothy fluid.

Abdomen. Close adhesions (old) of anterior edge of right lobe of liver to colon; also short, shaggy excrescences on peritoneum in immediate neighborhood, like the remains of old lymphatic effusion. Close adhesion of sigmoid flexure of colon to posterior abdominal wall, just in front of bifurcation of aorta. No recent disease of peritoneum. Old peritonitis.

Small intestines pale greenish externally; considerably distended; contain about two pints of yellowish white, flocculent fluid, without remarkable odor, and without reaction on test-paper. Mucous membrane generally pale; moderate yellow staining in duode-

num, and a little reddening in lower part of ileum. Mucous membrane everywhere of natural thickness and consistence. Villi quite visible in all parts of intestine. Twenty-four Peyer's patches counted; the lower eighteen very moderately developed. Solitary glands developed, but not remarkably altered, in lower three feet.

About four inches above cœcum there is, on internal surface of ileum a patch of soft, yellowish transparent substance, one and a quarter inches in diameter, about two lines in thickness, entirely resembling fresh lymph in appearance. It is easily separated from mucous membrane, which presents the same appearance underneath patch as in surrounding parts.

Lymph (?) on mucous membrane.

Large intestine light-colored externally. Cœcum, which is large and full of fluid, occupies almost whole of cavity of pelvis, rectum and bladder being both empty. Colon contains in all about one pint of thin, yellowish, semi-purulent looking fluid, without odor and neutral in reaction. Mucous membrane pale, of good consistence and thickness. Mucous follicles everywhere very distinct. No other remarkable appearance.

Stomach contains ten ounces of thick, brownish-yellow fluid, moderately alkaline, and with a disagreeable odor. Moderate softening of mucous membrane generally; considerable brown discoloration at cœcal extremity, without disorganization of mucous membrane. There is one patch, situated on large curvature, irregularly oval in shape, very well defined, which is of a very dark brown, almost black color, and perfectly distinct from surrounding parts. It has a pulpy appearance, but on scraping it, is found to be as firm, or a little more so, as parts in immediate neighborhood. There are two or three smaller similar spots near it. Mucous membrane generally much wrinkled. Nothing else remarkable.

Dark spots in stomach.

Mesenteric glands generally enlarged, but of natural color and consistence.

Liver pale externally, with spots of well-marked anœmia. Internally of a natural brownish-red color. Bright yellow bile can be expressed from cut ends of ducts in substance of organ. Gall bladder contains about one ounce of rather thin bile.

Pancreas pale; otherwise natural.

Spleen small, wrinkled. Internally red and softish, but deficient in blood.

Both kidneys pale and flabby; otherwise natural. Lining membrane of pelvis pale, and smeared with a puriform fluid.

Urinary bladder collapsed; contains about two drachms of thin turbid fluid, without any appearance of urine.

Abdominal vessels natural internally. Blood everywhere fluid, excepting a very little soft coagulum; not particularly thick.

Uterus somewhat vascular and tumefied; and with ovaries, shows signs of recent menstruation.

XIII.

JEREMIAH MULLEN. *Aged* 26. *Cholera for* 52 *hours, with some previous diarrhœa. Reported bloody vomiting and dejections, previous to entrance. In Hospital nine hours. Treatment; "Saline mixture" every half hour, and external heat. Autopsy* 13½ *hours after death.* AUGUST 7.

Rigor mortis sufficiently strong. Lips pale. Fingers much shrivelled, and nails dark blue. Body

and limbs everywhere cool. Abdomen natural in shape, moderately resonant.

Muscles have a slight slaty tinge.

Head. A little fluid blood in longitudinal sinus. A little bloody fluid smeared over posterior part of hemispheres. (This appearance is probably a post-mortem effect of the fluidity of the blood, and is favored by the dependent position of the head in first parts of autopsy.) Arachnoid perfectly natural in appearance. Substance of brain rather soft toward central parts, but no undue vascularity, or other morbid appearance.

Bloody fluid also over surface of cerebellum, and a very little in cavity of ventricles.

Chest. Dryness of pleura strongly marked, not only over pericardium, but also down on each side on anterior portions of diaphragm. Pericardium natural internally; no ecchymosis; contains not more than one drachm of clear fluid.

Right cavities of heart filled with dark, fluid, thickish blood, with almost no coagula. Left ventricle firm, sufficiently well contracted; contains, with auricle, dark fluid blood, moderate in quantity. Interior of heart natural; no staining nor ecchymoses. Substance also natural.

Both lungs crepitate well everywhere; light rosy in color, externally and internally, excepting some dark sanguinenous engorgement of posterior parts. Texture unaltered. Two greyish yellow, firm, encysted, perfectly inactive masses of tubercle, three eighths of an inch in diameter, in left apex; at which spot there is a moderately firm pleuritic adhesion. Nothing else unusual.

Abscess (?) in thyroid.

Trachea and bronchi, natural internally; contain some frothy fluid. Thyroid cartilage has an enlargement on left side, occasioned by a cavity in its substance, large enough to hold a pea, and containing a gelatinous fluid, with small, dark clots of blood. There is no cyst, but walls of cavity are composed of softened cartilaginous substance. Larynx otherwise natural.

Abdomen. Peritoneum dryish over stomach, liver, and great omentum; but underneath omentum, among convolutions of small intestine, it has its natural moisture.

Small intestines light colored externally, not much distended; contain about one and a half pints of thickish, stone-yellow, flocculent fluid, neutral in rëaction, and without remarkable odor. Mucous membrane yellow in duodenum, pale in jejunum, moderately reddened in greater part of ileum; everywhere of natural thickness and consistence. Villi perfectly visible in all parts of intestine. Twenty-nine Peyer's patches counted; the lower eighteen moderately developed. Solitary glands visible in last foot or two of ileum. No other remarkable appearance.

Large intestine contains rather over two pints of thin, greyish fluid, without odor, or rëaction on test-paper. It contains also a quantity of fish-bones, of various sizes and shapes. Some are long, slender, and sharp-pointed, as much as one and three-quarter inches in length, others thin and broad, others apparently parts of the jaw, as they are more solid in texture, and thickly set with small conical teeth. There are also undigested pieces of fish. These articles are chiefly collected in cœcum, but are scattered at intervals also from there down to middle of colon. Appendix cœci contains also, at its blind extremity, a few small bits of similar bone.

Fish-bones in colon.

Mucous membrane everywhere pale, and without any appearance of irritation, only mucous follicles are developed, and their orifices, for the most part, marked by a black speck.

Mesenteric glands generally enlarged, and of natural color and consistence.

Stomach contains one and a half pints of thin dingy fluid, with a slight acid rëaction, and a faint smell of beer; also a quantity of bones, similar to those in

Fish-bones, &c., in stomach.

colon, and more large pieces of fish, entirely undigested. Mucous membrane stained yellow near pylorus, elsewhere pale; and almost entirely unaltered by softening or thinning of substance. In cœcal extremity, however, there are a number of small whitish bodies, visible just beneath mucous membrane, like the solitary glands of the small intestine.

Ecchymosis in œsophagus.

There is a considerable amount of dark purple ecchymosis beneath mucous membrane of œsophagus, just above its termination in cardia, extending nearly or quite round œsophagus and for about three-quarters of an inch in an upward direction. Œsophagus otherwise natural.

Liver reddish externally; dusky and granular internally. Natural in consistence. Bile can readily be expressed from mouths of ducts of cut surfaces.

Gall bladder contains about one and a half ounces of rather thin bile, natural in color.

Pancreas natural.

Spleen large; six and three quarter inches long, and broad and thick in proportion; blue externally, not wrinkled. Internally red and softish, well supplied with blood.

Beside this, there is a supplementary spleen, one inch in length.

Both kidneys natural in appearance, but hard. Puriform fluid is smeared over lining membrane of pelvis, and can be expressed from papillæ.

Urinary bladder shrunken and contracted; contains about half a drachm of thinnish, turbid fluid.

Abdominal vessels natural internally, but contain no coagula. Blood generally rather thickish.

XIV.

ELLEN MCCANN. *Aged* 19. *Domestic. Irish. Temperate. Cholera for ten hours. In Hospital four hours. Treatment—"Saline mixture" every half hour. Autopsy* 20 *hours after death.* AUGUST 8.

Rigor mortis sufficient. Some lividity of finger nails; not much elsewhere. Abdomen natural in shape.

Spinal cord (examined first) every way natural. A drachm or two of clear serum in cavity of sheath, which collects at bottom of cord. Sheath and arachnoid quite pale and healthy looking. Cord has a natural degree of vascularity, and its substance is everywhere of proper color and consistence.

Head. Dura-mater and arachnoid natural. Bloody fluid, as before, just sufficient to smear posterior part of hemispheres. Color of brain natural; consistence firm. Ventricles contain little or no fluid; lining membrane pale. Medulla oblongata also natural.

Chest. No dryness of pleura in front, but a very little on diaphragmatic surface of right lung. Pericardium natural internally; no ecchymoses; contains a about half a drachm of clear serum. Right cavities of heart filled with dark, fluid, rather thickish blood, with trifling, soft coagula. Adjacent veins contain same. Left ventricle tolerably firm; contains, with auricle, a moderate quantity of dark fluid blood.

Heart natural internally; no staining.

Aorta contains much dark fluid blood, absolutely without coagula.

Both lungs crepitate well everywhere, and are of a natural red color externally and internally. There are some dark patches on the posterior surface of right, like those described in the case of *Ellen Keith*,

but not so large. No tuberculous or other alteration of pulmonary tissue.

Larynx natural. Trachea and bronchi pale-dusky internally; contain a little frothy fluid. Mucous membrane not altered in structure.

Abdomen. Peritoneum natural. Small intestines light-colored externally, moderately distended; contain one pint of thickish, yellowish-grey fluid, without odor. Mucous membrane considerably reddened and *browned* in duodenum, (upper 3 or 4 inches;) elsewhere pale; in all parts of intestine of natural thickness and consistence. Villi everywhere visible. Peyer's patches moderately developed in lower part of intestine. Solitary glands same. No ulceration or other morbid appearance.

Large intestine contains one pint and a half of thinner greyish fluid, with white cheesy-looking specks floating about in it. No other unusual contents. Mucous membrane pale, natural in texture. Mucous follicles everywhere very visible, and their orifices apparent; not otherwise altered.

Mesenteric glands not remarkable.

Stomach contains about one pint of thin dingy fluid, with a smell of beer, or fermenting vegetable juices. Mucous membrane nearly natural in consistence. Brown discoloration of blood, arranged in streaks and ridges, very marked in left half of organ. Toward pyloric extremity, sub-mucous tissue is thickly strewn with whitish, firm, round bodies, having much the appearance of Brunner's glands in the duodenum, only rather larger and more distinct. Nothing else remarkable.

Liver reddish-brown externally and internally. Consistence natural. Ducts in organ yield bile by pressure. Gall bladder contains about six drachms of thinnish bile, of natural color.

Pancreas natural.

Spleen small, blue, flabby. Internally reddish, rather soft, and tolerably well supplied with blood.

Kidneys about equal in size. Right a little pale;

left contains normal amount of blood. Otherwise both healthy.

Urinary bladder much shrunk and collapsed, and is absolutely empty. Only a little of the puriform secretion can be obtained by scraping its walls with the edge of a knife.

Uterus pale and small, without any appearance of activity. Internal surface slightly red and soft. Ovaries natural externally; contain internally several cysts; one of them having rather thick, yellow walls, and bloody contents.

XV.

KATHARINE HURLEY. *Aged* 30. *Pregnant. Cholera for* 15½ *hours, with three days previous diarrhœa. In Hospital four hours; collapse complete on entrance. Treatment—External heat, sinapisms "saline mixture" every* 15 *minutes, and brandy and water freely. No reaction. Autopsy* 19 *hours after death.* AUGUST 2.

Rigor mortis moderate. Fingers blue and shrivelled. Some heat about anterior part of abdomen, which is of natural form, but firm and resisting. Elsewhere, body and limbs cool.

Muscles red.

Pupils equally dilated. A spot of bright-red congestion in right sclerotic, just where it joins outer edge of cornea. Sclerotics otherwise natural.

Skin of abdomen seamed with numerous scars of pregnancy.

Mammæ flaccid; neither of them much developed, nipples show signs of previous nursing. Mammæ

internally granular. Left contains a moderate quantity of thin opaline fluid, like milk much diluted. Right contains a more abundant, opaque fluid, of a yellow color, appearing as if it contained a large amount of oil.

Sub-arachnoid ecchymosis.

Head. Dura-mater natural, well-marked sub-arachnoid ecchymosis, or rather infiltration of bloody fluid into pia-mater, over upper and anterior surface of hemispheres. Arachnoid natural. Substance of brain natural in color, but very firm in texture, particularly toward central parts, so that it requires some force to tear apart middle commissure. No other alteration of texture. Ventricles contain a very little clear fluid. Lining membrane pale. Medulla oblongata firm, like the brain, but otherwise natural.

Chest. No dryness of pleura, except a little on right diaphragmatic surface. Pericardium natural internally; only one or two ecchymoses, very small and ill-defined, on posterior surface of heart. Pericardium contains not more than one drachm of clear fluid. Right cavities, together with large veins of chest and neck, filled with an abundant, very black, soft coagulum, and some dark fluid blood. Left ventricle well contracted and firm. Left cavities contain a moderate quantity of blood, similar to that in right. Internal surface and substance of heart natural.

Both lungs crepitate sufficiently well everywhere, but are very dry; almost entirely deficient in blood and other fluids, so that they become collapsed and shrink up to an excessive degree, on being removed from the chest. Color of a natural light-red, freckled with black. No tubercle. No congestion, even at posterior parts. Larynx natural. Trachea and bronchi empty; pale internally.

Abdomen. Peritoneum covered with a colorless, slimy, sticky secretion, just sufficient in amount to smear surfaces and to be drawn out into slender threads, on separating intestinal convolutions. Small

intestine is also somewhat roughened in various parts of its surface; and this roughness is not removable by scraping with edge of knife. No other alteration of peritoneum.

Small intestines of natural appearance externally; contain about ten ounces of thickish, yellowish-grey, flocculent fluid, without remarkable odor. Mucous membrance rather pale in upper portions, considerably reddened throughout ileum. Redness is situated altogether in the villi, which are distinctly seen of a bright red color. Mucous membrane otherwise unaltered. Peyer's patches moderately developed in lower portion.

Large intestine contains half a pint of similar fluid to that in small. Mucous membrane generally pale and of natural consistence and thickness. Mucous follicles distinct everywhere, and their orifices slightly open. No other remarkable appearance. Mesenteric glands not remarkable.

Stomach of a very peculiar shape; it suddenly becomes contracted at its middle part, and continues so as far as pylorus; pyloric half being reduced to calibre of duodenum, while the cardiac half is of natural size. No external redness, exudation, or other mark of irritation about contracted part.

Fig. 4.

Great pouch contains about two ounces semi-transparent, stringy, mucous-looking fluid, colored yellow with bile. Contracted portion nearly empty, with the mucous membrane thrown into strong longitudinal rugæ, the prominent edges of which show a bright-red vascular injection, the intervening spaces remaining pale. In uncontracted portion, the mucous membrane is thrown into irregular convolutions, the prominent edges of which are also red, but brownish in cœcal extremity. Mucous membrane very slightly softened. Œsophagus natural.

Liver natural in color and consistence. Gall bladder contains about one ounce of very dark bile.

Pancreas natural.

Spleen rather small, blue; internally red, of natural consistence; somewhat deficient in blood.

Both kidneys natural. Urinary bladder contains about one drachm of light-colored turbid fluid, and is much shrunken.

Uterus comes up exactly to level of umbilicus. It occupies almost the entire cavity of pelvis, the bladder being collapsed, the rectum empty, and the remainder of intestines above and behind it. It is pear-shaped, and inclined to the right side, so that full two thirds of the organ lie to the right of the median line. It has a dull reddish vascularity on external surface. Fluctuation of liquor amnii can readily be felt through walls of uterus, as also limbs and head of fœtus. Uterus (with contents) measures, longitudinally, nine and a half inches; transversely, six and a half inches. Cervix uteri (which is included in the above measurement,) one inch in length. Os uteri has a somewhat tumefied appearance, and a dark purplish color. Its substance is filled with follicles which are distended with a yellowish, glairy, tenacious secretion. Cavity of cervix filled with a similar secretion. Placenta is attached to about the centre of anterior uterine wall, only a little inclined to the left of the median line. Cavity of cervix uteri communicates with cavity of body by an opening, one eighth of an inch, or a little more, in diameter.

Internal surface of uterus moderately red and shaggy; external surface of chorion, ditto. Chorion and amnion completely in contact.

Liquor amnii about fourteen ounces in amount, slightly turbid, of a yellowish color, neutral, and of a specific gravity (at 71° F.) 1010. Strongly albuminous.

Right ovary contains a corpus luteum, measuring half an inch through its short axis, and five sixteenths through its long. Nothing remarkable about other uterine appendages.

Fœtus of Katharine Hurley. Examined next day, at 12 o'clock, M. August 19.

Fœtus measures fourteen inches in length. Weight, with one inch of cord, three pounds and five and a half ounces.

Skin of a rosy hue, in some parts pale; sufficiently thick and tough; covered, over greater part of surface, with fine, white, short hairs.

Head covered with fine, dark hair, a quarter of an inch in length.

Nails distinct; reach nearly, but not quite, to ends of fingers.

Umbilicus situated one inch above pubes, and three quarters of an inch below middle point of body. Quite a thick layer of sebaceous matter on back.

Eylids in contact; adhering, but easily separated.

Slight opacity of cornæ.

No pupillary membrane.

No rigor mortis.

Strongly marked, distinct, purple, "tiger-lily" spots of ecchymosis on internal surface of pericardium. Some, also, on each pleura, particularly along sides of spinal column. Ecchymosis.

Both ventricles of heart white, and well contracted, while the dark color of the blood shows through the thin walls of the auricles. All the cavities of heart contain dark coagula, of moderate consistency; also, the veins of the chest and neck.

Foramen of Botal, a quarter of an inch in diameter; can be completely covered, from left side, by valve.

Arterial duct appears like the continuation of the pulmonary trunk, while right and left pulmonary arteries seem to be only small branches.

Heart, natural internally.

Lungs of a dull reddish color, rather purplish posteriorly, smooth, but with interstices between

lobules distinctly apparent. Lungs sink in water. A very moderate inflation is sufficient to change color of whole lungs to a bright rosy red, to bring out vesicles, and to make lung so much lighter, that it will float on water, even with the other, uninflated, still attached to it.

Lung, thus inflated, can be compressed in hand without much difficulty, so as to become again heavier than water.

Tongue white. Caliciform papillæ large and distinct. Mucous follicles at base, visible, but very small. Filiform papillæ also distinct.

Superior borders of larynx of a bright vermillion color. Larynx, trachea, and bronchi, pale internally. Longitudinal fibres of bronchi well developed.

Peritoneum natural. Liver of a dark-red color; soft and grumous internally, like spleen. Lower border comes down to five eighths of an inch above umbilicus. Gall bladder comes nearly, but not quite, to anterior edge of liver; contains a few drops of thin brownish fluid, with small yellowish flocculi.

Stomach, pale internally; contains a small quantity of thin yellowish, flocculent fluid. No softening of mucous membrane.

Small intestine six and a half feet in length; contains a little light olive-colored substance, of same consistency as meconium. No valvulæ conniventes. Brunner's glands visible; also Peyer's patches, which are very distinct. Solitary glands not seen.

Large intestine fourteen inches in length; round and smooth, not marked by either longitudinal or transverse bands. It is distended with dark greenish, almost black, meconium, from ileo-cœcal valve to within seven eighths of an inch of anus. Appendix also full of meconium.

Kidneys lobulated; rather larger than supra-renal capsules, but the *length* of the two bodies is the same, viz., one and an eighth inches.

Urinary bladder, one and an eighth inches long; empty. Its cavity is not extended at all into urachus.

Uterus, three quarters of an inch in length, and nearly cylindrical. Lips of os uteri thin and sharp. Internally, arbor uterina extends nearly up to fundus uteri.

Upper part of vagina distended with a whitish, soft substance, in appearance much like half-congealed starch. Internal labia pudendi much developed, and project beyond the outer ones.

Three points of ossification in sternum.

Calcaneum has one point of ossification, well advanced.

Astragalus has one point of ossification, just commenced.

Axis has a point of ossification, well advanced, in body, and another in odontoid process.

Fœtus is therefore, probably, seven and a half months old.

XVI.

MICHAEL DESMOND. *Aged* 27. *Laborer. Irish. Intemperate. Cholera for* 17½ *hours, with three or four days previous diarrhœa. In Hospital seven hours. Emetic of capsicum and ipecac. Saline mixture, one ounce, and chloric ether, one drachm; every hour. Autopsy* 9½ *hours after death.* AUGUST 12.

Rigor mortis well developed. Clubbed appearance of ends of fingers, with incurvation of nails and lividity. No œdema. No heat. Pupils equal, natural in size. Abdomen of natural form, tense, tympanitic.

Head. Dura-mater natural. A little bloody subarachnoid œdema over upper and anterior part of

right hemisphere. Slight bloody effusion in arachnoid cavity, farther back on left side. Arachnoid natural. Substance of brain also natural everywhere in color and consistence. A very little clear fluid in ventricles. Lining membrane pale. Medulla oblongata natural.

Chest. No dryness of pleuræ observable, owing to adhesions. Pericardium natural internally. Heart of good size, well contracted and firm. Right cavities almost completely filled with a firm fibrinous coagulum; contains also some dark coagulum and fluid blood. Yellowish coagula extend into veins of neck. Left cavities contain a moderate quantity of similar coagulum. Internally heart natural, except that one of aortic valves has a little thickening along semi-lunar ridges, not sufficient to interfere with its proper action. Substance of heart natural.

Phthisis. Extensive and firm pleuritic adhesions at upper portions of both lungs. Lungs crepitate well everywhere on surface, but upper portion of each is filled internally with tubercular masses of various sizes, most of them unsoftened. There is one cavity at right apex, capable of containing half an ounce of fluid. The walls of this cavity are soft, and irregular, variegated grey and red. There is another cavity, about half the size of that first mentioned, at posterior part of upper left lobe; but this has a distinct, nearly healthy-looking lining membrane, and has the appearance of a dilated bronchus. No engorgement of posterior parts of lungs. No appearances of recent inflammatory action anywhere.

Larynx natural. Trachea and bronchi pale internally, and their surfaces covered with minute drops of clear fluid, having the appearance of being left after evaporation. Mucous membrane natural in texture, except for two tuberculous ulcers on posterior surface of trachea; the first situated immediately behind upper extremity of sternum, oval in shape, one quarter of an inch in its longest diameter. Moderate tubercular deposite round edges of ulcer. The second is situated a little below the first, also on posterior surface, and is somewhat smaller. It is a smooth, roundish mass of deposite, with ulceration just commenced on prominent part. No inflammatory appearances in neighborhood of either ulcer.

Tuberculous ulcers.

The larger part of each lung is still in a healthy and serviceable condition.

Abdomen. A very little of the sticky secretion on peritoneum, between intestinal convolutions. Intestines of a natural color externally, considerably distended.

Numerous small, hard, tubercular deposites in peritoneum of mesentery, most abundant as we approach ileo-cœcal valve. There are also a very few on surface of small intestine; a considerable number on left side of abdomen, behind spleen and along spine; and cavity of pelvis is completely lined with them, whole of peritoneal surface being speckled with small, hard, white, cartilaginous, or fibrinous-looking masses. Those on mesentery are generally white, but a few of them are red.

Tubercular disease of Peritoneum.

No fluid in peritoneal cavity, or other sign of inflammatory action.

Small intestines contain one half pint, of thin, dingy, light-colored fluid, with large abundant flocculi, of a wood-brown color. Mucous membrane of duodenum very pale and greyish, with a look as if it had been maccerated for a considerable time in water. Below this, mucous membrane pale but of natural appearance; moderately reddened in lower part of ileum, everywhere somewhat softened, but not actually disorganized. Twenty-four Peyer's patches counted, none of them excessively developed. Villi visible in all parts of intestine. Redness in ileum in this instance is not seated in villi, but these are distinctly seen of a white color, on a red ground. No other remarkable appearance in small intestine.

Large intestines contain one pint of fluid, similar

to that in small, only rather deeper colored. Mucous membrane pale throughout. Mucous follicles visible, natural in lower part. Cœcum and upper part of colon have a considerable number of small irregular ulcers, with abrupt edges, many having penetrated the whole thickness of mucous membrane. These ulcers have no appearance of tubercular deposite about them. Many are elongated transversely to axis of intestine, occupying the free edge of a transverse fold of mucous membrane. No redness about ulcers. Appendix cœci has also many similar ulcers on mucous surface, and toward cœcal extremity a small, oval, prominent collection of pus, which has not yet escaped from beneath mucous membrane.

Ulcers.

Stomach contains one pint and a half of fluid, thinner than that in intestines; otherwise similar. Moderate softening of mucous membrane, with brown discoloration of blood.

Mesenteric glands a little enlarged and yellowish, but not tuberculous.

Liver large and smooth, with a lardaceous feel and rounded anterior edge; rather pale. No fat extracted by heat. Consistence about natural. Gall bladder contains half an ounce of dark, thin bile. Common duct large, and filled with same. Ducts in interior of liver yield thin yellow bile by pressure.

Pancreas natural. Spleen of natural size, smooth, and firm; natural internally; posterior surface smeared with softish lymph, easily removable.

Lymph on Spleen.

Both kidneys of full size, rather pale, of a lardaceous feel, like the liver, and decidedly morbid in appearance. Very slightly nodulated on surface. They are not flabby, but have a peculiar *clumsy* feel, similar to that of india rubber. Internally cortical portion abundant, pale, and with a confused, degenerated appearance. Tubular portion natural. Lining membrane of pelves pale. A few minute, globular, tuberculous looking masses scattered through substance of kidney.

Degeneration of kidneys.

Urinary bladder contains two ounces of thin, yellowish, flocculent fluid, with all the gross appearances of urine; highly albuminous. Abdominal vessels natural internally.

Albuminous Urine.

XVII.

MARGARET BURKE. *Aged* 30. *Irish. Intemperate.* *Cholera* 17 *hours, with one day's previous diarrhœa. In Hospital two hours. Much lividity. Bled to ten ounces, and ordered saline mixture every fifteen minutes. An hour and a half afterward patient rose from bed, drank half a pint of water, and almost immediately expired. Autopsy* 13 *hours after death.*

August 13

Rigor mortis firm. Much lividity and shrivelling of fingers. Well-marked lividity also of face. Abdomen rather prominent. Pupils equal, a little dilated. Muscles red.

Blood exceedingly fluid; trifling soft coagula in heart being the only ones found.

Head. Dura-mater exceedingly adherent to skull. A very little clear serous fluid, not at all bloody, in arachnoid cavity, most on right side. Moderate subarachnoid œdema. A drachm or two of clear fluid also in ventricles. Substance of brain and cerebellum every way natural. Lining membrane of ventricles pale, but vein running along inner border of choroid plexus is turgid with blood. Medulla oblongata natural.

Chest. Dryness of pleura well-marked on left side, doubtful on right. Pericardium natural internally, but empty: contains not more than five or six

drops of fluid. Heart much loaded with fat, but left ventricle well contracted. Cavities contain a considerable quantity of very fluid, dark blood, of moderate consistence. Internal surface of right auricle stained of a dark purplish-red, but other cavities are of natural color and appearance. Consistence of heart natural; valves, &c. healthy.

Both lungs have a remarkably full, healthy appearance. They collapse but little, crepitate perfectly everywhere, and are throughout of natural consistence. Color light-grey, mottled with red and black. Absolutely no sanguineous congestion, lower and posterior parts being, in fact, lighter colored and dryer than upper. They contain little blood, but a sufficient quantity of fluid. A minute round, smooth, encysted, calculous concretion just underneath pleura, at right apex. No other morbid deposite.

Larynx natural. Trachea pale internally; contains a little frothy fluid. Bronchi also pale generally, except those distributed to left apex, which are very slightly reddened. Thickness and consistency of mucous membrane unaltered.

Abdomen. Peritoneum natural. No sticky secretion visible, but intestines have a slimy feel. Drops of oil exude from peritoneal surface of liver, stomach, and small intestines, and reappear after they have been wiped away; most abundant on liver.

Small intestines of a light rosy hue externally; contain about two pints of thickish, grey, gruelly fluid. Mucous membrane generally pale or light-rosy, with very moderate rednesss in lower part. Peyer's patches visible to number of twenty; none of them remarkably developed. Solitary glands visible, somewhat enlarged, near ileo-cœcal valve. Mucous membrane natural in thickness and consistence. No bile in duodenum. Large intestines contain half a pint of fluid, similar to that in small. No evident morbid alteration of mucous membrane.

Stomach contains one pint of rather thin, dingy

fluid. Mucous membrane moderately thinned and softened in cœcal extremity, and slightly brownish over most of surface; otherwise natural.

Œsophagus natural.

Mesenteric glands not remarkable.

Liver mottled red and yellowish externally; internally, of natural color, rather soft; ducts contain a little yellow bile.

Gall bladder contains about half an ounce of thin, dark-brownish bile. Common duct rather collapsed; contains bile similar to that in bladder.

Pancreas natural.

Spleen not much enlarged, but full of blood; tense and elastic, like india rubber.

Kidneys small and flabby; of a dark-red color, natural in consistence.

Urinary bladder empty, excepting a little puriform secretion.

Both ovaries contain serous cysts of various sizes. One has, beside, a cyst, containing a brownish, old-looking coagulum. Old adhesions of right ovary to portion of wall of pelvis and of oviduct to ovary. Left oviduct free. Uterus somewhat reddened and softened internally, but reddened part can easily be scraped away, leaving internal surface smooth and pale.

XVIII.

August 15. JOHN MCCARTY. *Aged* 20. *Temperate. Cholera for three days. Secondary fever for one week. Treatment; at first, chlorate of potass, chloric ether, and hot brandy and water, ad libitum. After reaction, effervescing drinks, and finally wine and quinine. Autopsy about* 20 *hours after death.*

Rigor mortis moderate. Some lividity of fingers, but no marked shrivelling. Body and limbs everywhere cool. Much dark brown sordes about teeth and lips. Strong smell about body, like that of *rabbits' urine.* Muscles rather soft, mostly red.

Spinal cord (examined first.)

Considerable bloody œdema of cellular tissue in interior of spinal canal, along sides of cord, in dorsal and lumbar regions. None in cervical. Considerable, but not excessive, quantity of clear fluid in cavity of sheath. No undue vascularity about sheath, or cord, in any part. Cord everywhere of natural form and color, both internally and externally; but there is decided softening of cervical enlargement, though not enough to destroy texture. Dorsal portion very slightly softened; lumbar, quite firm and healthy. Nothing else remarkable.

Softening of cord.

Head. Dura-mater natural. Moderate quantity of red coagulum in longitudinal sinus. Arachnoid natural; no effusion. Substance of brain everywhere of natural firmness and color, unless cortical portion is rather pale. A little clear fluid in ventricles. Lining membrane pale. Medulla oblongata quite natural.

Emphysema. *Chest.* No dryness of pleura. Considerable emphysema of cellular and adipose tissue about anterior mediastinum. Pericardium natural internally;

contains from three to four drachms of fluid. Heart rather pale; contains almost no blood, but what there is, has due proportion of coagulum. Right ventricle moderately distended, principally with air; contains also, together with auricle and adjacent veins, a small quantity of dark red coagulum, with a little fluid blood.

Air in heart.

Left ventricle relaxed, and empty. Left auricle contains a little blood, as on right side. Aorta contains some dark red coagulum. Lining membrane of heart rather dusky, but not actually stained. Substance of heart, valves, &c., natural. Blood also deficient, in amount, in all parts of the body.

Lungs natural in appearance, anteriorly; rather darker, posteriorly. They generally crepitate sufficiently well, but there is a spot of hepatization at lower part of right upper lobe posteriorly, and another at upper part of left lower lobe, also posteriorly. Solidified portions each occupy a space of about five to six cubic inches. At these points the lung is full and smooth externally, without crepitation, and has a dense, resisting feel. Excised portions of it sink rapidly in water. Cut surface has a deeper red color than surrounding healthy parts, with a granular appearance, and a texture something like that of liver. Not much fluid exudes. Hepatized portions sufficiently well defined.

Pneumonia.

Left cavity of pleura contains five and a half ounces of dark brownish, dingy, thin fluid, with a disagreeable odor. Right cavity contains rather less of a similar fluid. A little soft, greenish-yellow lymph, smeared over costal pleuræ, at each apex.

Effusion.

On each pulmonary pleura, directly over hepatized portions of lung, there is an appearance as if fine sand had been sprinkled over the membrane, which is owing to the deposite of numerous small crystals of ammonio-magnesian phosphate upon the surface of pleura, giving it a finely granular, gritty feel to fingers.

Crystalline deposite on pleura.

Larynx, trachea, and bronchi, of a dark, dusky hue internally. Mucous membrane otherwise natural.

Abdomen. Peritoneum natural; contains no fluid. Small intestines of a very dark leaden color externally; contain a moderate quantity of thin, pasty, greenish substance, which grows more yellowish as we go downward, and finally becomes dark brown in lower part of ileum. Twelve Peyer's patches counted, nearly or quite natural in appearance, but below this their places are occupied by oval or irregularly circular ulcers, varying in size from a quarter of an inch diameter downward, with thick, rounded, swollen edges, and for most part penetrating quite through thickness of mucous membrane. The first three of these ulcers are distinctly seen to be situated in the substance of swollen Peyer's patches; but below this, structure of patches is no longer recognizable at ulcerated points. Two of the ulcers are covered on their surface with roundish, red and yellow, granular coagula, which project into cavity of intestines, and can be separated from ulcer without much difficulty.

Ulcers.

The ulcers in all are fourteen in number, and are entirely confined to lower two feet of ileum.

Mucous membrane generally of natural thickness and consistence; stained dull greenish, yellowish, or brown, according to color of contents in different parts. Solitary glands visible in lower part of ileum, not altered.

Large intestine contains a considerable quantity of consistent, dark brown, thick, pasty, homogeneous substance, like altered blood. Mucous membrane much reddened in upper third, where there are also a few small, purple, circular spots of ecchymosis in its substance. In lower two thirds, mucous membrane paler, and mucous follicles moderately enlarged, with their openings marked by a black speck. No other morbid appearance.

Redness of intestine.

Mesenteric glands generally enlarged, red, and somewhat soft.

Stomach contains about one ounce of a yellowish fluid. Mucous membrane discolored, of a strong slaty-brown, in cœcal extremity, but without any marked thinning or softening. Very remarkable appearance of œsophagus, mucous membrane of which is entirely destroyed in lower half, by irregular corroding ulcers, except a narrow strip on one side of the tube, which remains healthy. Healthy and ulcerated parts covered with a rather tough, opaque, yellow, flaky exudation, removable without much difficulty. Ulcers penetrate, at many points, quite through mucous membrane, and have much the aspect of corrosions. No ecchymosis, but some reddening of parts.

Corrosion of Œsophagus.

Liver natural in color, somewhat soft. Gall bladder contains about two ounces of thin, dark bile.

Pancreas natural. Spleen large and full; rather heavy. Internally natural, with normal amount of blood, or a little more.

Both kidneys large, pale, and flabby, without any other morbid alteration. Urinary bladder contains from one and a half to two pints of clear, light colored urine. Mucous membrane very pale, as if macerated.

The crystals of ammonio-magnesian phosphate, adhering to the pleura, could not be distinctly recognized as such by direct examination under the microscope, owing to their being somewhat enveloped in lymph. They were insoluble in distilled water, but soluble in dilute acetic acid, and were precipitated from this solution by ammonia, in minute crystals of the following form:—

Fig. 2.

The fluid taken from the left chest was moderately alkaline, with a specific gravity (at 80° F.) of 1026, and strongly albuminous, as to become opaque, and nearly solid by heat. Under the microscope it contained an abundance of well defined crystals of triple phosphate, varying in size, as follows:—

Fig. 10.

XIX.

August 18. Calvin Castleman. *Aged* 21. *Intemperate. Cholera for* 15 *hours, without previous illness. In Hospital seven hours. Venesection to* 16 *ounces. Sinapisms, external heat, and saline mixture with six grains of carbonate of ammonia, every half hour. Cold bath. Death half an hour after cold bath. Autopsy* 16½ *hours after death.*

Rigor mortis very strong. Much shrivelling and blueness of fingers. No heat about body.

Head. Dura-mater natural. Longitudinal sinus contains some fluid blood. A little bloody subarachnoid œdema at anterior and superior part of right hemisphere. Arachnoid natural. Substance of brain and cerebellum little, or not at all, altered in consistency. Vascularity normal.

Chest. Dryness of pleura over pericardium well marked, particularly on right side. Pericardium natural internally. No ecchymoses. Right cavities

contain a moderate quantity of thick, dark, sticky blood, with coagula similar in appearance and consistence to black currant jam. Lining membrane stained of a dark purple, as also that of veins up as far as neck, and throughout chest. Left cavities contain similar blood to that on right side. Heart otherwise natural. Staining of heart, &c.

Both lungs crepitate well everywhere. Very moderate engorgement of posterior parts. No deficiency of fluids. Larynx, trachea and bronchi dark-colored internally, but mucous membrane smooth and shining. A thickish, opaline secretion can be expressed from tracheal glandules, a clearer one from bronchial.

Nothing else remarkable about chest.

Abdomen. Peritoneum natural. Small intestine contains about two pints of thickish, yellowish-grey, flocculent fluid, without remarkable odor, slightly alkaline; also five lumbrici, most of them alive, the largest ten and five-eighth inches in length. Mucous membrane almost universally pale, and in some parts decidedly thinned, so that muscular fibres can be distinctly seen through it. Mucous membrane also perceptibly softened throughout. Twenty-five Peyer's patches counted, all of them somewhat swollen and softened. Solitary glands moderately enlarged in lower six feet of intestine. *Lumbrici.* Thinning of mucous membrane.

Large intestine contains one pint and a half of thin, grey, flocculent fluid, and thirteen cherry-stones. Mucous membrane pale, of natural thickness and consistence. Mucous follicles everywhere visible, their orifices being marked by a black speck. Cherry-stones.

Mesenteric glands natural.

Stomach contains about one pint of thin, dingy, semi-transparent, neutral fluid. Nothing remarkable about mucous membrane of stomach or œsophagus.

Liver decidedly soft, especially at posterior part of left lobe; everywhere very dark-colored, owing to staining of hepatic veins with the coloring matter of Staining of veins.

the blood. Ducts in interior contain an abundance of greenish bile. Gall bladder and common duct contain a moderate quantity of dark, rather thin bile.

Pancreas somewhat dark-colored, from the staining of veins, as in liver.

Spleen rather small; otherwise not remarkable.

Both kidneys pale and flabby. Renal veins stained, as the others. Urinary bladder contains from one and a half to two drachms of thin, light-colored, flocculent fluid, without any aspect of urine.

The fluid taken from the large intestines in this case, was examined for urea, without affording any trace of that substance. It contained an abundance of oil, and while evaporating gave off a strong odor of gluten. It was very moderately albuminous.

XX.

August 21. Ellen Barrett. *Aged* 30. *Widow. Irish. Intemperate. Cholera for* 10¼ *hours, without previous illness. In Hospital* 8¾ *hours. Thorough collapse at entrance. Treatment—Sulphate of Quinine, five grains every half hour, for four hours; afterward ten grains every* 15 *minutes. Autopsy* 13 *hours after death.*

Rigor mortis natural. Shrivelling and lividity of fingers well marked. Pupils equal, natural. No remarkable heat about body. Abdomen rather full, but lax; moderately resonant. Numerous scars of pregnancy.

Mammæ sufficiently full. A moderate quantity of

normal-looking milk can be expressed in jets from each nipple. Muscles red.

Head. Dura-mater natural. Some coagulum in longitudinal sinus. Some bloody fluid (or fluid blood) smeared over posterior and superior part of left hemisphere. A very little also on right side. Arachnoid quite healthy. No other unnatural appearance about any part of brain or membranes, except a moderate quantity, perhaps one and a half drachms of clear fluid in lateral ventricles.

Chest. Dryness of pleura well marked on left side, over pericardium. No fluid in pericardium, or only just enough to lubricate surfaces. Unusually large white spot on anterior surface of right ventricles; also a few small circular spots, similar in structure, on posterior aspect of ditto. Pericardium otherwise natural.

Right cavities of heart, as well as adjacent veins, considerably distended with dark, thick blood, and blackish, jelly-like coagula; left ventricle somewhat, but not perfectly contracted; nearly empty. Left auricle contains a considerable amount of blood, similar to that on right side. Lining membrane, valves, and substance of heart natural.

Both lungs crepitate well everywhere. Left quite light and healthy in appearance. Right rather more purplish and engorged, (as if from patient's lying on right side,) but nowhere altered in texture. No tubercles.

Trachea and bronchi quite pale internally; contain a little frothy fluid.

Abdomen. A little sticky feel to intestinal peritoneum. Peritoneal surface of mesentery presents numerous small spots of short reddish *tufts*, as if the products of old inflammatory effusion, become organized and engorged with blood. The whole inner surface of the pelvis, also, presents an abundance of these tufts, which, in this situation are colored, not red, but dark brown. Upper and posterior surface

Old Peritonitis.

of spleen also presents a few spots of somewhat old lymphatic deposite, but not colored.

Small intestines light colored and fair externally; contain about three pints thin, yellowish, flocculent, neutral fluid, without remarkable odor. Mucous membrane universally pale, excepting some brownish discoloration of duodenum; everywhere of natural thickness and consistence. Twenty-five Peyer's patches counted, most of which are slightly swollen and opaque. *The lower seven, however, are entirely free from alteration.* Solitary glands not visible.

Large intestine contains two and a half pints of thin, grey, flocculent, neutral fluid, without odor; and some half-digested bits of food. Mucous membrane pale, and not altered. Mucous follicles just visible in cœcum.

Mesenteric glands natural.

Stomach contains about six ounces of thin, dingy, semi-transparent, slightly acid fluid, and a considerable quantity of undigested bits of potato, quite recognizable. Mucous membrane moderately softened and thinned in cœcal extremity; not otherwise remarkable.

Liver natural externally; rather dusky colored internally. Yellowish bile flows readily from ducts interior. Consistence of organ natural.

Gall bladder contains about one ounce of quite dark, rather thin bile.

Pancreas natural. Spleen nearly of natural size, but flabby and wrinkled on surface. Internally rather dry; otherwise natural.

Left kidney somewhat dark-colored internally. Right paler. They are both flabby, and afford an abundance of puriform fluid from papillæ, by pressure. Nothing else remarkable.

Urinary bladder quite contracted and empty; only smeared with the puriform fluid. Internal surface natural.

Blood everywhere of same character as in heart. No staining of lining membrane of vessels.

Uterus somewhat tumefied and reddened internally, and right ovary contains a somewhat recent corpus luteum, from which the blood has not yet been entirely absorbed.

XXI.

JOSEPH COOLEDGE. *Aged* 29. *Intemperate. Cholera for one day. (Only a few hours previous diarrhœa.) Afterward delirium (tremens?) for five days. Treatment—at first saline mixture; then valerian and chloric ether; and during the last day of life brandy and water every three hours. Autopsy* 16 *hours after death.* AUGUST 22.

Rigor mortis well established. Considerable lividity of ends of fingers, but no shrivelling. Pupils equal, natural. No remarkable heat about body. Abdomen natural in form, moderately resonant.

Muscles red.

Head. Dura-mater natural. Longitudinal sinus empty. A very little clear fluid over both hemispheres in arachnoid cavity. Much sub-arachnoid œdema everywhere; in three or four small spots bloody. Arachnoid healthy in appearance. Substance of brain everywhere of natural vascularity; a little firmer than usual.

Effusion in Arachnoid.

Brain firm.

Lateral ventricles filled with clear serous fluid. Lining membrane not vascular, but otherwise presents a very remarkable appearance. All over both corpora striata, and on floor and roof of both posterior cornua, there is an abundance of thickly-set, minute, roundish, colorless, shining prominences, like small, bloodless granulations, of same consistence as

Granulation and ulceration of ventricular membrane.

cerebral substance. On each side of septum lucidum there are some of these granulations, and also several roundish, and irregular abrasions or ulcerations, very shallow, and without any induration or redness of base. The surface of most of these abrasions is smooth; that of some of them set with granulations. No granulations on surface of optic thalami, but they are abundant on floor of fourth ventricle, at its lower extremity. No abrasions except on septum lucidum. No remarkable appearance at base of brain, except that pia-mater adheres with somewhat unusual tenacity. Medulla oblongata firm; natural in appearance.

Chest. Dryness of pleura very well marked, over and about pericardium. Well marked, broad, white spot on posterior aspect of right ventricle; another, smaller and thinner, on anterior surface of left ventricle. Several others, small but quite opaque and well defined, on internal surface of pericardium, over right auricle. Pericardium otherwise healthy; contains hardly half a drachm of clear fluid.

Right cavities of heart moderately full of dark fluid blood, and soft, jelly-like coagula. Left ventricle, not at all contracted, but quite collapsed and flabby; contains, with auricle, a moderate quantity of blood, similar to that on right side. No staining of endocardium. Valves all healthy, except aortic; these present each a decided thickening along festooned borders of fibrous portion, and aurantian corpuscles are hypertrophied to five or six times their natural size. Cavities of heart of natural size, and substance healthy.

Both lungs of a very light mottled-grey anteriorly; posteriorly, moderately engorged with blood; crepitate well everywhere, but collapse rather more than ordinary. Structure natural. No tubercle. Larynx, trachea, and bronchi natural internally, except that lower ramifications of the bronchi, on both sides, are somewhat stained with the coloring matter of the blood.

Abdomen. Peritoneum natural. Small intestines light-greyish externally. Upper part contains a moderate quantity of rather thin, green, bilious matter; this becomes thicker as we go downward, and alters in color; first to yellow, then to brownish. Mucous membrane rather thin, otherwise natural; stained throughout nearly upper half with bile. No vascularity. Peyer's patches visible, but not altered. Solitary glands, the same.

Large intestine contains pasty yellowish fæces; at one spot, about commencement of lower third of intestine, stained with blood; elsewhere, natural. Mucous follicles generally visible; natural.

Mesenteric glands natural.

Stomach contains an ounce or two of dingy, slightly yellowish fluid; presents nothing remarkable, except that mucous membrane is stained with bile in cœcal extremity; of natural color toward pylorus.

Œsophagus natural internally; contains, about six inches above cardiac orifice, a tortoise-shell ring; (which patient had worn, and probably swallowed in last hours of life.) The ring is enveloped in a greyish, stringy, moderately tough exudation, but there is no other mark of irritation of mucous membrane in neighborhood.

Liver natural in appearance; contains bile in ducts. Kidneys sufficiently firm, and well supplied with blood. Urinary bladder contains about three ounces of turbid urine, moderately coagulable by nitric acid. Albuminous urine.

Other abdominal organs not remarkable.

XXII.

August 23. CATHARINE MCCARTY. *Aged* 30. *Married. Irish. Intemperate. Cholera* 96 *hours. In Hospital eight hours. Treatment—Emetic of ipecac: and magnesia; afterward, chlorate of potass ten grains, with bicarbonate of soda, half a drachm every hour. Autopsy* 7½ *hours after death.*

Rigor mortis natural. Some heat about chest and abdomen; none elsewhere. Blueness and shrivelling of fingers well marked. Pupils equal, slightly dilated. Countenance natural.

Head. Longitudinal sinus empty. Arachnoid quite natural, and no effusion into its cavity, or beneath it. Substance of brain everywhere unaltered. Moderate amount of clear fluid (half a drachm?) in lateral ventricles. No vascularity. Medulla oblongata natural.

Chest. Dryness of pleura sufficiently well marked, but not excessive. Pericardium natural internally; contains about one drachm, or less, of clear fluid; Right cavities of heart, moderately full of dark fluid blood, quite thick and tarry, with insignificant amount of coagula. Left ventricle perfectly firm, well contracted, and empty. Left auricle contains blood as on right side. Lining membrane, valves, and substance of heart healthy, excepting a trifling amount of cartilaginous deposite on one of the aortic valves.

Blood generally thick and tarry, and without coagula; but no staining of vessels noticed.

Both lungs crepitate pretty well everywhere, but collapse much, and have something of a dry, leathery feel; rather deficient in fluids; no tubercle; but just at anterior part of lower edge of left lower lobe there is an irregularly roundish, hard, light-colored, encysted calculus, about three eighths of an inch in diameter. Pulmonary tissue in neighborhood unaltered. Larynx, trachea, and bronchi pale internally; contain a little frothy fluid; no particular morbid appearance.

Concretion.

Abdomen. Peritoneum dryish at upper and anterior part. Some roughness of peritoneal surface of intestines, and a perceptible amount of sticky, slimy secretion. Peritoneum otherwise natural.

Small intestines contain two pints of rather thickish, flocculent, bright yellow fluid, with distinct alkaline rëaction, but no remarkable odor. Internally, intestines pale, with some yellowish staining at upper part of duodenum. Slight reddish discoloration in one or two spots below. Mucous membrane everywhere of natural thickness and consistence. A few Peyer's patches moderately swollen and opaque; otherwise natural. Solitary glands more than usually developed in lower foot and a half of ileum. Nothing else remarkable.

Large intestine contains one pint of greyish, flocculent fluid, having an odor and appearance like that of soap and water. Rëaction moderately alkaline. Mucous follicles everywhere considerably developed. Mucous membrane pale and natural.

Mesenteric glands somewhat enlarged and yellowish in color. Stomach contains about five ounces of dingy, alkaline fluid. Moderate softening of mucous membrane, without any other remarkable appearance.

Œsophagus natural.

Liver of natural color and appearance; sufficiently well supplied with blood. Green bile can readily be expressed from ducts in interior of organ.

Gall bladder contains a moderate quantity of dark, thickish bile.

Spleen rather small, blue and wrinkled; internally, not remarkable. Pancreas natural.

Kidneys rather dark-colored, sufficiently large, somewhat flabby; firm in texture. Papillæ afford an unusual amount of puriform fluid on pressure.

Urinary bladder contracted; contains only a little puriform secretion.

Menstruation present. Uterus somewhat tumefied, and together with vagina and external organs shows a considerable amount of menstrual fluid, which is smeared over labia and walls of vagina, and mixed with the mucus which fills the os uteri.

Left ovary contains a false corpus luteum, half an inch in diameter.

XXIII.

August 26. Bridget Black. *Aged* 38. *Married. Irish. Cholera* 42 *hours. In Hospital* 14 *hours. Saline treatment, with external heat. Autopsy* 6½ *hours after death.*

Rigor mortis natural. Blueness and shrivelling of fingers moderate. Some turgidity of superficial veins in neck. Muscles of natural color.

Head. Longitudinal sinus empty. Thickish bloody fluid smeared over posterior part of left hemisphere, in most dependent situation. None elsewhere. Arachnoid natural. No effusion other than that mentioned. Lateral ventricles contain a very moderate quantity of clear serum. Color and consistence of brain everywhere natural.

Medulla oblongata natural.

Chest. Dryness of pleura distinct, but not excessive. Sticky secretion, also, on pleura, in minute quantity, similar to that on peritoneum. Pericardium empty of fluid. Distinct, irregular, sharply defined, white spot, on anterior aspect of right ventricle; also others, similar in appearance, but smaller, on internal surface of pericardium. A few minute spots of ecchymosis on free edge of right ventricle. Pericardium otherwise natural.

Right cavities of heart moderately filled with dark, thick blood, with loose, jelly-like coagula, and some firm, stringy, yellowish clots, entangled among tendinous cords. Left ventricle moderately well contracted, nearly empty. Left auricle contains dark blood, with jelly-like coagula. One of the aortic valves has a prominent, well defined, cartilaginous thickening, in the form of a double festoon, arranged in a transverse direction. Interior and substance of heart otherwise natural.

Both lungs crepitate everywhere, but collapse rather more than natural. No alterations in texture, except one or two small concretions at left apex.

Larynx, trachea, and bronchi, pale and natural in appearance.

Abdomen. Peritoneum of intestines moderately smeared with slimy secretion; otherwise natural.

Small intestines contain from three to four pints of yellow, bilious-looking, flocculent fluid. That in duodenum is of a bright yellow, and evidently bilous. Mucous membrane of a dull red color in some spots, apparently from settling of blood in dependent parts of convolutions; thickness and consistence not altered. Several Peyer's patches, toward lower part of intestine, moderately swollen and opaque; others quite natural. Solitary glands not remarkable.

Large intestine nearly empty; contains only a very little thin, yellowish, flocculent fæces. Mucous membrane pale and natural. Mucous follicles visible, and not remarkably altered.

Mesenteric glands somewhat enlarged, but not reddened or softened.

Stomach contains nearly one pint of dingy, greenish, bilious-looking fluid. Mucous membrane very moderately softened; not otherwise altered.

Pancreas natural. Spleen of natural size, flabby and wrinkled. Internally, rather deficient in blood.

Liver of its ordinary reddish-yellow color, internally and externally. Ducts stained bright yellow, but do not yield much bile on pressure.

Gall bladder contains about one and a half ounces of dark, thin bile.

Horse-shoe kidney

Kidneys connected with each other on median line, at their lower extremities, by a band of corticle substance. Band about one inch broad on median line, and of proportionate thickness. It is constricted just at its middle, and here several fibres of the sympathetic nerve pass in front of it downward toward pelvis. The two kidneys have separate pelves and ureters, the latter of which pass downward in front of kidneys, in company with the uterine veins. Internally, kidneys not remarkably altered in structure. Lining membrane of pelves smeared with a creamy secretion. Urinary bladder contracted and empty; walls smeared with the same creamy secretion.

Uterus retroverted, so that its fundus is directed downward and backward. Posterior parietes somewhat reddened and soft, but organ otherwise unaltered. Internal surface pale. A very little stringy, uncolored secretion in cervix.

Both ovaries healthy in appearance; contain only serous cysts.

Abdominal vessels natural internally. No staining anywhere. Blood generally thick, and very deficient in coagulum.

XXIV.

August 28. Mary O'Neil. *Aged* 57. *Married. Temperate. Cholera* 24 *hours. No previous diarrhœa. In Hospital* 11½ *hours. Treatment;* 80 *grains of calomel in divided doses. Carbonate of ammonia, five grains, every* 15 *minutes. Autopsy* 15 *hours after death.*

Rigor mortis very moderate. Excessive lividity and shrivelling of fingers; none of importance elsewhere. Abdomen of natural form, rather resonant. No heat about body or limbs. Muscles red.

Head. Dura-mater natural. Longitudinal sinus full of dark colored fluid blood and gelatinous coagula. Some effusion of serum in cavity of arachnoid: no blood. Decided sanguineous congestion of superficial parts of brain, but, internally, amount of blood natural. Considerable amount of serous effusion also into ventricles, sufficient to produce fluctuation, but not enough to distend ventricular parietes. Moderate softening of central parts, particularly of fornix. Cerebellum also a little softened. Encephalon otherwise natural.

Congestion and Effusion.

Chest. Pericardium natural internally; contains about half an ounce of clear serum. Right cavities of heart, particularly auricle, as well as venæ cavæ and internal jugulars distended by a very dark, tolerably consistent coagulum, with a small portion colorless, and a very little fluid blood. Left ventricle relaxed; contains a little dark, fluid blood. Left auricle contains dark fluid blood, with gelatinous coagula. Lining membrane, valves, and substance of heart natural.

Both lungs have extensive, moderately firm, cellular, pleuritic adhesions. They crepitate tolerably well except just at lower edge of right lower

lobe. Here crepitation is very deficient, and texture of lung redder and more compact than natural, but not at all softened. The intimate structure does not seem altered. Excised pieces float in water. The unnatural appearance is apparently owing to confinement by adhesions. Lungs otherwise quite natural.

Larynx and trachea pale internally, covered with small drops of thickish, semi-transparent secretion from laryngeal and tracheal glandules. Bronchi pale, except that going to right lower lobe; this is somewhat reddened, and contains a little puriform secretion.

No other abnormal appearance about lungs.

Abdomen. No slimy secretion over greater part of intestinal convolutions, but a very little in some spots. Small intestines, light greyish-red externally; moderately distended with air, but nearly empty of fluid. They contain not more than six ounces of thickish, flocculent fluid, of a dull red color, (as if from the admixture of red paint, and with a moderately alkaline rëaction. Mucous membrane generally pale, stained yellow in duodenum. In upper part of duodenum, some injection of vessels of mucous membrane; in one or two spots, an approach to ecchymosis. Eighteen Peyer's patches counted, all slightly swollen and opaque, but not otherwise altered. Solitary and duodenal glands natural.

Congestion.

Large intestine contains about twelve ounces of reddish-brown, gruelly fluid, moderately alkaline, with slight fœcal odor. Mucous membrane pale, but presents, over greater part of its extent, an appearance of "deficiency," as in the case of *Ellen Keith*. As in her case, also, it seems most marked immediately round mucous follicles, as in scraping up mucous membrane, (which is very easily accomplished,) the follicles are often left adhering to the cellular coat. Mesenteric glands not remarkable.

Deficiency of mucous membrane.

Stomach contains rather more than one pint of a dingy, green, bilious fluid, neutral in rëaction, with

an odor of fermenting beer. There is also a considerable quantity (one scruple?) of heavy, dark, slate-colored powder, like the sediment of black wash, resting on mucous membrane, but not strongly adhering to it. There is a little of it toward pylorus, quite white, and like calomel in its physical properties. Mucous membrane considerably thinned and gelatinized over surface of posterior wall, but otherwise not remarkable. Œsophagus natural.

Calomel in Stomach.

Liver stained dark slate color on under surface, elsewhere reddish-yellow, externally and internally. Ducts stained bright yellow, and yield a moderate quantity of greenish bile, by pressure.

Gall bladder pale and much atrophied, and contracted round a gall-stone which occupies its cavity toward outlet. Cystic duct quite impervious. Gall bladder contains, beside calculus, about half a drachm of turbid, yellowish-white fluid, rather thinner than bile.

Calculus.

Hepatic duct hypertrophied to five or six times its natural size.

The calculus is irregularly ovoid in shape, five eighths of an inch in its largest diameter, and covered with ridges of transparent, tubular crystals, arranged with their broad faces opposed to each other, so as to form long blocks, or ridges.

Pancreas natural. Pancreatic fluid, clear, distinctly acid in rëaction, can be expressed from duct.

Spleen quite small, flabby, and deficient in blood.

Kidneys firm in texture, and moderately supplied with blood. Fluid expressed from papillæ, not thick and creamy, but reddish and semi-transparent. Urinary bladder contracted, empty; and smeared internally with a little creamy fluid.

Both ovaries atrophied to a few small, firm, cartilaginous nodules, connected by a little reddish tissue. Uterus considerably enlarged, by reason of three rounded fibrous tumors, which occupy its walls. Two of them, on the right side and posteriorly, are about the size of walnuts. The third is

Fibrous tumors of Uterus.

four or five times as large, and projects into cavity of uterus, covered only by mucous membrane, while the muscular fibres of the uterus are spread out over its body.

Lining membrane of uterus considerably reddened, but not otherwise altered. Cavity of cervix occupied by two small, softish, purple, pedunculated polypi. Os uteri and vagina natural.

XXV.

August 31. MARGARET INCH. *Aged* 31. *Married. Irish. Intemperate. Cholera* 28 *hours, without previous diarrhœa. In Hospital eight hours. Cramps very severe. Venesection to six ounces, which produced syncope; afterward to three ounces. Saline mixture every* 15 *minutes. Autopsy* 26 *hours after death.*

Rigor mortis moderate. Excessive shrivelling, with blueness of fingers. Abdomen rather collapsed, flabby. No heat about body.

Head. Dura-mater healthy. Arachnoid same. No bloody or other effusion in arachnoid cavity. Some clear sub-arachnoid œdema. Substance of brain and cerebellum everywhere firm and of natural color. Firmness perhaps greater than natural, considering time since death. Moderate serous effusion in lateral ventricles. Several small, firm, colorless, "miliary" granulations on free surface of posterior pair of tubercular quadrigemina. No inflammatory or other morbid appearances in neighborhood. Tubercula-quadrigemina natural internally. No other unusual appearance about brain.

Miliary Granulations.

Medulla oblongata healthy.

Chest. Moderate dryness of pleuræ, most marked on left side. Pericardium natural, internally, but contains nearly one ounce of thin, bloody effusion. Right cavities of heart distended, principally with air; contain a moderate quantity of dark, thick blood, with soft gelatinous clots, mixed with a great abundance of small air-bubbles. Left ventricle relaxed; contains a little dark blood, fluid. Endocardium of right side stained dark-brownish red; of left side stained little or none. Substance of heart natural.

Air in heart.

Both lungs crepitate well. Moderate sanguineous congestion of lower lobes at posterior part. No other remarkable appearances. Larynx, trachea and bronchi pale internally, and without any unnatural appearance, except slight duskiness.

Abdomen. A little roughness, in some parts of peritoneum, over intestinal convolutions; but no noticable amount of slimy secretion. Small intestines a little dusky externally; contain about twenty ounces of greyish, gruelly fluid. Mucous membrane pale, with a little yellow stain in duodenum. Peyer's patches moderately enlarged and opaque. Solitary glands same in lower part of ileum. Beside these there are numerous whitish specks in substance of mucous membrane, throughout most of its extent, somewhat smaller than solitary glands, but otherwise of similar appearance. Mucous membrane everywhere of natural thickness and consistence.

Large intestine contains twelve ounces of greyish-brown, flocculent fluid, with slight fœcal odor. Mucous membrane everywhere pale and natural in appearance. Mucous follicles generally a little enlarged, and their mouths open. Nothing else remarkable. Mesenteric glands generally natural; some enlarged, but not softened.

Stomach contains one pint of dingy, brownish fluid. Mucous membrane considerably softened, and has marked brownish discoloration, particularly on posterior wall. Nothing else remarkable.

Œsophagus natural.

Pancreas natural. Pancreatic fluid can be expressed from duct, clear and natural in appearance, distinctly acid in rëaction.

Spleen under natural size; quite flabby, wrinkled, and dry.

Left kidney small and flabby. Internally of natural appearance, but has quite a strong smell of molasses. Right kidney contains more blood than left, and is without melassic odor; otherwise same. Both pelves pale internally. Both capsules strip off readily, and external surface of each kidney shows several small, whitish spots of emphysema in substance of cortical portion.

Emphysema.

Urinal bladder empty, contracted. Puriform secretion smeared over walls has some reddish discoloration, as if from blood.

Liver light reddish-yellow externally; somewhat dusky internally. Ducts stained yellow, and yield a sufficient quantity of rather thin bile. Substance of liver somewhat softened.

Gall bladder contains about one ounce of dark, brown-yellow bile, of natural consistence.

Portal veins in liver stained brownish by blood. Hepatic veins natural.

Abdominal vena cava stained internally of a very dark brownish-red. Aorta stained dull red in thoracic portion, where it contains a dark fluid blood. In lumbar region it contains some very dark-brownish, and slate-colored blood, almost as thick as putty; and here, walls are stained of a corresponding dusky red and slate-color. Below this, the color of internal surface of aorta is natural.

Vagina smeared with a thick white secretion, like starch. Os uteri somewhat open. Uterus internally somewhat softened and vascular, and right ovary shows a recent-looking false corpus luteum, a little over one quarter of an inch in diameter. Left ovary contains only serous cysts.

XXVI.

JANE COLLINS. *Aged* 38. *Married. Irish. Intemperate. Cholera* 20 *hours. In Hospital* 3½ *hours, Catamenia present. Saline mixture every half hour, with efferverscing drinks. Autopsy* 23½ *hours after death.* SEPT. 4.

Rigor mortis moderately strong. Some shrivelling and much blueness of fingers. Abdomen of natural form, moderately resonant. Walls rather flaccid, as if from former pregnancies. Mammæ of natural size, white and firm internally, with a smooth section; contain no milk.

Muscles red.

Head. Dura-mater natural. Some bloody subarachnoid œdema over posterior part of hemispheres. Brain everywhere rather more vascular than natural, especially toward central parts, where substance is also somewhat softened, but nowhere so much as to destroy texture. Some effusion into lateral ventricles. Brain and membrane otherwise healthy.

Vascularity.

Chest. Moderate dryness of pleura, most marked on left side. Pericardium contains eight or ten drops of serous fluid. Small, irregular, white spot on anterior surface of right ventricle, and faint indication of a similar one on posterior. Pericardium otherwise natural.

Right cavities quite full of dark, rather thickish, fluid blood, with trifling amount of dark and fibrinous coagula. Left ventricle tolerably well contracted; contains a little dark fluid blood. Left auricle same. No staining of endocardium anywhere. Valves on right side natural. Mitral valves somewhat thickened, and have on their free edges a few small, firm, cartilaginous excresences, not sufficient to interfere

with action of valves. Aortic valves also a little stiffened, and aurantian bodies hypertrophied, but not to a serious extent.

Lungs light-greyish anteriorally, purplish posteriorly; moderately engorged with blood, and infiltrated with fluid. Crepitate generally well, but along lower edge of lower left lobe, pulmonary tissue is indurated, being somewhat stiff, nearly but not quite destitute of crepitations, with a solidified appearance, and an indistinctly lobulated feel externally. Excised pieces sink in water. The section shows numerous greyish-yellow, irregularly globular, tuberculous-looking deposites, varying from one quarter of an inch diameter downward, mostly encysted, and enucleated without much difficulty, leaving a smooth, red, vascular-looking surface. Immediately around these tuberculous or fibrinous deposites there is more or less induration of the pulmonary tissue, as in ordinary hepatization, thus giving the indistinct lobulated feel externally. There is one similar deposite in lower edge of lower right lobe, and another in lower edge of right middle lobe, but this last is surrounded by grey (tubercular?) infiltration, instead of hepatization. Both apices quite healthy, and free from any morbid appearance. Pleura covering left lung shows some signs of old inflammatory disease, and just along edge of lower lobe there is a small flake of recent yellow lymph. No other mark of pleurisy. Bronchi pale internally; contain a little frothy fluid, tinged with red. Larynx and trachea quite natural.

Morbid deposits in lungs.

Abdomen. Peritoneum a little dryish at upper and anterior part. Very little slimy secretion on intestinal convolutions, perceptible only to the feel. Small intestines light-colored externally; contain about one pint of thick, gruelly, whitish fluid, with distinct alkaline reaction. Mucous membrane shows a little red injection in upper part of duodenum; elsewhere pale. Thickness and consistence natural. Twenty-three Peyer's patches visible, the lower twenty of

which are moderately swollen and opaque; not softened or reddened. Solitary glands not remarkable.

Large intestine contains also about one pint of thin gruelly fluid, with an alkaline reaction. Mucous membrane pale, of natural thickness and consistency. Mucous follicles generally developed, and their mouths open. Nothing else unusual. Mesenteric glands not remarkable.

Stomach contains about ten ounces of dingy, yellowish, alkaline fluid. Mucous membrane mostly pale, moderately softened in cardiac half, without remarkable discoloration. Otherwise natural.

Liver of a natural reddish-yellow externally, with spots of anæmia. Internally rather dusky, inclining to olive. Somewhat soft. Ducts stained yellow, and yield readily greenish bile by pressure.

Gall bladder and duct contains about one ounce of brownish green bile, which shows, through coats, of a pure green color.

Pancreas natural. Fluid, which is distinctly acid, is readily expressed from duct.

Spleen small, blue, and wrinkled externally. Internally natural in appearance.

Kidneys everywhere natural as to consistence, vascularity, aspect, &c. Urinary bladder empty and contracted; walls smeared with puriform fluid.

Vagina smeared with menstrual fluid. Uterus natural. Right ovary contains a large, very recent bloody cavity. Nothing else remarkable.

XXVII.

Sept. 5. James McCarty. *Aged* 8 *years. Cholera for* 12 *hours, (after eating rotten fruit.) In Hospital four hours. Saline mixture, half an ounce every half hour, and two doses of naptha ligni, half a drachm each. Autopsy* 18 *hours after death.*

Rigor mortis natural. Eyes sunken, but face quite full. Fingers blue, not shrivelled. Abdomen natural in form. No heat about body.

Head. Longitudinal sinus contains dark fluid blood. Dura-mater natural. Considerable exudation of dark, thickish, bloody fluid over posterior part of hemispheres, and over surface of cerebellum. Substance of brain and cerebellum sufficiently firm, natural in color. Moderate amount of clear fluid in lateral ventricles. Lining membrane pale. Both corpora striata shew internally ill-defined tracts of light greyish, or opaline color, similar in texture to remaining portions. Medulla oblongata quite firm. Nothing else remarkable.

Chest. Moderate dryness of pleura on left side; not observable on right, owing to adhesions. Pericardium natural internally; contains three to four drachms of serous fluid. Right cavities of heart filled with dark, softish coagulum, and a little fluid blood; also a trifling quantity of colorless, firm coagulum. Left ventricle perfectly contracted, and empty. Left auricle contains a little dark fluid blood. Blood in venæ cavæ and internal jugulars fluid; not remarkable in consistence. Endocardium, valves, and substance of heart, natural.

Tubercular pleurisy.

Right lung has universal, moderately firm, cellular, pleuretic adhesions, so that cavity of pleura is entirely obliterated. Adhesions everywhere occupied by numerous firm, yellowish tubercles, varying from three

or four times the size of a pin's head downward. One is half the size of a hazel-nut. These all remain attached to thoracic parietes, none of them coming off with lung when it is removed. Lung generally deficient in crepitation, and has a somewhat solid feel, as if partially carnified, in consequence of these adhesions. There is one globular, firm, yellowish tubercle, cheesy in centre, situated just beneath surface of lung, at lower part of right middle lobe. Pulmonary texture in neighborhood of a grey color and natural consistence. No tubercular deposite in any other part of lung.

Left lung quite natural everywhere.

Larynx, trachea and bronchi pale internally, with mucous membrane of natural appearance.

Abdomen. Very slight roughness of peritoneum which covers intestinal convolutions. No perceptible slimy secretion. Small intestines light greyish and rosy externally; contain about three ounces of thick, dark, greyish fluid, alkaline in rëaction, somewhat resembling mucus in consistency. Mucous membrane generally pale. Thirty-eight Peyer's patches counted, all more or less swollen and opaque; none excessively so; some white, others reddened. Solitary glands visible; moderately developed throughout whole extent of small intestine; in lower part of ileum much enlarged. Some of them are encircled by a very narrow zone of redness. No other alteration.

Large intestines contains about three ounces of greyish, alkaline fluid, thinner than that in small. Mucous membrane pale, natural, but mucous follicles are generally enlarged and their mouths open; often marked by a black speck. Mesenteric glands almost all enlarged; not softened. Some of them show small tubercular deposites in interior.

Stomach contains from three to four ounces of a thin greyish fluid, with distinct acid rëaction. Mucous membrane pale, extensively thinned and gelatinized toward great pouch, particularly on posterior

surface. There are, in great pouch, and universally about cardiac orifice, many minute white granules, apparently in substance of mucous membrane. None elsewhere.

Œsophagus natural.

Liver reddish yellow externally; internally somewhat slaty. Ducts yield thin yellowish bile by pressure. Consistence natural. Gall bladder and duct contain about half an ounce of bile, which shows, through coats, of a pure green color; but when let out, is of a natural dark brownish-yellow. Duct of natural size.

Pancreas natural. Spleen about natural in size, very slightly wrinkled; internally rather pale, and deficient in blood.

Both kidneys absolutely natural. Urinary bladder contracted; contains about half a drachm of thin turbid fluid, and some of the puriform secretion on walls.

Thymus gland four inches in length.

Right testicle in scrotum; left in groin.

XXVIII.

MARY ANN MARAN. *Aged* 40. *Married. Irish. Intemperate. In Hospital* 10 *days, with debility, slight stupor, yellowness of skin, and palpable enlargement of liver. Soft souffle with first sound of heart, but both valvular sounds distinct. Pulse moderate. Cholera came on suddenly in night, and continued seven hours. Death on morning of eleventh day. Treatment, after Choleric attack—External heat, sinapisms, brandy, and musk. Autopsy* 24 *hours after death.*

Rigor mortis moderate. Some shrivelling of fingers of both hands, and considerable lividity of those of left. None elsewhere. No heat about body. Abdomen flattened, considerably resonant, except over region of hepatic enlargement. Here resonance deficient, but nowhere quite absent. Skin of abdomen marked with numerous scars of pregnancy. SEPT. 9.

Subject has the appearance externally of advanced emaciation, but fat is nevertheless everywhere quite thick under integuments.

Head. Dura-mater natural. Longitudinal sinus empty. Considerable clear fluid in arachnoid cavity, at base of brain, and some also over hemispheres. No exudation of blood. Much sub-arachnoid œdema. Internally, substance of brain natural as to color and vascularity. Lateral ventricles distended with a considerable amount (one ounce?) of limpid serum. No vascularity of lining membrane. Some moderate softening of central parts, particularly on left side. Cerebellum and medulla oblongata natural. Serous effusion.

Chest. Dryness of pleura well marked. On left side it has gone so far as to give pericardium a translucent appearance when held up to the light, like oiled paper, in one spot immediately beneath which

surface of heart is somewhat discolored. Pericardium contains about half an ounce of clear fluid. Heart perfectly loaded with fat, so that few or none of muscular fibres are visible externally. Large lobules of fat also in anterior mediastinum and on upper surface of diaphragm.

Fat abundant.

Right cavities of heart contain a moderate quantity of dark, fluid, thickish blood, with one or two trifling, soft, yellowish coagula. Left ventricle flaccid; contains, with auricle, a little dark fluid blood. Aorta contains also considerable dark fluid blood.

Heart of natural size, or a little less. Substance everywhere soft. Muscular fibres of right ventricle have undergone fatty degeneration to considerable extent, and there is no distinct dividing line between them and layer of fat on external surface. Left ventricle is dark-red in color, and distinction between muscular and fatty layers perfectly well marked. Lining membrane natural, but on one of aortic valves there is a prominent, semi-lunar cartilaginious induration, with a serrated free edge. Valves otherwise natural. Aorta natural.

Heart fatty.

Disease of valve.

Blood in vessels of neck rather deficient in amount, thinner than that in heart. Blood generally dark, thickish, and entirely destitute of coagula.

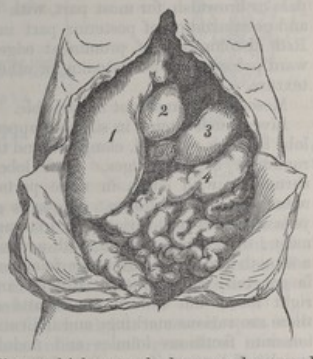
Both lungs light-colored and spongy at upper and anterior parts, but below and posteriorly they are darker, with deficient crepitation, and a flabby, leathery feel. Consistence natural. No very unusual sanguineous congestion. Excised portions float in water. One cheesy tubercle, without signs of active disease in neighborhood, in upper left lobe. None else.

Larynx and trachea pale interally. Trachea has on its mucous surface small globules of thickish, opaline exudation from tracheal grandules. Same secretion exists, more abundantly, in bronchi. Mucous membrane of bronchi mostly pale, in some parts rosy; everywhere of natural texture.

Abdomen. Peritoneal surface of small intestines

slightly roughened in parts, just enough to lose its natural polish, and is covered with a sufficient amount of slimy secretion. Position of abdominal organs, somewhat altered by the enlargement of

Fig. 11.



1. Right lobe of liver.
2. Gall bladder.
3. Stomach.
4. Transverse colon.
5. Pylorus and commencement of duodenum.

right lobe of liver, which extends downward one and three quarter inches below level of umbilicus. Gall bladder situated a little to the left of median line. Pylorus also a little to the left, and pushed upward.

Small intestines light rosy and greyish externally; contain a moderate amount of air and about eight ounces of very thick, flocculent fluid, colored strongly yellow, as if with bile, and neutral in reaction. Mucous membrane generally pale; in some parts pinkish; stained yellow in duodenum; of natural thickness and consistency. Eighteen Peyer's patches counted, all moderately swollen, white and opaque. No softening. Solitary glands also moderately enlarged in lower part of ileum, not elsewhere. No other remarkable appearance.

Large intestine contains one pint of thinner, yellowish, flocculent, moderately alkaline fluid, without remarkable odor. Mucous membrane pale and nat-

ural in appearance, excepting that mucous follicles are rather enlarged, and their mouths open.

Stomach contains about four ounces of dingy, olive-colored, faintly acid fluid. Mucous membrane pale or brownish, for most part, with some thinning and gelatinization of posterior part in cardiac half. Red discoloration of prominent edges of plicæ, toward pylorus, but no softening or other alteration of texture.

Mesenteric glands not remarkable.

Cirrhosis; commencing in right lobe, and advanced in left.

Liver much altered in size and appearance. Right lobe is much enlarged, elongated and thickened, with roundish, massive edges. Left lobe considerably shrunken, with edges in some parts thinned and reduced to a fibrous seam. Organ is generally pale yellow, (somewhat variegated) externally and internally; firmer than natural, with a dense, solid feel, a smooth section and granular fracture. Its surface is generally smooth, especially on anterior part of right lobe; but toward fissure and over left lobe, there are various markings and indications of a division into factitious lobules and nodules, owing to streaks of dirty white, condensed fibrous tissue, running in various directions. Also spots where surface is distinctly granular both to sight and touch. There are a few bands of adhesion between anterior surface and abdominal walls, and also some plates of old inflammatory thickening of peritoneum.

The variegation of color on surface is apparently produced by a convoluted mass of distended capillary gall ducts, causing a yellow spot in the centre of each acinus; which spot is surrounded by the pale color of remainder of acinus.

The condensation of fibrous tissue and consequent partial nodulation, is chiefly confined to the left lobe.

Antero-posterior diameter (right lobe,) . . 10 1-2 inches.
Greatest transverse diameter, . . 10 1-8 "
Greatest thickness, (right lobe,) 4 1-4 "

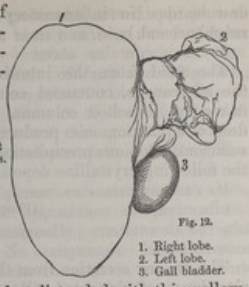


Fig. 12.

1. Right lobe.
2. Left lobe.
3. Gall bladder.

Gall bladder somewhat distended with thin yellowish bile. Proper duct of gall bladder is of natural size, but common and hepatic ducts are much dilated; five or six times as large as natural, containing bile similar to that in bladder. All the ducts interior of liver are also much dilated.

Pancreas mostly natural, but in several spots it is much firmer than ordinary, and granulated in same manner as parts of liver, by condensation of fibrous tissue. No alteration of color.

Spleen rather small, blue and wrinkled; flabby. Internally softish.

Both kidneys rather flabby, somewhat dark-colored, and sufficiently well supplied with blood. Both give out strong melassic odor from cut surface. Consistence natural. Puriform fluid expressed from papillæ.

Urinary bladder contracted, empty. Walls smeared with puriform secretion.

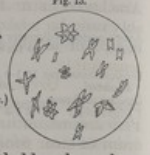
Vagina smeared with a moderate quantity of starchy secretion. Uterus of natural appearance, quite smooth, pale and firm internally. Ovaries somewhat atrophied, white and firm, with numerous deep scars.

[There were two intus-susceptions in upper part of jejunum, each about one inch long, directed from above

downward. No inflammatory appearance in their neighborhood.]

The fluid from the intestines, examined under the microscope, contained columnar epithelium, in flakes and detached columns. A drop of aqua ammoniæ produced a sufficiently copious precipitation of the following crystalline deposite;

Fig. 13.



(Phosphatic.)

The creamy secretion from the bladder showed an abundance of elongated cells, as in the case of *Isabel Hassen, &c.*

XXIX.

Sept. 12. Ellen Dorety. *Aged* 36. *Single. Irish. Intemperate. Cholera* 18 *hours, without previous illness. In Hospital* 12¼ *hours. Saline mixture and tincture of ginger, every half hour. Effervescing mixture, every two hours. Afterward, half a drachm of naptha ligni. Autopsy* 29 *hours after death.*

Rigor mortis moderate. Much lividity and shrivelling of hands. No heat anywhere, but skin damp and cold. Acid odor of cholera quite strong.

Abdomen of natural shape and resonance. Fat tolerably abundant beneath integuments.

Head. Excessively firm adhesion of dura-mater to cranium, so that it is impossible to remove skull cap without laceration of dura-mater. Moderate

bloody exudation over posterior part of hemispheres, but there is abundant bloody effusion over the cerebellum, the superior surface of which is even covered with a thin plate of dark red coagulum, which has evidently coagulated since its effusion. Coagulum on cerebellum. Arachnoid natural. Substance of brain not remarkably vascular; but rather soft throughout. A drachm or two of serum in lateral ventricles. Nothing else remarkable.

Chest. Dryness of pleuræ excessive on both sides, producing translucent appearance of pericardium. Pericardium natural internally; contains six or eight drops of clear fluid. No ecchymosis. Right cavities of heart, with veins of chest and neck, contain a very moderate quantity of dark, thickish blood, with trifling fibrinous clots; also dark red, loose, gelatinous, coagula. Left ventricle flaccid; contains a little fluid blood. Left auricle and aorta contain dark, fluid, thickish blood, with loose gelatinous coagula. Blood in system generally has the same character, but coagulum on surface of cerebellum is considerably firmer than that elsewhere. Endocardium and valves natural. Substance of heart a little soft. Aorta and veins natural internally.

Lungs light grey and spongy anteriorly; purplish, and considerably engorged with fluids, posteriorly; crepitate well everywhere;—collapse but little. A little emphysema along free edges of lower lobes. Nothing else remarkable.

Larynx, trachea and bronchi, pale internally, and contain a little thickish secretion, not standing in globules, but smeared over mucous membrane.

Abdomen. Peritoneal surface of intestines has a perceptible quantity of slimy secretion. Small intestines, rosy externally, at upper portion; dusky greyish in lower. They contain about fourteen ounces of thin, reddish, alkaline fluid, with white flocculi. Mucous membrane mostly pale, with a little red injection and some yellow staining in duodenum; generally softened, (as if a little macerated,) but of

natural thickness and texture. Peyer's patches moderately swollen and opaque as usual. Solitary glands in lower part of ileum.

Large intestine contains ten ounces of thin, grey, alkaline fluid. Mucous membrane of natural appearance. Mucous follicles visible, and not remarkably altered.

Stomach contains one pint of dingy, alkaline fluid. Mucous membrane has a moderate red injection along most of small curvature and over about two thirds of anterior wall; in whole of great pouch, and over most of posterior wall, it has a dingy brownish discoloration. It is thinned and softened in great pouch, with sub-mucous vessels colored black. No other alteration.

Mesenteric glands not remarkable.

Liver dark brownish red externally; dusky internally. It is flabby and "doughy" to the feel;—otherwise natural. Gall bladder contains about one ounce of dark brown bile, of ordinary appearance.

Pancreas natural. Fluid, having a faintly acid reaction, can be expressed from duct, in minute quantities.

Spleen of moderate size. Capsule strips off with the greatest readiness, leaving organ with a smooth surface, and looking much like a large coagulum. Rather soft internally. Close old adhesions between posterior surface and diaphragm.

Kidneys of natural appearance and consistence; sufficiently full of blood. Puriform secretion can be expressed from papillæ, but not abundantly. Distinct melassic odor in left, not perceptible in right.

Urinary bladder contains a few drops of thin puriform fluid.

Vagina smeared with a moderate quantity of starchy secretion; but, in extreme upper part, this has more of a muco-purulent appearance.

Uterine tumor. Uterus rather slender and small; firm and pale anteriorly. It has a well defined, globular, fibrous-looking tumor, imbedded in its posterior wall, about

a quarter of an inch in diameter, and distant a quarter of an inch from external surface of uterus. Uterine tissue, posterior to plane of tumor, is soft, dark reddish in color, and shows uterine veins much dilated. Substance of uterus elsewhere natural.

Right ovary contains a recent false corpus luteum. Abdominal vessels natural internally.

The fluid from the bladder, examined under microscope, contained as before small, elongated, nucleate and non-nucleate cells, with larger, flat, irregular epithelium scales, and a very few small round globules, of slightly granular aspect. There were also one or two small prismatic crystals of triple phosphate.

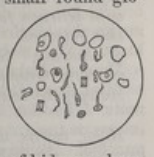


Fig. 14.
(260 diameters.)

The fluid expressed from papillæ of kidneys, showed only small, slightly granular, but transparent, globular cells, with very distinct oval nuclei.

Fig. 15.
(260 diameters.)

XXX.

Sept. 14. Andrew Patterson. *Aged* 45. *Irish. Intemperate. Cholera* 4½ *days. In Hospital four days. Symptoms at first not very severe. Passed urine occasionally. Saline mixture, naptha ligni p.r.n for vomiting, and application of liniment of ammonia to chest and back. Considerable improvement on third day, and large quantity of urine. On fourth day, mild delirium followed by somnolence. Coolness of skin returned. Difficulty of swallowing and dulness of hearing. Stimulants, alternating with saline mixture. Gradual failure of vital powers and death. Autopsy* 13 *hours after death.*

Rigor mortis moderate. Well marked, but not excessive, shrivelling of fingers. Abdomen natural in form.

Head. Some dark coagulum in longitudinal sinus. Dura-mater and arachnoid natural. Much sub-arachnoid œdema. No bloody transudation. Substance of brain about natural in consistence, but rather pale. No effusion into ventricles. Medulla oblongata natural.

Chest. Well-marked dryness of pleura. Pericardium empty; natural internally, excepting a small white spot on anterior surface of right ventricle, and another, smaller, on internal surface of pericardium over same. Right cavities contain a sufficient amount of dark-red and firm fibrinous coagulum, with some fluid blood of natural consistence. Dark coagula, of considerable firmness, extend up into subclavian and internal jugular veins, and fibrinous coagula into pulmonary arteries. Left ventricle rather flaccid; contains dark fluid blood. Blood in left auricle and pulmonary veins dark and thickish, with loose, dark coagula. Lining membrane, valves, and substance of heart natural. Foramen of Botal sufficiently open to allow a moderate-sized boagie to pass from right auricle into left. Opening perfectly valvular.

Both lungs light grey anteriorally; purplish and considerably engorged with fluids posteriorly. They crepitate well everywhere, and have a natural feel, except at lower part of right, where there are abundant old pleuretic adhesions and a great deal of fluid engorgement, so that lung does not collapse at this part, and has a somewhat dense and resistant appearance. Texture somewhat friable, but crepitation remains, and excised pieces float in water. Lungs otherwise natural.

Larynx natural. Trachea and bronchi pale above, dusky, or dull-reddish in color below. Texture of mucous membrane unaltered. Trachea covered internally with thickly-set globules of thickish, opaline secretion from grandules. Bronchi contain a more abundant, dull reddish-grey, muco-purulent secretion, in some parts evidently mixed with blood. Nothing else remarkable.

Abdomen. Very slight amount of slimy secretion on surface of intestines. Small intestines externally of a dull rosy hue, slaty, and dusky-greenish. They contain a moderate quantity of air, and about twelve ounces of very thick, yellow, bilious fluid, about the consistency of mucus. Mucous membrane stained bright yellow above; below, pale in spots; elsewhere shows dark-red congestion. Surface of mucous membrane everywhere natural in appearance. Consistence natural in upper third of intestine; below this, moderately softened. Peyer's patches and solitary glands moderately enlarged, and opaque as usual. No other change.

Large intestine contains a considerable amount of soft greenish fæces; no fluid. Mucous membrane shows dark-red congestion in cœcum, with some spots approaching to ecchymosis. Congestion most marked on prominent edges of membranous folds. A similar tract of congestion a foot or two lower down. Mu- Congestion.

cous membrane elsewhere pale; texture unaltered. Mucous follicles natural.

Mesenteric glands enlarged. Mesenteric glands generally enlarged. Those corresponding to upper part of intestinal canal are nearly or quite natural in color and consistence; those corresponding to lower part, have the enlargement more marked, and are also decidedly reddened and softened.

Congestion. Stomach contains half a pint of thin, yellow, bilious-looking fluid. Rëaction neutral. Mucous membrane has much dark-red congestion over about one quarter of anterior wall, and two thirds of posterior; deepest on posterior in great pouch, where there is also moderate softening, but no thinning. Beside this, there is a general yellow (bilious) staining of surface. Otherwise natural.

Liver somewhat turgid, smooth and flabby; dull-reddish in color internally and externally; a little soft. Thin, bright-yellow bile can be readily expressed from ducts in interior.

Gall bladder distended; contains about two and a half ounces of very thin, nearly colorless fluid, like water, with a small quantity of yellowish flocculi diffused through it.

Pancreas rather firm, with something of a granulated feel.

Spleen of full size, dark-red, not wrinkled; internally, grumous.

Kidneys rather turgid, and a little softened. Copiously supplied with blood. No melassic odor. External capsule strips off, leaving surface smooth, Puriform secretion can be expressed from papillæ.

Urinary bladder contains about one pint of light-colored urine. Mucous membrane pale, with a flabby, macerated appearance.

Albuminous Urine. The urine had a distinctly acid rëaction, and was moderately albuminous. Under the microscope it showed a few of the variously shaped epithelium cells,

similar to those contained in the creamy secretion in other cases.

The fluid from the gall bladder contained bright-yellow granules, and an abundance of columnar epithelium, mostly in detached cells, nucleo-nucleated, considerably larger than those from intestines.

Fig. 16.

(260 diameters.)

XXXI.

HONORA MCCAWLEY. *Aged* 37. *Irish. Intemperate.* SEPT. 16. *Cholera* 12½ *hours, with some previous diarrhœa. In Hospital* 4½ *hours. Saline mixture with six grains of carbonate of ammonia every hour. Effervescing mixture every two hours. Autopsy* 18 *hours after death.*

Rigor mortis natural. Abdomen prominent, rather tympanitic, not tense. Some scars of pregnancy.

Head. A very little fluid blood in longitudinal sinus. Dura-mater and arachnoid quite natural in appearance. Exudation of dark, thickish, bloody fluid in arachnoid cavity, over posterior part of hemispheres, and over cerebellum; not elsewhere. Substance of brain natural in color, a little soft. Lateral ventricles contain a small quantity of serum, but are not at all distended. Medulla oblongata natural.

Chest. Dryness of pleura well marked. Pericardium natural internally; contains only about four or

five drops of serum. Right cavities of heart contain a moderate quantity of dark fluid blood, of natural fluidity and consistence, without the least trace of coagula. Left cavities same. Left cavities very slightly contracted. Valves and lining membrane everywhere natural. Substance a little soft.

Blood in other parts of body of same character as that in heart.

Both lungs emphysematous throughout; i. e. pulmonary vesicles are everywhere visible on surface, lungs are very light-colored and dry. At anterior and upper portions, collapse very little, and after opening
Emphysema. of chest are still so prominent as nearly to cover heart and to overlap each other to considerable extent. Abundant crepitation everywhere. Lower lobes are more moist than upper—somewhat friable, and have a dingy brown color internally, while upper and middle lobes are dry, firm, and of a clear reddish-gray color.

Trachea and bronchi contain some frothy, flaky fluid, probably introduced from stomach. Mucous membrane of trachea, and that of bronchi distributed to lower pulmonary lobes of a uniform slaty-brown color, but retains its natural thickness and polish. Drops of thickish, opaline fluid readily expressed from tracheal glandules. Mucous membrane of bronchi distributed to upper and middle lobes, light-reddish in color. Nothing else remarkable.

Abdomen. Almost no slimy secretion on surface of intestines. Peritoneum generally of natural appearance and polish. Numerous old, cellular, bridle-shaped adhesions of upper surface of liver to diaphragm. A few of posterior surface of spleen to ditto. Numerous white, firm, fibrinous-looking deposites, of
Old peritonitis. minute size, on peritoneal surface of anterior wall of great pouch of stomach. There are also firm, close, cicatrix-like adhesions of small intestines to surface of descending colon in left inguinal region, just above commencement of sigmoid flexure. These adhesions are nine in number, and so close and firm

that intestines are separated by dissection with considerable difficulty. The first occurs at a point a little over ten feet below pylorus; the remainder at various distances below. The third adhesion includes a minute fistula between cavity of small intestine and that of colon; the others are quite solid and impervious. Adhesions all at nearly same point on colon.

There is also a communication at this point between cavities of cœcum and descending colon, by a fistu- Bi-mucous fistula.
lous passage three quarters of an inch in length, and large enough to allow the passage of an ordinary sized bougie. Cœcum occupies cavity of pelvis and communication runs across pelvis from right to left.

There is also a close adhesion, at the same point, between left ovary and colon. Colon itself is here pretty firmly adherent to anterior and lateral wall of abdomen. About one inch below this, there is a firm rounded cord of adhesion inserted, which thence runs across hypogastric region, to be inserted into abdominal walls at a corresponding point on opposite side. Several folds of intestine are bound down, and more or less constricted by this bridle, beside which small intestines are variously involved and entangled among themselves by numerous other cellular adhesions, less close and firm than those already described. Uterus is drawn out of its normal position in median line, and held firmly against left side of pelvis, while right lateral ligament is stretched across cavity of pelvis, like a curtain, between cœcum and bladder. No signs of recent inflammatory action anywhere.

Small intestines light-rosy externally at upper part, dull-greenish below; contain half a pint of thick, pinkish, alkaline, flocculent fluid, with some few yellow shreds. Contents of duodenum entirely yellow. Mucous membrane of usual appearance, with ordinary amount of tumefaction and opacity in Peyer's patches and solitary glands. Surface of patches covered by abundant, tumid, opaque, white villi, and shows also numerous blackish dots and markings.

Large intestine contains about one pint of thin, semi-purulent, alkaline fluid. Mucous follicles, toward lower part, rather enlarged, and their mouths open. Lining membrane of fistula, between cœcum and colon smooth and shining.

Mesenteric glands a little enlarged; some reddish, others of natural color.

Stomach contains six ounces of thin, light-greyish, turbid fluid, with lumps of undigested food. Rëaction of fluid, acid. Mucous membrane shows a slaty-brown discoloration of blood in vessels, over most of great pouch, and some moderate softening. On small curvature, two inches from pylorus, there is an irregularly globular, pendulated tumor of the mucous membrane, about the size of a hazel-nut, projecting into cavity of stomach. It consists of a softish tissue, resembling hypertrophied mucous membrane, containing several small cavities, filled with a transparent, glutinous fluid. Nothing else remarkable.

Liver dark-reddish brown, externally and internally, rather soft and flabby, without remarkable odor.

Gall bladder contains one and a half to two drachms of very thin, yellowish bile.

Pancreas natural, only somewhat reddish and flabby.

Spleen small, blue, and wrinkled; internally dark-red, softish, with moderate amount of blood.

Both kidneys flabby, dark-red in color, and fluid blood readily follows incision. No melassic odor. Puriform fluid readily expressed from papillæ.

Urinary bladder collapsed, and partly contracted; empty. Walls pale, but with some dark-red discoloration of prominent ridges of mucous membrane. Puriform secretion as usual.

Vagina smeared with starchy secretion. Uterus not remarkable.

XXXII.

MARGARET HARNEGAN. *Aged* 22. *Irish. Temperate. Cholera* 30 *hours, without previous illness. In Hospital* 10¾ *hours. Treatment; before entrance, brandy and water, ad libitum; after entrance, external heat, sinapisms and saline mixture every two hours, alternating with effervescing mixture. Noise in ears, and congestion about head. Dry cupping to back of neck and spine, with considerable relief. Failed suddenly, and died four hours after. Autopsy* 16¼ *hours after death. Ever since death, body kept lying on left side. Previously, patient lay constantly on back.* SEPT. 17.

Rigor mortis natural. Body presents the most perfect appearance of health, being finely developed, and all the limbs full and rounded. Considerable amount of fat beneath integument. Abdomen of natural form, or a little prominent. Mammæ full and round. Nipples deficient.

Head. Dura-mater and arachnoid natural. Exudation of bloody fluid, but thin, light colored, and trifling in amount over middle part of right hemisphere, adjacent to longitudinal sinus. On left side, exudation is in a corresponding situation, but quite copious, dark colored, and thick. Little or no exudation over cerebellum. No sub-arachnoid œdema. Brain of natural consistence and color; from one to one and a half drachms of clear fluid in lateral ventricles.

Medulla oblongata natural.

Chest. Dryness of pleura trifling. Pericardium natural internally; contains eight or ten drops of clear fluid. Abundant, large, irregular, dark purple ecchymoses on surface of heart, both anteriorly and posteriorly, along free edge, and over left ventricle, but most abundant on right side, over situation of Ecchymoses.

auriculo ventricular orifice. The largest of these eccyhmoses is a little over a quarter of an inch in diameter. Right cavities of heart contain a moderate amount of dark fluid blood, not very thick, with a little gelatinous coagula, and numerous small bubAir in heart. bles of air. Left ventricle rather flaccid, contains dark fluid blood. Left auricle contains fluid blood, with gelatinous coagula. Endocardium natural excepting a few faint, dark reddish stains in some parts, approaching to ecchymoses. Valves and substance of heart healthy.

Old abscess in adhesions Nearly universal old, close, cellular, pleuritic adhesions of right lung, and in separating these adhesions (which are most firm at lower part) an abscess is opened, situated in substance of false membrane. Abscess commences at anterior part of chest, at level of third intercostal space, and thence extends downward and backward five inches. Its cavity is flat and ribbon-like in shape, two inches broad at upper and anterior extremity, and thence gradually tapering nearly to a point. It contains about one ounce and a half of thick, yellow, natural-looking pus, and some masses of soft, granular, cheesy matter, also yellow. Walls of abscess are covered mostly by layers of this last mentioned substance, which adhere with some tenacity. Where exposed, internal surface of abscess is dark purplish in color, with smooth, rounded eminences, like flabby granulations.

Tubercle. Right lung crepitates well everywhere, allowing for adhesions, but contains two tubercles; one in lower part of lower lobe, near abscess, rather superficial in situation, encysted, cheesy. The other, smaller and drier, is situated in lower part of middle lobe. No signs of recent inflammatory action anywhere.

Some small tubercular deposites, also, in bronchial glands of this side. Other bronchial glands enlarged and soft.

Left lung everywhere natural; no adhesions. Larynx, trachea, and bronchi, everywhere pale, or a little reddish, internally; of natural appearance.

Abdomen. Minute quantity of slimy secretion on surface of small intestines. These have externally a dingy pinkish color, at upper part, approaching to green below. They contain a considerable quantity of air, and only about four ounces of a very thick, pinkish, alkaline fluid. Mucous membrane mostly pale, but in several parts of intestine there are limited tracts where villi are of a bright red color; rest of mucous membrane remaining natural. Thickness and consistence everywhere normal. Tumefaction of Peyer's patches and solitary glands as usual.

Large intestine contains only about two ounces of thin, puriform, alkaline fluid. Internal surface stained of a deep red near upper part of rectum, owing to redness of villi, but in centre of this tract injection is so intense that mucous membrane appears completely permeated by blood. Elsewhere pale. Consistency, &c. natural. Mucous follicles more and more developed, from cœcum downward.

Stomach has a strongly marked annular contraction about its middle part, which, however, is completely removed by forcible inflation, and original shape of organ restored. Mucous membrane shows no remarkable appearance.

Liver dark reddish-brown, internally and externally, soft and flabby. Yellowish bile easily expressed from ducts.

Gall bladder contains about one ounce of natural-looking bile.

Pancreas reddish and flabby; otherwise natural.

Spleen small, but quite smooth and fair externally; internally natural.

Kidneys firm, not flabby, moderately supplied with blood. Distinct melassic odor. Puriform fluid, thinner than usual, can be expressed from papillæ. Lining membrane of pelves pale.

Urinary bladder contains about half a drachm of thinnish, turbid fluid.

Venæ cavæ natural internally. Lining membrane of aorta natural in chest and upper part of abdomen,

but in lower part stained a little purplish-red and dingy. Blood here thick and somewhat tarry; elsewhere quite fluid and thin.

Vagina smeared with starchy secretion. Uterus somewhat reddened and softened internally. Left ovary contains a recent-looking false corpus luteum. (Patient menstruated two weeks previously.)

XXXIII.

Sept. 19. BRIDGET GILMORE. *Aged* 28. *Sempstress. Irish. Intemperate. Cholera* 9½ *hours. In Hospital six hours. Saline mixture; also tincture of cinnamon, and turpentine, and a little coffee occasionally. Hot-air bath. Autopsy* 20½ *hours after death.*

Rigor mortis sufficiently strong. Lividity and shrivelling of hands well marked. Abdomen prominent, tympanitic. Muscles rather slate-colored.

Head. Longitudinal sinus empty. Considerable exudation of thickish, purple-red, bloody fluid over posterior part of both hemispheres in arachnoid cavity; same on the two sides. Arachnoid natural. No sub-arachnoid œdema. Substance of brain rather soft, natural in color. Lateral ventricles contain a very little clear serum. Nothing else remarkable. Medulla oblongata natural.

Chest. Dryness of pleura well marked. Pericardium natural internally; contains about three ounces of serum. Right cavities of heart contain a moderate quantity of dark fluid blood, of ordinary consistence. Left ventricle perfectly flaccid. Blood in left cavities, fluid and thickish, with dark gelatinous coagula. Endocardium, valves, and substance of heart natural.

Lungs light-colored anteriorly, a little engorged posteriorly; crepitate well everywhere, and have a natural appearance.

Larynx, trachea and bronchi pale internally at upper part, dusky below. Nothing else remarkable.

Abdomen. Almost no slimy secretion on peritoneum. Small intestines much distended with air; contain also two pints and a half of thin, "rice-water," alkaline fluid. Mucous membrane mostly quite pale; a little red injection in duodenum. Enlargement and opacity of Peyer's patches and solitary glands, as usual. Consistence and thickness of mucous membrane natural. Large intestine contains from three to three pints and a half of fluid, similar to that in small. Mucous follicles moderately enlarged, with open mouths. Nothing else remarkable.

Mesenteric glands generally much enlarged, but white and natural in consistence.

Stomach contains not more than two ounces of a thickish grey fluid, more strongly alkaline than that in lower parts of intestinal tube. Mucous membrane extensively softened, with dusky discoloration; otherwise natural.

Liver brownish-red externally and internally; softish. Yellow bile can be expressed from ducts.

Gall bladder contains about half an ounce of natural-looking bile.

Pancreas natural. Secretion faintly acid.

Spleen rather small, but plump and smooth on surface. Internally red and dry.

Kidneys firm, not flabby, and fluid blood readily follows incision. No distinct puriform fluid is to be expressed from papillæ, but that which flows from them rather resembles turbid urine. Sufficiently distinct renal odor; no melassic.

Urinary bladder contracted and quite empty, excepting a puriform secretion smeared over walls.

Uterus and appendages not remarkable.

NOTE. The microscopic and pathological drawings are from the pencil of Dr. Dalton.

TOPOGRAPHY,

WITH A CHART OF THE CITY PROPER.

As this epidemic has, in a very remarkable manner, domiciled itself, so to speak, in localities, nearly all of which have in common certain easily recognizable and well-defined peculiarities, we have procured some perspective drawings and plans of several of them, as specimens of the rest. They will, we think, give a sufficiently accurate impression of the uniformly crowded state of the buildings; of their inaccessibility to air; and the apparent impossibility of arresting the spread of disease in such situations, or of treating satisfactorily in them, any of its victims.

We have appended to this Report a chart or block-plan of the City proper, in which the original location of all the cases which were received at the Hospital, and all the *fatal* cases, so far as they are known, are carefully indicated. This method was preferred to an attempt, which must have failed, for obvious reasons, to trace the origin of those also which recovered in private practice. So that, if this statement seems to fall short of what is desirable in this respect, it will be free from the gross inaccuracies into which the widely varying reports, from a large number of observers, many of whom have no uniform or well-defined standard of diagnosis, must inevitably have led. Besides, as a gen-

eral rule, the tables of mortality will always give a very good idea of the character and extent of any prevailing epidemic.

The subjoined statistics furnish the history of the origin of 707 cases—611 of which were fatal. The sources of information are the records of the Hospital, and the books of the City Registrar, at the City Hall.

The reports of the office of the City Registrar, being made mostly by the undertakers of funerals, and not by medical authority, are not of course entitled to implicit confidence; but we have no doubt that they give a very fair approximation to the exact truth.

There were doubtless some cases reported as Cholera, which were not so, especially of children under ten years of age; as our experience at the Hospital gave us the impression that it was seldom fatal in this class of subjects. These may fairly be offset by the deaths among adults, from drunkenness, or by drinking cold water, which were reported as Cholera.

The exact age was also evidently only approximately given, the foreign population being very illy informed in regard to their advance in life. This fact is indicated, upon the records, by the large numbers reported as having died at the ages of 25, 30, 35, 40, &c.; showing that the persons were *estimated* to be about those periods of life. But while this renders the statement uncertain for a particular year, (of the age,) it does not affect the results for periods of five years.

Of the 707 cases, 385 were males, and 322 females. Their birth-places and ages are given in the accompanying tables.

Isolated instances of the disease were noticed in even the most salubrious portions of the City, but with a very

few exceptions, the disease was confined to unhealthy, ill-ventilated and crowded localities. The lower parts of the City, where the drainage is difficult and the cellars more or less invaded by the back-water; those reclaimed from the ocean, and those in the vicinity of marshes, were invaded by the pestilence. As instances in point, we may cite the cases which occurred in the new streets, upon the Neck and the South Cove; Church street; Sea and East streets; Battery-march* street; Broad, Wharf, Well and Bread streets; Ann street and its neighborhood; Nashua and Brighton streets, and South and East Boston.

In nearly all these localities, an over-crowded population, bad ventilation, insufficient and unwholesome diet, *intemperance*, and the entire absence of cleanliness, have been most efficient adjuvants in assisting the operation of other causes.

As examples of the influence of filthy habits, deficient ventilation, &c. in what would be considered as healthy situations, may be mentioned the cases which originated in Oliver and Hamilton streets; Sullivan place; and Atkinson, Hanover, West-Cedar, Southac, and May streets. So many instances might be cited, from our personal knowledge of the localities where the majority of the cases occurred, that we are quite certain that the influences alluded to above are, as a universal rule, the exciting cause of the disease, with the occasional exception of those cases which are evidently produced by an unusual indulgence or excess.

The City Institutions at South Boston furnish evidence of the liability of persons of enfeebled constitutions to be attacked by the disease, even when removed

* Formerly Battery-*Marsh* street—a name which is quite appropriately descriptive.

to a healthy location, and furnished with clean rooms and a regulated diet.

A considerable number of deaths are reported from these institutions, especially from the House of Industry, notwithstanding the great advantages enjoyed by the medical officers, in being able to place the patients under treatment from the first moments of the appearance of the disease.

The exact place, whenever it could be ascertained, where each case originated, has been indicated, so that, if the epidemic should reäppear, as it is certainly not unlikely to do, the Health Commissioners may have it in their power to ascertain at once, not only what streets, but what particular buildings will be likely to require the process of purification. In cases where the number of the house is not designated, as in portions of those reported in Broad, Cove, Sea, and some other streets, it is presumed that most of the cases originated, directly or otherwise, in the houses which were known to be the chosen foci of the disease.

Most of the worst localities are easily to be recognized upon the chart, or on the accompanying list. Among them, as conspicuously bad, may be cited the houses in the rear of 136 Hanover street;* Mechanics court; No. 14 Battery-march street; Humphrey place; Burgess' alley; Cross, Broad, Well, and Wharf streets.

At East Boston there were quite a number of fatal cases, in or near Liverpool street; in every instance, as far as can be ascertained, the houses which were visited with the pestilence, were without proper *drains*, while others, in the same locality, and in otherwise the same circumstances, but *well-drained*, entirely escaped.

* It is worthy of note that a few years since, typhus or typhoid fever prevailed here to an unusual extent.

It will be observed that the Hospital was located near the scenes of the greatest ravages of the disease. This was most appropriately done. That it did not itself constitute a focus of contagion, may be proved from the circumstance that several cases originated in its vicinity, before it was occupied by patients from other parts of the City, as also by the fact that the disease was not manifested in all directions around it. *No cases occurred in the houses upon the square.* They were limited entirely to the houses, (on the northeasterly side of the hill,) which were occupied by the most miserable portion of our population, living in the most miserable manner; while those residing, under better circumstances, in the opposite direction from the building, were entirely exempt from the visitation of the malady.

It will be observed that about two hundred cases occurred within a circle, having a radius of a few rods only, whose centre was in Broad street, near Burgess' alley. The population of this district is enormous. The following is a plan of Half-moon place, with Burgess' and Baker's alley, showing the entrances from Broad street.*

No. 1. *Half-moon place.* *No.'s* 2 *and* 3. *Burgess' alley.*

a. Entrance through arch to Burgess' alley.
b. Entrance through Half-moon place from Broad street.
c. Entrance to Baker's alley.

The dark-colored parts represent the brick blocks. The *darkest* colored, the houses where the worst cases occurred. The lighter colored tints represent the sheds and out-houses.

* See Shattuck's "Census of Boston."

View of Half-moon place.

Half-moon place is situated in the rear of Broad street, and is formed by a kind of excavation into the side of Fort Hill; the houses which form its semicircular side being built either against the hill, or separated from it by a space of a few feet. It has two narrow entrances between blocks of houses, on Broad street, and "Jacob's Ladder," which, at the time of the prevalence of Cholera, was a very dilapidated stair-case, that connects it with Humphrey place, and thus with the higher streets upon the hill. Baker's alley, one of its entrances, forms its northern boundary, and Burgess' alley extends from its southern extremity. The cut represents a portion only of the place, and conveys, as do the others, but an imperfect idea of the near proximity of the houses, and the utter want of any circulation of air. The side towards Broad street, from which the view is taken, is formed by the sheds in the rear of the houses on that street, with extremely dirty back-yards, and a fair proportion of privies.

To the right of "Jacob's Ladder," as represented in the cut, is a cluster of six privies, situated nearly in the centre of the place. At the time of the epidemic, these were greatly out of repair, and the ground about them was covered with their overflowing contents, removed only by evaporation. They have since been repaired, so as to present a better outward appearance. A fence has since been erected, as a screen, at the side of the "Ladder," to hide the naked deformity of its neighborhood. At the foot of the drain are two more clusters of privies, six in number. The open space likewise presents three cesspools, intended to convey off the dirty water; but which were choked by all sorts of vegetable matters, as fragments of cabbage and potatoes. As these accumulated, they were scooped out and thrown upon the ground near them, which was thus plentifully bestrewed with putrefying vegetable matters. With these were mingled no small proportion of substances still more loathsome.

The houses to the left, are from four to six stories in height, and were crowded with inhabitants. Their rear was only separated from the stone-wall which supported the side of the hill, by a space of a few feet, and here the contents of drains from above found a receptacle, creating a perpetual humidity which must have reminded the tenants of their native land.

Burgess' alley. North view.
From point marked 2, on plan.

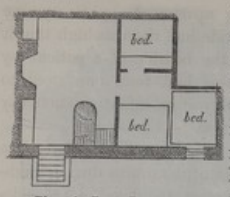
Burgess' alley runs from the southern extremity of Half-moon place, and its houses, fruitful sources of examples of the disease, are destitute of any opening whatever in their rear—being built against the hill, and in front are separated from the rear of the houses on Broad street by merely the width of the alley and a row of narrow sheds and privies.

Burgess' alley. South view.

Entrance to Burgess' alley.
(Looking out)

The sketches can convey a faint idea, only, of the actual narrowness of the limits occupied by an immense population, and the utter impossibility of a healthy circulation of air in such locations, where a free ventilation is especially demanded by the supreme filthiness of the persons who occupy them.

The plan which is given of a triple cellar, would scarcely be believed to represent a reality, by those unacquainted with some of these localities. The principal



Plan of cellar in Bread street.

tenant considered his accommodations of the most desirable character. The first cellar, from the street, was occupied, in one corner, by a bar for the sale of refreshments, and served as kitchen and parlor. The second, into which two beds were crowded, served as the family sleeping-room, whilst the third, a dungeon six feet square, and the same in height, (with no aperture for the admission of air, save the narrow door, which was closed at night,) served to accommodate boarders.

The landlord said the tide came through the floor of his rooms but rarely! We have procured a sketch of the appearance of one of these subterranean apartments. It gives a fair idea of the mode of stowing the bedsteads, and of its contracted dimensions; but cannot give an adequate impression of its darkness and its loathsomeness. The family was warned by visiting physician of the district not to permit these inner rooms to be occupied; yet he was called, a few nights after, to see a man in this very den, who, two or three hours previously, was in apparent good health, but had then already reached the stage of hopeless collapse.

Subterranean bedroom in Bread street.

One cellar was reported by the police, to be occupied nightly, as a sleeping apartment, by thirty-nine persons! In another, the tide had risen so high that it was necessary to approach the bedside of a patient by means of a plank, which was laid from one stool to another; while the dead body of an infant was actually *sailing* about the room in its coffin!

Many of the inhabited cellars in this vicinity are inundated by the back-water of the drains during high-tides; and being entirely below the level of the side-walks, they are necessarily, therefore, almost entirely without light or ventilation. But, far from being considered a hardship, a residence in them is considered preferable to loftier apartments. They are said to be cooler in summer and warmer in winter, and consequently command higher rents.

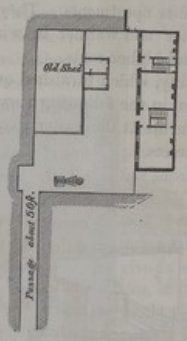
Another locality, which furnished quite a number of victims, is shown in the following view. It is a nest of miserable tenements at the easterly corner of Stillman and Endicott streets.

View of tenements in Stillman street.

They are filled to overflowing with a most vicious and miserable population. Even the cellars, under the long low building, near which the two figures are seen, and

into which it is very difficult to *crawl*, are inhabited, although the crazy timbers overhead threaten each moment to entomb, or the waters beneath to drown them.

We give but one illustration more: it is the place in the rear of 136 Hanover street, which was inhabited chiefly by the unfortunate "Crowe" family. It will be recollected that some of the earliest cases occurred here, and the victims were seized and died in such rapid succession as to attract special attention to the spot. There were something like twelve deaths here, in a period of little more than two days, out of a population of less than fifty persons.



Plan of Place in rear of 136 Hanover street.

The plan shows the long narrow entrance; the want of any passage beyond; the entire absence of any yard in the rear; and the reason, therefore, why all the excrementitious matters, the refuse vegetables, &c. should be constantly accumulated in the centre of the place. Nothing arrested the fearful progress of the disease,

here, but the immediate removal of all the inmates, and a thorough cleansing of the premises.

The large house, in the left foreground, was in tolerably good repair, but excessively crowded with inmates. The farther building on the right, was formerly the rear wing of a larger house. It is a very dilapidated and incommodious building, with very low and narrow rooms. It was with the greatest difficulty that the people were persuaded to leave these wretched quarters. The horse-litter* was sent repeatedly for them, and, although some of them were found sick upon the floor, all the energy of the authorities was required to overcome their listless indifference to their fate.

House in rear of 136 Hanover street.

An examination of the habits of the victims of Cholera, shows with how much discrimination they were selected for its attack; while the rate of mortality, among those who were intemperate, is still more remarkable.

Of the whole number of patients at the Hospital, (262,) one hundred and fifty-four were known to be intemperate, and one hundred and eight who were *supposed* to be temperate.

* An easy covered carriage, (containing a bed,) for the conveyance of patients, which was constantly in readiness, day and night, in the Hospital yard.

The whole number of deaths there was		166
Of those who were temperate, - -	37	
" " intemperate, - -	129	
		166
The whole number of recoveries was	-	96
Of the intemperate, - - -	25	
Of the temperate, - - - -	71	
		96

The experience of this epidemic has certainly given most satisfactory evidence of the power and value of sanitary measures: for, as we have stated in the early part of this report, while no person was attacked without some obviously exciting cause, so, in every case in which those much exposed were removed from these deleterious influences, and provided with cleanly, airy apartments, and suitable food, an attack of the disease was averted.

The laws of nature, although immutable, are beautifully adapted to the welfare and happiness of mankind. In nothing can this fact be more strikingly illustrated than in its relation to the public health, in a City whose natural advantages, for improvement, in this respect, are not surpassed by any other.

Modern science has demonstrated that the most malignant epidemics may be greatly controlled by efficient sanitary reforms: It is not unreasonable, therefore, that, for the future, the legal custodiens of the public health, (the necessary means being first placed at their disposal,) should be held to a strict accountability for its conservation.

For the Medical Staff of the Hospital.

HENRY G. CLARK,

Superintendent.

LIST OF LOCALITIES,

WITH THE NUMBER OF CASES OCCURRING IN EACH.

The following list of locations in which cases occurred, commences at the south end of the City, and proceeds nearly regularly, according to the map, towards the north and west:

	Cases.
Allen's block, Arnold street,	7
Concord street,	1
13 Hamburgh street,	1
Fabin street,	1
West Dedham street,	1
Middlesex street,	1
Suffolk street,	1
Erie street,	1
East Orange street, 1	
20 " " 1	2
705 Washington street,	1
Corey avenue, Ash street,	1
98 Warren street,	1
Knox street,	1
Church street, 3	
3 " " 1	
" " cor. Cedar, 1	5
Marion street,	1
Shaving street,	4
Cove street, 11 }	12
46 Cove street, 1 }	
Cove place, 7)	
2 " " 1 (	12 24
3 " " 1 (	
5 " " 3)	
Eliot street, } 2	3
59 " " } 1	
1 Foster place,	2
La Grange place,	1
Fayette court,	1
Kneeland street,	2
Albany street,	2

	Cases.
1 Utica street, 1	
49 " " 1	2
East street, 3	
17 East street, 1	4
Sea street, 21	
4 Sea street, 1	
13 " " 1	
21 " " 1	
26 " " 1	
39 " " 1	
43 " " 1	
45 " " 1	
64 " " 1	
75 " " 7	
101 Sea street, 1	
107 " " 1	
113 " " 1	
118 " " 1	
122 " " 1	
130 " " 1	
136 " " 1	
150 " " 1	44
South street, 3	
3 " " 1	4
Essex street,	1
7 Oliver place,	1
Ætna place,	1
36 High street,	1
86 Federal street,	1
Sullivan place, 3	
14 " " 1	4
Fort Hill Hospital,	2

	Cases.	
Atkinson street,	1	
11 " "	1	
22 " "	1	
31 " "	1	4
Washington avenue,		6
Leman's alley,		1
Purchase street,	3	
48 " "	1	
120 " "	1	
143 " "	1	
173 " "	1	7
Hamilton street,	11	
2 " "	3	
3 " "	1	
8 " "	1	
11 " "	1	
15 " "	1	
18 " "	1	
19 " "	1	
69 " "	1	21
Hamilton court,		1
4 Humphrey place,		7
2 Hamilton alley,		2
Wendell street,		1
Oliver street,	7	
7 " "	2	
8 " "	1	
9 " "	1	
29 " "	1	
31 " "	1	13
Battery-march street,	12	
12 " "	1	
14 " "	6	
cor. Hamilton,	4	23
New Broad street,		2
Broad street,	28	
3 Broad street,	1	
6 " "	1	
9 " "	2	
74 " "	2	
79 " "	1	
82 " "	1	
84 " "	1	
86 " "	3	
87 " "	1	
89 " "	2	
91 " "	2	
92 " "	2	
96 " "	1	
98 " "	2	
99 " "	1	
104 " "	4	
107 " "	2	
111 " "	2	
116 " "	1	
118 " "	1	
163 " "	3	
164 " "	1	
211 " "	1	65
Burgess' alley, Broad st.		16
Baker's alley, "		7

	Cases.	
Marsh's alley, Broad st.		1
Wharf street,	4	
1 " "	2	
2 " "	1	
5 " "	1	
7½ " "	2	10
Well street,	7	
5 " "	1	8
Bread street,	5	
6 " "	1	6
Milk street,	2	
120 Milk street,	1	3
7 Harvard place,		1
Commercial street,	1	
38 " "	1	2
Commercial wharf,		2
Fulton street,		1
Cross street,	3	
13 " "	3	6
Ann street,	10	
54 Ann street,	1	
106 " "	2	
108 " "	1	
110 " "	1	
112 " "	2	
126 " "	1	
136 " "	1	
152 " "	1	
155 " "	1	
175 " "	4	
191 " "	1	
252 " "	3	
310 " "	1	
324 " "	1	31
Keith's alley, Ann st.	3	
5 " "	1	4
Mechanics' street,		6
Mechanics' court,		6
3 Lewis street,		1
Moon-street court,		1
Hatters' square,		2
Richmond street,		4
49 Hanover street,	1	
115 " "	1	
136 " "	13	15
Hanover avenue		1
1 Lime alley,		1
143 Charter street,		1
19 Tileston street,		1
Prince street,	22	
" cor. Salem,	1	
3 Prince street,	1	
4 " "	1	
5 " "	1	
8 " "	2	
23 " "	1	
26 " "	1	
36½ " "	1	
37 " "	1	
75 " "	1	13
Salem street, cor. Prince,		1

	Cases.	
3 Bartlett place,		1
North Margin street,		2
31 North Margin street,		3
Endicott street,	5	
37 " "	1	
38 " "	1	
83 " "	1	8
Stillman street,	1	
38 " "	1	
83 " "	1	3
1 Thacher street court,		1
Thacher street avenue,		1
7 Charlestown street,		1
Causeway street,		1
28½ Portland street,	1	
54 " "	1	2
Deacon street,		1
38 Merrimack street,		1
Andover street,		
13 Nashua street,	1	
79 " "	1	
96 " "	1	3
9 Lowell street,		1
Cotting street,		1
Wall street,	1	
14 " "	1	2
11 South Margin street,	1	
44 " "	3	
48 " "	1	5
29 Gonch street,		1
Pitts street,	1	
11 " "	1	2
Ivers street,		1
Distil-house square,		1
Cambridge street,		1
8 Staniford street,		1
19 Temple street,		1
23 Belknap street,		1
South Russell street,		1
North Russell street,	2	
6 " "	2	
12 " "	2	
17 " "	1	7
64 Allen-street place,		1
Lovett place, Poplar street,		1
Spring street,	1	
17 " "	1	2
3 Milton street,		1
Brighton street,	2	
6 Brighton street,	1	
" "	1	4
42 " "		1
12 Fruit street,		1
Fruit-street place,		1
Bridge-street court,		1
8 Cyprus street,		1
North Grove street,	1	
8 " "	1	2
10 Grove place,		1
Butolph street,		1
6 West Centre street,		1
James place, W. Centre st.		1
Southac street,		2

	Cases.	
May street,	1	
15 " "	1	2
May-street court,		1
West Cedar street,	4	
56 " "	1	5
54 Mount Vernon street,		1
36 Charles street,	1	
" "	1	2
South Boston.		
No location mentioned,		21
House of Industry,		23
Lunatic Hospital,		10
House of Correction,		4
2d street,		5
3d "		7
4th "		2
5th "		2
A "		4
C "		1
Silver street,		1
Wright's court,		1
Swan street,		5
Athens street,		1
250 Broadway,	1	
465 "	1	2
South Boston Point,		1
Deer Island Hospital		28
From shipboard,		10
East Boston.		
Location not reported,		26
Centre street,		1
Lexington street,		1
London street,		3
Maverick street,		2
Marion street,		1
Liverpool street,		5
Havre street,		1
Kelley place,		1
		687
Location unknown,		20
Total,		707
Recovered,		96
Total Deaths,		611

PLACE OF BIRTH.

Ireland,	460
Children of Irish parents,	49
England,	18
Scotland,	14
British Provinces,	18
Continent of Europe,	11
Jamaica,	1
St. Helena,	1
Boston,	42
Massachusetts,	42
New England,	39
Other States,	12
	707

AGES.

Years.		Years.		Years.		Years.		Years.		Years.	
1	13	11	4	21	10	31	10	41	4		
2	13	12	5	22	14	32	7	42	12	5,—63	
3	8	13	2	23	8	33	15	43	5	5 to 10,—40	
4	11	14	4	24	11	34	13	44	8	10 to 15,—18	
5	18—63	15	3—18	25	25—68	35	42—87	45	23—52	15 to 20,—36	
6	12	16	3	26	7	36	18	46	7	20 to 25,—68	
7	1	17	5	27	16	37	11	47	4	25 to 30,—101	
8	14	18	9	28	15	38	14	48	5	30 to 35,—87	
9	4	19	10	29	17	39	9	49	7	35 to 40,—87	
10	9—40	20	9—36	30	46—101	40	35—87	50	16—39	40 to 45,—52	
	103		54		169		174		91	45 to 50,—39	
51	6	61	3	71	0	81	0	91	0	50 to 55,—22	
52	4	62	4	72	0	82	0	92	0	55 to 60,—19	
53	1	63	2	73	0	83	1	93	0	60 to 65,—18	
54	6	64	2	74	1	84	0	94	1—1	65 to 70,—6	
55	5—22	65	7—18	75	0—1	85	0—1			70 to 75,—1	
56	8	66	4	76	0	86	0			75 to 80,—2	
57	2	67	0	77	1	87	0			80 to 85,—1	
58	1	68	0	78	0	88	0			85 to 90,—0	
59	1	69	0	79	0	89	0			90 to 95,—1	
60	7—19	70	2—6	80	1—2	90	0—0				661
	41		24		3		1			Unknown,	46
											707

WEATHER TABLE.—JUNE.

D. of mo.	Sunrise.	M.	Sunset.	Kept at the Institution for the Blind.*
1	52	60	54	Cloudy, clear, S, SE.
2	62	64	64	Clear, S, SE.
3	66	76	72	Cloudy, calm, SSE, S.
4	66	76	68	Cloudy, fair, cloudy, SSW, SW.
5	60	65	64	Clear, WNW, NW, SW.
6	58	68	70	Fair, W, NW, W.
7	62	69	68	Light clouds, NW, SW.
8	62	54	52	Cloudy, calm, W, NE, NNE.
9	58	64	62	Clear, cloudy, NW, E.
10	64	62	64	Cloudy, calm, SE and E.
11	56	60	58	Fair, N, E.
12	56	60	58	Fair, cloudy, wind E all day.
13	56	67	60	Cloudy, fair, W, SW.
14	62	68	66	Fair, SW, E, SE.
15	62	74	70	Cloudy all day, SW, SSW, SW.
16	68	83	80	Clear, WSW, SW, NW.
17	64	73	72	Clear, NW, SE.
18	64	80	77	Clear, light clouds, wind variable.
19	68	86	88	Clear, clouds, SW and W.
20	74	84	80	Light clouds, NW and SE.
21	80	88	84	Fair, W, SE, SSW.
22	82	81	88	Clear, WSW, SSW.
23	80	88	87	Light clouds all day, W.
24	72	82	68	Cloudy, rain, NW, E and S.
25	70	80	78	Clear, W, NW and W.
26	70	80	74	Clear, W, N.
27	64	79	81	Clear, cloudy, WNW, NW.
28	67	70	62	Cloudy, rainy, NE and SE.
29	58	59	58	High wind, cloudy, E and N.
30	60	76	74	Calm, SW.

Mean Temperature.
Sunrise, 63.46
Noon, 69.46
Sunset, 63.7

Minimum of Thermometer.
Sunrise, 1st, 52 above 0.
Noon, 1st, 54 " 0.
Sunset, 8th, 52 " 0.

Rain during month, 1.37 inches.

Maximum of Thermometer.
Sunrise, 29th, 82 " 0.
Noon, 23d, 88 " 0.
Sunset, 23d, 88 " 0.

Mean Heat of month, 65.37.

WEATHER TABLE.—JULY.

D. of mo.	Sunrise.	M.	Sunset.	Kept at the Institution for the Blind.
1	67	70	70	Cloudy, fair, N and NW.
2	60	66	62	Clear, cloudy, NE and N.
3	56	60	64	Clear, N and NE.
4	64	67	62	Clear, cloudy, SE, SSW.
5	58	62	62	Cloudy, N, NE, calm.
6	61	78	75	Cloudy, NW, W, and SW, calm.
7	70	77	73	Cloudy, SW all day.
8	75	82	76	Calm, light clouds, W, SE.
9	66	71	69	Cloudy, calm, E, all day.
10	72	80	76	Cloudy, clear, W, S, SW, SSW.
11	68	87	85	Cloudy, clear, SW, WSW.
12	76	92	88	Clear, WSW, calm.
13	79	93	92	Clear, W, WNW.
14	80	81	66	Cloudy, high wind at sunset, N.
15	58	67	66	Clear, cloudy, NW, N.
16	58	74	72	Clear, cloudy, wind variable.
17	66	78	76	Clear, cloudy, SW.
18	65	83	74	Calm, clear, SW all day.
19	70	85	78	Calm, cloudy, fair, SW.
20	70	85	78	Cloudy, fair, cloudy, SW.
21	72	78	75	Calm, cloudy, fair, W, and NW.
22	77	80	75	Cloudy, calm, clear at noon, W.
23	67	70	66	Light clouds, calm, NE, E.
24	65	70	66	Clear, NW, nearly calm.
25	65	70	64	Cloudy, E, and ESE.
26	66	76	77	Cloudy, SSE, SW.
27	70	85	78	Clear, cloudy, SW.
28	64	80	78	Cloudy, WNW, calm.
29	58	81	76	Clear, WSW, ESE.
30	64	82	78	Nearly clear, high wind, SW.
31	73	85	73	Clear, cloudy, SW, calm.

Mean Temperature.
Sunrise, 67.45
Noon, 77.45
Sunset, 73.38

Minimum of Thermometer.
Sunrise, 3d, 56
Noon, 3d, 60
Sunset, 3d, 62

Rain during month, 4.10 inches.

Maximum of Thermometer.
Sunrise, 13th, 80 above 0
Noon, 13th, 93 " 0
Sunset, 14th, 92 "

Mean Heat of month, 71.74.

* Elevation 115 feet above the level of the sea.

WEATHER TABLE.—AUGUST.

D. of mo.	Sun-rise.	M.	Sunset.	Kept at the Institution for the Blind.
1	61	78	68	Cloudy, clear, calm, wind variable.
2	60	74	70	Cloudy, NW and SE, calm.
3	61	77	69	Clear, WSW and SE.
4	68	76	72	Fair, cloudy, SW and SE.
5	70	74	68	Cloudy, fair, wind variable.
6	64	75	72	Calm, cloudy, SE and N.
7	67	78	76	Cloudy, rain, fair, W, NW.
8	67	77	70	Clear, NW, SE.
9	62	77	77	Slightly cloudy, SW and SE.
10	66	74	68	Cloudy, violent thunder-storm, SE.
11	66	75	67	Cloudy, SE.
12	65	66	62	Cloudy, E, and N, calm.
13	66	76	66	Cloudy, clearer, at sunset, S.
14	66	72	64	Cloudy, calm, E, foggy.
15	63	73	68	Clear, high wind, SW and NW.
16	60	72	78	Clear, NW, all day.
17	64	78	74	Cloudy, wind variable.
18	66	76	72	Cloudy, clear, SSW.
19	64	72	66	Cloudy, clear, cloudy, NE, calm.
20	64	74	68	Cloudy, clear, NE, E, SE.
21	61	76	62	Light clouds, calm, wind variable.
22	70	80	78	Slightly cloudy, W all day.
23	66	76	64	Cloudy all day, NE.
24	62	70	66	Cloudy, clear, N, NW, W.
25	76	62	75	Fair, W, NW, W.
26	68	82	78	Calm, clear, W and SW.
27	66	*	74	Clear, cloudy, S, SSW.
28	70	83	77	Clear, cloudy, SW.
29	70	82	74	Calm, cloudy, wind variable.
30	70	78	72	Cloudy, clear, SSW, SE.
31	70	83	74	Cloudy, S and SSW.

Maximum of Thermometer
Sunrise, 3d, 71 above 0
Noon, 31st, 85 "
Sunset, 16th, 78 "

Minimum of Thermometer.
Sunrise, 2d, 60
Noon, 12th, 66
Sunset, 12th, 62

Mean Temperature.
Sunrise, 65.65
Noon, 66
Sunset, 54.09

Mean Heat of month, 61.89.
Rain during month, 3 inches.

WEATHER TABLE.—SEPTEMBER.

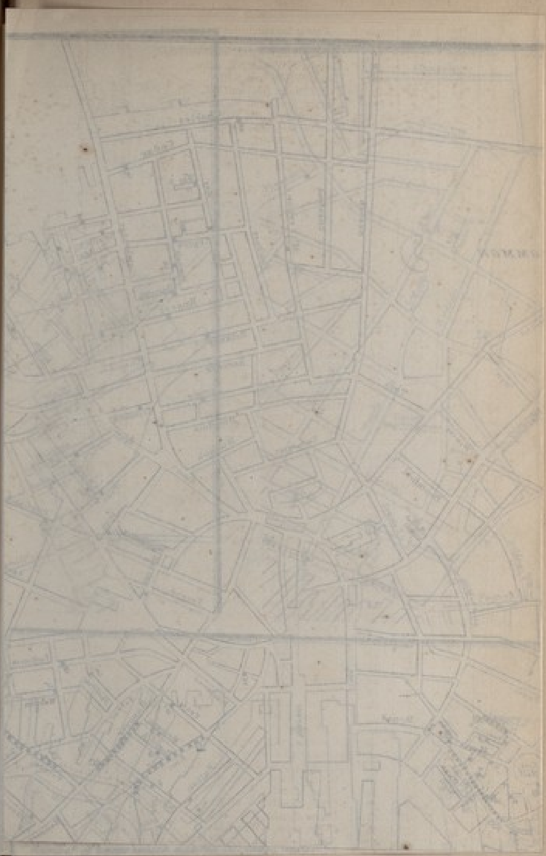
D. of mo.	Sun-rise.	M.	Sunset.	Kept at the Institution for the Blind.
1	54	64	64	Wind high, cloudy, NE and E.
2	54	63	62	Clear, windy, NW all day.
3	50	66	62	Calm, fair, NW, SE.
4	52	73	62	Clear, cloudy, calm, S.
5	62	73	68	Calm, S, cloudy, clear.
6	64	73	66	Fair, NE and SE.
7	66	80	66	Cloudy, SE, SW, NW.
8	54	63	59	Clear, NW and SE.
9	52	64	62	Perfectly clear all day, SE and NW.
10	52	66	60	Perfectly clear all day, wind calm, NW, [SE.
11	56	66	60	Fair, NW, E.
12	54	70	66	Cloudy, clear, calm, S.
13	60	74	67	Clear, calm, SW and S.
14	67	62	70	Calm, clear, cloudy, NE, SE.
15	60	69	68	Cloudy, SW, W, S.
16	62	70	71	Cloudy, clear, SE and S.
17	68	77	74	Cloudy, nearly calm, SW.
18	62	69	63	Nearly clear, NW and N.
19	48	58	52	Fair wind, N, NW, NE.
20	48	58	54	Calm, cloudy, clearer, wind variable.
21	54	60	56	Cloudy, NE all day.
22	52	64	60	Cloudy, calm, NNE and SE.
23	62	70	60	Cloudy, rain, S and W.
24	50	61	56	Clear, cloudy, W.
25	54	68	58	Clear, cloudy, W all day.
26	60	74	67	Cloudy, clear, SW, WNW.
27	50	57	66	Clear, calm, SW all day.
28	60	66	62	Nearly clear all day, WNW, NW.
29	52	66	52	Fair, NW, NE.
30	52	51	46	Cloudy, E, ENE.

Maximum of Thermometer.
Sunrise, 7th, 60 above 0
Noon, 7th, 80 "
Sunset, 17th, 74 "

Minimum of Thermometer.
Sunrise, 19th, 48
Noon, 29th, 57
Sunset, 27th, 52

Mean Temperature.
Sunrise, 54.8
Noon, 57 5
Sunset, 56 93

Mean Heat of month, 56.41.
Rain during month, 9-20ths of inch.



COURSE OF CHOLERA

IN BOSTON IN 1849.

CHART

showing the locations in which all the cases of Cholera at the Hospital & all the fatal cases elsewhere originated.

The dark spots give the localities, & the figures, the number of cases which occured at that location.

On Ship Board	*10*
In the City proper	*538*
At East Boston	*41*
At South Boston	*53*
At the City Institutions as follows:	
House of Industry	*23*
" " Correction	*10*
Lunatic Hospital	*4*
At Deer Island	*28*
Fatal cases 611.	*707.*

City Hospital for Cholera.

29	52	66	52	Fair, NW, NE.	
30	52	51	46	Cloudy, E, ENE.	

REPORT

ON

THE NATURE AND IMPORT OF CERTAIN MICROSCOPIC BODIES FOUND IN THE INTESTINAL DISCHARGES OF CHOLERA.

PRESENTED TO THE CHOLERA COMMITTEE OF THE ROYAL COLLEGE OF PHYSICIANS OF LONDON, BY THEIR SUB-COMMITTEE,

ON THE

17TH OCTOBER, 1849.

Royal College of Physicians,
Pall Mall East,
October 27th, 1849.

Sir,

The following Report was, in substance, laid before the Cholera Committee on the 17th instant; and we were then authorized to send copies of it to the members of the College. The epidemic was already rapidly declining, and it seemed desirable to make known the results of our inquiry before the opportunity of verifying them should be lost.

Dr. Jenner's observations and, with a single exception, Mr. Marshall's, were included in the original draught read to the Committee. On the same day Mr. Busk communicated to the Microscopical Society his observations on the identity of some forms of the "Cholera bodies" with a species of uredo, the contents of brancells, and starch-grains, respectively. These have been

embodied in the Report, together with the result of Mr. Marshall's examination of bran-cells (made subsequently, but independently of Mr. Busk's), and the fact, that the smallest "Cholera bodies" are derived from chalk,—a result to which we were led by the remarks of Dr. Griffith on their physical and chemical characters.

We have the honor to be, Sir,

Your obedient humble Servants,

William Baly,
William W. Gull.

To Dr.

REPORT

ON

THE NATURE & IMPORT OF CERTAIN MICROSCOPIC BODIES FOUND IN THE INTESTINAL DISCHARGES OF CHOLERA.

We propose, in this Report, to lay before the Committee the results of some experimental inquiries on a subject which, within the last few weeks, has engaged much of the attention of the profession. We allude to the discovery, by Mr. Brittan and Mr. Swayne, of Bristol, of peculiar bodies in the "rice-water" dejections of Cholera patients; and to the statement that similar bodies have been found by Mr. Brittan in the atmosphere, and subsequently, by Dr. W. Budd, in the drinking-water of infected localities.

These observations, on account of their important bearing, if true, on the Pathology of Cholera, seemed to us to demand a searching examination. We have, accordingly, given much time and attention to the subject. Having, in the first place, satisfied ourselves of the distinctive characters of the bodies found in the rice-water dejections, we next sought to verify the observations of Mr. Brittan and Dr. Budd with reference to their presence in the air and drinking-water of places infected with Cholera. It was necessary that this part of the inquiry should not be delayed; for the epidemic had already reached its turning point, and it would, before long, have been difficult

to obtain favourable opportunities for experiments of a satisfactory character.

Our inquiries were afterwards directed to the nature and properties of the newly-discovered corpuscules, and to the question of their occurrence in other diseases. In this investigation, we soon perceived that objects totally different had been regarded as identical; but we had arrived at no positive conclusion respecting those which seemed most characteristic of the Cholera evacuations, when we received two important communications on the subject from Mr. Marshall and Dr. Jenner. The letters of these gentlemen are appended to this Report; but the results obtained by them are embodied in it.

Our observations on the air and drinking-water of infected localities, twenty-four in number, gave uniformly negative results. With regard to the value of our experiments, taken separately, it will, we think, appear that many are liable to no objection. Some of those which relate to the drinking-water of infected places, are certainly wanting in the conditions which would make them convincing. But when it is considered that Dr. Budd believes he has detected the objects sought for "in great numbers", in such large bodies of water as the Float, at Bristol, and the Surrey canal, and that he represents them as being deposited in the sediment of the water, we shall not be thought unreasonable in having expected that they *might* be discovered in the cisterns of houses and public institutions in which Cholera had prevailed severely, although it had ceased there for some days or weeks.

Nevertheless, a much larger amount of evidence would have been required to disprove the statements

to which our observations refer, had those statements been unassailable from other points. But the facts to be detailed in the subsequent part of this Report, will shew that the bodies found in the rice-water dejections have no peculiar relation to Cholera; and, that if they should occasionally be present in the atmosphere, or impure water, this will not happen exclusively, or even especially, in districts infected with the epidemic.

We shall now submit the particulars of all the observations to the Committee, describing first those on the air.

Microscopic Observations on water condensed from the Atmosphere of Infected Localities.

Two methods were employed for condensing the aqueous vapour. One was, to suspend in the air to be examined a glass funnel, nearly filled with a freezing mixture, its lower opening having previously been closed by a cork and covered with sealing-wax. The moisture condensed on the outside of the funnel, trickled into a small phial placed beneath. The second method was, to force air slowly, by means of bellows, through a bent glass tube immersed in ice and salt; when the moisture was deposited on the interior of the tube, and collected in a bulb at its lower part. In either way from half a drachm to a drachm of water was readily obtained.

Obs. 1.—In Millbank prison, from the 6th June to the 16th September, there occurred eighty-four cases of cholera. The last patient began to suffer from diarrhœa on the 16th September, and died on the 25th. On the 19th, when he lay in a state of collapse, about a drachm of water was condensed from the air of a lobby which separated his small apartment from a water-closet, in which

his evacuations were emptied. The water thus obtained was submitted to microscopic examination the same evening.

Obs. 2 *and* 3.—On the same day (the 19th September), we accompanied Mr. Bayfield, one of the surgeons of the Union of St. Olave's, Southwark, to two localities in his district, in which cholera had been most prevalent, namely, English Ground, Bull Court, Tooley-street, and Gimber's Rents, Snow's Fields. In a ground-floor room of a house in the former court, a woman and child had died of cholera within a few days; and the husband, at the time of our visit, was in bed, ill with the disease. Nearly a drachm of water was obtained from the noisome atmosphere of this room.

In Gimber's Rents the drainage and the ventilation were as bad as possible. In several places we saw the openings of drains covered with matting, to prevent the escape of effluvia. We collected about a drachm of water from a house where a woman lay ill of cholera; her husband having only recently died of the epidemic. The water procured in these two experiments, was examined the same evening, and the examination of it repeated on several subsequent days.

From Gimber's Rents we brought away a piece of bread which had been long in the house, and which had not been cut for a week; a piece of butter, the surface of which was covered with dust; and a jug, which we found filled with drinking water. The examination of this water will be referred to in our second series of experiments. On the bread and the butter, no bodies like those observed in the rice-water evacuations could be found.

Obs. 4 *and* 5.—On the 22nd September, water was condensed from the atmosphere in two houses situated in St. Erman's Hill, near the Broadway, Westminster. Mr. Painter, Surgeon of St. Margaret's parish, to whom we had explained our object, conducted us to this locality, as, at that time, the chief focus of the disease. In one house (No. 21) a child lay dead, having been attacked with cholera the preceding evening. Two other cases had recently occurred in the same house At No. 12 a child was ill of cholera; and a second had been removed, in the morning of the same day, to the Cholera Hospital, where it died. Mr. Brittan and Mr. Newport took part in the microscopic examination of the water condensed from the air in these houses, about an hour after it was collected; but, like ourselves, were unable to discover any "annular bodies". On the following day, the same water, as well as that procured in the second and third observations, was again examined by Mr. Brittan, and with the same result.

Obs. 6.—On the 6th October cholera appeared amongst the patients in the Insane ward of the Birmingham workhouse; many were attacked. On the 9th October, at our request, Dr. Fletcher, of Birmingham, kindly obtained for us some water condensed from the atmosphere of this ward, and likewise from that of one above it, when diarrhœa was prevalent. These specimens of water reached us, and were examined by us, on the 11th October.

Obs. 7.—From the beginning of the month of October cases of cholera had been numerous and fatal in the workhouse of the Walsall Union; partly imported, but partly occurring in inmates of the workhouse. When the epidemic was at its height, we obtained, through the kindness of Dr. F. Burton, of Walsall, about a drachm of water from the air of the room in which the greater number of the cases occurred. This specimen of water was condensed from the air on the 7th, and was examined by us on the 8th October.

The water condensed from the air in the several localities and under the circumstances we have described, was, in each case, examined by us more than once. But the search for "annular" bodies, such as those found in the Cholera dejections, failed, as we have already intimated. Neither cells, nor rings, nor anything bearing a resemblance to them could, in most cases, be discovered. We saw merely portions of gelatiniform matter containing bright points—sometimes finely granular, brownish masses, perhaps derived from smoke,—and occasionally colourless, transparent particles, of a crystalline appearance, which may have been portions of silicious dust. After the water had been kept some time, chains of delicate oval vesicles, like those of the torula of yeast, but much smaller, appeared in it. These were absent at first, and could not be mistaken for the Cholera discs. Equally unlike

those discs, were the three or four separate oval cells, which, in two instances, were seen in the water when first examined. They had a clear, single outline, and were not flattened.

Microscopic Observations on the Drinking-Water of Infected Places.

Obs. 8.—On the 26th September, Dr. Snow kindly furnished us with a specimen of water from Albion terrace, Wandsworth, a locality in which cholera had been very fatal between the 28th July and the 13th August. This water, which was very foul, had been taken from a tank at Albion terrace on the 16th or 17th of August; but, as it had been kept so long before it was submitted to microscopic examination, it may be objected that, had "cholera fungi" originally been present, they might have become decomposed or otherwise destroyed.

Obs. 9.—A second specimen of water, sent to us at the same time by Dr. Snow, was obtained from a house in Gresse street, Rathbone place, in which five persons had recently died of cholera. The last case of the disease here occurred two days before the water was obtained from the cistern, and twenty-four days before it was examined by us with the microscope.

Obs. 10.—From the 31st August to the 7th September four fatal cases of cholera occurred amongst the female prisoners in two wards of the Millbank prison. The part of the building where these wards were situated was forthwith vacated. On the 19th September a portion of water with sediment was taken from the cistern which supplied those wards, the contents of this cistern having remained undisturbed since the removal of the prisoners to another part of the building. At the same time specimens of water were taken from the cistern of the female infirmary, where two fatal cases of cholera had occurred simultaneously with those above referred to, and also from the tank which supplies the whole prison. These three specimens of water were submitted to the microscope the next day.

Obs. 11.—The drinking-water taken on the 19th September from the house in Gimber's rents, Borough, (see *Obs.* 3,) deposited a sediment which was carefully examined. The description of the locality has been already given.

Obs. 12.—On the 27th September we visited Crosby court, Bermondsey, an open space containing seven houses. Four cases of cholera (two fatal) had recently occurred in one of these houses, the others having escaped. The house in which cholera had been fatal was closed. But we found that the water used by the inhabitants of the court came from two pumps; one supplied from the Thames water, the other raising well-water, which was hard and ferruginous. On a strict inquiry it appeared that the Thames water was used for drinking in every house except the one in which cholera had appeared; in that house only the well-water was used. We brought away water from both pumps, and examined the deposits, which were abundant, on the following day.

Obs. 13. We next went to Jacob's Island, Bermondsey, a most crowded and wretched part of the district, in which Cholera had been very severe. It is a portion of low ground bordering the river, and surrounded by a shallow tidal ditch, which receives the contents of the privies on either bank. The water for drinking and other purposes, is taken for the most part from this ditch. We procured some water from the ditch itself, and also from two pumps supplied from it, situated in Gutteridge's Court, where deaths had occurred.

Obs. 14. On the same day we also went to Hanover Street, Rotherhithe, a low and crowded cul-de-sac. A woman lay dead of Cholera in one of the houses; and other deaths had occurred. The water used, of which we procured a specimen, was derived from the Thames, through a pump which became dry at every ebb. Behind the houses on the east side was an open ditch, receiving the refuse from them and conveying it into the Thames, at a point close to the opening of the pipe which supplied the pump in the street.

Obs. 15.—In a house in Swan Lane, Rotherhithe, close to the Millpond, a man lay dead of cholera. The disease had been fatal in two adjacent houses. The woman, whose husband had just died, told us that she and most of the inhabitants took their water for drinking from the Millpond, which is a tidal ditch serving as a sewer to the houses on its banks. We filled a bottle with water from this source.

Obs. 16.—Dr. Burton of Walsall forwarded to us, on the 7th October, three specimens of water from the workhouse, cholera prevailing at the time amongst the inmates. (See *Obs.* 7.) The first was from an open cistern fed by land drains, the second from a moat, the third from cisterns in the workhouse. The last water,

which is that chiefly drunk by the paupers in the workhouse, is derived from the moat, but is filtered through charcoal and gravel. The deposits of all were carefully and repeatedly examined.

Obs. 17.—To Dr. Fletcher, of Birmingham, we are indebted for five specimens of the water which supplies the workhouse, forwarded to us at the time cholera prevailed in the insane ward of the establishment. (See *Obs.* 6.) The specimens included:—1. Clear water from the reservoir which is supplied from the river; 2. Sediment from the reservoir; 3. Clear water from the cistern of the workhouse; 4. Sediment from the bottom of the cistern; 5. Sediment from the side of the cistern. These specimens were examined on the 11th instant, and the examination of them has been most carefully repeated.

Obs. 18, 19, 20, 21, and 22,—were all made on water obtained for us by Mr. Hunt, one of the assistant-surgeons at the Westminster Cholera Hospital, from several parts of the district called Palmer's Village, which we have ourselves inspected. The names of the places are Goodman's Green, where the water used for all purposes is contained in a filthy open trough; Perrin's Place; a house (No. 3) in Perrin's Court, in which five cases of cholera (two fatal) had occurred; a house (No. 2) in Providence Row, where also there had been five cases (three fatal); and the Dispensary, Palmer's Village, at which two surgeons successively had been attacked with cholera, one fatally. Cholera had prevailed in all these localities, but not within a fortnight of the time when the water was taken for examination.

Obs. 23.—In a small house (No. 9) in Dorset Place, Vauxhall Road, three cases of cholera had occurred in succession; the first on the 5th instant, the second (fatal) on the 8th, and the third (also fatal) on the 12th. These cases were attended by Mr. Clark, of St. James's-terrace. On the 8th instant, just after the second case occurred, two specimens of water were, at our request, taken from the butt supplying the house,—one from the surface of the water, the other from the tap after the sediment had been stirred up; and both have been several times examined with the aid of the microscope.

Obs. 24.—On the 5th October a man labouring under cholera was admitted into University College Hospital. He had resided for some months at No. 4, Howland Street. A week previous to his attack he had changed his room to another in the same house,

where a woman had died of cholera seven weeks before. Water was taken from the kettle, and from a stone water jug in his room, as well as from a cistern which supplied the house. As he had dined in another house on the day previous to his attack, water was procured thence also. The deposits of these several specimens were likewise submitted to careful microscopic examination.

The uniform result of these experiments, as of the former series, was negative. No bodies were found which could be regarded as identical with the more characteristic of those discovered, by Messrs. Brittan and Swayne, in the rice-water dejections of Cholera. The objects met with were far more numerous than those seen in the moisture condensed from atmosphere. The sediment, when viewed with the 1-8th-inch object glass of Ross, or 1-16th-inch object glass of Powell and Lealand, presented, besides amorphous matter, an almost endless variety of organic forms, both animal and vegetable. Amongst these were many round or oval cells, of various dimensions, and some separate rings of minute size, colourless, and pellucid. The cells had generally very delicate walls and a clear cavity, were never flattened, and often contained a multitude of distinct granules, which, in some instances, presented the molecular motion. Like the rings, these cells were obviously different in their nature from the thick-edged disks, which the descriptions and drawings of Messrs. Brittan and Swayne and Dr. Budd had led us to regard as the characteristic corpuscles of the Cholera evacuations.

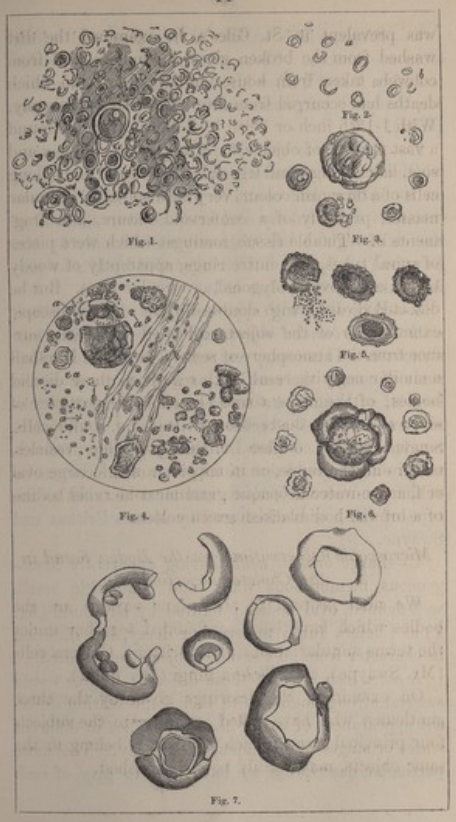
The negative results of our search in the atmosphere of infected places, for objects identical with those just referred to, are confirmed by some observations communicated to us by Mr. Marshall. While Cholera

was prevalent in St. Giles's, he examined the dirt washed from the broken glass of windows, and from cobwebs taken from houses in that district, in which deaths had occurred from four to ten days previously. With 1-12th inch or 1-8th inch object glass, he found a vast number of objects, such as particles of silex and soot, hairs, wings, and legs of insects, round and oblong cells of a brownish colour, very dark spherical granular masses, probably of a confervoid nature, and fragments of vegetable tissue, amongst which were pieces of spiral tubes, and entire rings, apparently of woody tissue, of an oval, polygonal, or circular form. But he detected no disks with double outline. A microscopic examination of the objects collected on a moist surface from the atmosphere of sewers, gave Mr. Marshall a similar negative result with regard to those discoid bodies; although he found (besides fine particles of silex and other dust) brown, oval, and round cells, single and in couplets, minute colourless vesicles, either single, double, or in triplets, a single large oval cell, and numerous opaque granular confervoid bodies, of a brownish or blackish green colour.

Microscopic Observations on the Bodies found in the Cholera Dejections.

We next proceed to show how various are the bodies which have been confounded together under the terms annular bodies (Mr. Brittan), Cholera cells (Mr. Swayne), and Cholera fungi (Dr. Budd).

On examining the drawings given by the three gentlemen who have called attention to the subject, four principal forms, which can hardly belong to the same objects, may readily be distinguished.



1.—*Rings*, which enclose a free area, and which often are broken. These are usually of minute size (see figs. 1 and 2 after Mr. Brittan, and fig. 4 *a* after Mr. Swayne), but, occasionally large (fig. 7 after Dr. Budd).

2.—*Globular or oval cells*, chiefly of the middle size, which have a thick wall with numerous small eminences on its surface, and contain a granular mass, in some instances separated by a clear space from the wall of the cells. These are distinctly figured only by Mr. Swayne (see fig. 5), but are regarded by him as perfectly developed Cholera cells.

3.—Bodies having apparently the form of *discs, with thick rounded edges*, and centres of indistinct structure. These vary extremely in size, including some of nearly the smallest, as well as many of the largest, of the objects represented by the three observers (see fig. 3 after Mr. Brittan, fig. 4 after Mr. Swayne, and fig. 6 after Dr. Budd). They predominate in all the representations given of the corpuscles of the rice-water dejections, and must be taken as the type of the bodies discovered by Messrs Brittan and Swayne.

4.—Large *broken cells*, having apparently homogeneous membranous walls, and containing small, well-defined, oval bodies ; figured by Dr. Budd (fig. 7) as Cholera fungi undergoing decay, but differing in character from all the other objects represented.

A mere inspection of these different figures would suggest strong doubts as to their representing different appearances of really identical bodies in different states or stages of development or decay. The more particular description we have now to give of each

kind of body, will demonstrate that they are of various and distinct nature.

1.—The rings, when closely examined, are seen to be of different kinds, some perfectly continuous in their entire circle, others formed by a curled fibre; some round, some oval, others lozenge-shaped. (See fig. 8.)* Some of these have been traced to their true source by Mr. Marshall, who has found that exactly similar objects may be prepared by the artificial digestion of the vegetables used as food: such as cabbages, potatoes and onions, the withered style of wheat grain, and portions of cane in sugar; the spiral and annular tissues of which, break down into rings of different sizes, or coils resembling rings. (Fig. 9.)

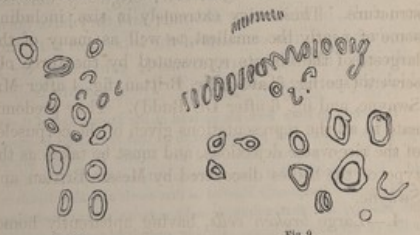


Fig. 8.
From Cholera.

Fig. 9.
Artificial.

Intermediate between these and the third class of bodies, are minute oval, or round, colourless corpuscles, which have an annular appearance; but, on close inspection, are seen to have their area filled up with a transparent substance, presenting, sometimes, perforations. (See figs. 10 and 11.) In some specimens

* All the figures are magnified from 360 to 400 diameters.

of the rice-water fluid, oval bodies, in part having

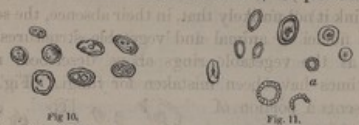


Fig 10. Fig. 11.

their middle filled up as here described, and, in part, mere rings, exist in extraordinary abundance. The rings of these bodies have been observed, by Mr. Busk and Dr. Griffiths, to be divided, by cross-lines, into segments, which Mr. Busk thinks are bead-shaped: an appearance which had occasionally been noticed by ourselves, as well as by Mr. Marshall. (See fig. 11.) They are calcareous structures, originally derived from chalk, in which they abound; and they have been introduced into the contents of the intestines with the medicines (chalk-mixture, aromatic confection, &c.) which the patients have taken.* These minute bodies

* It is right to state how we arrived at the knowledge of these facts. Dr. Griffith had pointed out to us that the bodies in question are heavy, polarize light, and are soluble in dilute nitric acid. He suspected that they were oxalate or phosphate of lime. Mr. Marshall subsequently shewed us that acetic acid also dissolves them readily, and that sulphuric acid acts on them, producing needles of sulphate of lime. Having ourselves found the same bodies in the evacuations of two patients suffering from typhoid fever, we were examining them in company with Dr. Griffith and Mr. Marshall, when the demonstration of their calcareous nature reminded us of the fact, that these patients had been taking medicine containing chalk, and, at the same time, brought to our recollection the remark made to one of us by Mr. Topping, that Mr. Brittan's "annular bodies" were to be found in chalk-mixture. Accordingly, we examined a portion of medicine containing aromatic confection, and, afterwards, a piece of common chalk, and, in both, found the bodies described above, though not the larger disks which are also found in the rice-water fluid. Ehrenberg

from the chalk are, of course, not found in all cases; and we think it not unlikely that, in their absence, the separated nuclei of animal and vegetable structures, as well as the vegetable rings above described, may sometimes have been mistaken for fungi. Fig. 12 represents a portion of mucus from the stomach of a Cholera patient, where the nuclei of epithelium are seen becoming freed from their surrounding cells, and assuming more and more of an annular appearance. Fig. 13 shews the green nucleated globules of a conferva, with some of the colourless nuclei free, and presenting a distinctly annular appearance, as they were seen in some drinking water from Dorset-Place (*Obs.* 23). The microscopic bodies from chalk are, however, the most striking in their characters, and, we believe, are those which have been chiefly regarded as representing the first stage of the Cholera fungi.

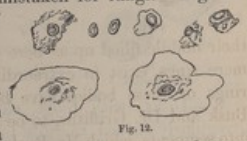


Fig. 12.

Fig. 13.

2.—The globular bodies have been clearly identified by Mr. Marshall with the spores of different kinds of Uredo, the rust, smut, and bunt of grain; some species of which may be found, not only about the withered style on grains of wheat, but also in almost every specimen of corn and bread.

Mr. Busk has made the same observation; and identifies them with the uredo segetum, or bunt. The fact is illustrated by the following figures, which may

figures these calcareous bodies, and describes them as being "crystalloids". Abh. d Akad. d. Wiss. z. Berl. 1838. p. 68.

be compared with the one copied from Mr. Swayne's paper. (See fig. 14, and fig. 15.)

Fig. 14.
From Cholera.

Fig. 15.
From Bread.

3.—Disks, with thick, elevated, and somewhat irregularly-curved margins; the central area flattened, and obscurely granular. They have generally a yellowish, or pale brown tint, which varies in depth with the colour of the fluid containing them. (Figs. 3, 4, and 6.) These are the most peculiar of the bodies found in Cholera, and differ from the rest in being more or less soluble in ether. Mr. Marshall, who first informed us of this fact, found that the smaller disks undergo nearly complete solution, leaving a cavity in the dried mucus (see fig. 16*a*), whilst the larger ones leave a fine granular film. They are apt to break across, and the thick margin to curl inwards. (Fig. 16*b*.)

Fig. 16.

They are evidently not cells, nor have they any organized structure which could give them any claim to be regarded as living organisms. On the other hand, their solubility in ether, shews that they consist, in great part, of some substance of the class to which the fats, resins, and saponaceous matters belong. This observation led Mr. Marshall to examine

different fatty substances, and at length to find that curled concretions, not unlike the disks found in cholera, could be obtained by compressing a piece of rich cheese (with or without the addition of ether) between two plates of glass. (See fig. 17.) We are not yet able to account for the origin of these peculiar discs. Mr. Busk regards the smaller ones as altered starch grains. It is, at all events, certain that they are not fungi; and, as we shall afterwards see, that they are not peculiar to cholera.

Fig. 17.

Mr. Busk thinks that the larger disks are the altered contents of bran-cells. Mr. Marshall, too, has, independently, made the observation, that certain yellowish bodies, sometimes seen, which have a thinner and narrower border than the fatty disks, and are merely rendered pellucid by ether, may, perhaps, be derived from bran. The granular masses contained in bran-cells have, however, when undigested, no distinct border. Fig. 18 represents their appearance when acted on merely by potash.

Fig. 18.

4. Under the fourth class of bodies, we refer to those represented by Dr. Budd (see fig. 7) as the cholera fungi undergoing decay and disintegration. They are evidently of a different nature from those figured by him as characteristic of the fresh cholera dejections. The mode of disintegration of the two classes of bodies is quite distinct: the so-called cholera bodies, after resisting the action of water for some

time, break up into irregular granular masses; whilst the decomposing bodies depicted by Dr. Budd, seem to be, in part, homogeneous, membranous cells dehiscing; and are, perhaps, starch cells. The rings are, most probably, parts of disintegrated vegetable tissue.

It is shown by Mr. Marshall, and had before been noticed by Boehm and others, that cells like fungi, or their spores, are occasionally found in the excretions in Cholera. These, however, have a more delicate structure than any of the bodies described as characteristic of Cholera, and are totally different from them. It is well known that various vegetable forms are apt to become developed in organic fluids generally.

From a review of the foregoing facts, it is obvious that various bodies found in cholera dejections have been confounded, and described as identical. It is also shewn, that many are traceable to an extraneous source, and that even the disks placed in our third division, are not fungi. The statement, that the bodies found in the cholera dejections present an endogenous multiplication, has, in all probability, arisen from confounding them with the uredo, or from mistaking the appearances produced by the small bodies seen through, or upon, the larger ones, or entangled in their substance.

We are unable to identify the rings obtained from the air and figured by Mr. Brittan with any of the bodies included by him under the term 'annular bodies'. Our own experiments have satisfied us that these bodies do not commonly exist in the atmosphere of

infected places, but the observations of Mr. Marshall, on the dirt collected from windows and cobwebs, shew the great variety of matters which must be wafted about in the air, in the form of dust, and which might, in different instances, be caught with the condensed moisture.

The bodies represented by Dr. Budd, as being found in impure drinking water, have the form of disks with thick edges. We have ourselves never seen such bodies in water. But, if it should be established that the contents of bran-cells sometimes assume that form, the occasional presence, in water, of bodies capable of being confounded with the disks derived from the discharges of Cholera, will not appear remarkable.

Had the bodies described by Messrs. Brittan and Swayne been proved by the foregoing investigations to be of fungoid nature, yet the facts we have now to add would have shewn that they have no necessary connection with Cholera. In the first place, they seem not to be constantly present in the discharges. It is, indeed, remarkable that, in those dejections which, from the absence of colour, have usually been regarded as the most characteristic of the disease, they are frequently absent. We have failed to find them in several instances. In one, a portion of every evacuation was set apart, and examined several times by each of us, and yet in no portion could we detect them.

A still more important fact, which, from the explanations already given might be anticipated, is, that all the more remarkable of the bodies which have been thought peculiar to Cholera, exist in the intes-

tinal evacuations of persons affected with other diseases. Dr. Jenner first demonstrated to us their presence, in great abundance, in the dejections of a patient affected with typhoid fever. We have since verified his observation in five other cases of this disease (see fig. 19). We have also satisfied ourselves of the existence of some of the forms in dejections apparently healthy, from two patients in Guy's Hospital, one suffering from bronchitis, the other from early cirrhosis of the liver; and Mr. Marshall has detected small annular bodies "in the mucus covering the healthy excrement" of several herbivorous animals. It is obvious that bodies derived from such various sources will not commonly be found all present together. This, indeed, is not the case in Cholera. The minute bodies, especially, which belong to chalk will, of course, very rarely be met with, except that substance has been taken as medicine.

Fig. 19.

We shall now briefly restate the principal results we have arrived at, and submit the conclusion which seems to us justified by them.

1. Bodies presenting the characteristic forms of the so-called Cholera fungi are not to be detected in the air, and, as far as our experiments have gone, not in the drinking water of infected places.

2. It is established that, under the term, "annular bodies," "Cholera cells," or "Cholera fungi," there

have been confounded many objects of various, and totally distinct, natures.

3. A large number of these have been traced to substances taken as food or medicine.

4. The origin of others is still doubtful, but these are clearly not fungi.

5. All the more remarkable forms are to be detected in the intestinal evacuations of persons labouring under diseases totally different in their nature from Cholera.

Lastly, we draw from these premises the general conclusion, that the bodies found and described by Messrs. Brittan and Swayne are not the cause of Cholera, and have no exclusive connexion with that disease;—in other words, that the whole theory of the disease which has recently been propounded, is erroneous as far as it is based on the existence of the bodies in question.

(Signed) William Baly, M.D. } *Cholera*
William W. Gull, M.D. } *Sub-Committee.*

Letter from Dr. W. Jenner, Assistant-Physician to University College Hospital.

Albany Street,
17*th October*, 1849.

My dear Sir,—On reading Messrs. Brittan and Swayne's papers, it appeared to me that the bodies they described as cholera fungi, bore a very close resemblance to objects I had long since observed in examining microscopically dejections passed by patients labouring under typhoid fever. That they were identical, whether of vegetable origin or otherwise, seemed to me the more probable because of a certain resemblance in the chemical constitution of the evacuations in the two diseases.

My colleague, Dr. Parkes, found, when analyzing, at the early part of the year, several dejections passed by patients suffering respectively from typhoid and typhus fevers, that while the latter were acid and contained no albumen, the former were alkaline and albuminous. Understanding that the microscopic vegetations which flourished in alkaline fluids are not to be found in acids, it struck me that such peculiarity in the nidus, suited for different vegetable growths, might account for Drs. Brittan and Swayne having failed to detect the "cholera fungi" (if these bodies are vegetable) in the stools passed by patients affected with typhus fever or bilious diarrhœa. Dr. O'Shaughnessy stated, in 1832, that he had tested the stools in 100 cases of bilious diarrhœa, and found them all acid, and without a single chemical character of cholera stools. Simon also says that in bilious diarrhœa they are acid. On examining microscopically four alkaline stools, passed at different stages of typhoid fever, I found in them bodies which appeared to me identical with those described and figured by the members of the Bristol committee.

The bodies I have observed consist of the ring with double outline, and others corresponding to the more developed forms of "cholera fungi", figured by Mr. Swayne. I have seen none of the most highly developed forms. Floating through the liquid part of one

dejection were numerous minute jointed threads. I may mention that the former bodies were found to exist most abundantly in the *pale* yellowish particles floating through the typhoid stools, some of which appeared almost entirely composed of them.

I am, my dear sir,
Yours faithfully,

Dr. Baly. W. Jenner.

Letter from John Marshall, Esq., Assistant-Surgeon to University College Hospital.

Mornington Crescent Place,
23*rd October*, 1849.

Gentlemen,—I beg to submit to your consideration the following results of an examination of the minute bodies which have been recently pointed out as existing in the evacuations of cholera patients.

1. In the *dejections* or in the contents of the intestines of cholera patients after death, I have, in the majority of instances, recognized all the forms of microscopic bodies described as being found therein, and represented by Messrs. Brittan and Swayne, and by Dr. W. Budd. These I have examined under high magnifying powers (using a one-eighth or a one-twelfth of an inch object glass), and have submitted them to various reagents. In order to obtain objects for comparison with these bodies, I have digested, with pepsin prepared from the sheep's stomach, the common articles of vegetable diet. Not one of the reagents which I have employed appears to have acted uniformly upon all the cholera bodies. Neither alcohol nor ether, when applied to the moist mucus in which they lie, produce much effect upon any of them; but when the mucus is spread out upon glass, and allowed to dry spontaneously, either of these agents, especially when pure, almost entirely dissolves the *substance* of a certain number of them.

a. The bodies thus acted on by ether, vary in size from the smallest up to those which are rather *under* the medium dimensions, and are plainly distinguishable from the particles of solid, and globules of liquid fat present with them. They have a bright, transparent, yellowish hue, resemble flattened discs in form, are cupped, or irregularly depressed in the centre, and have a more or

less distinct double outline. The smaller ones appear homogeneous in substance, and in them the faintly-marked inner line corresponds pretty accurately with the outer margin; but in the larger kinds, which are granular in the centre, the thickened border between the two lines is irregular in width, or seems as if it were formed by the union of two or more *curled* portions. These bodies are not acted on by iodine or chromic acid: they preserve well in thickish mucus, or in strong saline solutions; but in more watery dejections, in dilute aqueous solutions, or more readily on the addition of water, they slowly disintegrate and break up after the manner of fat. (See fig. 16 b.) When dissolved by ether, the smaller ones leave behind merely a space or mould in the dried mucus (See fig. 16 a.); but in the place of the larger ones, there is certainly an appearance of a thin film, within or upon which, besides some irregular granules, one or two of the smaller annular bodies which resist the action of ether may, though not constantly, be found.

The origin and meaning of these fatty (?) bodies is a subject for further inquiry. They may originate in the secretions of the digestive organs, or be produced from fat taken as food, or they may have some relation to the dextrine into which the starch grains are converted in the alimentary canal; for fat is known to appear under certain circumstances during the decomposition of saccharine solutions. That fatty substances may crystallize in somewhat similar forms to the bodies just described, may be shown by digesting sour cream or cheese in alkaline solutions or in ether,—or, as I afterwards found, much more simply, by compressing a small piece of rich cheese, moistened with ether, between two plates of glass,—when a multitude of minute *curled* concretions of fat (fig. 17) are seen under a high magnifying power, similar to, though of course not identical with, the class of Cholera bodies now under consideration.

Some of the bodies shown by Dr. Jenner to exist in typhoid dejections are of the same nature.

A large proportion of the Cholera bodies, however, of all sizes, but especially of the smallest kind, resist more or less the action of ether; and these, as well as the empty places or husks of such as are more or less dissolved by that menstruum, may be conveniently displayed and preserved, after the evaporation of the ether, in mastic varnish, covered with thin glass. The larger and smaller bodies not dissolved by the ether, may, I think, be referred to the following heads.

b. Numerous *yellowish* bodies *above* the medium size, having a round or oblong form, a hard outline, an irregular rim or border,

and a granular centre, which is either scarcely cupped, flat, or even slightly embossed. Iodine does not colour them; they decay in water; but after longer time than those previously described: in ether they become colourless and transparent, especially in the centre, crack in angular lines, and, in some cases, under slight blows, the rim appears to fall away in pieces and leave a central well-defined mass. One or more of the small annular bodies are frequently found lying upon them, and, occasionally, appear to be in them or beneath them; but I have never seen a *group* of smaller bodies within a larger one.

Having found cells of this kind abundant in the case of a patient who had eaten daily of walnuts previous to his attack, I digested artifically and examined portions of that fruit and its skin. Beneath the epidermic layer, are found polygonal cells containing a *coloured* granular matter, differing from those composing the oily substance of the nut. In the cabbage and onion, greenish and yellowish cells are found, also differing in their contents from those amongst which they lie; and, lastly, beneath the outer skin of the potatoe, and that of the grains of wheat and barley, *coloured* cells exist, perfectly distinct in character from those containing the starch granules. In the walnut, wheat, and barley, they are somewhat flattened, and have a fusiform, or polygonal, or even a roundish outline. (Fig. 18.) They resolutely resist artificial digestion. By maceration in liquor potassæ, and the subsequent addition of water (under the microscope), they swell, sometimes separate from each other, and become more or less rounded in outline. Those obtained in this way, from the softened cotyledon of wheat, are coloured *yellow* by the alkali, and display a pale central spot, which by prolonged maceration becomes larger, and pushes towards the margin of the cells, their granular contents: on bursting them, a thick, limpid, oily fluid escapes. Ether causes them to shrink. In size, colour, and form, they very much correspond with the larger cholera bodies just now described. A close imitation of the changes incident to digestion might establish their identity. Certainly, flat, yellowish, polygonal or fusiform bodies, resembling these cells unaltered, do exist in cholera and typhoid evacuations.

c. Another set of bodies, not nearly so numerous as the last, but also above the medium size, and having a rounded form, are cha-

racterized by their deep yellowish or brownish-red colour, their decidedly spherical shape, and their hard and finely indented outline, within which one or two other concentric and similarly indented lines may be traced. The surface of some is faintly marked with a polygonal tesselation; in others, which are usually larger, this is no longer recognizable. Water distends them; iodine gives them colour; and ether or alcohol greater definition. These are the spore cases of different species of uredo.

In artificially digested white and brown bread of the best quality I first found similar bodies; and subsequently in different samples of fine flour. (Fig. 15.) Four to six occur in as much flour as will lightly cover a sixpence; and in a cubic inch of bread consumed at my own table, as many as 150 must exist. Finally, in two separate specimens of wheat of this year's growth, I have found them entangled amongst the fine hairs surrounding the withered style and pistils,—in numbers, from one to eight upon a single grain,—though occasionally none could be detected. Usually, I have met with the orange-yellow spore cases of Uredo rubigo, or rust; more rarely, and only in bread, with the larger and darker sporidia of Uredo fœtida or smut balls, or of Uredo segetum or bunt.

Those found in cholera dejections (fig. 14.) appear to be often partly digested, being soft, pale, flattened out, and even emptied of their contents. In one typhoid evacuation they existed in great numbers and were only very slightly altered in appearance.

By far the most numerous of the so-called cholera bodies, are the small annular bodies, both oval and circular. Their great abundance, and variety of size, are well seen in specimens treated with ether, and put up in mastic varnish.

d. Some of these, whether oval or circular, which are not rings, but have an annular appearance, owing to their double outline (fig. 10), have, as was pointed out to me by Dr. Baly, all the characters of epithelium-nuclei from the alimentary canal, altered, or simply set free, by the digestion of their containing cells.

By artificial digestion I have succeeded in imitating the appearances of many, but not all, of these bodies, with their bright surrounding border, and their central substance and nucleoli.

e. Another set of the small annular bodies, *not so numerous* as those last described, consists of *true rings*, as may be determined by the fact of the inner bounding line being as dark as the outer

one. (Fig. 8.) In prepared specimens they are recognized by their oval and compressed form, homogeneous glassy character, and their dark outline. Sometimes the ring appears thicker, and at others, as if broken at some point. Frequently mere fragments are met with.

Exactly similar objects may be prepared by the artificial digestion of the vegetables used as food. The spiral tubes and annular tissue of plants, break down sometimes into simple entire rings, sometimes into portions of fibre, which coil up and show their overlapping ends only to a practised eye. From the cabbage and onion, from the cooked potato, where these tubes form part of every bud or eye, even from the withered style of the wheat grain, and from fragments of the cane in coarse sugars, spiral tissue, of various diameters, is met with, some of the tubes being not more than 1-4000th of an inch in diameter. (See fig. 9.) The inner rims of the stomata of plants, and the margins of flattened cells, may also furnish rings of various size and form.

Furthermore, in the mucus covering the healthy excrement of the goat, rabbit, and guinea pig, I have found similar rings of vegetable tissue.

f. There still remains a series of minute bodies, some oval and others circular, which have an annular appearance, but which, owing to their extreme precision of form and smoothness of outline, are not referrible to either of the kinds yet described. Some, which are oval, appear like minute clear cells, or like the remains of such cells ruptured. Very small circular bodies have the same characters. Probably these are really the spores of fungi, or are cellular fungi introduced with the food or drink, and only imperfectly digested. The cells of the yeast plant are to be found in moistened bread. As we have already seen, smut balls are actually introduced into the digestive organs with bread; and, in examining the hairy tufts on grains of wheat, I found the spores of *two* other fungi,—one, rare, the other in larger numbers. On the skin of the walnut I found no less than *four* different fungi, with their sporules; and others in digested cabbage. Minute vegetable cells also exist in water. Where the digestive process is nearly arrested, as in Cholera, the remnants of these fine cellular bodies might appear in the dejections.

g. Certain circular rings, with a bead-like appearance, also seem to me to be peculiar. (Fig. 11.)

h. Lastly, I have occasionally seen in the rice-water fluid and its sediment, colourless, transparent vesicles, varying from 1-3000th to 1-1000th of an inch in diameter, and presenting, when focused at their middle, a brilliant, but very fine, double outline. They are destroyed by desiccation, and, after a few days, disappear from the fluid which at first contains them. They are distinct from any of the bodies previously noticed, but resemble some which I have seen in the fresh urine passed after the stage of collapse.

In conclusion, I may state that, whatever be the nature and meaning of the bodies described in section *f*, which are probably introduced from without; and of those in section *h*, which perhaps are formed as the accompaniments of a particular state of the fluid in which they are contained, I can trace no specific relations between these and any other series of the Cholera bodies; nor does there at present appear to me to be satisfactory evidence of the existence of any living organism, animal or fungoid, actively developing itself, and multiplying in the interior of the alimentary canal, in cases of malignant Cholera.

The foregoing observations apply entirely to the objects seen in the intestinal discharges. My examination of the matters vomited, in four instances, has led to merely negative results.

In five cases, in which both serum and clot of the blood were examined, no annular bodies of any kind were found.

I have the honour to be
Your obedient servant,
JOHN MARSHALL.

To the Cholera Committee
of the College of Physicians.

Postscript.—In a case of typhoid fever and Pneumonia, I find in the bile contained in the full bladder, three days after death, small, roundish, fatty masses, having a bright rim and double outline; the largest having, moreover, a curled margin. The observation affords additional evidence of the proneness of fat to assume such form, and suggests the possibility of the bile being concerned in the formation of the "bodies" described in Section *a* of this letter.

I. M.—October 29th.

London: Richards, Printer, 100, St. Martin's Lane.

ON THE

INTESTINAL DISCHARGES

IN

CHOLERA.

BY

E. A. PARKES, M.D.

ASSISTANT-PHYSICIAN TO UNIVERSITY COLLEGE HOSPITAL.

(From the London Journal of Medicine.)

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1849.

ON THE INTESTINAL DISCHARGES IN CHOLERA.

By E. A. PARKES, M.D., Assistant-Physician to University College Hospital.

THE chemical and microscopic examinations of the discharges from the alimentary mucous membrane, present certain difficulties, and are liable to certain fallacies, which do not occur in the investigation of the constitution of the urine. Whatever abnormal ingredients may exist in the urine, must have been derived from the blood, and have passed, with more or less change imposed upon them, through the secreting textures of the kidney or bladder. But the excretion from the intestinal mucous membrane is, in health, mixed with a mass of extraneous matter, such as the debris of food, the excrementitious portions of certain secretions, etc.; and, in disease, with the abnormal discharges induced by medicines, or even with the medicines themselves. In the case of severe Cholera, however, many of these possible difficulties and errors are avoided. The fæculent contents of the intestines are, at an early period of the disease, expelled; no solid food is taken, or, if taken, is ever tolerated by the stomach; the bile, and probably the pancreatic fluid, is retained; and there is no fear of urine mixing with the stools, for the kidneys are inactive. The Cholera dejections are therefore the products of the mucous membrane alone, with the possible addition of certain medicines, or of fluids, which, having remained on the stomach, and then passed into the intestines, have been discharged nearly unaltered.[1] In the following observations, I believe even these sources of error have been guarded against. In most of the cases I was aware of the treatment which had been employed; and if any fluid that I obtained, was found to contain an obviously extraneous and foreign ingredient, I did not make use of it.

The stools in Cholera, it need hardly be said, consist of two very distinct portions: of a colourless fluid, which is turbid, or, more usually, nearly clear, or perfectly transparent; and of a sediment, which is white, and of different physical characters, according to the period of the case. In several cases I have made analyses of the fluid, and have also made, or caused to be made, microscopic examinations of the sediment. In the following paper I shall first detail the chemical analyses of the supernatant fluid; and subsequently, the microscopic appearances of the cholera-masses in the same cases.

I. CHEMICAL EXAMINATION OF THE FLUID.

Two of these analyses were made by Dr. Garrod, the remainder by myself. I have shortened all details as much as possible; and have not included negative experiments, unless of an important kind. Although it has not been possible to analyze, as I desired, all the stools passed during the course of a single case, it will be seen that my observations embrace all periods of the illness in different cases, and indicate, with tolerable accuracy, the probable course of events in individual patients.

[1] This seems to be the case with milk, which often is not rejected by the stomach, and then passes through the bowels so unchanged as not only to give the stool a milky appearance, and to present under the microscope multitudes of oil globules, but actually, after standing for some time, to form a kind of cream.

Observation 1. *First or second true rice-water stool of the algide stage, from a middle-aged man, who subsequently died.* Analyzed by Dr. Garrod.—The stool separated into two parts, on standing: *specific gravity* of the entire fluid, 1009.16 at 56° Fahr.; *specific gravity* of the clear fluid, 1009.40 at 53° Fahr.; or if the temperature be taken into account, about 1009.0; *reaction*, slightly alkaline, but well marked; *odour* peculiar, slightly fæculent.

Heated with a small quantity of *nitric acid*, the fluid acquired a pink tint, and a precipitate fell; a peculiar odour was developed;[1] there was no effervescence. Strong nitric acid destroyed the pink tint. The alcoholic extract gave the tint with nitric acid; showing, in this way also, that it could not be dependent on uric acid. On drying the watery extract, however, and exposing it to the vapour of ammonia, a pink colour again became evident, most probably from the formation of murexide. No urea could be detected. With *hydrochloric acid*, the purple tint, from the presence of a protein compound, was produced. *Acetic acid* gave a slight precipitate. There was none of the organic principle of the bile.

Composition.—Water		985·35
Solids		14·65
		1000·00
Albumen	2·40	
Other undetermined matters, including principle coloured by nitric acid, trace of uric acid, etc.	1·27	
Salts, phosphates, and chlorides,—the latter in excess	10·98	
	14·65	

Dr. Garrod remarks, that "the ash has nearly the same composition as that of the serum of the blood, the chlorides being greater in amount than the phosphates."

Observation 2.—*Stool passed by a man aged about* 50, *thirteen hours after the commencement of the attack, and six before death. Algide symptoms intense.*—The stool separated, on standing, into two parts. The supernatant fluid was perfectly watery and limpid, passing readily through fine filtering paper. *Reaction*, markedly alkaline; *odour*, peculiar, and faint,—perhaps slightly fæculent; *specific gravity*, 1009.5, at 49° Fahr.

The liquid became hazy by heat, and the peculiar odour was rendered more intense. A drop of *nitric acid* increased the turbidity; a few more drops considerably increased it, and produced a very faint, but decided violet, tint; a further addition of acid destroyed this colour, and gave a light yellow tinge. A tolerably copious precipitate fell. When acidulated with *acetic acid*, the yellow prussiate of potash, and the bichloride of mercury, both gave precipitates. The ash of the fluid was perfectly white; it effervesced with nitric acid; the solution of the salts was strongly alkaline. There was no urea, nor uric acid, in the fluid.

[1] Dr. Garrod compared this odour to that of butyric acid.

Composition.—Water		989·13
Solids		10·87
		1000·00
Coagulable organic matter,—probably albumen		1·18
Incoagulable organic matter, and a little phosphate of lime		0·55
Soluble Salts, viz.: Chlorides of sodium and potassium	5·188	
——— ——— Phosphate of soda	1·059	
Other soluble salts, of which sulphate and carbonate of soda formed a part	2·803	
		9·14
		10·87

Observation 3.—*Last stool passed by a woman, aged* 28, *in the deep algide stage, six hours before death; cramps had been severe, but had nearly ceased.*—The whole stool was only ʒx in quantity. It separated into two parts: the fluid part was perfectly clear and watery. It was filtered through fine paper. *Reaction*, alkaline; *odour*, peculiar,—not at all fæculent; the *specific gravity* was not taken.

Boiling produced no change of colour. A drop of *nitric acid* produced a little decided effervescence; but no violet tint. A few more drops gave a flocculent precipitate; but there was no change of colour. A very peculiar odour was given off; and a gas was evidently disengaged, as it was now difficult to boil the liquid, on account of its occasional violent ebullition. The odour was certainly different from that of butyric acid, with which it was at the time compared. It was less sharp, and had more of a burnt odour. By adding nitric acid in excess, and boiling for some time, the odour disappeared, and the precipitate more completely separated itself. There was no uric acid. The ash of the fluid effervesced with nitric acid.

Composition.—Water		990·294
Solids		9·706
		1000·000
Organic matter (of which a large portion was albumen) and insoluble salts		2·186
Soluble salts, viz.: Chlorides, phosphates, and sulphates		7·520
		9·706

Observation 4.—*One of the last stools passed by a middle-aged man, in the deep algide stage, who subsequently died.* It had the usual physical appearance, and was alkaline.

Dr. Garrod was kind enough to examine it very carefully for urea, and uric acid, but could not detect the presence of either. The organic compound which gives the red or violet tint with heat, and nitric acid, was also absent. The stool contained, as usual, salts, and coagulable organic matter, but the quantities of these were not determined.

Observation 5.—*Either the 6th or 7th stool passed by a woman, aged* 23. *There were severe cramps at the time. The algide symptoms were well marked, but the patient ultimately recovered.*—The stool consisted of two parts, as usual. The fluid was thin, watery, and colourless, but not perfectly transparent. It was not filtered, but drawn off with a pipette.

Reaction, strongly alkaline; *odour*, peculiar, and very slightly fæculent; *specific gravity*, 1008.3, at 66° Fah.

With *heat*, a slight haziness occurred. A very small quantity of *nitric acid* added to the hot fluid, gave a very beautiful violet tint, which boiling for several minutes did not destroy. The addition of more nitric acid at once destroyed it, and the liquid assumed a slightly yellow tinge; a flocculent precipitate fell. The peculiar odour was given out as usual. The ash, but not the fluid, effervesced with nitric acid.

Composition.—Water		989·17
Solids		10·83
		1000·00
Coagulable organic matter	0·27	
Incoagulable organic matter and insoluble salts	2·23	
Soluble Salts, viz.: Chloride of sodium	4·013	
——— ——— ——— potassium	0·791	
——— ——— ——— phosphate of soda	0·326	
——— ——— ——— sulphate of soda	0·487	
Other soluble salts	2·713	
	8·33	
	10·83	

Observation 6. *A stool passed by a girl, aged* 11, *who had been much purged, and had vomited, and had had severe cramps. At the time she passed this stool, the pulse was imperceptible, or nearly so; the eyes were sunken, the surface was very cold, but there was comparatively little cyanotic tinge of the skin, and respiration was easy; six hours afterwards, reaction commenced, and she recovered.*

The fluid was thin, colourless, and slightly opaque; it was filtered through coarse paper.

Reaction, faintly alkaline; *odour*, peculiar, not at all fæculent; *specific gravity*, 1005.8 at 65° Fah. By heat the fluid became hazy. It was not treated with nitric acid. The ash effervesced with nitric acid.

Composition.—Water		991·053
Solids		8·947
		1000·000
Organic matter, of which an undetermined quantity was albumen	3·12	
Soluble Salts, viz.: Chlorides, phosphates, sulphates, carbonates	5·827	
	8·947	

Observation 7. *The last stool passed by a boy, aged* 10, *seven hours before death. There had been from eight to twelve previous stools during the illness. The algide symptoms were intense, but there were no cramps at any time.*[1]—The stool measured ʒxij—it was like gruel; there was a very incomplete separation of the flaky substance from the fluid, until gentle heat was applied, when the flaky substance fell, and left a perfectly clear and limpid supernatant fluid. It was deemed advisable to estimate the solids without separating the suspended solid matter.

Reaction, alkaline; *specific gravity*, 1010.27, at 52° Fah. The fluid would not pass through the coarsest filtering paper, and very slowly through muslin.

Nitric acid and heat produced a yellowish or fawn colour, there was no red tint; the peculiar odour, rather sharper than usual, was given

[1] Cramps are often absent in children; but in boys of this age they are generally present.

out. When the flaky substance was separated, the thin fluid gave a flocculent precipitate with nitric acid. The residue had a brownish colour. The phosphate of lime was in unusual quantity, and may have been derived from the unseparated flaky substance which caused the quantity of organic matter to appear large.

Composition.—Water		982·68
Solids		17·32
		1000·00
Organic matter, a portion of which was albumen	8·962	
Soluble Salts: Chlorides, phosphates, sulphates	7·258	
Phosphate of lime	1·100	
	17·320	

Observation 8. *A stool passed by a boy, aged ten, who had presented all the algide symptoms in moderate intensity. Reaction was just commencing, and in a few hours afterwards, consecutive fever was fully established.*[1]

The stool did not separate readily into two portions; when it did so, the supernatant fluid was subalbid, and turbid. The liquid was strained.

Reaction, alkaline; *odour*, peculiar, not at all fæculent; *specific gravity*, 1014, at 56° Fah.

The fluid, when heated, gave out a peculiar odour. *Nitric acid*, in small quantity, produced a yellowish tint, and a more peculiar and characteristic odour was evolved, but not so well marked as in some of the stools. An excess of nitric acid was added, and the liquid was kept boiling for six hours, when a distinct, but very small, precipitate fell, which was in too small a quantity to weigh.

Composition.—Water			972·82
Solids			27·18
			1000·00
Organic matter, of which only a small portion was albumen, and insol. salts			20·84
Soluble Salts, viz.: Chlorides of sodium and potassium	2·938		
——— Phosphate of soda	1·8		
——— Sulphate of soda	·3951		
Other soluble salts, including carbonates	1·2069		
		6·34	
		27·18	

Observation 9. *A well marked case in a woman, aged* 27*; the symptoms were, however, mild, though very characteristic; she ultimately recovered. First stool during the period of reaction which had a fæculent smell; at the time it was passed, the woman still presented many of the algide symptoms, though the pulse was stronger, and the surface and breath were regaining warmth.*

The stool was of a yellowish-white, or subalbid colour, and separated into two portions on standing; the upper portion was whitish-yellow,

[1] This patient did not pass urine for fifty-three hours; he then passed about ten ounces of clear yellow urine; after standing for twenty four hours, there was no sediment. The specific gravity was 1.016, at a temperature of 56°. By heat and nitric acid the fluid acquired a light red tinge, and about one third of its bulk of albumen was thrown down. Evaporated to one-sixth, and treated with nitric acid, it exhibited, after twenty four hours, no nitrate of urea. It was not tested with Pettenkófer's test for choleic acid.

thick, and turbid; the sediment was greenish-yellow, granular and dense, and with a decided fæculent smell.[1]

Fluid filtered through coarse paper. *Reaction*, faintly alkaline: *specific gravity*, 1008.91, Temp. 55° Fah.

When boiled for ten minutes, the colour changed and became of a light red, or fawn tint—the liquid continued alkaline—a peculiar odour was given out, which was not fæculent—there was no ammonia evolved. A few drops of nitric acid added to the hot liquid, gave a dark red, or brown colour; a copious precipitate fell, and the usual odour was given out. After boiling for an hour and a half, the red colour was unchanged. An excess of nitric acid, however, at once destroyed the colour, and the liquid became of a light yellow tint. It appeared as if a portion of the precipitate was re-dissolved. The ash effervesced with nitric acid; the solution of the salts was strongly alkaline.

Hydrochloric acid, boiled with the liquid, gave a slight, but very distinct purple tinge, and a precipitate fell; a great excess of acid neither destroyed the colour, nor re-dissolved the precipitate. Sulphuric acid gave a reddish tint, and a flocculent precipitate. Uric acid was not tested for; but after some days keeping, the fluid had acquired a smell very much like stale urine.

Composition.—Water			983·38
Solids			16·62
			1000·00
Congulable organic matter not redissolved by excess of nitric acid	1·48		
Incoagulable organic matters	6·055		
Soluble and insoluble salts, the former consisting of chlorides, phosphates, sulphates, and carbonates	9·085		
		16·62	

Observation 10. *A boy, aged* 15*, attacked with Cholera. Subsequent reaction and febrile symptoms; then recurrence of rice water purging. The stool was taken at this time. Ultimate recovery.*

The stool separated into two parts by rest. The fluid part was watery, but turbid, and of a very light brown colour; it had no fæculent smell. The sediment was greyish-white, and was divided into two strata; the upper whiter, more flocculent, and less granular, than the lower. The fluid portion was filtered through coarse paper.

Reaction, markedly alkaline; *specific gravity*, 1017.83, at 45° Fah.

Heated with *nitric acid*, it effervesced slightly; a red tinge appeared, which became very much deeper after a few minutes boiling. An ex-

[1] This woman passed urine, for the first time, thirteen hours after the fair commencement of reaction. It was about five ounces in quantity, faintly acid, and of a yellow colour. Specific gravity, 1.018. It was highly albuminous, and threw down, with heat and nitric acid, a copious precipitate, which occupied nearly one-half of the bulk of the fluid. At the same time a very deep red colour was struck by the acid, exceedingly like the colour given by nitric acid to the stool in typhoid fever, only not quite so dark. A portion evaporated to an eighth of its bulk, and nitric acid added, gave no crystals of nitrate of urea after thirty-six hours standing.

A white flocculent precipitate subsided from this urine after a few hours standing. As I had not time to examine this, my friend, Mr. Clover, examined it, and found the following objects:—

1. Scaly and columnar epithelium.
2. Corpuscles like mucous or exudation corpuscles.
3. Vibriones.
4. Pus corpuscles?

There were no crystalline objects.

cess of nitric acid being added, and the boiling continued, the colour was partially, but not entirely destroyed. A tolerably copious precipitate fell. Uric acid was not detected.

Composition.—Water		981·79
Solids		18·21
		1000·00
Organic matter coagulated by heat and nitric acid, albumen (?)	·855	
Incoagulable organic matter and salts . . .	17·355	
	18·210	

Owing to an accident, the soluble salts were lost after they had been dissolved out from the incinerated mass, and were being evaporated to be weighed. They appeared to be in their usual quantity, and assuming this to be 8 parts in 1000, it leaves 9.355 for the incoagulable organic matter.

Observation 11.—*A middle-aged man, after rallying from the cold stage of well-marked Cholera, continued to suffer from diarrhœa. Seven days after reaction, he had a return of what was considered rice water purging. He ultimately recovered.*

The fluid separated into two portions; the sediment was white and flocculent.

Reaction, faintly alkaline; smell peculiar, not at all fæculent; there was not sufficient fluid to take the specific gravity. Heat and nitric acid gave no violet, or red colour, nor at first was there any precipitate; but after some time, a small flocculent precipitate appeared. The peculiar odour of cholera stools was given out.

Composition.—Water		991·53
Solids		8·47
		1000·00
Incoagulable and coagulable organic matter (the latter in small quantity) and insoluble salts	4·589	
Soluble salts	3.881	
	8·470	

Observation 12.—*Fluid taken from the small intestines after death.* After filtration, it was distinctly alkaline; it coagulated by heat alone, and also by heat and nitric acid, which produced no red colour. It contained chlorides and phosphates in abundance. After some days, crystals of triple phosphate formed in it.

Observation 13.—My friend, Mr. J. E. D. Rodgers, has been kind enough to furnish me with the following account of his examination of a specimen of *intestinal fluid taken after death.*

The fluid was alkaline before evaporation, but after this process it yielded a strongly acid solution.[1] After incineration, the ash yielded a strongly alkaline solution, which contained carbonates. "Analysis indicated an immense quantity of alkaline chlorides, alkaline and earthy phosphates, and albumen."

In addition to the analyses given above, I have examined several other cases, and have always found, that the thin fluid was alkaline,

[1] Mr. Rodgers suspected this acid to be the butyric, but was not quite certain on that point.

and contained an abundance of alkaline chlorides, phosphates, and sulphates, and a certain proportion of albumen. In one or two cases, there has been a trace of iron, possibly from the presence of blood particles, which form an occasional, but very infrequent, constituent of the Cholera stools.

These observations correspond with those of O'Shaughnessy,[1] Vogel, Wittstock,[2] Buchanan,[3] and many others, made during the epidemic of 1832. I shall now proceed to draw such inferences as may safely be done from so small a number of cases.

1. There is no doubt that it is incorrect to speak of the Cholera fluid as the serum of the blood; the fluid is derived from the serum, but is not composed of all its ingredients; it consists of its water, and of its salts, with a very small proportion of its organic elements. If other organic elements of the serum are poured out, they do not remain fluid. The ash effervesces like the ash of the serum, with nitric acid.

2. The Cholera fluid, in its purest form, consists of little else than water, salts, and coagulable organic matter, which is probably albumen. The incoagulable organic matter, or extractive, which is probably an excretion from the intestinal mucous membrane, is reduced to its lowest proportion, (in one case, only .55 in 1000 parts), and possibly, in some cases, may be altogether absent.

3. This soluble incoagulable organic matter, or extractive, which exists in great quantity in healthy fæces, soon disappears from the cholera fluid. It appears to be restored when reaction commences. It raises the specific gravity of the fluid and the proportion of the solids in 1000 parts.

The following observation proves its existence in the mildest form of Cholera, or what may be called, as the algide symptoms were not present, choleroid diarrhœa:[4]—

Observation 14.—*Stool from a middle-aged woman, who had had serous diarrhœa for two or three days. Vomiting then came on; twelve hours after its commencement, she had cramps in the extremities.* The stool was passed a few hours after the commencement of cramps; at this time there was languor, and the pulse was weak; but there were no other signs of collapse; the skin was warm, and the eyes were not sunken; she speedily recovered. Cholera was ravaging the neighbourhood; and a daughter of this woman was at the time labouring under its developed form.

The stool separated, as usual, into a fluid and sediment.

The fluid was slightly brownish in tint, and semitransparent; the sediment was brownish and flocculent.

Reaction, distinctly but not strongly alkaline. *Odour* peculiar, not at all fæculent. There was not enough to take the specific gravity.

No effect was produced by heat. A small quantity of nitric acid did

[1] Report on the Chemical Pathology of the Malignant Cholera. Highley, London, 1832.
[2] Simon's Chemistry by Dr. Day, vol. ii, p. 382, and Hoefle, Chemie und Mikroscop am Krankenbette. Erlangen, 1848, pp. 87-8.
[3] Observations on the Malignant Cholera, 1832, p. 11.
[4] In another less advanced case of premonitory diarrhœa, the extractive was 3·846, the albumen ·466, the phosphate of lime ·348, and the soluble salts as much as 9·04, in the 1000 parts. The sediment was white and flocculent; and was found, under the microscope, to consist entirely of undigested food, chiefly vegetables.

not produce any red or violet tinge; an excess gave a slight yellow tinge, and a precipitate, which had previously formed, separated itself completely. An odour similar to that from other cholera stools was at the same time evolved. The solution of the salts was strongly alkaline.

Composition.—Water		986·9
Solids		13·1
		1000·0
Coagulable organic matter, albumen	0·29	
Incoagulable organic matter and insoluble salts	6·82	
Soluble salts, viz.: Chlorides, Phosphates, Sulphates	5·99	
	13·10	

The following tabular view, from which the seventh Observation is excluded, will show more conspicuously the relation of the extractive matter, as well as of the albumen and salts, to the cholera fluid:—

Period of disease in which the stool was passed.	Specific gravity.	Albumen in 1000 parts.	Extractive in 1000 parts.	Sol. salts in 1000 parts.	Total of solids in 1000 parts
Diarrhœal period	1012·9	0·466	3·846	9·04	13·9
Diarrhœal period	—	0·29	6·82	5·99	13·1
Early algide stage	1009	2·4	1·27	10·98	14·65
Developed & intense algide stage	1009·5	1·18	0·55	9·14	10·87
Developed & intense algide stage	—	2·186		7·52	9·706
Developed and moderate ditto	1008·3	0·27	2·23	8·33	10·83
Developed and moderate ditto	1005·8	2·2		5·827	8·947
Commencement of reaction	1014·0	20·84		6·34	27·18
Commencement of reaction	1008·91	1·48	6·055	9·085	16·62
Relapse	1017·83	0·855	17·355		18·21
Relapse	—	not weighable	4·589	3·881	8·47

4. Although the extractive is thus affected by the intensity of the disease, it does not appear that the salts and albumen are equally so. The analyses are too few to allow me to speak with certainty; but it seems probable that, both in the premonitory period, and in the stage immediately following the algide period, when the pulse is again felt and warmth is returning to the surface, the proportion of effused salts and perhaps of the albumen, may be as great in any particular stool as in the depth of the algide stage. The number of stools, of course, differs in the respective periods.

5. The albumen and the salts do not seem to bear a very constant proportion to each other; but the salts hardly ever seem to be thrown out, without carrying with them a portion of albumen, however small.[1]

[1] In the liquid stools of typhoid fever (by which term I mean the disease described by Louis), the quantity of albumen in solution, is, as in Cholera, very small; and is never found unless soluble salts, similar to those of the blood-serum, are also present. In one case it was 0·63, while the soluble salts were 7·24, in 1000 parts. In a second case it was 0·457, and the salts were 5·164, in 1000 parts. It would even appear as if some portion of the albumen of the serum were so much more intimately combined with the salts than the remaining larger mass, that it is alone effused when the salts are poured out.

The greatest amount of the albumen is very trifling; and I have never seen any other case in which, from the bulk of the precipitate, I was led to infer that it very greatly exceeded in amount the quantity stated in the above analyses.

6. Boehm remarks,[1] that the discharges probably do not all come from the mucous membrane; but that some of the fluid may be derived from the immense quantity of water drank by the patient. This may be the case sometimes, but there is no indication of such a dilution in the above analyses; the proportion between the salts and the water is tolerably well preserved, and renders it likely that these constituents were both derived from the same source.

7. As in the deep algide stage the excretion of the extractive is arrested, so also, in great measure, is that of the earthy phosphates, which are thrown out so largely by the healthy intestinal surface. In some cases there has hardly been a trace of the phosphate of lime; in others this has existed in diminished quantity. In no case has it nearly equalled the healthy standard, or approached to the excessive increase which occurs in the stools of typhoid fever. In the cholera stools, the crystals of triple phosphate, although sometimes seen, are infrequent.

8. Nitric acid does not, as Simon supposed, produce any change of colour in the true cholera fluid. When the violet tint does occur, the stool has generally a fæculent smell. The colour is clearly not owing to uric acid, for it is destroyed by an excess of nitric acid, though not, in my experiments, by boiling. Moreover, as Dr. Garrod pointed out, it must be owing to an organic substance soluble in alcohol. It is then either to be attributed to the presence of bile, or to some substance excreted by the intestinal mucous membrane. There is no evidence of bile beyond this colour, and as there is a remarkable retention of this product in cholera, as in dysentery, I am disposed to think the last supposition the most probable one. The same organic matter, if I may speak from the similarity of the remarkable tint produced by the acid, was passing off by the urine in one of the cases of reaction. As uric acid appears to be usually excreted in very small quantity in the first urine passed after cholera,[2] the colour was probably not attributable to it, and it was indeed dissimilar in shade.[3]

[1] Die Kranke Darmschleimhaut in der Asiatischen Cholera, etc., von Dr. Ludwig Boehm. Berlin, 1838, p. 15.

[2] Dr. Letheby has lately made two analyses of urine passed during reaction, in which the proportion both of urea and uric acid is low, while that of extractive (kreatine, kreatinine, and other organic matters) is very high.—(*Medical Gazette* for December.)

[3] The same colour, only of a very much deeper shade, is given by the fluid part of the stools in the "fièvre typhoïde," and I have also seen it several times in the urine of persons labouring under obscure affections of the digestive organs, not connected, as far as I could make out, with the liver. It is important to remember, as bearing on the question of the nature of fever consecutive to Cholera, that urea and uric acid and kreatine are not the only excretions which may be retained in the blood; it is very possible that the peculiar organic compounds, usually excreted by the intestinal mucous membrane, may be also retained, in consequence of the deep injury this membrane has undergone. In other diseases, I have been led to infer, although it is exceedingly difficult to prove the supposition, that the interruption to the secreting function of the intestinal mucous membrane produces serious disorders in other organs, which may be connected with it in function, or may be called upon to supply the deficiency. I have formerly argued that certain diseases of the liver, of the pan-

9. Although the inference of Wittstock, drawn from the colour given by nitric acid, that the cholera fluid contained uric acid, is erroneous, because the colour cannot be always obtained, and when obtained, cannot be owing to uric acid, it appears, from Dr. Garrod's first analysis, that a trace of this acid may exist, as it does in healthy serum; Dr. Garrod, in his second analysis, could not detect any, and I have carefully looked for it without success.

10. In many cases, Pettenkófer's test for the organic principle of bile has been used, but no trace of this substance has been found.

II. MICROSCOPIC EXAMINATION OF THE SEDIMENT IN THE STOOLS, THE SO-CALLED "CHOLERA MASSES."

Many stools receive the name of "rice-water", which have no claim to this appellation. The sediment in the true rice-water stool is perfectly white, in flocks or little shreds, and is exceedingly light. Sometimes, the entire stool seems not to have a greater specific gravity than the fluid separated from the sediment. This lightness may be illustrated by the following fact:—The whole flocculent substance from a stool which measured more than a pint in quantity, and which was well washed and dried, in order that it might be submitted to ultimate analysis, weighed only four grains.

The most accurate microscopic examination of the cholera masses are those made by Boehm in 1832, and described and figured in the work to which I have already referred. His descriptions, however, apply almost entirely to the fluid contained in the intestines after death, and he does not seem to have bestowed equal attention on the sediments of the stools. As the proper comprehension of Boehm's admirable researches is essential to the discussion on this subject, I shall, as briefly as clearness will permit, detail his opinions.

In the first chapter, Boehm describes minutely the changes in the epithelium of the intestinal mucous membrane in Cholera. In the second chapter, he describes the microscopic character of the cholera masses. After saying that, in all languages of Asia and Europe, the epithets flocculent, creamy, like groats-broth, like rice-water, etc., have been applied to the intestinal fluid, he goes on to say that the various products, however different to the naked eye, described under these terms, may be all referred to changes in the epithelial coat. The thin fluid, however, he decides to be undoubtedly a secretion from the blood, which is poured in large quantity through the diseased intestinal membrane. The varieties of the intestinal contents depend on the varying proportions of this secretion and the cast-off epithelial particles, and on changes in the latter. He then enumerates the several varieties. The fluid was like *milk* when the quantity of secretion was great, and the epithelial particles were all separated from each other; it was *purulent* or *creamy* when the epithelium, separated into its finest elements, was scantily diluted with the secretion; it was *flocculent* when, with a profuse secretion, the epithelial particles were not separated, but cohered together, and under the microscope presented flat lamellæ if they came from the smooth mucous coat, or crooked cylinder-like masses, or tubes, domes, or glove-like cases, according as, more or less perfectly cohering, they were shed from the apices, bases, or entire surfaces of the villi, or from the interior of the follicles; it was like *rice-water* when the flocculi, in smaller quantity, swam in a slightly turbid secretion; it was like *oatmeal-broth*, when the larger epithelium masses were of various colours, white or greyish green, mixed intimately with each other, assuming, from the scanty secretion mixed with them, a pulpy consistence. When the cholera masses were adherent, this was owing to the partial separation of large patches of epithelium, the further mixing of which with the general contents of the intestine was prevented by death. Boehm then goes on to describe the *mucous* intestinal contents (which, he says, are rare as long as Cholera is acute), the *bilious* contents seen at the end of the slighter cases, and the *bloody* contents seen in some of the severest cases. With these last observations I shall not concern myself at present. Boehm makes one very important observation, viz., that while in the severest cases of Cholera epithelial particles, in immense quantities and with the sharpest outlines, are found on the iliac side of the ilio-colic valve, on the other side of the valve their number at once diminishes in an extraordinary manner, and sometimes they are not seen at all. He accounts for this by supposing that the epithelial coat of the small intestine is soluble in the fluid poured into the large intestine. He says also, that he yet seldomer found pyramidal epithelium particles in the discharges, although there was a quantity of flocculi, which, at the end of the chapter, he describes as composed of semitransparent long strings of an elastic consistence, so that, after being pressed between plates of glass, they recovered their form. These flocks often enclosed little crystals of a rhomboidal form, which, as they also occurred in the cholera fluid, seemed to imply that these elastic shreds might arise from coagulation of some material, which perhaps, he says, owed its origin to solution of epithelial fragments.[1]

In some respects, it would be difficult to describe more accurately the contents of the intestines after death; in no other disease are such beautiful specimens of epithelium seen, and their several conditions cannot be better described than they are in Boehm's work. But the account of the flocks of the stools is meagre and unsatisfactory; and Boehm appears to me to have even overlooked some elements in the intestinal contents.[2]

creas, and less frequently of the kidneys, follow large and irreparable destruction of the mucous membrane of the colon in tropical dysentery. Some affection of these organs is not uncommon after mild attacks of Cholera; it may be, possibly, from a similar cause.

[1] Op. cit. pp. 10 to 35.

[2] I have not been fortunate enough to meet with any detailed observations made during the present epidemic in St. Petersburg or in Berlin, on the intestinal discharges. From some very interesting debates, however, in the *Gesellschaft für wissenschaftliche Medicin* of Berlin, reported in *Die Medicinische Reform* for September, October, and November, it is apparent that Boehm's opinion of the extreme importance of the casting off of the epithelium is considered erroneous. This is not only maintained by Virchow and the partisans of the opinion which regards Cholera as a general blood disease, but also by Leubuscher and others, who consider all symptoms as sequences of the disease of the intestinal mucous membrane, and who, it might have been supposed, would have attached much importance to changes in the epithelial coat. Thus Leubuscher says that he cannot consider, with Boehm, the essence of Cholera to be repre-

Before proceeding to this point, I shall subjoin a few microscopic observations on the stools. I was anxious to have these made by independent observers, so that no hypothesis of my own might be supposed to have biassed me. The names of the gentlemen who so kindly complied with my request, is an ample guarantee for the extreme accuracy of the observations. The numbers refer to the corresponding analyses of the fluid of the same stool.

Observation 1. *Early algide stage.*—Examined by Dr. Jenner, with a power of 400 diameters.

"1. Some closely aggregated amorphous, very fine granular matter, rendered somewhat more transparent by acetic acid.

"2. Numerous minute granules, the largest transparent and yellow, surrounded by a dark border, the smallest dark and opaque; acetic acid rendered some of the granules more transparent; liquor potassæ dissolved a few, and rendered others more transparent; boiled in ether for seven minutes, they appeared undiminished in number and unaltered in appearance.

"3. Organic corpuscles, similar to those described subsequently (Observation 6, No. 3), but much fewer in number, and generally smaller; many of them imperfectly formed, the capsule enveloping them being indistinct, so that they looked like a simple aggregation of black and yellow granules.

"4. A few semitransparent, peculiarly smooth granules, unaffected by cold liquor potassæ or acetic acid.

"5. No epithelium particles, no pus globules, nor blood corpuscles, either red or white."

Observation 2.—*Developed and intense algide stage.* Examined by Professor Ellis.

"The white, flaky substance, suspended in the rice-water stool, consists of a clear transparent basis, which contains a granular material and cells.

"*Granules.*—The granular material is seen on the surface of the mass, and is collected here and there into patches of uncertain size and irregular form; the molecules composing it are very minute.

"*Cells.*—The cells are strewed thickly through the mass; and, speaking generally, they may be said to be rather larger than the white corpuscles of the blood. In many parts they seem to be arranged in lines, but this appearance may be due to only a certain number coming into focus at the same time.

"*Form of cells.*—Some of the cells are roundish in form, though none are circular; and many (perhaps an equal number) are oval or elongated. The lengthened cells are about the size of the others in their short diameter.

"*Contents of cells.*—Both sets of cells have finely granular contents, and a dark defined circle round them.

sented by this throwing off of epithelium; this is only a secondary process; "die Abstossung ist immer nur ein secondärer Process."—(Op. cit. Nov. 3, p. 124.)

It may not be uninteresting to mention that, in these debates, are many important details of the "diphtheritic inflammations" of various organs, which occur in the consecutive fever.

"*Size.*—The statement respecting size must not be taken too literally, for many cells are larger than the size stated, and many are smaller.

"*Action of acetic acid*, equal parts of acid and water. Acetic acid causes the mass to shrink and become more transparent. The cells become very indistinct, being in some cases scarcely recognizable, even where the material is thin. But where the mass is thick, the granular material comes more distinctly into view. Of course the fibriform appearance is lost; the acid seems to gelatinize the mass.

"*Nature.* The material resembles exudation mass more than any other substance."

Observation 3.—*Developed and intense algide stage.* Examined by Professor Sharpey.

"1. No characteristic epithelium particles to be seen.

"2. Slimy flakes, containing, scattered about, irregular-shaped particles, and small molecules.

"3. A few white finely-granular corpuscles; some round, others of a more or less irregular shape; in size a little smaller than the pale corpuscles of the blood."

There may have been other matters; but Dr. Sharpey had time to make only a cursory examination.

Observation 4.—*Developed and intense algide stage.* Examined by Mr. Hillman; Mr. Quekett, of the College of Surgeons, was kind enough to confirm the observation, and to make sketches of the objects, which I possess.

"1. Squamous epithelial particles; none of the columnar form.

"2. Nucleated and granular bodies, resembling exudation corpuscles.

"3. A small number of blood corpuscles.

"4. Irregularly-shaped flattened cells, with single large central nuclei; rather larger in size than the exudation corpuscle.

"5. Membranous shreds, resembling basement membrane."

Observation 5.—*Developed and moderate algide stage.* Examined by Mr. Clover. Unfortunately it could not be examined till four or five days after it was passed. There was a quantity of granular matter, and scaly and columnar epithelium.

Observation 6.—*Developed and moderate algide stage* Examined by Dr. Jenner.

"1. Colourless, semitransparent, amorphous, membranous flakes; dissolved or rendered transparent by acetic acid or liquor potassæ. Boiling ether has no effect upon them (albumen?)."

"2. Semitransparent fibres, lying in close apposition; perhaps united by No. 1, or may be only the same matter arranged in striæ. They were seen most distinctly at the parts of the field in which the tissue had accumulated in the thickest masses. Liquor potassæ dissolved them, or rendered them very transparent (fibrine?).

"3. Organic corpuscles; round, oval, irregularly oval, or pointed at one end, and rounded at the other; more or less spherical, finely-granular on the surface, and containing, in their interior, minute granules, varying in number from six or eight, to sufficient to fill the entire corpuscle.

Some of these contained granules were mere black points; others were transparent and yellow, with dark margins. In size, the round corpuscles varied from 1-4000 to 4-5000 of an inch in diameter. The oval corpuscles were about 1-4000 in breadth and 4-5000 in length. They had both a faintly-yellow tint. Boiled in ether for seven minutes, they were unchanged.

"4. Granules similar to those described in observation 1, No. 2.

"5. One large granular body, semiopaque and yellow; 1-1000 of an inch in diameter; unaffected by acetic acid.

"6. Vibriones in great numbers. Two or three oval transparent bodies placed end to end. When the stool was kept, these fungi increased in numbers."

Observation 7.—*Intense algide stage. No cramps throughout illness.* Examined by myself. Power of microscope, 400 diameters.

1. Amorphous finely-granular matter.
2. A few molecules.
3. No epithelium or blood corpuscles.

In this case the flaky matter did not separate from the thin fluid till gentle heat was applied; it then formed a confused sediment, which had not the usual flocculent appearance. Mr. Bowman saw this stool, and confirmed the above observation.

Observation 8.—*Commencement of reaction.* Examined by myself. Power of microscope, 400 diameters.

1. A large quantity of transparent gelatinous matter, completely dissolved by acetic acid.
2. In the meshes of this matter, many dark or yellowish granules, unaffected, or nearly so, by acetic acid.
3. In some few cases, these granules were aggregated together, and formed little masses; whether then surrounded by a cell-wall could not be determined.
4. One or two large cells, containing two or three central granules.
5. No epithelium. After a long examination, one or two particles were seen, which looked like debris.

Observation 9.—*Commencement of reaction.* Examined by myself, immediately after it was passed.

There were a few epithelial scales, and granular and molecular matter, but hardly any of the peculiar corpuscles formerly described.

Observation 10.—*Relapse.* Examined by Mr. Quekett and Mr. Hillman.

"1. Small masses of biliary resin.

"2. Granular matter, similar to that seen in mucous corpuscles, and such as is obtainable by squeezing the follicles of the intestinal canal.

"3. Portion of muscular tissue (adventitious).

"4. No epithelium—no exudation corpuscles—no blood."

Observation 11.—*Relapse.* Examined by myself.

To the naked eye, the sediment appeared partly finely-granular and partly flocculent,—not at all unlike some true Cholera masses. It consisted entirely of shreds of striped muscular fibre (adventitious), of particles, apparently of undigested food, and of molecular matter. No dark yellow granules were seen; neither was there any appearance of epithelium, nor of blood.

Observation 12.—*Fluid from intestine.* Examined by myself.

1. Epithelium particles very numerous.
2. Organic corpuscles, about the same size as the pale corpuscles of the blood, finely granular on the surface, and containing from six to twelve dark yellow or black granules. Acetic acid caused no appearance of nuclei.
3. A few red blood corpuscles, very much altered and irregular in outline.
4. A few cells, like immature epithelial particles, small and irregular.
5. Granules of the same size as those described in No. 2, but free.

After several days' keeping, the fluid was again examined, when the same elements were seen, with the addition of a few crystals of triple phosphate.

Observation 13.—*Fluid from Intestine.* Examined by Mr. Rodgers.

An immense quantity of epithelium was seen. A dried specimen exhibited a large quantity of crystals of alkaline chlorides, a few crystals of phosphate of ammonia and magnesia, and a little phosphate of lime.

Observation 14.—*Choleroid diarrhœa.* Examined by Mr. Clover and myself.

Epithelial scales, granular matter, and shreds of vegetable fibre and cells derived from food, were observed.

In addition to the above examinations, I have made some others, which agree completely with them, but which, to avoid repetition, I shall not here insert.

These observations, made by independent observers, have a remarkable uniformity among themselves, but differ completely from Boehm's descriptions. In the true Cholera masses, there are the fibres to which he alludes; but there exist also corpuscles, peculiar granules, and an amorphous flaky matter, which he has not noticed in the stools, nor in the contents taken from the small intestine after death. In both these situations, these elements exist in abundance, though mixed, in the intestine, with an immense quantity of epithelium, which may possibly, in some cases, obscure them, or cause them to be overlooked.

I do not think any one who had ever seen these corpuscles, could for a moment suppose them to be any modification of broken down epithelium, or to be immature and imperfectly-formed epithelial nuclei. They are different in size, and in all their physical appearances; and, moreover, it must be remembered, that cylinder epithelium is confessedly scarcely ever seen in the cholera stools; and that if it were so seen, and could by any change or breaking down form either the corpuscles or the granules, we ought to be able to find all grades and phases of the change. Neither can it be considered probable that the epithelium of the small intestines is soluble in the fluid of the large, and that then, by deposition, it forms these corpuscles, or the fibres which Boehm describes. In the fluid of the small intestines, the epithelial particles often preserve their sharp and definite outline for days, although they occasionally do seem to break up. It is by no means probable that the fluid effused into the cœcum, which is doubtless of the same nature as that from the whole canal, can possess any such solvent power.

If not epithelium, can these be mucous corpuscles and granules

thrown off, as it were, by an intense *catarrh* of the mucous coat?[1] In reply to this, it may be argued: 1, that these bodies are much smaller than the large corpuscles with the central granules, seen in mucus; the granules are of a different kind, are differently arranged in the interior of the cell, and are differently acted on by acetic acid. 2. It is not likely that mucus would be secreted in such enormous quantity, while the usual excreting functions of the mucous membrane are evidently totally abolished. 3. If these corpuscles are mucous, why should they not appear through the whole course of the disease, instead of being confined to the deep algide period? They are not seen in the premonitory diarrhœa, nor after the algide stage; and disappear when the pulse and the warmth of the surface are returning. Now, it seems unlikely, that if they are formed by an intense irritation of the mucous coat, they should so rapidly disappear. I do not wish, however, positively to contend that these corpuscles are not mucous, since I have not compared them, as I hope soon to do, with the intestinal mucous corpuscles in other diseases.

But whatever be the nature of these corpuscles, it seems to me impossible to consider the fibres and gelatinous-looking flakes, mucus. If they are so considered, everything which appears on the surface of a mucous membrane may be called mucus, without any regard to the nature of the action which has been exerted upon the transuding blood fluid, by the textures through which it passes. These fibres and flakes, in all respects, chemical and microscopical, resemble those seen in the so-called inflammatory exudation matter, and it is in the highest degree probable that they owe their origin to effused blood-plasma, which assumes with great rapidity a low, ill-defined, and non-progressive organization. This opinion is rendered still more probable by the fact, that other elements of the blood are effused in the cholera fluid, and that the plasma itself is certainly poured into the solitary and Peyerian glands, (distending their capsules to a great extent,) and perhaps into the entire mucous membrane.

Boehm alludes very briefly to the possibility of this occurrence. He writes:—

"In previous observations, carried on to determine the nature of the flocculent substance, that opinion was most likely, which considered that together with the serous element of the blood, the so-named albuminous, or plastic material, transuded in a dissolved form into the intestinal canal, and then separated in the form of flocculi. In this case, however, the flocculi would naturally exhibit no organized structure and arrangement."[2]

Boehm certainly appears to have been a little biassed by his observations on the great desquamation of epithelium, when he did not proceed to *prove* that this unorganized plastic matter was not present, an observation it was certainly incumbent upon him to make.

With regard even to the separation of the epithelium, although, from the facility with which this structure is shed, even during certain ordinary healthy processes, it does appear probable *a priori*, that it would be

[1] This would probably be the opinion of Andral, who has already (*Gazette Médicale*, No. 33, 1847) called this substance "modified mucus."

[2] Op. Cit., p. 19. From the size of Boehm's plates, it appears probable that his microscope was not of sufficient power to enable him to see the corpuscles.

largely thrown off in Cholera, there is absolutely no proof that it is so thrown off, until after the death of the patient. The stools contain none, or a quantity not more considerable than is present in common diarrhœa, if even so much.[1] If the epithelium is separated, during life, what could prevent its passing off? It cannot surely be separated and yet retained. Is it then so broken up that it cannot be recognized? This is impossible. Boehm himself accounts for this difficulty, by assuming that the epithelium is dissolved in the fluid of the large intestine; but this is, in the first place, unlikely; and secondly, is not indicated by analysis. Besides, if during the whole course of Cholera, epithelium is thrown off, how is it that we find it after death in such great abundance?[2] Is it not most likely that the epithelium does not really separate in any quantity during life; but that after death, being continually immersed in the fluid which fills the intestines, and being possibly, in some measure, rudely shaken by the previous rapid transit of the Cholera fluid, it may separate itself more or less completely from the basement membrane, and divide itself more or less minutely into its smallest elements, according to the length of time after death, the violence used in opening the intestine, and other obvious circumstances?[3] It is quite certain that the several varieties of the stools, such as milky, chalky, &c., are given, not by epithelium, but by very small granules. In the milky stools, there is often a complete "molecular base."

It appears to me the most simple, and the most likely view to consider all the flocculent matter of the true Cholera stool, cells, dark yellow granules, fibres, flakes, and amorphous matter, to be but modifications of the same substance, viz., fibrine. The granules appear to form, by aggregation, little masses, round which a cell wall forms in the way which, as pointed out by Henle, occurs in certain inflammatory exudations, or perhaps cells may form from the liquid plasma, as in the low organization taking place in the follicular deposit of typhoid fever.

Whether this be the case or not, it may be considered probable that the microscopic forms now referred to, co-exist in their greatest perfection with the purest type of the Cholera fluid.[4] They are effused while the disease is at its acme. Immediately after the algide stage, in the first stool of reaction, they become indistinct, and finally disappear; the effusion of fibrine into the intestinal canal appears to have stopped; the sediment of the stools consists now only of amorphous matter, a few perhaps of the peculiar granules, and a little epithelium. It may be mistaken, however, if judged only by the eye, for a true Cholera mass, although it does not contain the characteristic elements,

[1] It is probable, however, that in the period of reaction especially, there is a great tendency to desquamation, and that one form of consecutive fever is complicated with this.

[2] In order to account for the great quantity of flocculent matter found after death, and the small quantity passed in the stool, I formerly, believing the matter to be of the same kind in both, suggested that the thinner portions only might pass off; but this explanation is unnecessary, if the opinions advanced above are correct.

[3] The epithelium of the gall-bladder, in other diseases besides Cholera, separates in this way after death, particularly where the bile is watery.

[4] I must state, however, that I have met with two or three stools, passed during the cold stage, in which the flocculent matter appeared granular and amorphous. But these were all mild cases, and there were foreign matters in the stool which obscured the view, and I may mention that in these cases it was singular that there was very little lividity of the skin.

Then gradually the quantity of Cholera fluid lessens, and finally, bile pigment appears, and the stools lose altogether the Choleraic character.

Want of space compels me to dismiss these most important topics, with this indication merely of the chief points of interest. I hope on a future occasion, to be able to adduce additional facts in corroboration, or modification of my views, and to enter more fully into the question of the relation of the individual elements of the Cholera dejections, to the general phenomena of the disease.

Dr Parkes
from the author

CONTRIBUTIONS TO THE

PHYSIOLOGY OF THE ALIMENTARY CANAL.*

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PART I.

ON THE MOVEMENTS OF THE STOMACH.

I. *The anatomy of its muscular coat.*—There is little necessity here to dilate upon the well-known structure of the muscular stratum of this organ. That there is an external plane of longitudinal fibres, and an internal and transverse layer immediately beneath this, would be almost a sufficient description in the case of the simple-stomached mammals; and an alteration in the disposition of these layers relatively to the surface constitutes the chief difference at present made out in the majority of the fishes, the longitudinal layer being for the most part internal to the circular.

In man and some of the higher mammalia, descriptive anatomists have sought to distinguish a third layer, which, lying deeper than the two preceding, is directed from the right of the cardiac orifice over the large extremity of the stomach on its anterior and posterior surfaces, expanding as it descends, and returning into itself at the lower border of the viscus. But the situation of this layer—immediately beneath the ordinary circular fibres, and with difficulty, or not at all separable from them; together with its direction, transverse to the altered axis of the recurved and enlarged tube—seem to render it fairly inclusible in the category of transverse fibres; transverse, not to the apparent horizontal axis of the organ from the pylorus to the large extremity, but to that real axis of the tube which occupies its centre, and is terminated by its orifices.

It deserves, however, to be remembered, that a considerable difference exists in the amount of muscular tissue present in different parts of the stomach. In about the pyloric half of the organ, its muscular coat is perceptibly thicker, and the variation,

* This essay was written considerably more than a year ago.

like some analogous to it which are met with in other animals, chiefly affects the transverse fibres.*

II. *The muscular actions of the stomach.*—Of the movements which are the immediate function of this contractile apparatus, little seems to be known. Haller† considered that there was an alternate peristaltic and anti-peristaltic action, which urged the food in corresponding directions, now forwards, now backwards; and thus resulted in a kind of churning of the alimentary matters. In support of this doctrine he adduces both observation and argument.

Under the first of these heads, his chief authority appears to be the experience of Wepfer, to the 87th and 251st pages of whose "Mémoire sur la Ciguë aquatique" he refers. One of these passages, however, is a general statement, and not a narrative of an occurrence; while the other offers no identity with the fact sought to be established. The observation of a "nunc sursum, nunc deorsum" movement, in the duodenum of a vivisected animal, from which the stomach had recently been cut, is scarcely any index of the probable ordinary movements of a healthy stomach *in situ*, far less a proof of what they really are. The argument made use of is that of necessity: a physical dilemma is attempted to be laid down. "Both orifices being shut, either the stomach must be quiescent, or the food must be sent by alternate movement backwards and forwards:" again, "if the course of contraction were simply forwards, the food would remain but a very short time in that organ." But the latter objection requiring that the pylorus should be open, will not, I think, demand a separate answer: the first can only be received with the great caution due to such methods of arriving at facts, and the error on which it is based will be pointed out in the course of this paper.

Somewhat similar to the opinion of Haller is the explanation given by Beaumont, of the movements impressed on the food. From these he deduces, that contraction occurs in alternately reversed directions; but it would also appear that he considered a kind of rotation of contraction to obtain, by the preponderant share of the greater and lesser curvatures in these alternate movements. But his views on this point are by no means clearly stated.

It is allowable, I think, to point out the simple structure and arrangement of these muscular strata, and to note their great similarity in every respect but quantity to those of the remaining portion of the alimentary canal. From these as data

* I have purposely forborne reference to the so called "transverse ring" which exists at the junction of the pyloric and cardiac portions. It is more properly included in the contractions of the stomach, for though remarkably distinct during these movements, yet anatomy fails to recognise a distinct band, or even any exaggeration of the ordinary circular fibres sufficient to merit a separate description.

† Vol. vi., p. 276.

we might almost argue, *à priori*, the improbability of their possessing any but analogous contractile powers; and the probability that the peristalsis of the simple tube of intestine, or of the simple tubular stomach, would scarcely be so greatly altered in quality by the mere pouching of one part of its surface, or the exaggeration of one of its sides, as to be changed from a simple forward contraction into a complex alternate or rotary movement; the immediate agents of that movement remaining so little affected as they are known to be in the human stomach and those of similar shape. But it will be preferable to any such speculations to examine into the facts themselves, so far as we may be able, and to inquire—What movements of the stomach are seen on laying open the abdomen of an animal, and what are their characters and varieties?"

In many of the lower animals the progressive peristalsis which obtains in other parts of the alimentary canal, is certainly retained as the stomachal movement; and in fishes generally it has been thus described by Profesor Owen.* "The muscular action of a fish's stomach consists of vermicular contractions, creeping slowly in continuous succession from the cardia to the pylorus, and impressing a twofold gyratory motion on the contents; so that, while some portions are proceeding to the pylorus, other portions are returning towards the cardia."

Some of the carnivorous mammalia, as the dog and cat, offer, in addition to other advantages, that of possessing a stomach which in shape closely resembles the human organ; and it is to these animals that the following observations directly apply. One source of error which might be thought unavoidable, is the stimulating effect which results from the admission of air to the peritoneal surface; but though in the case of the intestines the effect of this irritation is so great as seriously to interfere with the practical utility of observations, if not completely to mar their efficiency, yet its influence on the stomach is so slight that it might safely be dismissed from notice, while its tendency to cause irregular motions, makes it little of an objection to any uniform and constant movement which shall appear to have been observed.

On exposing the stomachs of these animals immediately after death, contractions may be seen, varying considerably both in quantity and quality, or they may be altogether absent.

1. *In the empty stomach.*—If we examine an animal from whom all food has been withheld for some hours previously, and whose stomach is void of ingesta, that viscus is seen completely at rest, offering no movement whatever. And even after the interval of a minute or two, when the intestines are exhibiting very active vermicular contractions, the stomach presents a marked contrast, and preserves its quiescent state.

2. *In the stomach which contains food*, two chief varieties of peristalsis are observable; and they occur in such uniform

* Hunterian Lectures, vol. ii., p. 236.

coincidence with the different stages of digestion, and contents of the cavity, as to be attributable to these as their causes.

a. In the early stage of digestion.—In the carnivorous animals above mentioned, and especially in the destitute specimens which are generally obtained for such experiments, it is not unusual to find that solid food has been swallowed hastily in large lumps, after little or no division, still less mastication. In such cases the stomach is found crammed with hard masses of flesh; and owing to this unyielding condition of its contents, very little contraction of its parietes is visible. This state is best obviated by chusing an aliment the consistence of which shall not interfere with the movements,—such as thick soup or other pultaceous food,—and administering it in quantity sufficient for moderate but not excessive, distension. If the animal be pithed about a quarter of an hour after, and immediately opened, the following movements will be seen going on:

The most noticeable is a transverse constriction, which sets out from the cardiac extremity, and travels slowly towards the pylorus. This is comparatively feeble until it reaches the locality of the "transverse band," which is situated at about the junction of the pyloric two-fifths, and cardiac three-fifths; here it suddenly becomes much more distinct, and from hence it continues rapidly forwards, as a well-marked circular depression, until it reaches the pylorus. Having arrived thither, an interval of relaxation succeeds, which is followed by the recurrence of a similar contraction: as nearly as can be judged, the average period of relaxation is about a minute, and the contraction itself occupies nearly the same time.

Cotemporaneous with this contraction is a certain amount of longitudinal shortening of the organ.

At this period the pyloric orifice is always shut, but the cardiac much less efficiently so. The difference between the two closures is well shown by the effect of pressure; for the same amount which easily forces the contents of the stomach into the œsophagus and mouth, expels none into the duodenum.

On laying open the organ, the ingesta are seen to be already somewhat altered: thus, where milk or soup have been given, flocculi of coagulated caseine or albumen are found floating in a dirty fluid.

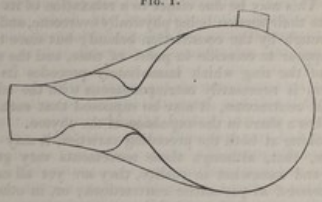
b. At a later period of the digestive act, the movement differs considerably from the preceding description, though it still offers the same general appearances.

Above the situation of the transverse band, the large cardiac extremity, dilated by its contents, is more quiescent than in the earlier stage. Movements, indeed, do occur, which are similar to those previously described, but they are so slight as scarcely to allow of their nature or direction being defined.

The chief visible commencement of contraction is by a constriction which has exactly the same place as the sudden increase

above mentioned (viz. almost midway between the orifices of the viscus), but is much deeper than it. After continuing a short time, it passes onwards to the pylorus as a circular concavity, which appears nearly to obliterate the tube in its course; and finally arriving at that valve, terminates by engaging the muscular ring which surrounds it. A slight relaxation follows closely on the heels of this peristalsis, and in a little while a more complete dilatation succeeds, but not exactly in the order in which the constriction had occurred, the central hour-glass contraction being the last which altogether disappears, as it is also the first to return. The accompanying diagram contrasts together by its three outlines—the commencement of contraction, its maximum, and that of the intervening dilatation.

Fig. 1.



While the contraction remains, the large size and fulness of the cardiac pouch, the well-marked circular depression, and the narrow pyloric tube, have often suggested to me the simile of a funnel, the expanded portion of which contained a quantity of fluid, which its tube (here a muscular one) was slowly draining off.

The contractions themselves are more rapid than in the earlier stage, but the intervals are rather longer—from one to three minutes; and a longitudinal shortening occurs, but it is even less prominent than before.

I have not been able to trace the movement clearly into the duodenum: indeed, the balance of evidence is somewhat in favour of an independency of movement in these two parts of the alimentary canal; since I have sometimes remarked that a contraction of the stomach began when a peristaltic movement already occupied the duodenum, at a distance of an inch or two from the pylorus, and that the latter both travelled at a much slower rate, and was repeated at much longer intervals, than the gastric constriction. But on this point it is necessary to speak with great hesitation, since there are many circumstances which tend to prevent an accurate observation of these intestinal movements, by simulating contractions, or distorting

those which already exist. Some of these will be more fully pointed out in a succeeding part of this paper; but I may here mention the action of the atmosphere, and the dragging which is the physical result of contraction in the immediate neighbourhood.

In general terms, the differences in these two stages might be briefly stated as follows:—Soon after ingestion, the peristaltic movements are more general, and more uniformly diffused, engaging the whole of the organ; but even now with a manifest preponderance in the pyloric half, and the pylorus is firmly shut; while towards the termination of digestion, the cardiac extremity experiences less movement, but the peristalsis of the pyloric portion becomes much more rapid and vehement.

The pylorus, doubtless, opens slightly at the end of each contraction. This may be due either to a relaxation of its muscular fibres, or to their tension being physically overcome, and the fluid forced through by the constriction behind; but since these two periods appear to coincide in point of time, and the slight relaxation of the ring which immediately precedes its greatest constriction is necessarily cotemporaneous with the advance of the general contraction, it may be supposed that each of these actions takes a share in the expulsion of the chyme.

And looking at both the preceding varieties, it may be fairly laid down, that, although these movements vary greatly in quantity, and somewhat in quality, they are yet all capable of being expressed as peristaltic contractions; or, in other words, they all present, as their most important constituent, a superficial transverse indentation moving gradually forwards. Though I have looked carefully, I have never been able to identify any irregular motions which would affect this rule, far less any approach to an inverted peristalsis.

I cannot avoid mentioning in this place, that both the appearances beheld in the contracting stomach, and a consideration of the arrangement of the longitudinal fibres here and elsewhere, unite in allotting to them the subordinate function of serving merely to preserve the tension which is necessary to the proper physical action of the deeper layer. And their comparative uniformity in amount and thickness, in many animals in whom the transverse stratum is greatly increased in both these respects, seems to corroborate this view of their import.

III. *The movements of the food.*—Turning from these observations, which have had sole reference to the movements visible on the exterior of the digesting stomach, we next come to inquire into the motions which they impress on the food as their result.

A twofold gyratory movement has been already quoted as present in the contents of the fish's stomach in the earlier part of the digestive process; and this simultaneous passage of different

portions in opposite directions, may be taken as the index of similar currents—one towards the cardia, one towards the pylorus.

The very careful and accurate experiments of Beaumont, will afford satisfactory evidence of something very similar to this. "The ordinary course and direction of the revolutions of the food are—first, after passing the œsophageal ring, from right to left, along the small arch; thence through the large curvature from left to right. The bolus as it enters the cardia turns to the left, passes the aperture, descends into the splenic extremity, and follows the great curvature towards the pyloric end. It then returns in the course of the smaller curvature, makes its appearance again at the aperture in its descent into the great curvature, to perform similar revolutions. These revolutions are completed in from one to three minutes. The bulb of the thermometer, which has been frequently introduced during chymification, invariably indicates the same movements. They are slower at first than after chymification has considerably advanced."*

Subsequently to this statement, he mentions that there is a perfect admixture of the whole ingesta; and that if the motions were simply revolutionary, the central portions would retain their situation, until the outer or chymified part had passed into the duodenum in successive parcels. The supplementary movement, by which rotation is converted into complete admixture, he considers to be a general trituration, which is partly the result of the same muscular contractions that cause the revolutions, partly produced by the respiratory muscles. But it is an obvious objection to any immediate alteration of the circular movement that the latter really obtains, and that it is of little use to grant the possibility of its conversion or modification into trituration by these means, when all his experiments, by substantiating the simple revolutionary character of the movement, prove that the change is *not* effected. But we shall presently endeavour to show that the circulation is of such a kind as necessarily implies mixture.

The opportunity so well used by Dr. Beaumont, is unique; and there are many difficulties which have hitherto been an obstacle to its artificial repetition in animals, so as to present any thing like trustworthy experience on the subject of these movements.

But of the accuracy of his experiments, few, I conceive, would entertain any doubt; and if the preceding observations have been as correct, we are brought to this point in the investigation:—that the movements of the healthy stomach during chymification are of a peristaltic character, and that the direc-

* Experimental Observations on the Gastric Juice. Combe's edition, page 101.

tion of this peristalsis is uniformly forward; but that the currents in the fluid or semi-fluid ingesta, are of two kinds, and in two opposite directions,—one being forwards to the pylorus, one backwards to the cardia. The apparent inconsistency of these statements, or the incompatibility of one movement with two currents, has now to be explained.

The most simple and obvious course, and one which, to some extent, will reflect light upon the data, as well as on the result, is to imitate the natural conditions and to observe and compare the effects.

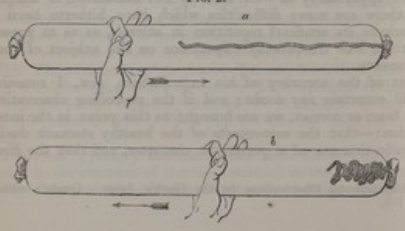
Thus, taking a long membranous tube, preferably of considerable size and width,—such as the prepared weasands sold to the sausage-makers,—and filling it with water, to moderate but not extreme distension, by tying up both extremities we tolerably approach to the condition of the simple stomach of some animals.

The opposed and semi-flexed forefinger and thumb will produce a transverse circular indentation, which, carried slowly forwards, will similarly come near to a peristaltic movement. By previously introducing any sufficiently visible and flexible object, of considerable length, little diameter, and a specific gravity somewhere about that of water, and by attaching this to the centre of one extremity, we shall obtain an index of the current developed in this part of the interior. Ordinary black tape fulfils these requirements.

And now, producing the transverse constriction in the manner just mentioned, and moving it rapidly and frequently from the one end towards the other, an elongation of the black string attached to the centre of that extremity to which the movement is constantly carried, indicates that a backward current of liquid in the axis of the tube is a coincident of the forward one which occupies its periphery: and like it is the direct result of the peristalsis. —Fig. 2, *a*.

A reversal of the direction of movement heaps up the previously-elongated tape against the extremity from which it was firmly extended.—Fig. 2, *b*.

Fig. 2.



Prior to any experiment, a consideration of the mechanism of such an organ leads to the same conclusions.

The simplest form to which we could reduce it would be that of an inflexible hollow cylinder, in which the transverse indentation might be represented by a circular septum, perforated at its centre, and capable of free movement on the interior surface of the tube which it accurately fits. Let such a septum be moved in either direction, and it at once exerts a pressure on the body of liquid contained in the end towards which its motion sets. The pressure being equal in all directions, a portion of the fluid escapes backwards through its aperture, and this retrograde course is, *pro tanto*, a current, and one which will be continually lengthened by the advance of the septum along the remainder of the tube. The successive movement of a series of such septa would result in the establishment of two currents in the liquid —a peripheric of advance, and a centric of return.

The membranous and distensible nature of the tube actually made use of complicates the result only thus far: that at the commencement of the contractions, some distension of the distal extremity occurs.

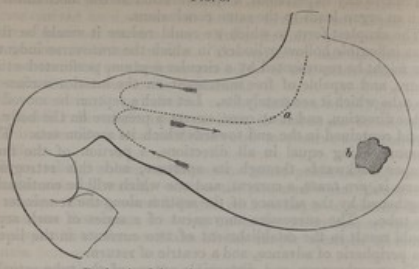
The inconsistencies before alluded to, might therefore probably receive the following explanation:

Transverse contractions, of uniform direction, occurring in a closed tube filled with a liquid, and falling short of obliterating its calibre, necessarily imply two currents—a superficial or peripheric, in the direction of those contractions, and an axial or centric, having precisely the reverse course.

The conditions here specified evidently exist in the case of simple tubular stomachs; nor does the modification of shape which is at present in the human and similar stomachs, affect their existence, since, so far as I have seen, the movements both in the cardiac pouch, and the more vigorously-contracted pyloric extremity, are transverse to the axis of the organ, as defined by its cavity and apertures.

And applying the same theory as before, it seems highly probable that we have at once a complete elucidation of the revolutions of the food, which Dr. Beaumont witnessed, and a corroboration of the general accuracy of his observations. The return of the alimentary bolus, was, to all appearance, along the lesser curvature; and when we recollect the situation of the opening into the viscus, from which his observations were made, it is evident that a movement along the real axis of the organ would be so near to the curved border, and comparatively so far from the point of view, that he could scarcely have avoided imputing to it the course which he has done.

Fig. 3.



a. Real axis of the tube.
b. Situation of the aperture in Dr. Beaumont's case.

The gradual mixture of the food is also explained: for, on the principle laid down, it is obvious that the activity of the pylorus, by occluding this part of the canal, has the direct effect, not only of retarding the onward passage of the contents, but also of impressing on them such a circulatory movement as must quickly result in their perfect admixture; since every part of the stomach is occupied by one or other of the currents, the mutual interference of which, at their borders, would gradually cause an uniform diffusion of matters moving with them; while the continuity of one current into the other at each extremity of the organ, ensures an equal contact of every portion of the contents with its active mucous surface, since the matters which occupy the axis during one moment, are destined to move along its periphery during the next.*

* Some of the currents seen in the Tubularian Polyp, by Mr. Lister, and described by him in the Philosophical Transactions for the year 1834, seem to approximate very closely to this general expression. Two currents were recognized in the tubular horny stem of the animal: they occupied different *halves* of its circumference, and proceeded in opposite directions. Two other currents engaged the communicating cavities of its contractile mouth and stomach. But these, although they also evinced a contrariety of direction, divided the tube in a very different manner,—that from the mouth to the stomach being situated in the periphery of the tube, while that from the stomach to the mouth occupied its axis. "The latter was suspended at the time of the close contraction of the stomach, and of the (general) discharge from the mouth into it."

Now, though transverse contractions of a marked character, and of duration equal to these currents, do not seem to have been observed in the soft contractile parietes of this part of the polyp, still it is impossible to avoid noticing their great similarity, both to those which probably obtain in the stomachs of higher animals, and to those seen in the rough model which I have suggested. And their contrast to those in the stem is perhaps significant of their different origin.

And it might be natural to regard the stronger and thicker condition of the terminal half of the stomach as having some useful relation to this circulation, not only by its more active influence, but also by its greater passive contractility, tending to prevent the dilatation to which this portion would otherwise be peculiarly liable, from the increase of action seen in this part of the organ.

In the present state of our knowledge, it would, I think, be too much to assume that these movements of its contents occur in the stomachs of all animals: indeed, in some of the carnivora (especially the fish-eaters) it is perhaps more probable that the ingestion of large immoveable masses of aliment is subsequently attended with so rapid and perfect a solution, that the process is scarcely necessary or possible; but it is interesting to notice that even in these, as far as regards the organ itself, the conditions are certainly present: while we are also presented with a very simple means by which mastication of the food, where requisite, is, as it were, enormously exaggerated in its results,—since, on this view, division, by implying circulation, also implies a further sub-division; and a coarse grinding in one stage of digestion is necessarily followed by a minute trituration in that which immediately succeeds it.

The anti-peristaltic action supposed to take a part in the healthy movements of the stomach is still more universally received as the immediate share which that organ takes in the production of vomiting; but, as in the previous case, experiment negatives the doctrine: in an animal killed during repeated and copious vomitings, the movement was seen to be distinctly forwards, having a considerable general resemblance to that of the earlier stage of digestion; but whether this movement be an invariable coincident of vomiting, a single observation would preclude one from judging.

In concluding this part of the subject, some peculiar actions may be alluded to, as possibly connected with this state of the food; viz., the regurgitation of fluid which sometimes happens during the digestive process, and, with less likelihood, the easy kind of vomiting which is occasionally witnessed in very young children while feeding.

In the first of these cases the abdominal contractions and the closure of the glottis which occur in vomiting are absent, and the facility with which it happens seems to indicate that a full and contracting stomach, a patulous cardia, and possibly, the period of expiration, are the only conditions of its occurrence. Conformably to this, it is found that a slight pressure on the replete organ will produce a similar regurgitation in the recently dead animal, and, perhaps, the axial current, which probably obtains in the living subject, may facilitate the upward movement. It would be difficult to conjecture whether the opening of the cardiac aperture be the result of an increase of pressure

overcoming the resistance of the circular fibres which surround it, or whether these are merely relaxed: indeed, over-action of the longitudinal layer, where it expands in passing from the œsophagus to the stomach, would equally account for it.

PART II.

ON THE PHYSIOLOGY OF INTESTINAL OBSTRUCTIONS.

The argument of the following part of this paper, and its connection with that which preceded it, may be thus stated:

The pylorus being shut, the peristaltic action of the muscles of the stomach resulted in a reflex current of the liquid ingesta. But the form of the intestinal tube, the structure and disposition of its muscular coats, and the probable action which they effect, so closely resemble the corresponding circumstances of the preceding organ, as to offer in these respects physical conditions which are essentially the same. Therefore, if disease or experiment add the only remaining requirements,—viz., those of occlusion and distension,—and thus complete the analogy of the intestine and stomach, the physical results obtained in the two cases will probably be referrible to the same principle; and the closeness with which they will approximate will be determined by the variations in these the common conditions,—variations the amount of which will be represented either by their number or degree, or by both these considerations jointly.

One of the most remarkable and constant symptoms of occlusion of the intestine is the occurrence of fæcal vomiting.

The explanation given by Galen, of the mechanism which effects this phenomenon, has remained up to the present time; and scarcely challenged during all this period, but repeatedly adopted and confirmed by succeeding authorities, it still rules so universally, that I am alike spared the necessity or possibility of quoting its advocates. What with its philosophic simplicity, the eminence of its supporters, and the completeness with which it accounts for the fact, perhaps few doctrines have a more impregnable appearance. And partly on these grounds the author trusts that, where the argument requires it, he may be allowed to anticipate, by a short statement, results which will be detailed more fully afterwards.

The theory may be thus briefly laid down. At a certain stage of an intestinal obstruction, the natural peristaltic action of the bowel above the occluded point is reversed, and, instead of proceeding towards the lower outlet, as heretofore, it passes in the contrary direction, impelling the contents in a similarly retrograde course, so as to return them to the stomach, whence they are vomited.

As far as can be collected, it would seem that by some the vomiting itself is supposed to constitute but a part of one continuous action; while others, who might be considered to separate the two stages (viz., the return of fæcal matters into the stomach, and their expulsion thence,) by considering vomiting to imply an antiperistalsis of the stomach, reduce them to much the same thing; the action in each being identical, its starting points only different.

On examining into the experimental foundations of this doctrine, I have been surprised to find the small number of facts which represent its basis, and the inefficiency of the few made use of.

Among the very numerous writings which affirm and illustrate the antiperistalsis, in those of Wepfer* and Schwartz† only have I been able to discover the results of experiment; and even in these the necessary parallelism of both the preliminary conditions and the produced effects is completely wanting. None of these experiments included obstruction of the cavity of the tube, although it is notorious that with this condition alone the symptom sought to be explained is connected; and in none was fæcal vomiting present. So also in none was the antiperistaltic movement substantiated; for that described is in every instance an irregular vacillating motion. Wepfer, indeed, expressly defines it as a "nunc sursum, nunc deorsum" movement: and Brünner, whom he quotes, mentions a similar action, in the same words, as obtaining in the rectum of a living animal, while the fæces were being propelled in the normal direction. And, on the whole, I have found it impossible to come to any other conclusion than this,—that an anti-peristaltic movement has never yet been seen in any part of the alimentary canal. But although the facts observed by these authors seem not to warrant the inferences they have drawn from them, yet the existence of such irregular actions is undeniable; and in this view they demand some attention.‡

When the abdomen of a healthy animal is laid open imme-

* Op. cit.

† Haller's Disputationes Anatomicæ.

‡ Antiquarian research might, perhaps, somewhat modify this statement, but I suspect very slightly only, since numerous observations seeming to bear on the subject, and quoted by these older authors, on close inspection are found quite wanting in relation to that which they are brought forward to confirm. One author must be especially mentioned here, as having combated the anti-peristaltic theory: this was Haguenot, whose thesis is given in Vol. I. of Haller's "Disputationes Anatomicæ," and in which the author of this paper found some of the objections raised by him had been anticipated. But Haguenot adopted the singular view of attributing all the movements in the intestines almost entirely to the diaphragm and abdominal muscles; and considered that, on the occlusion of the tube, a tendency of liquid towards the least resistance, expressed the cause and mode of its return to the stomach by the same forces.

diately after death, the intestines are seen lying perfectly still; but in a very short time, those parts of them which are exposed to the air, experience vigorous contractile movements. In many instances these are irregular and indefinable; but in other cases they take on appearances of a forward or backward course, or sometimes of each of these directions alternately.

In those instances where a direction of transverse contraction is best marked, the circular depression is preceded by a dilatation which stretches the intestine to the full length of its mesentery, so that it rises, as it were, at the extremity of this its tether; and immediately to this succeeds the circular indentation, travelling slowly onwards.

A forward course of these constrictions is certainly by far more frequent than the reverse, but both occasionally obtain, while it is perhaps more usual to find them without any direction capable of identification; and in this respect they are much more truly named "vermicular," than "peristaltic," movements.

After a few minutes, the contraction of the intestines (which ordinarily contain but little fluid) gives them a nodulated or almost moniliform shape. Gradually the movement wholly ceases, but the contracted condition endures for a considerable time.

On raising these parts of the canal, and disclosing other portions hitherto concealed, these also pass from a condition of comparative rest, into one of like activity to that previously described; and, after experiencing movements of an identical character during about an equal time, they finally attain the same quiescent and permanently contracted state. The behaviour of the stomach under similar circumstances was noticed in a former part of this paper. A comparison of the small intestines and stomach, under these circumstances, led Glisson to imagine that the movements of the latter organ in health were slow, insensible, and in no degree approaching to those of the intestines. But, in spite of these appearances, the reverse would be a far more correct statement.

Now the tranquillity of these parts previously to the admission of air,—the irregular and diffuse nature of the contractions themselves, which correspond to the widely-spread application of the stimulus,—the final result on the intestine,—and the effect of uncovering fresh portions,—together offer the strongest probability that the movements witnessed are chiefly due to the irritation consequent on the admission of air. Perhaps we might almost term it a sort of precipitate rigor mortis, resulting from an amount of exposure to the cold atmosphere, which hours only can produce in the case of the muscular tissue of other parts of the body.

But whether this comparison be true or not, it is sufficiently evident that there is nothing here which can be called an

inverted peristalsis, and little even of analogical aid to assist us in conjecturing the definite movements which undoubtedly occur in these parts during life.

In the case of the artificially occluded bowel, and where the vomiting of fæcal matter has been a prominent symptom during life, an examination immediately after death gives very similar results; but some differences do obtain, and these appear to be chiefly connected with the degree in which distension of the intestine has taken place.

If the bowel be enormously dilated by its contents, it will, for the most part, be found that in the parts so distended none of this vermicular action obtains. If fluid be present in less excessive quantity, the movements are both more evident and more distinctly and uniformly peristaltic than in the healthy intestine. This effect appears to depend on two causes: on the contents offering an object on which constriction can be made manifest; and also, I believe, on a direct increase in the energy of the movements themselves; but their apparent direction is subject to the same uncertainties as in the healthy intestine, though in a less degree.

Thus, the observation of an inverted movement fails us, even in the condition the symptoms of which it was supposed to explain; and, on the whole, there are still fewer appearances of a backward movement in the strangulated than in the healthy tube: while all the positive evidence of these observations is in favour of a similarity of contraction in the obstructed and unobstructed states,—the few differences offered being directly or indirectly assignable to their physical condition.*

We next proceed to adduce some arguments against the consistency and probability of the antiperistaltic theory.

1. The antiperistalsis is supposed to occur from the over-irritation at the stricture inverting the natural action of the bowel. The following quotation,† though originally written of the stomach, represents this view with sufficient accuracy:—"All substances which, when their action is moderate, promote the peristaltic motions of the irritated parts, by a more violent operation cause those motions to become reversed."

It is a serious objection to any theory which would constitute irritation the first link in the chain of cause and effect, that,

* The vivisection of healthy and obstructed animals, and the comparison of the intestinal movements in the two states, will probably suggest itself to many as an *experimentum crucis*. But the appearances observed in tying the intestine of several animals were sufficient to show that no hope of such a satisfactory result could be entertained, since in these cases I was not able to identify a definite peristalsis before deligation. It would thus appear that either the movements of the bowel are considerably affected by the operation and exposure, or that, during health and in their normal situation, their movements are of much less visible dimensions than the gastric contractions, to which they are probably analogous.

† Müller's Physiology, translated by Dr. Baly.

however we may interpret the term, we cannot name any morbid state or affection of the bowels in which irritation is not present; while an occlusion of their cavity in some part of its course is the only condition in which fæcal vomiting is present; that, in fact, the alleged cause is almost universal in the pathology of the organ, while the alleged effect is rare and exceptional. Nor can we show, or even plausibly speculate upon, any differences in the degree or kind of irritation in the different diseases of the bowel, which should cut off the occurrence of the result in so extensive a number, or rather so vast a majority.

On the other hand, since we find a physical fact—occlusion—to be the necessary condition of a peculiarly physical phenomenon—fæcal vomiting—there are considerable grounds for suspecting some immediate physical causation in this circumstance, the nature and frequency of which so closely coincide with those of the effect.

2. Of nearly equal value is the objection drawn from the condition of the replete intestine. Where, as frequently happens in these cases, the occurrence of the effect (fæcal vomiting) many hours or even days before death, and its continuance up to that event, ought to imply a similar duration of the antiperistalsis which is the cause, a post-mortem inspection offers appearances utterly irreconcileable with this. From the analogy of other contractile tubes, we might fairly expect that a sufficient quantity of contents would by this time have been propelled in the direction of motion, to render the calibre and distension of the intestine at least uniform throughout, if not greater at the upper part of the duodenum, towards which the movement had set. But the contrary is invariably the case: that which should have been the starting point of contraction evinces the least signs of its presence, and is by far the most distended part of the bowel; and from this point upwards, the intestine tapering away like a cone, soon regains its normal diameter, and generally dwindles to comparative or even absolute emptiness before arriving at the pylorus.

In favour of the simpler view, we may notice the great general resemblance of this state to that which is seen in all cases where tubes, conveying fluid contents, are strangulated in some part of their course. After such a condition has obtained for some time, the appearances are uniformly those of dilatation immediately behind the obstructed point. And, though we might attempt the distinction, that the contents are evidently returned in one case, and only accumulate in the others, yet it must be remembered that this is true so far as regards our detection of the fact, but is insufficient to establish its negative. It is, in strictness, only another mode of stating our ability to recognize, by certain qualities, that such and such matters have reached a point in the intestine nearer to the obstruction than that in which they are found; and our inability to predicate the like where no such

differences obtain (or have been seen) at different parts of a tube; our inability, *e. g.* to say whether urine found in the pelvis of the kidney has ever occupied the occluded ureter; or bile found in the liver, its obliterated duct; or blood found in the heart, its strangulated vessel. But it is probable that within the limits of this general analogy, considerable deviations exist. These will be subsequently pointed out, and their explanation attempted.

3. In one particular kind of obstruction, viz. intus-susception—a peculiar condition is found after death. A superior portion of the intestine has passed into an inferior, and its occupation of the latter part, added by distension, congestion, or inflammation, has resulted in occlusion, with its ordinary symptoms and fatal effect.

It has occurred to me, that by the reduplication itself, Nature appears to inform us, not only of the cause of intus-susception, but even of the very steps of its development. In looking at such a specimen, we seem to behold a case in which the agents of disease are, as it were, taken in the very act. The longitudinal fibres remaining quiescent, the intestine has been surprised by a transverse constriction, the rapid passage of which forwards has hurried the contracting portion into the flaccid and dilated part immediately anterior to itself.

With a circular wire, and the finger of a glove, we may tolerably imitate both the conditions and the result.

The circumstances of these invaginations corroborate the evidence already afforded by their uniformity of direction and anatomical appearances. It has long been known, that whatever tends to irregular action of the intestines, favours the production of intus-susceptions, and that the general agitation which accompanies the mortal agony, often leaves them as its relics in the dead body; their recognition by the eye of the anatomist being the first and only sign of their existence.

Now, though a continuance of the transverse peristalsis would obviously be useless as a means of disengagement, nay, more, would only aggravate the evil, by tending still further to introduce the upper contained portion; and, though we can readily imagine that the very gradual accumulation of fluid from above, would but develope and dilate an abnormal pouch or valve, to the stricter obliteration of the cavity of the impacted portion which it surrounds; and, though in all probability it would require the most vigorous contractions of the previously slumbering longitudinal fibres, both above and below the intus-susception, in order that these unaided should restore the natural condition; yet it does seem evident, both from the nature of the theory, and the rude model I have suggested, that an antiperistalsis would so effectually, and of necessity, remove the condition, that the theory of such a reversal is well nigh incompatible with the fact of the invagination.

The effect that the longitudinal fibres would have in assisting

reduction, is sufficiently obvious; but even supposing the antiperistalsis literally reduced to a transverse constriction, the result would be little affected: for the advance of such a constriction seems to imply a dragging behind it.

An inverted movement of this kind would at once diminish the diameter of the impacted portion, and, as it proceeded upwards, draw the so narrowed tube out of the part containing it. It would thus imitate, under the happiest circumstances, the conduct of a surgeon who reduces a paraphimosis; while with one hand he compresses the strangulated glans, and reduces its size thereby, with the other he simultaneously pushes it through the strangulating ring of prepuce, or, what is virtually the same thing, draws this over that.

The operator knows that each of these actions is essential to the result; and that first mentioned—viz. compression—would probably be even more necessary in the case of the intestine, where the texture of the muscle, and its independence of volition, offer much earlier limits to the energy of the tractile share of restriction than the powerful mechanical force which the operator can exert at will. And, so far as I can see, an antiperistaltic movement is almost the only way in which both these could obtain at the same time.

4. The nature of the movement affords some ground of objection. The supposed antiperistalsis is a continuous motion, the vomiting only an interrupted phenomenon; an inconsistency, if they are considered as one and the same action. And, therefore, a theory which showed an essential independency of the two acts—of this backward passage of fæces into the stomach, and their expulsion from it—would be so far preferable. But since many who receive the ordinary view evidently distinguish these as two stages, though not as two actions, little stress can be laid on this objection derived from their observed independent nature: and hence its consideration is deferred.

5. But although an extension of this action to the stomach might be considered as only indirectly, or not at all involved in the antiperistaltic view, it is incontestable that the supposed action ought to extend in both directions far beyond the irritated or occluded point: while, in striking opposition to this, it is found in numerous instances that the ordinary peristalsis of the tube has gone on in the part below the strangulation; satisfactory evidence both of the existence and power of this movement having been afforded by the expulsion of the usual solid contents of the bowel. Defæcation after the obstruction and vomiting have persisted many days, is by no means an uncommon occurrence. In animals where this condition has been artificially induced, I have almost always found an empty contracted state of intestine immediately below the stricture. And, finally, in one experiment, where the deligated intestine of a cat was evidently filled with solid fæces at the time of the operation, an examination after death showed that this part had been subsequently emptied.

And even were it imagined that by some inexplicable peculiarity, the reversed movement only engaged those parts of the canal which lay within its course, and superior to its starting point, yet it must be borne in mind that this emptying of the tube immediately below, requires that the peristalsis shall have commenced from the very seat of the stricture; and thus, from one and the same point, to which has been applied one and the same stimulus, two opposite movements have set forth; the one upwards towards the stomach—the other downwards towards the rectum.*

6. The varieties in the date of occurrence of the symptom form the last objection I shall urge.

We might, indeed, prelude it with a remark on the ordinary time of its appearance, which somewhat disfavours the idea that the return of fæcal matters is due to so immediate and complete an agency as antiperistalsis; and in support of such an inference, we might adduce the well-known fact, that under irritation the whole length of the human alimentary canal may be traversed in six, four, or even two hours; while in cases in which we can assign the precise time of strangulation, at least twenty-four hours are generally occupied in the passage of only a fraction of its length. But this argument might be considered hardly a fair one, since many would reply that the theory did not suppose a reversal of movement to ensue instantaneously on occlusion.

A more valid objection may be drawn from the comparative date of its accession in different cases. The time at which the symptom first appears, might indeed be expected to vary in direct relation with the distance of the stricture from the stomach; but observation shows that the true causes of such variations would only be partially stated. The rapidity of its occurrence in reality depends on the quickness with which the tube above the occlusion becomes distended. And a further analysis of this distension shows it to be compounded of two things—length of cavity, and quantity of contents. And if these opposite elements be arranged as a fraction, the whole variation might be included in this simple formula—

$$\text{quickness of vomiting} \propto \frac{\text{contents}}{\text{height}}\ \dagger$$

—where, if the contents be constant, the rapidity with which fæcal vomiting comes on will be inversely as the height of tube

* It might be answered, that the emptying of this part occurred before the establishment of the retrograde movement, and that the subsequent defæcation only implied the action of the termination of the bowel, and not of the part near the stricture. The improbability of this is manifest, but absolute disproof is difficult.

† Or, vice versâ, the time preceding the occurrence $\propto \frac{\text{height}}{\text{contents}}$ *i.e.*, varies directly as the numerator, inversely as the denominator of the fraction.

to be filled; or, if the latter element be constant, will be directly as the quantity of fluid which secretion or ingestion together afford. Distension is thus not only essential to the occurrence, but is that which chiefly regulates its access. Now, distension is no more a condition necessary to antiperistalsis than to peristalsis, while, as will be hereafter shown, it is essential to the theory which the author seeks to establish.

I have next briefly to detail the results of experiments in which the intestinal tube was artificially occluded by the application of a ligature; some of these have been already adduced, where their connection with preceding parts of the argument has rendered such a course desirable; and it only remains to examine more minutely into the symptoms and post-mortem appearances, with a view to elicit any additional circumstances from which we may derive assistance in deducing the theory of this action, and assigning its relations to others which resemble it.

The animals subjected to the operation were dogs and cats. The latter were previously rendered unconscious by the administration of ether; but with the former nothing but a very noisy struggling intoxication was produced in the one or two cases in which that drug was used.

A thick tape constituted the means of deligation, and this was generally tied so as to obliterate from half an inch to an inch of the canal, in order to avoid the restorative process described several years ago by Mr. Travers. Despite this precaution, in one instance where the ligature was a little narrower than usual, a sudden remission of the symptoms led to a suspicion that this process had occurred, and the steady improvement which followed had almost attained apparent health when the dog was killed; on the fifth day after the operation, and the third from the cessation of the vomiting. The intestine was found to be completely united in its whole circumference. Internally, the mucous membrane offered two raised lips separated by an interval; and in contact with this circular fissure ran the ligature, which so far preserved its shape as to occupy, without occluding, the cavity of the bowel. Externally, a thick coating of soft coagulable lymph covered the seat of the original stricture. The ligature itself was of a sufficient breadth and thickness to make it very unlikely that any of the coats of the intestine had been divided at the time of the injury, as was supposed to have happened in the cases detailed by Mr. Travers; but with this probable exception, nothing can be added to that gentleman's description.

In every other instance the intestinal canal was greatly dilated immediately above the strictured part, but to a variable extent: thus, where fæcal vomiting had occurred, the distension was generally excessive. From this point the tube gradually narrowed as it was traced up to the stomach, rarely exceeding its

natural diameter in the upper extremity of the duodenum. The length of the dilatation exhibited a close relation to its greatest width.

In one case, the inflamed and injured portion was soldered by lymph to a neighbouring loop of intestine, and in this manner had effected a singular secondary constriction, and it was only above this latter stricture that any marked dilatation was present.

It is singular to remark how little will sometimes suffice to effect the physical obstruction of a bowel, as in this instance. A similar one was brought under my notice in the human subject. The division of the stricture of a strangulated hernia had been followed by no remission of the vomiting or general symptoms. An artificial anus then formed at the wound, to the immediate relief of the patient: but on her dying some days after, of the consequent exhaustion, it was found that at the seat of the stricture the liberated tube was still almost obliterated. The introduction of a finger easily overcame this contraction, although for twenty-four hours after the operation the whole powers of the intestine (such as they were,) must have striven in vain against it. Similar cases are probably known to many surgeons.

The degree in which the stomach was distended offered considerable variety; where excessive, it was partially due to the ingestion of water. The pylorus was generally open, always easily permeable.

Below the occlusion, an inch or two of empty contracted intestine was almost universally present.

The fluid found within the tube varied both in *quality* and *quantity*.

In some, in whom its amount was very great, an uniform green fæcal fluid occupied the whole of the intestine and stomach. In others, there was a decided difference in the consistency of the contents, which were often of a hardish pultaceous character in the immediate vicinity of the stricture, but more fluid in the neighbourhood of the pylorus and in the stomach.

Gradations of amount were also well marked. They ranged from enormous distension and dilatation of the greater part of the intestine between the stomach and the strangulation, and increasing with proximity to the latter point, to the occupation of the nine or twelve inches of intestine nearest the occlusion, leaving the remainder nearly or quite empty.

The former condition was always associated with stercoraceous vomiting; but the latter was limited to those few cases where this symptom had not set in at the ordinary date, and where the animal had either been killed, or (as in one instance) had died of the disorder.

Occurrence of fæcal vomiting.—Varieties in the *date of accession of the vomiting* appeared to depend on several causes.

In some instances, the mere irritation of the operation seemed

to produce it: but though coming on immediately, it was only after an interval of eighteen or twenty hours that it acquired a fæcal character. Somewhat was also apparently due to the kind of animal selected. Generally speaking, the dog vomited much more speedily and regularly than the cat: indeed, in one or two instances, the latter animal did not reject any matters up to the time of its death.

But this difference may probably be ascribed, not so much to a peculiarity of the constitution of the dog, as to the fact, that under these circumstances he drinks eagerly and frequently, and by thus distending the stomach in all likelihood favours the occurrence of sickness, or perhaps aids the intestinal distension. In three cats no vomiting whatever occurred. One of these died on the third day, and on inspection, its stomach was found tolerably distended with a distinctly fæcal fluid. Another was killed on the fourth day, and here the stomach was found empty, having an interval of empty duodenum between it and the fæcal contents above the strangulation. The third lived nearly twelve days, with a tolerable appetite and appearance, and at the end of this time was killed: here also the intestinal repletion above the stricture was moderate, but it extended nearly or quite to the stomach, and a small quantity of fæcal matter occupied the cavity of this organ.

Thus not only do these cases present us with what seems to be a rare exception in the human subject, the occurrence of complete intestinal obstruction, and its continuance or fatality, without fæcal vomiting, but two of them further establish that the return of these matters to the stomach does not necessarily imply their ejection thence.*

The date of vomiting appears to be likewise affected by the distance between the ligature and the pylorus; or by the length of intestine which the returning fluid has to traverse. But the comparative shortness of the alimentary canal in these animals renders variations in this respect so limited, and so immeasurably overpowered by differences in the quantity of fluid, that this statement can only be made with caution, especially since it seems probable that the hardened fæces present in their small intestine at the time of ligature may oppose so considerable a barrier, as to render the real distance at first somewhat less than the apparent one, and thus offer an additional element of confusion.

In the human subject, the greater length of the small intestine, and the more fluid condition of its contents, render the date of occurrence a valuable means of diagnosticating the probable

* This analysis of the action, and its separation into two independent stages, is completed by a singular case detailed in the Transactions of the Pathological Society of London, vol. 1, p. 62. Here, owing to an ulcerative communication between the stomach and colon, there was fæcal vomiting without any obstruction.

situation of the stricture, and liable to little source of error save one,—that introduced by the possibility of great variations in the quantity of secretions or ingesta.

The *amount of fluid* much more evidently affected the accession of this symptom, chiefly because a certain amount of distension seemed necessary to the introduction of fæcal matters into the stomach. But it is possible that it may also act in another manner, and favour vomiting by presenting a "*point d'appui*" against which the respiratory muscles may compress the stomach. The peculiarly easy character of this species of vomiting may perhaps be partially explained by the abdominal distension which it supposes.

The *rapidity with which death followed* the operation varied remarkably with the degree of distension. It rarely occurred under forty-eight hours: the maximum time noticed was twelve days, but in this instance the aspect of the animal when killed, and the moderate quantity of fluid contained in the bowel, affords no room to doubt that it might have lived some days longer. In one or two instances, the fatal result appeared accelerated by the accidental complication of sloughing and effusion into the peritoneal cavity, followed by extensive peritonitis.

Theory of fæcal vomiting.—The following theory is, I think, fairly deducible from the preceding facts, and presents at once the most natural and consistent explanation of the phenomena in general.

When any part of the intestinal canal has its cavity obliterated by an immoveable mechanical obstacle, a movement of the ordinary character propels its contents forwards, until they are arrested at the obstructed point. A continuance to the process distends this part of the canal, and gradually the dilatation extends upwards. The analogy of the intestine to the stomach, and the vague results of atmospheric stimulus, lead us to consider its normal movement as almost certainly of a peristaltic character; and if the contents of the dilated part are fluid, this peristalsis tends to develope *an axial reversed* current, which returns matters from the immediate neighbourhood of the strangulation to some higher point in the canal; and thus, if the distension have reached the upper extremity of the duodenum, a portion of fluid possessing the properties of the intestinal contents near the obstructed part occupies the immediate neighbourhood of the stomach; and a continuance of the movement introduces this fluid through the unresisting pylorus,* into the cavity of that organ. Having attained the interior of the

* The little resistance offered by the pylorus to the passage of duodenal contents has been long known; *e. g.*, a little bile generally exists in the non-digesting stomach.

stomach, either by distension or irritation, or both combined, it provokes vomiting, and is expelled from the mouth.

But it is probable that this brief statement of the theory will require modification, to render it applicable to some of the cases witnessed. For though great distension of the intestine was seen to be associated with a complete uniformity of fluid, which perhaps almost presupposes a circulation like that noticed in the stomach, yet, in many cases, the remarkable difference in the consistence of the contents at the obstructed and duodenal ends of the dilatation, would seem to lead us to the inference, that it is only by a slow process that the more solid fæces are broken down. These latter instances, however, equally exhibit a stercoraceous character of the matters vomited, and of the whole contents above the strangulation; and while they prove that uniformity of fluid is by no means necessary to the symptom, or even to the fatal result, they also appear to indicate that a sufficient duration of the action would always convert the partial mixture into a complete one. But it may be questioned how far the peripheral and central currents actually obtain, and whether we may not refer this incomplete mixture to the agitations which the contracting tube impresses on its contents, without supposing any precise direction or number of these movements.

But though in none of these cases has the fæcal obstruction appeared sufficiently hard and complete to form a secondary obstacle, from which the backward current might start (as doubtless happens in those cases of disease where it constitutes the primary cause of obstruction), yet I think it preferable to bear in mind that this would be the chief tendency of an increased consistence of the contents—viz., to increase the distance from the stricture at which the more fluid portions would experience their reflection upwards, and thus to interfere with the perfection of mixture. And, on the whole, the results are so similar in kind, and glide into each other by such insensible degrees, that they are fairly susceptible of being grouped together: the more so, that the fact of a majority of these obstructions in the human subject, being situated in the small intestine, removes a like per centage of cases from the category of imperfect mixture.

And we are no longer at any loss to comprehend how an occlusion of the large intestine returns its contents into the small intestine, and causes fæcal vomiting; since the preliminary dilatation* would produce a patulous state of the ilio-cæcal valve in all respects identical with that seen in the inflated and

* I need scarcely add, that dilatation by the pressure of a fluid implies the exertion of an equal force in all directions and upon all points of the interior—including both surfaces of the valve; and that subsequently a tension of this structure is added, which increases its patulous state.

dried preparation of this part, and the peristalsis would then bring back the natural contents of the tube, and in a greater or less quantity according to the degree in which their previous consistence, the movement itself, and the fluid subsequently poured out, had together resulted in an uniform liquid state.

The degree in which peristalsis is affected by obstruction can scarcely be deduced from these observations: but taken in conjunction with the well-known phenomena in man, they indicate that it is much increased during a considerable time, and while only moderate distension is present; towards the fatal termination, and with excessive dilatation, contractile energy seems somewhat diminished, perhaps we may say exhausted.

The nature of the distending fluid is also little elucidated. One or two microscopic examinations, however, revealed immense multitudes of cytoblasts, and few or none of the ordinary columnar cells; and hence it would appear that the natural secretions are augmented by the products of an over-excited nutrition, which may be compared to inflammation.* Whether this was solely due to the mechanical irritation is doubtful. The share which the ingesta take in increasing the quantity of fluid has been already noticed; how far they affect its quality is less important.

Finally, in *comparing the occluded intestine with the stomach*, it is submitted that the following differences of conditions consistently explain those of the results:—

The former is occupied by fluid in small quantity, and the gradual accumulation of its contents corresponds with the necessary period which precedes the accession of fæcal vomiting. Its parietes possess far less muscular strength than those of the pyloric extremity of the stomach; and thence the dilatation above the stricture, instead of the unaltered shape of the stomach. The time required by the previous difference is yet further increased by this.

The length of the intestine implies an additional period of time before the repletion of the whole can assimilate its condition to that of the naturally filled stomach.

The occasional existence of solid contents in the small intestine of the animals operated on, and in the large intestine of the human subject, offers an obstacle to the production or perfection of the currents, which the ordinary fluid state of the food in human stomachs does not present.

In *comparing* the occluded intestine with *other strangulated tubes*, a consideration of their mechanism also appears to account for their various appearances.

Thus, in an obstructed artery, the distending force is from

* Great differences exist between these appearances and those of the products of idiopathic inflammation in the same tube; but they are excluded as irrelevant to the present subject.

behind, and uniform fluid contents fill its cavity; and hence, if its coats be everywhere of equal strength, the partial preponderance of the force over their resistance will determine an equal dilatation of all parts of the tube.

In an obstructed *bile-duct* we approach more nearly to some of the intestinal conditions. A gradual process of filling here occurs; but the parietes, though little muscular, are tougher and more resisting than those of the intestine. And hence, though the dilatation in its earliest stages exhibits some increase immediately behind the stricture, yet, in a case of long standing, the whole tube and its ramifications are pretty equally distended.

In the occluded *intestine* we are presented with a highly muscular and yet extremely dilatable tube; and hence the swelling behind the obstruction is at first enormous, since the former circumstance carries matters rapidly forwards to that point, while the latter allows of great accumulation before the parts above are implicated. The difference of calibre gradually diminishes as the upper portions successively fill, and perhaps would ultimately disappear, but that death intervenes long before such an event can happen.

The immediate result of such a theory on practical medicine, even when taken at its utmost valuation, may not be large; but if it be true, what has hitherto been thought a symptom will assume the importance of a sign; while the locality of the obstruction will be somewhat indicated by the date of its occurrence. As to the *treatment* of such cases, the theory assigns the causes which accelerate death, and the circumstances with which the greatest delay of that event is associated. It thus establishes, that from the moment of perfect obstruction purgatives are poisons; it indicates the necessity of rigid abstinence from all but the most necessary food, and especially from fluids; and points out opium as the best means of alleviating pain, preventing secretion, and prolonging the doomed life.

But all this is only corroborative of what has been known and done before. The symptom has long been considered pathognomonic, and the ill effects of purgatives are fully recognised. And I am by no means certain that the presumption of situation which the date of the symptom affords, has altogether escaped observation.

The experiments adduced might have been much extended; but there are two facts which may constitute a considerable apology for what would otherwise be a reprehensible parsimony of trouble. The first is, that while, on the one hand, there was some danger of generalizing from insufficient data; on the other hand, every such experiment over and above what was necessary would have been so much cruelty. The next is, that the verification and extension of all these details is unfortunately but

too easy: the collected hospital cases of the next few months would afford ample grounds on which to reject or receive this theory.

But the author ventures to hope that the principle which he has sought to establish will be found substantially correct. And with respect to the doctrine of an antiperistalsis, he knows no better general expression to which this theory could be reduced than the imperishable words of Bacon, with which he begs leave to conclude this paper. "Sunt denique idola quæ immigrarunt in animos hominum, ex perversis legibus demonstrationum, quæ idola theatri nominamus. Neque de philosophiis universalibus tantum hoc intelligimus, sed etiam de principiis et axiomatibus compluribus scientiarum; quæ ex traditione, et fide, et neglectu, invaluerunt."

22, *Bloomsbury-street.*

QUEEN'S COLLEGE, CORK,

FACULTY OF MEDICINE, SESSION 1850-51.

INTRODUCTORY ADDRESS

ON

MEDICAL EDUCATION,

WITH

ESPECIAL REFERENCE TO THE COURSE OF STUDY REQUIRED FOR THE DEGREE OF M.D., IN THE QUEEN'S UNIVERSITY, IRELAND.

BY

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THIS ADDRESS

IS RESPECTFULLY INSCRIBED

TO

SIR ROBERT KANE, M.D., F.R.S.,

PRESIDENT OF THE COLLEGE.

THE limits of an Address do not permit the full discussion of the subject of Medical Education, and the Author has confined his observations to a selection of the more important points deserving of the student's attention.

QUEEN'S COLLEGE, CORK,
November 1, 1850.

SUMMARY.—Medicine a difficult profession.—Extent and importance of the medical sciences.—Pleasure derived from their study, and from the practice of medicine.—The bright and dark sides of the profession.—Importance to success of a high standard of education.—This of two kinds, preliminary and professional.—Objects of preliminary study, and what it should embrace.—Professional study of two kinds, intellectual and practical.—Nature and importance of the latter.—The student is advised to cultivate correct observation, to work diligently during all the years of study, to follow the order of courses recommended by the University, to study equally all departments of medicine, and to rely on his own exertions.—He is reminded of his obligations to the College, the Profession, and his fellow-students.—Claims of medicine to the esteem and gratitude of mankind.—Conclusion.

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Arrangement of the special courses of French, Practical Chemistry, and Natural Philosophy for the students of medicine in Queen's College, Cork, p. 28.

ADDRESS.

GENTLEMEN,—We welcome the students of last year as old friends, and the new-comers, in the hope that between them and us will rapidly grow that kindly intercourse essential not only to our mutual happiness, but to the successful prosecution of the ensuing winter's labours. It is to the latter, or those who now enter for the first time on their professional life, that my observations to-day are more especially addressed, but I trust they may be listened to with advantage by all. The present occasion must ever be an anxious period to both pupil and teacher. To you, on the threshold of a difficult profession, success in which is to be attained only by severe and long-continued labour; and to us, conscious of the importance of the advice which may now be given, to guide you in husbanding your time, and in acquiring, soundly and profitably, that extensive range of knowledge which you cannot be told too early is absolutely necessary to the enlightened physician.

I have said that your profession is difficult, and I feel that it would be doing you a wrong to encourage you now by representing it as easy. The question for you is not,—how great is the difficulty, or how much labour is necessary to overcome it; but, the knowledge and the profession once gained, will you

then be compensated for your industry and self-denial? The difficulty of your profession consists in the acquisition of an extensive range of knowledge, embracing more especially the sciences of Natural Philosophy, Chemistry, and Biology; but the delight experienced in tracing and unveiling the laws of any one of these sciences is so pure as to afford in itself an ample reward to thousands, who devote their lives to their study. In mechanical philosophy you become conversant with those beautiful results of induction—the laws regulating the general phenomena of matter; in the intricate researches of the chemist, with the important laws which determine the special phenomena of external bodies. But how far surpassing in interest to either of these is the science of life, in its double capacity of unfolding, on the one hand, the delicate machinery of the most perfect part of creation, and, on the other, of investigating their uses, and revealing the wonderful design exhibited in the adaptation of structure to function; or, proceeding deeper, to the study of the laws of the mind, which guides, controls, and in its aberrations reacts so powerfully on the physical actions of the frame; and how absorbing, though futile, is the attempt to explore the mysterious nature of life itself!

But however gratifying may be the study of these sciences in themselves, their interest to you is doubly enhanced in their applications to practical medicine, the value of which may be usefully impressed on you at the present time by a few illustrations. In physics, the recent researches of Matteuci on the passage of fluids through animal membranes have explained to us several phenomena in the action of drugs, and have suggested new and important rules to our art. The invention of Arnott has supplied us with the hydrostatic bed and compressor; the one valuable to the sick in relieving and preventing suffering, and the other essential to the equal distribution of pressure applied as a remedial agent. How indispensable

are the sciences of light and sound to the explanation of the morbid states, and in the suggestion of remedies for diseases of the eye and ear; and so important is acoustics to the detection of internal disease that the recent advances of this obscure science have been chiefly contributed by diagnostic physicians. The services of physical science in explaining the phenomena of health, disease, and treatment, are only beginning to be properly appreciated, and a few years will suffice to give it an equal place with chemistry among the fundamental branches of medical learning.

The human body has been likened to a laboratory, in which are constantly proceeding a vast number of intricate chemical changes; and though chemistry has unveiled only a few of these, so important is the light already afforded, that we confidently look forward to the time when the chemist will clear up much that is now utterly obscure, and so change the face of medicine as to make it almost a new science. Chemistry has furnished antidotes to the mineral poisons, and is daily being applied with success to the elucidation of healthy and diseased action. To this science we owe most of our remedial agents, and to it we shall be mainly indebted in the future for the explanation of their mysterious operation, as well as for the only scientific basis of the rules of diet.

So numerous are the applications of anatomical and physiological knowledge to practical medicine, that your teacher of this department will have constant occasion to direct your attention to them. The recent researches of Marshall Hall on the spinal cord, of Dr. Reid on the functions of the eighth pair of nerves, and of Bernard on the secretions of the stomach, pancreas, and liver, deserve prominent notice, from their great value in explaining much that was formerly unintelligible in the diseases of the nervous, digestive, and urinary systems.

Estimated by the extent and importance of the knowledge which it demands, your profession takes precedence of all others; and it would be difficult to indicate any department of mental or physical philosophy of which medicine has not availed itself, or which has not been successfully cultivated by medical men. Its study presents an intellectual feast of the most attractive character, and is in itself a full compensation for your labour.

But it is in the practice of your profession that is found its highest reward. He who unites in himself the successful practitioner and the upright and honourable man, enjoys a position in society which may well be envied. He is the adviser, friend, and confidant, and at all times a welcome visitor of those who possess his professional services. And when to this are added the pleasure derived from abating pain and restoring health, and the yet more divine privilege of saving life itself, I may justly call your's a noble profession, worthy of any amount of toil, and deserving of your highest ambition. As a means also of securing an honourable independence it has many advantages. There are few occupations in which success is more obviously influenced by personal exertion. If you dislike civil life, you may join the army or navy; and should you wish to avoid the severe struggle which the crowd of competitors occasions at home, the world is open to you. There are few emigrants more certain of success than the medical man; his services are welcome to all, irrespective of country or creed. Among my own fellow-graduates there are some metropolitan physicians, some country practitioners, some military and naval surgeons, and some medical missionaries,—all distributed in nearly every quarter of the civilized globe.

Like most things, however, your profession has two sides, a bright and a dark one; and in fairness to you I cannot withhold some account of its gloomier aspect. The ordinary

exercise of the art involves intercourse with grief, contagion, and death. The life, more especially of the country practitioner, is one often of unceasing toil to body and mind; he has no hour by day or night to call his own, and dares not dream of a holiday. The slave of others' caprice and unreasonable fears, he must bear all with patience and meekness; and perhaps after months of anxious attendance and unwearied kindness, he finds coldness and ingratitude growing with the increasing strength of his patient. And the trials of the profession are not confined to rural life. If ambition lead you to a metropolis, long years of unrequited toil may await you, and some may, perhaps, fall victims of excessive mental exertion, or of infectious disease caught in the practical study of medicine. Medicine as a profession is too commonly adopted as an instrument merely of obtaining fortune; and the public is apt to accord consideration to its members in the ratio of their income as successful practitioners, and to neglect unjustly the much higher claims of him who devotes his time and talents to its advancement as a science. Everywhere we have to contend with the hydra-head of quackery, whose pretentious boasting yet deceives a large portion of the public. Too often do we see the charlatan homœopath, the bone-setter, or the mesmerist, rolling in wealth, and followed by crowds, when the enlightened physician is pining in obscurity.

The Government also, on which, by reason of our manifold gratuitous services to the community, we have such strong claims, has neglected us. Complete legislative protection I would not ask, but assuredly efficient means should be taken to enable the public to distinguish readily and certainly the educated and legally qualified practitioner from the charlatan who so often obtains success under the disguise of legitimacy.

But do not let this picture alarm you; it is given to excite you to exertion, for it rests much with yourselves whether

your's be the brighter or the darker lot. I grant that in every physician's career there are circumstances affecting success over which he has little or no control, but their influence is slight when compared with that exerted by the intellectual and moral character of the individual. The rewards of ability and industry,—not always, it is true, adjudged to the most deserving,—are becoming more certain every day. The public is not so readily deceived now as it was, by ignorance concealed under a mysterious solemnity of manner; and charlatans, both within and without the profession, must possess talents of some sort, and a consummate knowledge of mankind, to exercise with success their deceptive calling. Men begin to seek anxiously for the best educated and most skilful practitioner, and are often guided in their selection by the position enjoyed by the candidate in the estimation of his professional brethren.

The moral requisites of the profession, though most important, scarcely fall within my province, which is more especially to enforce upon you the value of a high standard of intellectual education.

To secure the social rank and consideration to which you are entitled as members of a *liberal* profession, and to make your presence acceptable in whatever company your duties may call you, you should be educated in taste, feeling, and manners, at least to the level of good society; and I cannot too earnestly direct your attention to this element of your education, as to the want of it is due a considerable share of the neglect which our profession sometimes receives from the public.

The education required of you by the regulations of our University is of two kinds, preliminary and professional. The object of preliminary education is twofold; first, the development and discipline of the mind, and secondly, the acquisition of knowledge necessary to your position in society,

and much of which is indispensable to the successful pursuit of professional study.

You are required to know Latin and Greek, because an acquaintance with these ancient tongues is essential to the thorough understanding of your own language, and of the technical terms of your profession. Formerly, the classics were trusted to as the best means of securing all the objects of preliminary study; and the youth who could write Latin and Greek verse, though utterly ignorant of all more useful knowledge, was supposed to be educated. But this system is now exploded, and certainly no greater wrong can be inflicted on the youth destined to medicine than an exclusive attention in his school education to classical learning; it absorbs time which may be more profitably employed, and is apt to generate a disposition of mind unsuited to the active and cheerful intercourse with the world which the practice of his art requires. This evil is provided against by the matriculation examination, which demands a certain knowledge of geometry, arithmetic, and geography.

On the subject of the classics, I must protect myself against misapprehension, by observing, that I object to them only when allowed, as is so often the case, to exclude other and important branches of education. I have said that a certain knowledge of Latin and Greek is essential to the medical student; and I am fully conscious that a *complete* course of classical study exercises a beneficial influence in developing the faculties and refining the taste and imagination; but these advantages are secured only by a very long period of study, and such a sacrifice of time as is scarcely compatible with the urgent demands of an extensive system of scientific and practical education. Moreover, it should always be kept in view that, as a means of mental cultivation, the study of French and German is of nearly equal value, and that the acquisition of these modern languages is of direct utility to the practical

wants of our profession. The intellectual training of the young student should be accomplished (and it may perfectly) by the same means which store his mind with useful knowledge. How few of us, even among the most diligent, have acquired a fair acquaintance with a tithe of the knowledge which we feel we ought to possess; how many books we have marked to read—how many subjects to investigate, but for which the time is never found: and surely it is a great error to devote sixteen or seventeen years of that time which subsequently becomes so valuable, exclusively to mental discipline, when by another course that end may be attained, and, as we believe, even more effectually, at the same time that the mind is filled with knowledge capable of daily and useful application.

These remarks on the early education of the medical student apply with equal force to the case of the young lawyer, engineer, merchant, or farmer; and certainly it is not the least of the many important objects contemplated by the Queen's Colleges, that they will show the value of recognising natural and physical science, general knowledge, and modern literature, as essential elements of a liberal education. They understand the spirit of the age, and will meet its pressing requirements, by preparing the students for the *real* business of life.

In offering to direct the studies of the aspirant to the medical profession, we should always bear in mind the urgent claims on his limited time; that he cannot learn all that is or may be useful to him, and that the longest and most diligent life is too short for the acquisition of knowledge absolutely essential to his preparation for the discharge of responsible duties.

I shall scarcely be accused of a disposition to limit his general acquirements, or to undervalue the importance of a good preliminary education; but I am anxious, on the other hand, to avoid an error common to those in my present position, of enumerating such a variety of accomplishments as essential, that

the youth is bewildered and depressed by the conviction of his inability to adopt the counsel given. I am thus led to speak of two branches of instruction generally recommended to medical students—drawing and German. If the youth have a very decided taste for drawing, he may acquire it, but not otherwise. This accomplishment is of very sparing utility, absorbs much valuable time, and is often made a plausible excuse for trifling. It is much cheaper to give our money than our time for illustrations, and to purchase the finished labours of an artist. Of the value of German, as a key to a rich mine of medical knowledge, there is no question; and it is only in relation to the time selected for its study that I now refer to it. It is certainly best acquired as a branch of preliminary education; but students who have commenced their medical course as you have, are often advised to study the modern languages, but more especially French, German, and Italian, as if an acquaintance with these tongues were picked up with the same facility as apples from the ground. But a really useful knowledge of German is not acquired by the majority of youths with less than from nine to twelve months' close and almost exclusive study; and to withdraw that time from the four years devoted to medical instruction would indeed be a fatal error. You must wait until you have obtained your degree, when you shall have more leisure, and when you may, perhaps, have an opportunity of visiting the German Universities, and learning the language in its native country, at the same time that you are extending your knowledge of practical medicine.

Our University has boldly taken a step in advance of many older institutions, in establishing an entrance examination for the medical student; but it is incumbent on me to warn you against the error of supposing that the passing of this examination implies your having obtained an adequate general education. It is difficult for any one institution to exact more without en-

dangering its success; and, as earnestly pointed out many years ago by Sir James Clark, it is the duty, and in the power of the Government only, to enforce by law a really efficient course of preliminary study on every one entering the profession of medicine, and not leave this question, so vital to the best interests of ourselves and our science, to be determined by the mercenary contentions of rival Colleges and Universities.*

In addition to the subjects included in our matriculation examination, a sound and complete system of preliminary education for the young physician should embrace English composition, logic, history, the study of our standard literature, and the acquisition of at least one modern language. Geometry and logic force him to reason and compare, and give him quickness and accuracy of thought; while the other branches remove prejudice, teach him caution, sharpen discrimination, and strengthen the judgment.

Thus educated, with his mind invigorated and stored with a large amount of general and useful knowledge, the student is prepared to enter with advantage on the special and more complex studies of his profession, and he may aspire not merely to the successful practice of a routine art, but to the complete knowledge and advancement of a most difficult science. Your preliminary knowledge already tested by examination, and your medical studies once begun, I recommend you to give your almost undivided attention to the latter; and according to my experience of medical students, you are not likely to neglect this advice. The earnest student is quickly enamoured of his studies, and, conscious of their extent and immense importance to his future career, is most unwilling to devote time to any pursuit not having a direct and obvious bearing on his profession. The combining of extrinsic with essential profes-

* Remarks on Medical Reform, in two Letters addressed to Sir James Graham. By Sir James Clark, Bart., M. D., F. R. S. 1843.

sional study, is, I am satisfied, most injurious in its results, and is not founded on a correct knowledge of the human mind.

The subjects of *professional study* are stated in your curriculum, and the importance of each in relation to the end of all your labours—the successful treatment of disease, will be pointed out by their respective professors. I will not occupy your time now by special allusion to them, but I have some advice to give you applicable to the study of all of these sciences, and to which I beg your earnest attention.

Professional study is of two kinds, which may be named intellectual and practical. By *intellectual* study is understood the reading of books and attendance on lectures, modes of obtaining information with which you are already familiar; but these sources furnish only a portion of the knowledge of the medical man, a large share of which is obtained, and obtained only by *practical* study, *i.e.* by seeing, hearing, feeling, smelling, and tasting the various objects described in your text-books and spoken of in the lectures. Both kinds of study are essential, and it is foolish to vaunt the one and undervalue the other, but the knowledge gained through the senses is the more enduring and the more important. A few illustrations will make this evident to you. Let us suppose that you desire to study the metal potassium, and that you have read its description in your text-book, you will yet have only a very vague idea of its appearance and properties; but the moment you see the metal, and perform for yourself the experiments detailed, a flood of precise and very permanent knowledge is obtained: or you wish to study the brain, and find it impossible to do so with success by merely reading the account of it in your work on anatomy; yet how readily the description is followed with the organ itself before you: or again, how futile would be the attempt on my part to describe to you a drug and its preparations, without the articles before me to illustrate my remarks: or finally, to

take a very familiar example, and suppose that you wish to know the appearance of a man, so as to be able to identify him again with certainty, you would not read a description of his face, or content yourself with a sight of his portrait, but you would take the first opportunity of seeing the individual, and observing for yourself his features; and the same plan must be followed in the study of all the medical sciences.

But it is in obtaining a knowledge of the symptoms and signs of disease that practical education is most indispensable. It is then called clinical medicine, and is, or ought to be, taught at the bed-side of the patient. Those of my hearers who have advanced to this, the most interesting of all their courses of instruction, must be aware that the only means of knowing the jerking pulse of aortic disease, the crepitating râle of a pneumonia, or the bronchophony of a tubercular lung, is to have them pointed out by your teacher, that you may feel them and listen to them for yourselves. Description is here utterly inadequate to supply the place of observation. Or, again, how impossible to obtain a knowledge of diseases of the skin from books, and yet how easily the student recognises an acne, a psoriasis, or a prurigo, when once they have been shown to him on the living body. No diseases are so readily known as these, yet in this country their diagnosis is commonly thought to be difficult, simply because they are not taught in the hospital. Your knowledge of the properties of drugs may be complete, and yet utterly fruitless, if to it is not superadded an acquaintance with their action on the economy, and of the modifying influences of constitution and disease, as ascertained by cautious observation at the bed-side. In clinical medicine, it is desirable that the pupil in the first instance have a teacher in whom he has full confidence, to tell him the name and nature of the pulse he feels, the sounds he hears, and the appearances he sees: and here the evil of an incompetent instructor is most serious, as erroneous impressions of sense, once acquired, are difficult to

eradicate, and will certainly lead to dangerous mistakes in practice.

It would be well if the improvement of the observing faculties formed a prominent feature in intellectual culture from earliest childhood; but it does not, and hence the greater need for the advice I have now to give you,—that, from the first day of your professional career, you cultivate close and accurate observation, and endeavour to educate your organs of sense, by continued exercise, to a high degree of perfection. Your sight may be clear, but you will find that much looking is necessary ere you can distinguish with certainty a glaucoma from a cataract, or the measles from the nettle-rash; your fingers may be delicately sensitive, and yet many and careful trials are required to enable you to distinguish the fluctuation of a fluid from the elasticity of a solid tumour, or the wiry pulse of inflammation from the irritable pulse of excessive loss of blood; your hearing may be acute, yet considerable practice is necessary before you can recognise with certainty the crepitating râle of an inflamed lung, or distinguish to your own conviction a friction sound from a mucous murmur in the chest. And our science, in recent times, has carried observation to parts inaccessible to the unassisted sense by means of instruments, as the microscope and stethoscope, for the successful employment of which much practical training is required. Without this improved faculty of observation, so important in diagnosis and prognosis, it is impossible to pursue successfully the profession of medicine. It distinguishes the mind possessed of real experience from ignorance with grey hairs; as it must be obvious to you that one man may pass his life in practice, and yet, if deficient in this faculty, or too lazy to use it, may have less knowledge than another may acquire in one year by its active exercise.

Do not misapprehend the meaning of these words, and fall

into the error of supposing that intellectual study leads exclusively to a knowledge of the science or theory of medicine, and practical study to a knowledge, only of its art. You derive from each mode of study information in both the science and the art; but assuredly, the diligent pursuit of practical study, independently of its vast importance in the acquisition of knowledge, is such an admirable means of mental training, and of the education of the senses, that it confers ultimately on the student the *tact* so essential to the successful application of his knowledge in the treatment of disease, or, in other words, to the practice of the medical art.

To provide for the cultivation of the observing powers, and the acquisition of practical knowledge, your teachers are required to illustrate their lectures with the objects spoken of, whether instrument, bone, metal, or drug. That you may verify the description with your own observation, and that you may examine and experiment with them at leisure, special classes are instituted, as, practical anatomy, practical chemistry, practical pharmacy, and clinical medicine. And before dismissing this subject, let me tell you that your mere presence in the dissecting room, hospital, and dead-house, or the simple inspection of the appearances of disease, will not make you medical observers. You must frequently, indeed almost always, reflect and reason on what you have seen and heard, before attaining the knowledge you seek. Your business is not simply to ascertain the fact, but you must also determine its absolute and relative value by a searching inquiry into the conditions associated with its existence. Herein lies the great difficulty, and a fertile source of error in medical observation; and herein also lies the necessity of combining intellectual with practical study; for he only who reads and observes with a mind already well stored with knowledge, and fitted for correct reasoning, will profit by experience, and become a skilful physician.

I insist the more strongly on the importance of practical study, because I know that many of the most diligent students of medicine neglect it, under the false impression that it will be time enough to direct attention to practical knowledge when they have completed their College course, and obtained their degree. I earnestly hope that our University will effectually check this evil by the nature of their examinations for the degree. But I trust my remarks have convinced you that the foundation, at least, of practical knowledge must be laid during your College life, and that much of it is obtained *only* by direct instruction from your teachers. If you fail now to cultivate observation, and secure a certain amount of practical skill, you will be wanting hereafter in the most efficient means of self-instruction.

You are required to devote four years to your medical studies, and if you believe what I have said of their extent and difficulty, you must feel that the period is short enough, and you will be willing to accept my warning against a common and serious error of the medical student—that of sacrificing the first and second years to trifling and pleasure, in the vain expectation that he will be able to make up for the lost time by extra exertion during the third and fourth. I can tell you the consequences, having too often seen them. When the defaulter at last begins his task, overwhelmed and embarrassed by the amount of work before him, he soon abandons all hope of acquiring a sound knowledge of his profession, and confines his ambition to the passing of his examination. He goes to a grinder, is crammed with facts and answers to catch-questions, and hurries from subject to subject with a haste quite opposed to the sure and systematic advance of the regular student. Instead of the pleasure and intellectual strength derived from well-arranged study, he is continually harassed with a painful anxiety as to the result. He may struggle through his examination, but

his superficial and hastily acquired knowledge of facts without principles quickly passes from his mind. Perhaps one of ten has the moral courage and perseverance to commence his studies anew, and ultimately to redeem his past folly; whilst the remainder, after two or three ineffectual efforts to restore their knowledge, purchase books of formulæ, and sink irretrievably into routine practitioners.

This College has endeavoured to secure uniformity of study on the part of the students preparing for the University degree, by submitting them at the end of each year of study to a pass examination on the subjects of the lectures attended by them during that year. I attach much value to this regulation, and I am glad to be connected with an institution which has been the first in these Islands to take this important step in the improvement of medical education. It must be gratifying to the parents of such students to be assured annually of their steady progress in professional knowledge; and, on the other hand, to know that idleness will not pass unchecked by official warning. And let me assure the students themselves, that any trouble which the passing of this examination may occasion will be far more than compensated by the light and cheerful spirit with which they will enter on the following year's labours, when satisfied that they have done justice to those of the past; and they will be enabled to go through their entire curriculum with a healthy self-reliance and certainty of ultimate success, to which medical students are too often strangers. The multiplicity and extent of the subjects on which they have in the end to undergo examination, may well oppress with anxiety even the most diligent, unless assured from time to time, that their studies are being conducted rightly and successfully. Moreover, our students may safely entertain the hope that good marks obtained at these annual examinations will receive due consideration at the final trials for the degree.

To provide against another error of the student, productive of great present irregularity, and of serious injury to his future progress, namely, the mal-arrangement of his classes, the University has prepared an order of study which, though not absolutely enjoined (from the inconvenience which some of you, qualifying for other boards, might otherwise experience), is strongly recommended for his adoption. The principle of it is obvious. Passing from the elementary and general to the more complex and special accessory sciences, the student is finally brought by progressive steps to the practical and more difficult departments of medical study. The first and second years may appear to be overloaded, but the arrangement enables the pupil to concentrate his attention on the more important and difficult subjects allocated to the third and fourth years; and time is secured for efficient attendance on clinical medicine and surgery. And the University could not ignore the fact that some of you have to qualify for other boards, and will require attendance on extra courses of anatomy and surgery in the two last years.

Another word of advice and I have done: avoid the error into which many students fall, of confining their attention to one department of the profession, whether surgery or medicine, to the neglect of the other. I can recollect some of my fellow-students, who, believing themselves endowed with manual dexterity, and attracted by the reputation of a successful operator, devoted themselves almost exclusively to surgery and plumed themselves especially on their ignorance of medicine. This is very contemptible, and I cannot warn you too anxiously against it. The division of labour in our profession is convenient in practice, but should be unknown to the student, who, to be well versed in any one department, must be fully educated in all; and moreover, it is rarely possible for any one of you, during the period of your studentship, to be certain whether your lot in future life will be that of the physician, surgeon, or general practitioner.

Such, Gentlemen, is the counsel I beg to offer you on the subject of your education, and I urge you not to waste time, nor neglect the opportunities of improvement here afforded. Superiority, or great natural gifts, are not given to all; but in demanding the exercise of various talents, our profession has the advantage of placing its members on a footing of near equality; for where one is endowed with high reflective intellect, another has greater facility of observation, a third superior industry or capacity for labour, and a fourth may have pre-eminently the rare talent of common sense,—a most important element of success in the practice of medicine, and the possession of which will go far to compensate the physician for the want of higher powers. But, whatever be the talents that nature has confided to your keeping, you are required to make the best possible use of them, if you hope in the future to practise the art with an approving conscience. Life is dear to man, and bodily suffering often terrible; and, he who, imperfectly educated and incompetent, undertakes to save the one or abate the other, incurs a great responsibility; and his nature must be blunt indeed if he be not filled with bitter repentance and remorse for time mis-spent, talents prostituted, and opportunities neglected.

I have held up to you as your best reward the pleasure derived from the study and practice of medicine; but a generous Government, anxious to excite emulation and stimulate exertion, has furnished additional inducements to industry, in prizes and scholarships, not surpassed in value by those of any other medical school in this country. Of the great utility of such incitements to diligence, I never had any doubt; and our University has happily removed the only valid objection to the system of prizes, namely, the danger of their causing an exclusive devotion of the pupil's attention to one subject, by awarding the scholarships to the students who exhibit the highest proficiency in all the subjects of the previous year's study.

Do not fall into the mistake of supposing, "that for the formation of your professional characters your teachers alone are responsible. The very best instructions, falling upon a barren soil, are utterly fruitless. The most accomplished lecturer may as well discourse to empty benches as to the careless, inattentive student. The sagacious physician, or the dexterous surgeon, may work any number of miracles of science at the sick bed, before the eyes of a crowd of pupils, with no good result, except to the patient, if you do not strive to understand the rationale of their proceeding, and to acquire the knowledge by which you may yourselves be equally successful. On the other hand, the earnest and discriminating student is comparatively little dependent upon the guidance of the teacher under whom he may chance to be placed; but draws from the dissecting-room, hospital ward, and dead-house, and from the works of the masters of their respective departments, the information which the inefficiency of the lecturer, on whom he attends, or the unskilfulness of the practitioners whom he follows, may fail to afford him. In almost every walk of life, the knowledge which a man gains by his own exertions is that which he most prizes, and which is most fruitful in all good results; and in no case is this more evident than in our own profession."*

I have recommended diligence as the surest and most honourable means of securing your own success; and I would now appeal to you in behalf of the young institution in which we are assembled, and whose reputation will be made or lost mainly by the character and future position of its *alumni*. Though students now, let me carry you forward to the time when I may be able to point to some of you as men advancing our difficult science, and adorning by their learning and virtues the profession of which they are members; and when you may be able to refer with pride to the Cork Queen's College as your

* Dr. Carpenter on the Objects of Medical Study. *Medical Gazette*, October, 1848.

common *alma mater*. The pride is honourable and the pleasure is pure which are associated with the place of our education, and I trust they may be realized to you.

I would remind you, also, of your obligations to your profession, that you may endeavour to reflect upon it a portion, at least, of the honour it confers upon you. The elevation generally of the profession in the social scale will be accomplished solely by the improved knowledge, virtues, and usefulness of its individual members; and you need not indulge the hope that any measure of medical reform or legislative enactment will raise our status otherwise than by enforcing a better training of the youth destined to medicine, and higher general and professional acquirements.

We are unjustly accused of being unfriendly among ourselves; but in all large towns we have our societies, where we meet as well to cultivate mutual kindness as to promote science; and throughout Europe we maintain together a most friendly and beneficial intercourse to an extent quite unknown in the other professions; and I could point to you many instances of young men advancing successfully in their profession, in virtue of aid received from professional brethren, where no claim whatever for the kindness existed except, perhaps, that of a desire to do well. But, Gentlemen, the severe contest for practice, the main source of the uncharitableness which sometimes unhappily exists among medical practitioners, is unknown to you as students; and I urge you to cherish a good understanding among yourselves. The present is probably the best opportunity that you will ever enjoy of sowing the seeds of genuine friendship, by which you will secure happiness not only for the time of your studies, but lay up a store for after life. Into your rivalry for prizes and scholarships let not the canker-worm of envy enter. "It is the product of a narrow and unwholesome mind, and will but

ill attain the object at which it strives. He who repines at another's success, or listens to the recital of the errors or misfortunes of a rival with a malicious joy too vivid to conceal,—who is nervously jealous of the little reputation he may have scraped together, and trembles with anxiety and anger if it be but rubbed against,—surely such a man need not be the object of our envy, and has been punished for his own, for it has led him to adopt a line of conduct the very opposite to that which is calculated to make him happy in himself, or respected by his fellows. Let us meet one another with the open brow of candour and the open hand of fellowship, as labourers in the same rich field, and as all striving for the same good and great object—the advancement of knowledge and the alleviation of human misery. Our time is but short in this world, and should not be frittered away in murmurings and contentions one with another. Let our only rivalry be that of enlightened and generous minds, a friendly strife who shall exert himself most for the benefit of others, and who shall advance furthest, and with the most unblemished steps, in the honourable paths of science and humanity."* Let us be *united* in truth as well as in name.

Our claims on the esteem and gratitude of men are freely admitted. It would be difficult to refuse respect to a profession which is indispensable to civilized life; whose constant occupation is the alleviation of suffering and cure of disease; which gives more time and labour to the poor than all the other branches of society together; which exhibits unwearied devotion to the cause of science, and which can cite the names of Harvey and Hunter, of Bichat and Cuvier, of Jenner and Sympson, of Faraday and Alison.

Thus, Gentlemen, estimated by the extent and importance

* Introductory Lecture on Surgery. By James Miller, Professor of Surgery in the University of Edinburgh. 1840.

of the knowledge it demands, by its past services and present value to society, by the names illustrious in science, literature, and philanthropy, of which it can boast, your's is a noble profession; opening to all a wide field of usefulness, and holding out rewards to the most honourable ambition.

I add the curriculum for the degree of M. D. in the Queen's University, Ireland, to which reference has been repeatedly made in the preceding address. Every candidate is required to pass the matriculation examination, and to give evidence of having attended the following courses of instruction during a period of at least four years. The order of study here given is recommended to the student, but is not absolutely enjoined.

First Year.—Anatomy and Physiology; Chemistry; French or German: *Six Months.* Natural Philosophy; Botany: *Three Months.*

Second Year.—Anatomy and Physiology; Materia Medica; Practical Anatomy: *Six Months.* Practical Chemistry: *Three Months.*

Third Year.—Surgery; Midwifery; Clinical Surgery: *Six Months.* Comparative Anatomy: *Three Months.*

Fourth Year.—Practice of Medicine; Medical Jurisprudence; Clinical Medicine: *Six Months.*

Every candidate is required to give evidence of having attended a general hospital during twenty-four months, or an hospital for eighteen months and the out practice of a dispensary for six months; also, of having received instruction in practical pharmacy, for three months.*

The only courses in this curriculum requiring special notice here are French, Natural Philosophy, and Practical Chemistry.

The introduction of French into the curriculum is a violation of the principle which separates preliminary and professional study, rendered necessary by the imperfect condi-

* In the Prospectus of the Faculty will be found all the Statutes relative to the degree, and the details of the matriculation and scholarship examinations.

tion of many of the preparatory schools in Ireland, where efficient instruction in the modern languages is not provided. The evil of this encroachment on the time set apart for medical education has been, to a certain extent, removed by the selection of medical authors for perusal by the pupils; a plan of study which I adopted myself with advantage in the acquisition of German, and which I have often recommended to students.

The Professor of Modern Languages in this College has arranged a French course exclusively for students of medicine, in which the regular class-books are Bichat's Recherches physiologiques sur la Vie et la Mort, and Pariset's Eloges des Membres de l'Académie Royale de Médecine; and extracts from the following works will be read to the pupils for exercise in dictation:—Leçons de Philosophie chimique, par Dumas; Leçons sur les Phénomènes physiques de la Vie, par Magendie; Discours sur les Révolutions de la Surface du Globe, et sur les Changemens qu'elles ont produits dans le Règne Animal, par Cuvier; Recherches expérimentales sur les Propriétés et les Fonctions du Système nerveux dans les Animaux vertébrés, par Flourens; Histoire de la Médecine, par Rénouard; and the Recherches anatomico-pathologiques sur l'Encépale et ses Dépendances, par Lallemand de Montpellier. This arrangement has the advantage of introducing the student to the rich mine of knowledge which an acquaintance with the language will open to him, and of making him familiar with some of the great names of France in general science and medicine. Nor are these benefits obtained by any sacrifice of education in taste, an important object in the study of the languages, for,—and, as members of the same profession we may be proud of the fact,—the works above cited of Bichat, Pariset, and Lallemand, are scarcely excelled for elegance and purity of style.

The students have expressed themselves highly satisfied with this arrangement, and I am confident of its leading to good results.

Attendance on natural philosophy is made imperative on the medical student for three months only, but he is invited by the Professor (and this year I am glad to say that the majority of the students have embraced the offer) to attend the entire course, extending over seven months. This course comprehends, first, the general laws of matter, at rest and in motion, or statics and dynamics, with the subsidiary sciences of, mechanics, astronomy, hydrostatics, hydraulics, pneumatics, acoustics, optics, heat, and electricity; and secondly, a course of lectures adapted exclusively to students of medicine, on the special applications of natural philosophy to medical science. The following is a synoptic view of the course on MEDICAL PHYSICS:—

Phenomena of life divisible into two classes, *physical* and *vital;* their mutual relation; value of a knowledge of the first class to the physiologist, pathologist, and therapeutist.

IMBIBITION.—Endosmose and exosmose through animal membranes; endosmometer; Dutrochet's, Hales', Magendie's, Matteuci and Cima's, and Liebig's experiments; capillary circulation; Poiseuille's experiments; applications of the laws of endosmose to absorption, secretion, cell-growth, action of saline purgatives, &c.

HYDRAULICS.—Circulation of the blood; its mechanism and forces; velocity of the circulation; experiments of Hering, Matteuci, Poisseuille, and Hales; pressure of the blood on the blood-vessels; Poiseuille's hœmo-dynamometer; special physical conditions of the cerebral circulation; Arnott's hydrostatic bed and compressor; Hooper's water-cushion; stomach syphon, and pump; cupping.

PNEUMATICS.—Respiration; its mechanism; changes produced in the air; gaseous endosmose; Valentin and Brunner's researches; Graham's experiments; force and volume of inspiration and of expiration; Hutchison's spirometer; effect of perforation of the thorax.

ANIMAL MECHANICS.—Muscular contraction, velocity and extent of motion, how gained; system of levers in the body; influence of atmospheric pressure on the joints.

SOUND.—Mechanism of the voice; its *timbre;* the voice as heard in the chest, and its modifications; consonance of the voice; hearing and its mechanism; auscultation and stethoscope; laws of the production of sound by percussion, and their applications to diagnosis.

LIGHT.—Influence of, on the development and on the colours of animals; eye, and the mechanism of vision; adaptation of the eye to vision at different distances; presbyopia and myopia; achromatism of the eye; specula, eye-glasses, and microscopes.

ANIMAL HEAT.—How produced; agency of caloric on vital action.

ANIMAL ELECTRICITY.—Muscular electrical current, its direction, intensity, and origin; electric current of other tissues and organs; electric fishes, and the mechanism of their electric organs; relation of electricity to the nervous force; effects of the electric current on the muscles, nerves, &c., of animals; different effects of the direct and inverse current.

I again state my conviction of the value of the study of natural philosophy to the student of medicine, considered either as a means of intellectual discipline, or as affording important light to medical science, and valuable resources to medical art.

The course of PRACTICAL CHEMISTRY is adapted to the special wants of the medical student; and his attention is directed more to the different methods of chemical manipulation and qualitative analysis than to the preparation of substances. He is presumed to be well grounded in the general principles of the science of chemistry, having attended the systematic course during the previous year. He is first made acquainted with the ordinary operations in analysis, as pulverization, solution,

decantation, evaporation, distillation, sublimation, &c.; and is then required to practise the construction and arrangement of apparatus for pneumatic chemistry, and for the preparation of chemical and pharmaceutical substances. Recourse is had as much as possible to the Pharmacopœias, for practical illustrations of the different processes. He is then conducted through a regular course of qualitative analysis, and is made to employ the knowledge thus acquired for the discovery of the adulterations of drugs, and the presence and nature of poisons; and to the qualitative examination of mineral waters, the fluids of the body, urinary deposits, and calculi.

In closing these remarks I cannot omit referring to the curriculum for the arts degree in our University* as a course of study admirably adapted to secure the ends contemplated in the preliminary instruction of the young physician. The Statutes permit the student to take both degrees in Arts and Medicine in five years, but I would earnestly recommend such parents as have selected our profession for their sons, to send them to College at the age of 15, that they may complete the arts curriculum, and be prepared at the age of 17 or 18 to commence their medical course, to the subjects of which they will then be able to give undivided attention. It is thus that we shall be able to accomplish our anxious wish of sending forth men fitted to raise our social position and advance our difficult science.

* First Session.—The Greek and Latin Languages. The English Language. The French Language. Mathematics. Second Session.—Logic. Chemistry. Natural History and Physical Geography. The Higher Mathematics, or, The Greek and Latin Languages. Third Session.—Natural Philosophy. History and English Literature. Metaphysics, or, Jurisprudence and Political Economy.

THE END.

HOSPITAL FOR CONSUMPTION
AND DISEASES OF THE CHEST,
BROMPTON.

The First Medical Report

OF THE

HOSPITAL FOR CONSUMPTION

AND

DISEASES OF THE CHEST,

PRESENTED TO THE

COMMITTEE OF MANAGEMENT,

BY THE

PHYSICIANS OF THE INSTITUTION.

London:
PRINTED BY WATERLOW & SONS, LONDON WALL.

1849.

CONTENTS.

To the Committee of Management of the Hospital for Consumption and Diseases of the Chest.

GENTLEMEN,

In compliance with your request, we beg to submit the following Medical Report of this Hospital, from the date of its establishment in the year 1842, to the end of the year 1848 :—

Previously to the close of last year, it seemed undesirable to publish a Report, for the following reasons :—The number of Consumptive Patients relieved, when the Hospital was opened at Chelsea, was comparatively small, —the Hospital there accommodated, as you are aware, only twenty Patients, and the Out-Patients were not nearly so numerous as those who are at present in attendance. The Hospital at Brompton, which now admits 85, at first received but 30 Patients; the number of Out-Patients who then attended was scarcely a third of those who are now receiving relief. Thus, the number of Consumptive cases was not, in our opinion, sufficiently large, before the present period, to warrant the deduction of general conclusions.

It will be observed that although the number of Patients who have received relief amounts to 10,939, not more than 4,358 are included in this Report. Amongst those who applied for relief were many suffering either from Bronchitis in various degrees of aggravation, or from other diseases of the organs of the Chest; not a few from Coughs, symptomatic of disorders of distant organs, or from painful affections of the Chest, not connected with pulmonary disease. The prevalence of Influenza at one period very much swelled the list of applicants; some have presented themselves with varieties of indigestion, which, in consequence of incidental debility and other symptoms, had induced the apprehension of Phthisis; and it has often been a source of great satisfaction to us to be able, after careful examination, to discharge a considerable number of such individuals, with the consolatory assurance that there were no evidences of the disease they dreaded. These facts will explain the difference between the number of Patients relieved, and that included in this Report, which is intended to apply only to Consumption. The Report, also, must

be received, not as including all the facts concerning every Consumptive Patient relieved by your Institution, but as containing such of them as have been carefully observed in 4,358 cases—a number greater, as regards Consumption, than has heretofore been analyzed for scientific purposes, and having claims to more attention, from its including in it only those in whom the existence of the disease admitted of no doubt.

The Report, though it does not embrace all the points on which it is desirable to make enquiries respecting Phthisis, many of which must be left to the individual labours of the Medical Officers, will, we trust, be found to furnish information calculated to advance Medical Knowledge, and at the same time to interest the friends of the charity. In conclusion, we beg to observe that measures are in progress for ensuring such regularity and correctness in the Hospital Records, as will enable us to furnish in future a medical and statistical report at fixed periods.

We have the honour to be, Gentlemen,

Your obedient Servants,

HAMILTON ROE, M.D.
THEOPH. THOMPSON, M.D.
GEORGE CURSHAM, M.D.
RICHD. P. COTTON, M.D.
RICHARD QUAIN, M.D.
JOHN J. BOWIE, M.D.

Hospital for Consumption, Brompton.
April, 1849.

REPORT.

THIS first Report of the Hospital for Consumption and Diseases of the Chest, is founded on the combined observations of the Physicians by whom it is presented, and is arranged under the following heads:—

I.—The number of Patients treated, and the facts in their history which have reference to the origin and progress of Consumption.
II.—Some of the principal signs and symptoms of the disease.
III.—The duration of the disease, and the results of treatment.

Various other subjects are still under investigation: such as the influence of locality, of habits of life, or of previous disease in producing Consumption; the connexion between Scrofula and Consumption; the influence of the disease in suspending or altering various secretions and functions of the body; the characteristic signs of Phthisis in its earliest stage; the further effects of reputed remedies; &c. Observations upon these subjects will be made in future Reports.

1*st.—Number of Patients.*

On referring to Table I., it will be seen that the entire number of cases received into the Hospital, from its commencement to 31st December, 1848, is 888; and of those treated as Out-Patients, 10,051.

TABLE I.

Total number of Cases treated in the Hospital from September, 1842, to 31st December, 1848	888
Total number of cases treated as Out-Patients from September, 1842, to 31st December, 1848	10,051

As this Report has reference only to cases of Phthisis, all other Diseases of the Chest are excluded from it; and consequently, as will be seen in Table II., the number of cases is reduced to 4,358—of whom 888 were In-Patients, and 3,470 Out-Patients.

TABLE II.

			Total.
Total number of cases of *Phthisis* treated as *In-Patients*, from September, 1842, to December 31st, 1848	Males ..	542	888
	Females	346	
Total number of Cases of *Phthisis* treated as *Out-Patients*, from September, 1842, to December 31st, 1848	Males ..	2,137	3,470
	Females	1,333	
			4,358

2nd.—Influence of Sex and Age.

a—Sex.—In the preceding Table it will be observed, that of the 888 In-Patients, 542 were males, and 346 were females—the males constituting 61 per cent., and the females about 39 per cent. of the whole number. Of the 3,470 Out-Patients, 2,137 were males, and 1,333 were females,—the males here also being, as nearly as possible, 61 per cent., and the females a little more than 38 per cent. When it is remembered that the number of females in London somewhat exceeds that of males, the relative prevalence of the disease in the latter must be considered in reality slightly greater than even appears from the Table. A much greater liability to Phthisis is thus shown to exist in the male than in the female sex. This is not in accordance with the opinion entertained by writers of authority on the subject in this country and on the Continent, still we can see no reason for doubting the conclusion to be drawn from these Tables, as the facts are of a nature which scarcely admit of any error. The excess of males over females, thus shown, cannot be attributed to the greater number of that sex who attend at hospitals generally, as the converse is known to be the case. At St. George's Hospital, in one district, for example, the proportion of females to males during the past year, amongst the Physician's Patients, was as about 15 to 9. At the London Hospital, in another district, the female Out-Patients of the same class were to the males in nearly a similar ratio. The correctness of the conclusion as to the greater liability of men to Consumption in the Metropolis, is further shown by a reference to the Mortality Tables of the Registrar-General. From the year 1843 to 1846, inclusive, the number of male deaths from Phthisis in London was 14,836; whereas that of females was only 12,988: being in the proportion of about 53 per cent. of males to 47 per cent. of females. The proportion at Brompton being 61 per cent. of males to 39 per cent. of females.

It has not escaped our observation, that in the country the relative proportion of Phthisical males and females differs from that shown here. In the year 1842, the return of the Registrar-General gives the number of male deaths from Phthisis in the Provinces as 24,048, and that of females 28,098.

b—Age.—The annexed Table, No. III., shows the ages in decennial periods of 2,679 males and 1,679 females, labouring under Pulmonary Consumption, and the per centages of the sexes at each period of life.

TABLE III.

Ages.	Males.	Per Cent.	Females.	Per Cent.	Total.	Per Cent.
0 to 5 ..	9	0·33	12	0·71	21	0·48
5 to 15 ..	125	4·66	112	6·67	237	5·43
15 to 25 ..	695	25·94	574	34·19	1,269	29·11
25 to 35 ..	953	35·50	578	34·42	1,531	35·13
35 to 45 ..	570	21·27	271	16·14	841	19·29
45 to 55 ..	251	9·37	110	6·55	361	8·28
55 to 65 ..	68	2·53	21	1·25	89	2·04
65 to 75 ..	8	0·29	1	·05	9	0·20
Total Males ..	2,679	Total Females ..	1,679	..	4,358	..

Viewing the sexes collectively, the first conclusion to be drawn from the examination of this Table is, that the period of life at which the liability to Consumption is greatest in both sexes, is from 25 to 35 years of age. The disease occurred at this period of life in 953 males, out of 2,679 cases, or in nearly 36 per cent. of the whole; and in 578 females out of 1,679 cases, or in a little more than 34 per cent. If we compare the numbers affected at the different periods of life under and above that just mentioned, and hence infer the liability to Consumption in the sexes during these periods, we find that it is not alike in both; for example, under 25 years of age the liability is greater in females than in males by nearly 10 per cent.: whilst above 35, the liability is greater in males than in females by about 12 per cent.

Comparing the liability of individuals of the same sex at different periods of life, we find that in males the disease is slightly less frequent before the age of 25 than it is after 35, being in the proportion of about 31 to 33; whereas in females, the liability to the disease is considerably greater before the age of 25 than after 35, being in the proportion of about 41 to 24. This difference, perhaps, depends in some measure on the influence of hereditary predisposition, which, as will subsequently be shown, manifests its effects much more frequently in females than in males, and therefore it may be expected to do so in early life. On the other hand, males are subjected to various injurious influences resulting from their pursuits, habits of life, trades, and occupations, tending to the de-

velopment of the disease at a later period of life. The practical conclusion, however, to be derived from the examination of these facts, is this, that the period of human life from 25 to 35 is a most important one in both sexes, as far as the development of Consumptive disease is concerned: hence the peculiar necessity of guarding against all those circumstances which may tend to the production of the disease, and of carefully watching the earliest indications of its approach. The vigilance always necessary, is especially requisite in the case of females from 15 to 25—a period of life at which the liability to disease is nearly as great as it is from 25 to 35, when it has reached its maximum. On looking over the columns of the Table which contain the numbers of the Patients, we notice that they are very few at first, *i.e.*, below 5 years of age—they gradually rise up to the period of 35 years of age, and as gradually fall until they become as few between the ages of 65 and 75 as they are under 5 years of age.*

* The comparisons made in the preceding observations, afford, no doubt, a pretty accurate estimate of the relative liability of different ages to Consumption. Feeling however, that these conclusions may be in some degree modified by a reference to the greater or less numbers of persons living at different ages, the following Table has been prepared :—

TABLE IV.

Showing a Reduced Scale of the Population in London at different Ages, according to the last Census, and the per centage of the Cases of Phthisis in relation to these numbers.

Ages.	The numbers of Cases of Phthisis, Males and Females	Reduced Scale of Population, Males and Females.	Ratio Per Cent. of Cases of Phthisis.
5 to 15 ..	237	3,799	6
15 to 25 ..	1,209	3,922	32
25 to 35 ..	1,331	3,151	42
35 to 45 ..	841	2,559	32
45 to 55 ..	361	1,656	21
55 to 65 ..	89	945	09
65 to 75 ..	9	497	2

The most obvious inferences to be drawn from the above Table are—1st, that from 25 to 35 is in reality the period of life at which the liability to Consumption is greatest in both sexes; 2ndly, that after that age, the frequency with which the disease occurs, is greater than is shown by Table III.; for, instead of being 35, 19, 8, and 2 per cent. in the consecutive periods from 25 to 65, the consecutive per centages taken from the numbers living at these periods, are 42, 32, 21, 9.

3rd.—Social Condition.

Under this head is distinguished the single, married, or widowed state of the Patients.

As the influence of social condition upon the development of disease has been discussed by statistical writers, we cannot with propriety omit giving the results of the inquiries made respecting the Consumptive Patients treated at Brompton; they are shewn in the following Table.

TABLE V.

Showing the Social Condition of 4,056 *Individuals affected with Phthisis, treated at the Hospital, from September,* 1842, *to December* 31, 1848.

Social Condition and Age.		Males.	Per Centage of the Total No. of Males.	Females	Per Centage of the Total No. of Females.	Total of both Sexes.	Per Cent. of both Sexes.
Single ..	Under 25	633	25.2	540	35.0	1,173	28.9
	Over 25	475	18.8	319	20.6	794	19.5
Married	Under 25	100	3.9	94	6.0	194	4.8
	Over 25	1,240	49.3	489	31.7	1,729	42.6
Widowed ..	All Ages.	66	2.6	100	6.4	166	4.0
Total Males ..		2,514	Total Females	1,542	Total, both Sexes ..	4,056	—

With the view of ascertaining whether Consumption owes its origin in any degree more than any other disease to the influence of social condition, a Table has been prepared showing the social condition of 2,028 Patients of a General Hospital, *i. e.*, one-half the number of the Consumptive Patients tabulated above.

TABLE VI.

Showing the Social Condition of 2,028 *Individuals, treated as In and Out-Patients at a General Hospital, exclusive of Cases of Phthisis.*

Social Condition and Age.		Males.	Per Centage of Total Number of Males.	Females	Per Centage of the Number of Females.	Total.	Per Cent. of both Sexes.
Single ..	Under 25	309	35.6	468	40.3	777	38.3
	Over 25	87	10.0	112	9.6	199	9.8
Married .	Under 25	24	2.7	49	4.2	73	3.6
	Over 25	406	46.7	400	34.4	806	39.8
Widowed ..	All Ages .	42	4.8	131	11.2	173	8.5
Total Males ..		868	Total Females.	1,160	Total, both Sexes ..	2,028	—

In the following Table, an abstract is given of the two preceding Tables, for the purpose of instituting a comparison between them.

TABLE VII.

Showing comparatively (per cent.) the Number of Individuals, Married, Single, or Widowed, amongst the Consumptive Patients of this Hospital, and the Non-Consumptive Patients of a General Hospital at certain Ages.

Social Condition and Age.		Consumptive.		Non-Consumptive.	
		Males Per Cent.	Females Per Cent.	Males Per Cent.	Females Per Cent.
Single	Under 25 ..	25.2	35.0	35.6	40.3
	Over 25 ..	18.8	20.6	10.0	9.6
Married ..	Under 25 ..	3.9	6.0	2.7	4.2
	Over 25 ..	49.5	31.7	46.7	34.4
Widowed ..	All Ages ..	2.6	6.4	4.8	11.2

It will be observed that amongst the Consumptive Patients, single, and under 25, females exceed males by 10 per cent., a fact which agrees with what is already stated at page 9; where it is shewn that Consumption is more frequent in females than in males under the age of 25. In the single above 25, the proportions of the sexes are nearly equal. Of the Consumptive Patients married under 25, the numbers are few, but the females exceed the males by more than one-third,—a fact in some degree to be accounted for by the greater number of females—as compared with males—who marry at an early age; of those married over 25, the males exceed the females by 18 per cent. This difference may, in some degree, be owing to Consumptive unmarried females dying under 25 in a larger proportion than males at the same period of life, as just now stated. Of the widowed Consumptive Patients, the females are to the males in the proportion of 3 to 1.

On comparing the Consumptive with the non-Consumptive Patients, it will be perceived that the single persons under 25, including males and females attend in larger numbers at a General Hospital in London than at the Consumption Hospital; possibly because at the former more young persons seek relief in consequence of the greater facility with which they can attend, than at Brompton, which is some little distance from town. On the other hand, the number of single persons over 25 at this Hospital, is nearly double that treated at a General Hospital. Comparing the married persons of both Institutions, the Consumptive males and females under 25 will be found to be slightly more numerous than non-Consumptive Patients at a General Hospital, *i.e.*, in the proportion of about 9 to 7; those over 25 are in nearly similar proportions at both.

It will further be observed, that amongst the Consumptive Patients married

over 25, the males exceed the females by about 18 per cent, and the non-Consumptive males exceed the non-Consumptive females by about 12 per cent. On the other hand, amongst the Consumptive Patients unmarried under 25, the females exceed the males by about 10 per cent., whilst the non-Consumptive females exceed the males by only about 5 per cent.; these facts suggest some interesting conclusions, and also tend to confirm the inference already drawn, that Consumption is more fatal to females than to males under 25 years of age.

The widowed non-Consumptive are more than double the number of widowed Consumptive Patients, whilst the number of widows of both classes is much greater than that of widowers.

4th.—Trades and Occupations

Are next to be considered, with a view to ascertain how far they influence the production of Phthisis. The following Table gives the occupations of 4,358 Consumptive Patients, that is, of 2,679 males, and of 1,679 females.

TABLE VIII.

Showing the Occupations of 4,358 *Patients labouring under Phthisis, treated as In and Out-Patients, from September,* 1842, *to December* 31, 1848.

MALES—Total, 2,679.

In-Door.		Out-Door.		Mixed.	
Clerks, Warehousemen, and Shopmen	314	Labourers of various kinds	490	Carpenters	120
Mechanics	370	Coachmen and Cabmen...	109	Painters and Glaziers	73
Servants	237	Butchers	15		
Tailors	192	Various occupations .	184		
Shoemakers	127				
Printers and Compositors	104				
Weavers and Glovers ...	22				
Bakers	45				
Various	146				
None, or under 15 ...	231				
Total In-door ...	1,688	Total Out-door ...	798	Total Mixed ...	193

FEMALES—Total, 1,679.

In-door.		Out-Door.		Mixed.	
Servants, or persons engaged in in-door occupations	896	None.		None.	
Milliners, Dress-makers, Needlewomen, and Straw-bonnet Makers .	312				
Laundresses	82				
Governesses	10				
No occupation, or under 15	439				
Total In-door ...	1,679				

In forming this Table, we have distinguished in-door from out-door occupations, and have placed in a separate column those which partook of the character of both.

Those occupations are classified separately in which the numbers of persons engaged in them were sufficiently large to entitle them to a separate consideration; when, however, they were too few to justify the deduction of any special conclusions, or the circumstances under which they were placed were similar, their occupations were grouped with those to which, in their leading features, they appeared to be analogous: thus, Tailors, Shoemakers, Servants, &c., are kept separate, whilst Clerks, Warehousemen, and Shopmen, are classed together; Wheelwrights and Turners are placed with Carpenters; Engineers and Whitesmiths will be found under the head of Mechanics; Milliners and Needlewomen form one class.

With the view of ascertaining the influence of a particular occupation in promoting or counteracting a tendency to Consumption, the following Table of the occupations of non-Phthisical Patients attending a General Hospital is annexed—the number being 2,179, or exactly one-half of the Consumptive cases, affords a ready means of making a comparison :—

TABLE IX.

Showing the Occupations in 2,179 Cases relieved at a General Hospital as Out-Patients, excluding Cases of Phthisis.

MALES, 885.

In-Door.		Out-Door.		Mixed.	
Clerks, Warehousemen, Shopmen, &c.	26	Labourers of various kinds	94	Carpenters	32
Mechanics	84	Coachmen and Cabmen...	30	Painters and Glaziers	33
Servants	38	Butchers	4	Various	66
Tailors	51	Various	42		
Shoemakers	42				
Printers and Compositors	9				
Bakers	9				
Weavers	4				
Various	97				
None, or under 15 ...	227				
	584		170		131

FEMALES, 1,294.

In-Door.		Out-Door.		Mixed.	
Servants, or persons engaged in in-door occupations	833	Various, as Fruit-women, &c. ...	20	Various	5
Milliners, Needlewomen, &c.	109				
Laundresses	53				
None, or under 15 ...	212				
	1,209		20		5

In the first place, it is desirable to ascertain the influence of in-door and out-door occupations respectively in producing or warding off Consumption; but in consequence of the mixed character of the occupations in which many of the Patients are engaged, it is difficult to obtain sufficiently precise information to justify very accurate conclusions. The relative liability of persons following in-door and out-door occupations to Consumption would seem, from the records of this Hospital to be as 63 per cent. of in-door males to 30 per cent. of out-door; and all the Consumptive Females followed in-door occupations. If it were possible to ascertain the precise number of persons engaged in the various in and out-door occupations in London, we might, by comparing them with the numbers just stated, arrive at correct conclusions as to the effects which such occupations are calculated to produce; but in the absence of this information we must confine ourselves to a comparison of the apparent influence which in-door and out-door occupations have in the production of Phthisis, with that which they appear to have in inducing other diseases. At this Hospital the in-door occupations of males and females form 77 per cent. of the whole; at a General Hospital, 85 per cent. Out-door occupations form 18 per cent. of the whole at this Hospital; at a General Hospital, 9 per cent. The difference, therefore, is not that which would warrant the inference that in-door occupations in themselves have a greater tendency to produce Consumption than any other disease; on the contrary, the in-door occupations of the Patients at this Hospital are 8 per cent. less than at a General Hospital, whereas the out-door are 9 per cent more.

With a view to ascertain the tendency which any particular occupation has to induce Phthisis, as compared with that which it may have to induce any other disease, an abstract of the two preceding Tables has been prepared. This abstract shows the proportion each particular occupation bears to that of all other occupations, at this Hospital, and also at a General Hospital. A column is introduced, in which is given the total, in round numbers, of the persons engaged in some of these occupations in London.

TABLE X.

Showing the relative proportion, to the whole Number of Cases, of Persons following similar Occupations, at the Consumption Hospital, and at a General Hospital, respectively.

MALES.	Per Centage of 2,679 Male Patients at the Consumption Hospital.	Per Centage of 880 Male Patients at a General Hospital.	MALE POPULATION OF LONDON, 800,000. Number of Persons engaged in these Trades and Occupations in London.
Labourers, Out-door ..	18.2	10.6	50,000
Clerks, Warehousemen, and Shopmen	11.7	3.0	
In-door Servants	8.8	4.3	40,000
Tailors	7.2	5.8	20,000
Shoemakers	4.7	4.7	25,000
Carpenters	4.4	3.6	18,000
Coachmen and Cabmen .	4.0	3.5	
Printers and Compositors	3.9	1.0	6,600

FEMALES.	Per Centage of 1,679 Female cases at the Consumption Hospital.	Per Centage of 1,294 Female cases at a General Hospital.	FEMALE POPULATION, 1,000,000.
In-door Servants and Persons engaged in Domestic Occupations ..	49.8	64.3	130,000
Milliners, and Persons similarly engaged ..	18.6	13.0	21,000

An examination of the first column of this Table shows that a much larger number of persons following certain employments, seek relief at this Hospital, suffering from Phthisis, than of those following other occupations; for example, there are 18 per cent. of out-door labourers amongst our patients, to 4 per cent. of printers and compositors, and there are other employments not specified here, in which the proportions are still smaller. Recollecting, however, that the numbers of persons pursuing different occupations vary very greatly, and that this difference, must of course, affect the number of persons in each occupation liable to disease, it will be felt that no accurate conclusion can be drawn from these numbers alone. It would be necessary for this purpose that the actual numbers of persons engaged in each of these occupations, within the sphere of the operations of this institution, should be ascertained. This not being practicable, we avail ourselves of the means at our disposal, of

comparing the numbers which represent the occupations of the consumptive at this Hospital, with those which represent similar occupations at one of the London Hospitals for disease in general. This comparison will afford us the means of judging how far such pursuits render those who are engaged in them more liable to Consumption than to other diseases. Thus, if we compare the 18 per cent. of out-door labourers with the 10½ per cent. of the same class who attend a General Hospital, we can say that there are nine consumptive persons of this class to five of the same class suffering from other diseases, requiring Hospital assistance. Whilst, if we compare the 3.9 per cent. of printers and compositors at this Hospital, with the 1 per cent. of the same occupation at a General Hospital, we conclude that printers and compositors are more liable to Consumption than to other diseases, in the proportion of nearly 4 to 1, and, therefore, are sufferers to a much greater extent from this disease than the class last named. Amongst clerks and shopmen, the proportions are nearly the same as the last, viz., 4 to 1. Proceeding with the comparison, we find two in-door male servants at this Hospital, for one at a general Hospital. Tailors are in the proportion of 7 to 6, &c., &c. Amongst females, the great variety and number of persons included under the designation of domestic employments, forbid any attempt at drawing inference as to the special influence of their occupations. The next class is that of needlewomen and milliners, which, whilst it represents 18½ per cent. of all the females attending this Hospital, is found to constitute 13 per cent. of the sick at a General Hospital; thus, whilst the persons following these occupations are shown to be very liable to Consumption, it will be noticed that they constitute also a large proportion of those attending a General Hospital. Tailors likewise are numerous at both institutions. Clerks and shopmen, printers and compositors, as already mentioned, rank high amongst the patients at this institution. Hence, the inference is a correct one, which assigns to these different occupations the power of exerting a more or less injurious influence on the health of those engaged in them; for whilst some are rendered liable to both Consumption and disease in general, others who are less liable to disease in general, are particularly so to Consumption.

In drawing there inferences, however, as to the effects of different employments, it cannot be denied that other influences are often conjoined with those necessarily belonging to the occupation itself: for example, hereditary predisposition, intemperance, deficient food, want of cleanliness, &c. These circumstances must all be kept in view in forming any opinion as to the injurious effects on health of any particular occupation. On the other hand, there are certain

pursuits which, it may be said, almost independently of these conditions, exercise a directly injurious influence on the health of those engaged in them—particularly those which compel persons to work in close, ill-ventilated, and overheated rooms, sitting for many hours each day in a posture unfavourable to the free action of the muscles of respiration, breathing an impure atmosphere, and restricted from taking exercise in the open air. These are the circumstances which appear to render so painfully prominent the class of Clerks, Milliners, Printers, Tailors, in-door Servants, &c.: persons thus occupied soon feel the effects of these injurious influences, and if they have any tendency to tubercular disease, it rarely fails to develope itself. Several striking instances presented themselves of young men and women from the country, previously in good health, who soon fell victims to Phthisis under these circumstances. It is greatly to be desired that the employers of such persons should endeavour to obviate these evils, by not requiring too long service, by allowing time for exercise in the open air, and taking care that the offices in which the employments are carried on are properly warmed and ventilated.

5th.—Hereditary Predisposition.

General observation and experience having led to the conclusion that certain diseases are transmitted from the parent to the child, with not less certainty than many physical characters, not inconsistent with health, it seems desirable on this occasion to exhibit the extent and degree of this power of transmission rather than to question its existence. Disease may or may not be transmitted to the offspring of a diseased parent; or, if transmitted, may not be developed. Counteracting circumstances, chiefly those connected with the protection and preservation of health, may suffice to prevent results which, in their absence, would have occurred. Hence one or more only of the several children of the same individuals may exhibit the diseases of the parents. The other children, though not apparently diseased, may, on becoming parents, have still the power of transmitting to their offspring the elements of disease, which wait but an occasion, or an exciting cause for their development. Thus we find a diseased parent in one generation having an apparently healthy offspring, and in the next generation an apparently healthy parent with a diseased offspring. This class of facts is of the greatest importance in all inquiries like the present, since conclusions founded on the presence or absence of disease in the parents only, afford too limited an idea of the influence of predisposition. The effect upon the offspring, of disease in the

parent is, however, an important, and indeed the first step in such an inquiry, and to this we propose to limit our present investigation. With this view, we have inquired into the state of health of the parents in a thousand and ten cases of pulmonary Consumption; of these 669 were males and 341 were females; and, as is shown in the Table No. XI., 122 of the males, or 18 per cent., were born of Consumptive parents, whilst 124 of the females, or 36 per cent., were born of parents affected with the same disease; or combining all the cases together, we find that, in 1,010 Consumptive Patients, 246 had parents who suffered from the same disease, being about 24½ per cent. of the whole, or nearly one in every four cases. It is quite certain, that if this inquiry were extended, as already stated, to a preceding generation—that is, to grandfather and grandmother, and to collateral relatives—uncles, aunts, brothers, and sisters—that the influence of predisposition would be shown to be still more considerable. It is, however, a remarkable fact, that nearly one in every four of the Consumptive Patients at this Hospital was born of a Consumptive parent.

TABLE XI.

Showing the number amongst 1,010 *Consumptive Patients predisposed to the Disease, by its existence in the preceding generation.*

Sex.	Cases of Consumption.	Predisposed by Disease in Parent.	Per Cent.
Males ..	669	122	18.2
Females ..	341	124	36.3
Total ..	1,010	246	24.4

With the view of ascertaining the extent to which hereditary predisposition influenced some other diseases, and of forming a comparison with Consumption, we have annexed a Table of Cases of Insanity, Table XII.

TABLE XII.

Showing the number amongst 4,730 *Insane Patients who were predisposed to the Disease by its existence in the preceding generation.*

Sex.	Cases of Insanity.	Predisposed by Disease in Parent.	Per Cent.
Males ..	2,611	310	11.9
Females ..	2,119	285	13.4
Total ..	4,730	595	12.5

Insanity* has been chosen, because its statistics are very accessible, whilst no doubt can exist as to the frequency with which this disease is transmitted from parent to offspring. The result of the comparison is curious:—We find that, in males, Insanity is an hereditary disease in nearly 12 per cent. of the cases observed, whilst Consumption is so in 18 per cent. In females, Insanity is hereditary in about 13½ per cent., Consumption in 36 per cent. In both sexes taken together, the per centage of Insanity is 12½, of Consumption 24½. Thus the probability of Consumption being transmitted to the offspring by a parent affected with that disease, is as two to one when compared with the probability of the transmission of Insanity from an insane parent.

A remarkable fact may be noticed in Table No. XI., illustrating the influence of sex on hereditary predisposition. Eighteen per cent. of the males refer their origin to Consumptive parents, whilst 36 per cent. of the females (or two females to one male) report their parents as having been Consumptive; a careful scrutiny has failed to detect any error in the recorded observations. But the conclusion may be slightly modified, by supposing that females, being more domesticated, know more accurately, and can give better information regarding the histories of their parents.

From these facts, however, the obvious conclusion is, that daughters are more liable to inherit Consumptive disease from their parents than sons, in the proportion of two to one. In Insanity, this liability is shown but to a much more limited extent, being little more than one and a-half per

* Table XIII.

The following Table shows the source from whence the information contained in Table XII. is derived.

	Insane Males.	Hereditary in	Per Cent.	Insane Females.	Hereditary in	Per Cent.	Total. Cases.	Total. Hereditary.	Total. Per Cent.
Hanwell ..	397	51	12.8	281	27	9.6	678	78	11.5
Bloomingdale (U.S.)	1,699	118	10.8	751	89	11.9	1,841	207	11.2
New York ..	1,617	121	11.9	997	152	15.2	2,614	273	13.5
Morningside (Edin.) ..	107	20	18.7	90	17	18.8	197	37	18.8

Considerable uniformity in the results of observation by different persons is here manifested. It is more than probable, however, that the influence of predisposition operates amongst the insane to a greater extent, but that the difficulty of obtaining information causes it to appear thus limited.

cent. greater in the case of daughters. Proceeding a little farther with the investigation, it will be necessary to inquire whether the influence of father or mother, when diseased, extends equally to both sons and daughters. This will be seen in

Table XIV.

Showing the Sexes of the (246) Consumptive Patients from Table XI., and of the Diseased Parents.

	Males.	Per Cent.	Females.	Per Cent.
Father	42	6.2	31	9.
Mother	24	3.7	39	11.4
Father and mother	12	1.8	10	2.9
Father, and brother, or sister	21	3.1	16	4.8
Mother, and brother, or sister	19	2.8	22	6.5
Father and mother, and brother or sister, .	4	0.6	6	1.7
Total	122	18.2	124	36.3

Omitting those cases in which both parents were Consumptive, and without reference to brothers or sisters, we found the following Table on the abstract of the preceding:—

Table XV.

Showing the Proportion of Consumptive Sons and Daughters to Consumptive Fathers and Mothers respectively.

	Number of Cases.	Father Consumptive.	Per Cent.	Mother Consumptive.	Per Cent.
Sons	106	63	59.4	43	40.6
Daughters	108	47	43.5	61	56.5

Both father and mother were Consumptive in the cases of twelve males and ten females. The brothers and sisters, in addition to father and mother, were Consumptive in four males and six females.

The results here shown are very remarkable. The father transmits Consumptive disease to the sons in 59.4 per cent., to the daughters in only 43.5 per cent. The mother to the sons in 40.6 per cent., but to the daughters in 56.5 per cent.

Results remarkably similar, indeed almost identical, are found in Insanity, as shown in the following Table prepared from the last Report of the New York State Lunatic Asylum, the only one in which the facts are given:—

TABLE XVI.

Showing the Proportions of Insane Sons and Daughters to Insane Fathers and Mothers, respectively.—(From New York Report.)

	Number of Cases.	Father Insane.	Per Cent.	Mother Insane.	Per Cent.
Sons	117	64	54.6	53	45.3
Daughters ..	147	67	45.4	80	54.4

Both father and mother were insane in the cases of 4 males and 5 females.

These facts alone, illustrating the influence of sex on the transmission of disease, afford very striking evidence that such transmission takes place. They indicate, also, an important consideration in a social point of view—viz., that those persons who have a tendency to the disease should, before entering on the social relation of married life, reflect on the great probability there is of transmitting this disease to their offspring: the consideration applies to both sexes, but in an especial manner to females; and shows that maternal influence, whether for good or evil, is not less important in a physical than in a moral point of view.

II. SYMPTOMATOLOGY.

It cannot be doubted that it is an object of the first importance to be able to detect the existence of Phthisis at its very commencement, inasmuch as it is well known that there is a stage in its progress after which cure must be considered almost hopeless; whereas many examples present themselves, in which the detection of the disease at an early period has led to the adoption of such remedies as have practically cured it. No doubt exists that many persons, in whose lungs tubercular matter has been deposited to a limited extent, have been so far restored as to enjoy a fair degree of health, and attain the average duration of human life. In a large proportion of such cases, the physical signs furnished by auscultation and percussion, in conjunction with the general symptoms, leave little doubt regarding the nature of the disease; but not a few instances occur in which, although there are some reasons for suspecting the presence of tubercular deposit, yet the physical signs are either absent, or so indistinct, that the most experienced observers can scarcely detect them. Under these circumstances, additional means of diagnosis are obviously desirable; and the Medical Officers felt it their duty to avail themselves of the opportunity afforded by the large number of Phthisical Patients under their charge, to test the value of all modern means suggested for detecting the disease in its *early* stage.

a—Spirometer Observations.—One of these means is an instrument named the Spirometer, intended to ascertain the capacity of the lungs for air, and which may be expected to give indication of the extent to which they are obstructed by tubercular or other deposits. Dr. Hutchinson, who has published a series of valuable observations calling the attention of the profession to the subject, kindly offered us his assistance, and during several months attended at the Hospital for the purpose of testing the instrument. A large proportion of the 415 cases recorded in the Tables which have reference to this subject, were examined under his immediate superintendence; and it is satisfactory to find the results of the examination made by him and others so nearly corresponding, that all are blended in the following Tables.

In Tables XVII. and XVIII. a few characteristic cases are given by way of example, in order to exhibit the amount of deviation from the healthy standard in the first and second stages of Consumption. Dr. Hutchinson has shown that, in a state of health, the vital capacity* has a relation to the *height* of the individual, increasing in the proportion of eight cubic inches of air for every inch of stature from five to six feet. Cases 3 and 13, in Table XVII., are examples of vital capacity only 14 and 16 inches below the presumed healthy standard. It will be observed that these Patients were above the ordinary height. The calculations, however, which have been published, do not apply to persons above six feet,—observations on men above that height not being sufficiently numerous to determine the healthy standard of their vital capacity. But there are grounds for suspecting that the ratio of increase above six feet exceeds 8 inches for every inch of height. For instance, a man, examined by Dr. Hutchinson, whose height was 6 feet 11½ inches, had a vital capacity of 434 cubic inches—being in the ratio of more than 14 cubic inches of air to every inch of stature above six feet; and

* This term is applied to the utmost quantity of air which a person can *expire* after a deep inspiration.

TABLE XX.

Showing the Comparison of Healthy Individuals and of Cases of Phthisis, in the Stage before Softening.

Number of Cases observed.	Mean Healthy Vital Capacity.	Mean Diseased Vital Capacity.	Difference.	Difference per Cent.
	Cubic Inches.	Cubic Inches.	Cubic Inches.	Cubic Inches.
241	223	149	74	33

TABLE XXI.

Showing the Comparison of Healthy Individuals and Cases of Phthisis, in the Stage after Softening.

Number of Cases observed.	Mean Healthy Vital Capacity.	Mean Diseased Vital Capacity.	Difference.	Difference per Cent.
	Cubic Inches.	Cubic Inches.	Cubic Inches.	Cubic Inches.
174	221	105	116	52

In forming these Tables, the sum of the capacities, whether in health or disease, has been divided by the number of cases in order to determine the means. It is interesting to observe how evidently they establish the fact, that the Spirometer gives distinct indications at an early period of the malady, and that these indications become more obvious in proportion to the progress of the disease. For instance, in the first stage, the diminution of vital capacity in a range of 241 cases is 74 cubic inches; but in 174 patients, after the stage of softening, the diminution is no less than 116.

It is proper to mention that some Patients, in their early trials with the instrument, in consequence of nervousness or inexperience, do not expire an amount of air equal to their vital capacity. In such cases, therefore, unfavourable conclusions must not be too hastily drawn; but, on the other hand, whenever an individual under six feet expires his average quantity, it may, we think, be generally inferred that he is free from tubercular disease. In various individuals, in whom there were circumstances calculated to excite some suspicion of the existence of disease, the favourable indications furnished by the Spirometer have enabled the Medical Officers to pronounce an encouraging opinion, which, in the sequel, has been confirmed. It must be added, that various other circumstances may prevent a Patient from expiring the average quantity of air indicated by his height, such as Pneumonia, Emphysema,

Hernia, or Abdominal Tumours, Diseased Heart, &c. A deficiency of vital capacity alone cannot, therefore, be considered a proof of the existence of Phthisis; but these Tables are given for the purpose of showing that, where Consumption was present without any of these accidental circumstances, the vital capacity in all the cases was more or less diminished.

b—Hæmoptysis.—The Medical Officers, in investigating those symptoms, general or local, which are calculated to throw light on the existence and early progress of Consumption, have paid considerable attention to Hæmoptysis; for amongst other reasons, spitting of blood is often the first circumstance which attracts observation, and frequently excites in the minds of Patients and their friends considerable alarm.

The existence or non-existence of this symptom was carefully noted in 1,381 cases of Phthisis, of whom it will be seen in the Table, 910 were males, and 471 females.

TABLE XXII.

Showing the Existence or Non-Existence of Hæmoptysis in 1,381 *Cases of Phthisis, arranged according to the Sexes, without reference to Age.—Males,* 910; *Females,* 471—*Total,* 1,381.

	Males.	Per Cent.	Females.	Per Cent.	Total.	Per Cent.
Hæmoptysis ..	563	61.9	307	65.2	870	63
No Hæmoptysis ..	347	38.1	164	34.8	511	37

Of the 1,381 cases, 870 individuals, including males and females, had Hæmoptysis at some period or other of the disease, that is, in the ratio of 63 per cent.*

In recording the facts which have reference to the absolute frequency of this symptom, it seems desirable to consider the influence of Age and Sex, and the period of the disease at which it occurred:—

1st.—Sex.—In investigating the influence of Sex on the occurrence of this symptom, it will be seen from Table XXII. that in 910 males Hæmoptysis was

* It may be remarked that a large proportion of the cases of Phthisis recorded in the Table were seen at an *early* period of the disease, and that not a few of them were only for a short time under observation. Many of those in whom the symptom had not occurred when their cases were first noted, would, in all *probability*, be sufferers from it during the further progress of the disease; so that we believe we are justified in assuming that the proportion of cases in which Hæmoptysis occurs in Phthisis is still greater than that shown in this Table.

recorded in 563 cases, or in the ratio of 62 per cent.; and in 471 females this symptom was observed in 307 cases, or in the ratio of 65 per cent. The influence of Sex is thus shown to be very slight in determining the occurrence of Hæmoptysis, during the progress of Phthisis. It appears that an inference may be safely drawn from that fact as to the paramount influence of tubercular disease of the lungs itself in the production of Hæmoptysis. Daily experience affords numerous examples of the occurrence of *spitting of blood* by non-Phthisical females, resulting from irregularities peculiar to the Sex, and to which males are not prone,—cases of this description have been carefully excluded from the list; and yet, on reviewing the results presented in the preceding Table, the influence of Sex almost entirely disappears; and nearly an equal number of males and females are found to present this symptom.

2*nd.*—*Age.*—The observations on the ages at which Hæmoptysis did or did not occur were made in 1,084 cases, of whom 706 were males, and 378 females.

TABLE XXIII.

Showing the existence or non-existence of Hæmoptysis in 1,084 *Cases of Phthisis—viz., Males,* 706; *Females,* 378*—arranged according to the Sexes in Decennial Periods. Also, the per Centage of the Cases in which Hæmoptysis occurred.*

Age.	Hæmoptysis occurred.		Hæmoptysis did not occur.		Total of Cases observed.		Hæmoptysis occurred per Cent.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
0 to 5..	0	3	2	4	2	7	..	42.9
5 to 15..	7	32	14	9	21	41	33.3	78.0
15 to 25..	124	107	85	45	209	152	59.3	70.4
25 to 35..	175	59	71	42	246	101	71.1	58.4
35 to 45..	115	35	48	25	163	60	70.6	58.3
45 to 55..	29	7	23	8	52	15	55.8	46.7
55 to 65..	3	0	10	2	13	2	23.1	..
65 to 75..	0	0	0	0	0	0	..	..
Totals ..	453	243	253	135	706	378	64.2	64.3

Of the 706 males, 453 had Hæmoptysis; and of the 378 females, 243 were similarly affected; being in each Sex on the whole number in the ratio of 64 per cent. Dividing the period of life during which Phthisis occurs, according to our observations—that is from birth to 70 years of age—into two equal intervals, viz., from infancy to 35 years, and from 35 to 70, we find in these periods respectively that in males under 35 years Hæmoptysis occurred in 306 out of 478 cases of the disease, being in a ratio of 64 per cent; whilst in 301 females, at the same period of life, it occurred in 201 cases, being in the ratio of nearly 67 per cent.: hence the inference may be drawn that Hæmoptysis is slightly more frequent in the first of these periods in females than in males. In the second period, that above 35, we find Hæmoptysis to have occurred in 147 males out of 228 cases, being again in the ratio of about 64 per cent.—very nearly that of the antecedent period in the same sex; whilst 42 instances of Hæmoptysis were met with in 72 cases in females above the age of 35, that is, in the ratio of 54.6 per cent. The facts are shown in Table XXIV.—

TABLE XXIV.

Showing the Relative Frequency of Hæmoptysis in Males and Females at Certain Ages.

Age.	Hæmoptysis occurred.		Total cases observed.		Hæmoptysis per Cent.	
	Males.	Females.	Males.	Females.	Males.	Females.
0 to 35 ..	306	201	478	301	64.	66 8
35 to 70 ..	147	42	228	77	64.5	54.6
5 to 25 ..	131	139	230	193	57.	72.
25 to 45 ..	290	94	409	161	70.9	58.4
35 to 55 ..	144	42	215	77	67.	54.6

Thus, whilst on the one hand, we see this symptom occurring in males with an equal frequency before and after the age of 35, *i.e.*, apparently uninfluenced by age in this sex, we find, on the other hand, a different and unexpected result in females. This difference, although only to the extent of 10 per cent., shows the proportion of cases in females to be greater before the age of 35 than after; to which latter period (according to some observers) its greater frequency has been assigned. In fact, our observations show that Hæmoptysis occurs more frequently during the *earlier part* of female life, than at that period when the functions of the uterus begin to be suspended.

This difference will appear still more marked if we take two periods of life more clearly separated. Thus we find that in females from 5 to 25 years Hæmoptysis occurred in 139 cases out of 193, being in the ratio of 72 per cent.; whilst between the ages of 35 and 55 this symptom presented itself in

42 cases out of 77, being only in the ratio of 55 per cent. If, however, we turn to the numbers recorded in the male sex, during the same periods, we find the proportions reversed, for between the age of 5 and 25 Hæmoptysis was noted in 131 cases out of 230, or in the ratio of 57 per cent.; and between 35 and 55, 144 cases out of 215, or in the ratio of 67 per cent.

It will be further seen, on reference to the Table, that whilst in Phthisical females, Hæmoptysis most frequently occurred between the ages of 5 and 25, viz., in the ratio of 72 per cent., the period of its most frequent occurrence in males is between the ages of 25 and 45; for out of 409 cases of Phthisis, within those two decennial periods, 290 were attended with Hæmoptysis, being in the ratio of 71 per cent.; whereas in the same *(male)* sex, under the age of 25, it occurred in the ratio of only 57 per cent., and between the ages of 45 and 65 the ratio is even under 50 per cent.

3rd.—Stage of the Disease.—The stage of the disease in which Hæmoptysis occurred was noticed in six hundred and ninety-six cases, of whom four hundred and fifty-three were males, and two hundred and forty-three were females.

TABLE XXV.

Showing the Stages of Phthisis at which Hæmoptysis occurred in 696 Cases of the Disease. Males, 453; Females, 243.

	Males.	Per Cent.	Females.	Per Cent.
Before Softening ..	333	73.5	176	72.4
After Softening ..	120	26.5	67	27.6

The disease was considered as being appropriately divisible, for the purpose of these observations, into two phases or periods; viz., 1st. That characterised by the deposition of tubercular matter in the crude state; and, 2nd. That subsequent to the softening of this matter, or the formation of cavities. We find from the Table, that in four hundred and fifty-three males, Hæmoptysis took place in three hundred and thirty-three cases, during the first of these periods, that is, in the ratio of 73 per cent, and in two hundred and forty-three females it occurred during the same period in 176 cases, being in the ratio of 72 per cent. In the second period we find this affection present in the same number (453) of males, in one hundred and twenty instances, a ratio of 26 per cent., and in two hundred and forty-three females, in 67 cases, being in the ratio of 28 per cent.

These figures show unquestionably that Hæmoptysis is much more frequent (nearly as 3 to 1) in the first period of the disease, and nearly equally so in both sexes.*

Without entering at any length into the pathological causes of this marked difference, we may refer to an explanation which suggests itself, viz., that the blood-vessels of the lungs are, in the first stage of the disease, exposed to the irritating influence of the deposited matter; they are then, too, subjected to partial compression and congestion, and there can be little difficulty in supposing that blood itself, or its colouring matter, will, under these circumstances, escape from them, either alone or along with the matter then being deposited; whilst, at a later period of the disease, these vessels become obstructed or obliterated by the tubercular deposits, or in consequence of the inflammatory action by which the various lesions have been circumscribed or bounded. Indeed, it seems not improbable that many examples of Hæmoptysis, in the more advanced stage of the disease, are the result rather of fresh tubercular deposition and its effects, than of the lesions of vessels connected with cavities.

It will be obvious that the fact of the frequent occurrence of Hæmoptysis at an early period of the disease, so clearly shown in the above Table, tends strongly to establish its value as a diagnostic symptom in early Phthisis.

III.—DURATION OF THE DISEASE, AND RESULTS OF TREATMENT.

a—Duration of the Disease.—The following Table (No. XXVI.) exhibits the duration of Consumptive disease in 215 cases, of which 147 were males, and 68 females, arranged, as respects age, in decennial periods. This number (with the exception of 14, in which the duration was marked "doubtful,") includes those cases only in which the duration of the disease had been ascertained with tolerable accuracy—a matter not attainable in all cases.

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* The occurrence or non-occurrence of Hæmoptysis was noted when the patients first presented themselves for observation. In many of those, however, in whom the disease had reached the stage of softening, Hæmoptysis had taken place some time previously, so that we have no doubt, but that in a larger proportion than is here stated, it occurred in the *first* stage of the disease.

TABLE XXVI.

Showing the Duration of Phthisis in 215 Fatal Cases, viz., 147 Males and 68 Females, arranged according to Age and Sex.

Ages.	Under 3 Months.		3 to 6 Months.		6 to 9 Months.		9 to 12 Months.		12 to 18 Months.		18 to 24 Months.		24 to 30 Months.		30 to 36 Months.		36 to 42 Months.		42 to 48 Months.		Above 4 Years.		Doubtful		Totals.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
0 to 5	..	..	2	1	1	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	3	3
5 to 15	1	..	..	..	1	1	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	3	4
15 to 25	..	..	9	2	10	1	9	5	7	7	2	6	5	4	..	2	..	1	..	..	2	1	4	..	48	29
25 to 35	..	..	3	2	7	4	9	3	7	2	4	3	6	1	1	2	1	1	..	..	2	2	5	..	45	20
35 to 45	..	..	2	..	6	1	3	..	6	4	4	1	4	3	..	1	4	..	1	1	4	..	..	..	34	17
45 to 55	..	..	1	..	3	0	1	..	1	..	1	..	..	..	..	..	..	..	..	..	3	..	2	..	11	1
55 to 65	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	2	0
65 to 75	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	0
Totals. Male and Female	1	..	17	5	28	8	22	8	21	13	10	12	15	8	1	5	7	2	3	1	11	3	11	3	147	68
Both Sexes	1		22		36		30		34		22		23		6		9		4		14		14		215	
Per Cent. Male and Female	..		11·5	7·3	19·0	11·7	14·9	11·7	19·1		6·8	17·6	10·9	11·7	0·6	7·3	4·7	2·9	2	1·4	7·4	4·3	7·4	4·3	..	..
Both Sexes	..		10·2		16·7		13·9		15·8		10·2		10·5		2·8		4·2		1·8		6·5		6.5		..	

It appears, from an examination of this Table, that Phthisis rarely proves fatal in less than three months, only one case being recorded as having been fatal within that period. The disease existed in 22 of the 215 cases for a period of between three and six months; of these 22 cases, 11¼ per cent. were males, and a little more than 7¼ per cent. were females. In 36 cases the disease lasted from six to nine months; of these, 19 per cent. were men, and 12 per cent. women. The disease existed for a period of from nine to twelve months in 30 cases, of whom about 15 per cent. were males, and nearly 12 per cent. females. The half-yearly periods, extending in the Table from twelve months to four years, contain, in each period, with one trifling exception, a decreasing number of cases. For whilst we observe that nearly 17 per cent. of the cases have a duration of from six to nine months, not 2 per cent. are found in the period from three and a-half years to four. Fourteen persons, that is 6½ per cent., lived for periods above four years. We observe, on examining the Table a little further, that considerably more than half the entire number of cases were fatal within a period of eighteen months,—the numbers being 123 to 78. In reference to the influence of sex, we observe a remarkable fact, viz.—that the disease is more rapidly fatal amongst males than females: thus, of the 123 cases which terminated within eighteen months, 89, or 60·5 per cent., were males; whilst only 34, or 50 per cent., were females. After a period of eighteen months, the duration is reversed,—of 78 cases, 47, or 31·9 per cent., were males, whilst 31, or 45·5 per cent., were females.

b—Results of Treatment.—For the purpose of illustrating this important subject, the In-Patients and Out-Patients, for self-evident reasons, are separately classified. The length of time during which the In-Patients remain in the Hospital, the subjects of close observation, affords ample opportunity for forming tolerably accurate conclusions respecting the degree in which the disease is amenable to treatment. This has been found to vary from simple amelioration to complete arrest. The Patients are therefore classed according to the amount of benefit they have received; by the term *relieved* is implied a simple diminution or cessation of some of the more distressing symptoms, so long as the Patient remained under observation; by *much relieved* is meant the removal of the principal symptoms,—the health of the Patient, though improved, being still delicate; the term *arrest* (without entering into the question of the curability or non-curability of Consumption, or defining these terms with reference to this disease), implies that all or nearly all symptoms of the disease have disappeared, the Patients feel themselves well, and are able to pursue their ordinary occupations. In some of these cases the evidence of local mischief had greatly diminished, and in a few had disappeared: such Patients being, in fact, scarcely in a worse position than they were before the attack. The other terms speak for themselves.

TABLE XXVII.

*Showing the Results of Treatment in 535 In-Patients, classified according to Age, Sex, and the Stage of the Disease.**

Ages.	Sexes.	First Stage.						Second Stage.						Third Stage.						All.
		Relief.	Much Relief.	Arrest.	Non-Arrest.	Death.	Total.	Relief.	Much Relief.	Arrest.	Non-Arrest.	Death.	Total.	Relief.	Much Relief.	Arrest.	Non-Arrest.	Death.	Total.	Totals.
0 to 5 ..	Males ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	Females ..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1
5 to 15 ..	Males ..	..	..	2	..	..	2	1	..	..	..	..	1	1	1	..	1	1	4	7
	Females ..	2	..	..	..	..	2	1	..	..	..	..	1	..	..	..	1	1	1	4
15 to 25 ..	Males ..	9	11	2	1	..	23	6	3	1	3	..	13	9	12	2	13	17	53	89
	Females ..	23	21	3	2	..	49	2	2	..	..	1	5	6	5	1	9	9	30	84
25 to 35 ..	Males ..	11	14	3	1	1	30	9	5	..	1	..	15	18	8	3	13	20	52	107
	Females ..	10	10	3	2	..	25	4	1	..	..	..	5	14	6	1	7	16	44	74
35 to 45 ..	Males ..	12	6	2	2	..	22	5	..	..	1	..	6	15	8	1	9	18	51	79
	Females ..	4	3	..	..	..	7	1	1	..	..	..	3	4	2	2	6	8	22	32
45 to 55 ..	Males ..	12	8	3	..	..	23	2	1	..	..	..	3	6	2	..	2	4	14	40
	Females ..	..	2	..	..	..	2	..	1	..	..	..	1	2	..	..	4	1	7	10
55 to 65 ..	Males ..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	3	4	4
	Females ..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1
65 to 75 ..	Males ..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	..	2	2
	Females ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	1
All Ages.	Both Sexes ..	85	75	18	8	1	187	31	14	2	5	1	53	77	44	10	65	98	295	535

With the view of rendering more clear the results contained in the preceding Table, we have prepared from it the following abstract, viz.—

TABLE XXVIII.

Showing the Per Centages of the preceding Results in each Stage of the Disease in Males and Females.

Stages.	Sexes.	Relieved per Cent.	Much Relieved per Cent.	Disease Arrested per Cent.	Disease not Arrested per Cent.	Died per Cent.
First	Males ..	44.0	39.0	12.0	4.0	1.0
	Females ..	47.1	41.3	6.8	4.5	0.0
Second ..	Males ..	60.5	23.6	2.6	13.1	0.0
	Females ..	53.3	33.3	6.6	..	6.6
Third ..	Males ..	26.8	16.3	3.1	20.5	33.1
	Females ..	24.7	12.3	3.8	25.7	33.3
All	Both.. ..	36.0	24.8	5.6	14.7	18.6

* The In-Patients who were under the care of one of the Physicians, who has resigned, are not included in this Table, nor in any save those which relate to the numbers, ages, sexes, occupations, and social conditions of the Patients.

From an examination of this Table, we find that nearly one-half the Patients, both males and females, who seek relief in the first stage of the disease, obtain it to a limited extent. In about 40 per cent. of the cases the material benefit implied in the term *much relieved* is conferred, the sexes being in nearly equal proportions. In 12 per cent. of the males applying in the first stage of the disease its progress appears to have been, for the time at least, if not completely, arrested; whilst in less than 7 per cent. of the females was the like result obtained. In 4 per cent of the males and in 4½ per cent of the females the disease resisted treatment in this stage, and progressed rapidly to a fatal termination. In one case death occurred in this the first stage of the disease.

In the second stage of the disease we find that about 60 per cent. of the males and about 53 per cent. of the females have the distressing symptoms under which they suffer more or less relieved; in about 23 per cent. of the first-mentioned sex and 33 per cent. of the latter a more material degree of benefit is conferred. The very small number of cases arrested in this stage is quite in accordance with what might have been *a priori* expected. When the softening process, characteristic of this stage of Pulmonary Consumption, has commenced, the formation of cavities is an almost inevitable result; the number of females slightly exceeds that of males, the converse of what occurs in the preceding stage: the numbers, however, are too few to justify any positive deductions as to the apparent influence of sex. The disease proceeded unarrested in about 13 per cent. of the males. We can only account for no females appearing under this head by supposing that the disease had either been relieved or passed into the third stage before they came under observation; one death occurred in this stage in fifteen females.

In the third stage, we find that in about 25 per cent. of both sexes the symptoms were mitigated by treatment; 16 per cent. of males and 12 of females, in addition to the preceding, were very much benefitted, and in a little more than 3 per cent. of males and nearly 4 per cent. of females the progress of the disease was arrested. In about 20 per cent. of males and 25 per cent. of females the disease progressed unchecked whilst under observation. In 33 per cent. of each sex who applied in this stage of the disease death occurred. Viewing these results collectively, without reference to stage or sex, we find that benefit is conferred in 36 per cent. of the cases, material relief in nearly 25 per cent.; in nearly 6 per cent. the disease is arrested; and here it should be borne in mind that the delay which occurs in the admission of Patients, in consequence of the want of accommodation for

the numbers who apply, allows the disease to advance, and thus renders the treatment more difficult, and less successful than it would otherwise have been. Still, under such unfavourable circumstances, it is satisfactory to find that, in nearly 6 per cent. of the cases of this disease considered by many to be beyond the reach of treatment, a result has been obtained, which a desire not to speak too confidently alone forbids to designate as cure. In nearly 15 per cent. the disease was unchecked by treatment, and was fatal in the Hospital in 18½ per cent. of the cases admitted.

Results of Treatment of Out-Patients.—Amongst these two distinct classes of cases are to be found—the Consumptive and non-Consumptive. As the report applies exclusively to the former, it will suffice to say that the latter is a very numerous one; for great numbers daily seek relief at the Hospital, suffering, as has already been mentioned, from Bronchitis and other diseases of the lungs, not tubercular; from heart disease; from disease and derangement of the digestive organs, simulating Consumption; and from various other obscure debilitating influences. The majority of these cases become objects of solicitude; for though they may not be at the moment actually the victims of Pulmonary Consumption, experience has shown that the diseases for which they seek relief, if neglected, render the system liable to its attacks. These cases are relieved in great numbers; and thus many victims are saved from the consequences of protracted disease and suffering. Amongst the Consumptive Out-Patients the results have been satisfactory, though it is difficult to ascertain them with accuracy, owing to the well-known habits of Hospital Out-Patients, who, when they have obtained relief, are so anxious to return to their occupations that they neglect to report their condition. The great distance* at which many of the Patients live from the Hospital contributes to the same result. It would be very desirable, indeed, if the subscribers, in giving letters of admission to Out-Patients, would point out to them the necessity of reporting personally, or by letter, to their respective Physicians before they cease to attend. From a number sufficiently large to afford pretty accurate conclusions, we find that in the first stage including males and females, the symptoms are more or less relieved, in about 35 per cent.; in about 33 per cent. they are much relieved; in 18 per cent. the disease appears to have been arrested; in 12 per cent. it passed into more advanced stages. Placing together

* Many Patients receive medicine from the Hospital, attending in person occasionally, but living at distances, even within a circuit of some 50 or 60 miles or more.

the second and third stages we find relief given in about 23 per cent.; in 24 per cent. the relief was material; and in 4½ per cent. the disease was arrested; in 48 per cent. it remained unchecked, or progressed to a fatal termination.

When it is recollected that the average daily attendance of Out-Patients is 120, and that of the non-Consumptive a large majority are cured,—that of the Consumptive, more than one-half have their sufferings so much relieved as to enable them to pursue their usual occupations, even whilst under treatment, and many to have them removed altogether,—an estimate can be formed of the amount of benefit conferred by the charity, without any extended or illustrative comment.

c—*Treatment.*—In making some observations on the treatment of Consumption pursued at this Institution, the medical officers feel it a duty to bear testimony to the judgment evinced in the selection of a site for the Hospital, and the excellence of the arrangements for promoting the health and comfort of the Patients. To those unacquainted with the locality it will be necessary to say, that the Hospital is built on a dry gravelly soil, in a suburb of the metropolis long celebrated for its salubrity, sheltered on the north and east by the whole of the metropolis, and open to the south and west; the wards are lofty, and of moderate size; the corridors light and capacious; whilst the coldness and dampness of our atmosphere, so highly injurious in diseases of the respiratory organs, are corrected by the method of ventilation devised by Dr. Arnott, and which is so arranged as to supply warm fresh air in a continuous stream at the rate of 2,160 cubic feet per minute, thus allowing to each Patient, during that time, more than 23 cubic feet. This air reaches the wards so modified as to keep them at the uniform temperature of nearly 65° in winter and summer. There is thus provided for the poor a climate nearly approaching that of the southern latitudes, the advantages of which can only be enjoyed by the more favoured portion of the community. The beneficial effects of these arrangements upon the Patients are strikingly manifested in the great improvement which generally takes place in their symptoms soon after admission; the cough becomes less frequent and the expectoration diminishes, they lose the anxious expression of countenance frequently attending the disease, and strangers who visit the Hospital often express their surprise at the quiet and comfort of the Patients, and their comparative freedom from cough. It is proper to mention, that though a majority of the Patients are sensible of deriving benefit from the warmth of the atmosphere of the Hospital, certain individuals, owing to peculiarity of constitution or disease, find it oppressive. A similar statement applies to Madeira and like climates.

Of the strictly medical treatment of the disease a detailed description would be inappropriate in the pages of this Report; the medical officers limit themselves, therefore, to a brief statement of the results of the use of a few particular remedies which have attracted attention.

Much has been accomplished, especially at the early period of the disease, by acting upon those general principles which are familiar to every medical practitioner for strengthening the digestive powers, correcting pulmonary congestion, improving the condition of the blood, and administering those remedies which are considered suited to particular symptoms.

Naphtha.—Amongst the medicines alleged to have curative powers, a fair trial has been given to Pyro-acetic Spirit or Naphtha. There are some complications of Phthisis, such as Bronchitis, attended with profuse secretion, in which it has appeared occasionally to exert a favourable influence—moderating the secretion, improving the appetite, and increasing the strength; but it was not observed to possess any specific power of suspending or ameliorating tubercular disease of the lungs, and in many cases it acted very injuriously.

Iron.—The pale and anæmic condition of many Consumptive Patients, and the deficiency of red globules in their blood, (as shown by experiments of Andral and Gavarret), naturally suggested to us, in common with the profession, the use of Iron; especially as when administered to the lower animals, this agent is stated to possess the power of arresting the formation of tubercles. It has been used in different stages of the disease, and in various forms, such as the Iodide, Phosphate, Sulphate, Sesquichloride, and Citrate. During the first stage of the disease, in the absence of Pulmonary Congestion and Hæmoptysis, it has been found useful to the extent of arresting its progress; but the utmost benefit which persons in the later stages have derived from this remedy are, an increase of strength and a temporary improvement of general health.

Cod Liver Oil.—This substance is entitled to special notice, as having been productive of more good in the treatment of Phthisis than any other agent yet employed. The earliest trials of this remedy made on a large scale were those instituted at the Hospital; and it has now been given in many hundred cases. The results of all these, for reasons already mentioned, cannot be given, but its effects are shown in 542 cases, in the following Table.

TABLE XXIX.

Showing the Results of the Administration of Cod Liver Oil in 542 Cases of Consumption, arranged according to the Stage of the Disease, the Ages and Sexes of the Patients.

Results.	First Stage.										Second and Third Stages.								All Stages.	
	Under 15.		15 to 35.		Over 35.		Total.		Per Cent.		Under 15.		15 to 35.		Over 35.		Total.		All Ages.	
																			Both Sexes.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Total.	Per Ct.
Improved	10	4	99	49	28	11	137	64	72.1	62.1	2	4	58	54	14	9	74	67	342	63.1
Arrested	5	4	30	23	1	2	34	29	17.8	28.1	0	4	18	11	2	0	20	15	98	18.1
Not improved	6	0	14	8	5	2	19	10	10.0	9.7	2	1	34	25	9	2	45	28	102	18.8
Total	21		223		49		190	103	—		13		260		26		139	110	—	542	—

Of these 542 cases 293 were in the first stage of the disease, and 249 in the second and third, or those stages subsequent to softening; of those in the first stage, 190 were males, and 103 were females. Applying to these cases the terms already used, it will be observed that 72 per cent. of the males, and 62 per cent. of the females, had these symptoms materially improved; in nearly 18 per cent. of the males, and in 28 per cent. of the females, the disease was arrested; in 10 per cent. of the males, and in nearly 10 per cent. of the females, the disease progressed unchecked. Of the 249 Patients in the second stage of the disease, 139 were males, and 110 females. In 53 per cent. of the males, the symptoms were materially improved, and in nearly 61 per cent. of the females. In a little more than 14 per cent. of the males, and in nearly 14 per cent. of the females, the disease was arrested. In a little more than 32 per cent. of the males, and in 25½ per cent. of the females, the disease was not arrested. Viewing these results collectively, we find in about 63 per cent. the symptoms improved; in 18 per cent. the disease arrested; and in 19 per cent. it went on unchecked. When it is recollected that of the whole number treated at this Hospital, the disease was arrested in only 5 per cent., the value of this remedy, under the use of which the disease appears to have been arrested in 18 per cent. of the cases, must be considered very great.

Different qualities of oil have been tried, without exhibiting any marked

difference in their remedial effects; but the offensiveness of some of the darker kinds renders their general use impracticable. The oil now used is straw-coloured, transparent, and free from offensive smell. Patients in general take it without repugnance. The dose at first is 1 drachm three times a-day for an adult; but it is gradually increased in some few cases to 1½ oz. for a dose. It is usually administered in camphor-water, any aromatic water, bitter infusions, milk, or any other agreeable fluid. When there is great irritability of stomach it has been given in mucilage of gum with a few drops of hydrocyanic acid. In cases where there existed great anæmia and debility, and in those where the effect of the oil seemed slight, preparations of quinine and iron, especially the iodide, have been conjoined with advantage. It has appeared advantageous to intermit its use for a few days when nausea and feverishness, from whatever cause produced, are present. In certain cases the use of the oil has been continued during the existence of slight hæmoptysis, without producing any injurious results.

Other animal oils (not derived from the liver) and vegetable oils have been tried with a view of ascertaining how far their operation resembled that of Cod Liver Oil. The experiments hitherto made have not shown them to possess the same powers; but they have not been as yet sufficiently often repeated to warrant decided conclusions.

One of the most striking effects of the use of Cod Liver Oil is an increase in the Patient's weight; with a view of showing the frequency with which this occurs, the following Table has been drawn up.

Table XXX.

Showing the gain or loss of weight in 219 cases of Consumption treated by Cod Liver Oil, arranged as in the preceding Table.

Weight.	First Stage.										Second and Third Stage.								All Stages.	
	Under 15.		15 to 35.		Over 35.		Total.		Per ct.		Under 15.		15 to 35.		Over 35.		Total.		Per Ct.		All Ages.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Both Sexes.	
																					Total.	Per Ct.
Gained	8	2	50	20	12	3	70	25	78.5	67.5	1	3	22	18	10	4	33	25	61.1	64.1	153	69.8
Lost	0	0	8	8	0	0	8	8	8.9	21.6	0	0	13	6	6	6	19	12	35.1	30.7	47	21.4
Stationary	2	1	7	3	2	0	11	4	12.3	10.8	0	0	2	1	0	1	2	2	3.7	5.1	19	8.6
Total	13		96		17		89		37		4		62		27		54		39		219	

From this Table it appears, that taking both stages of the disease and the sexes collectively, a gain of weight occurred in 70 per cent., a loss of weight in only 21 per cent., and in about 8½ per cent. the weight remained stationary. The amount of the increase varied, being in some patients little more than one or two pounds during several months; whilst, in many, the average increase was from a pound to two pounds weekly during several weeks. Some very remarkable instances of great increase of weight have presented themselves,—thus, in one instance, 41 pounds were gained in 16 weeks; in another, 19½ pounds were gained in 28 days, and 10 pounds in the succeeding 10 days; in another case, 29 pounds were added to the Patient's weight in 31 days. It must be observed, that an amelioration of the symptoms did not invariably follow an increase of weight, though the exceptions were rare. An aggravation of the symptoms and a diminution of weight were almost invariable coincidences. In a few cases the symptoms improved, though the weight remained stationary, or even became slightly diminished. It is right to mention that in some of the cases marked stationary in the Table (XXX.), the first effects, though encouraging, were not permanent. In other cases where the amelioration was still more considerable, and the progress of the disease appeared to have been stayed, relapse occurred, and was followed by a rapid progress to a fatal issue. That such cases do occur requires to be remembered, in order to restrain too sanguine expectations, and to prevent the remedy from falling into the discredit which disappointment after an unlimited confidence may induce. On the other hand, without entering into a description of the successive steps of amelioration experienced by Patients (which have been already described under the head of Results of Treatment), it will suffice to say, that many of the cases included in the 18 per cent., in whom the disease is marked arrested, felt themselves as well as they had been before the attack of the disease. In some of these cases there was, as already stated, a decided and progressive diminution in the local mischief. Comparatively few of such cases having returned to the Hospital after a lengthened interval, it is not too much to assume that the improvement is permanent,—it is so in some cases which are under observation.

From these facts and a more extended experience, since the period at which this Report terminates, no other conclusion can be drawn than that Cod Liver Oil possesses the property of controlling the symptoms of Pulmonary Consumption, if not of arresting the disease, to a greater extent than any other agent hitherto tried.

Inhalations have been tried under a variety of circumstances, and with

benefit to some of the distressing symptoms, such as cough and difficulty of breathing. Experiments, with a view of ascertaining the simplest means of using these agents, being now in course of trial, remarks on their use are reserved for a subsequent Report.

Counter-irritation has been found useful in many cases in which local congestion existed, or in which cough and abundant secretion were distressing. In many of these cases, a solution of Iodine and Iodide of Potassium in Alcohol sufficiently strong to produce vesication, applied with a camel's-hair brush, was found remarkably beneficial.

Night Sweats have been relieved in very many cases, by the use of Gallic Acid in doses of five or six grains, combined with Morphia; in the treatment of Diarrhœa, recent experience has shown that the Trisnitrate of Bismuth, when perseveringly administered, often proves a most safe and effectual remedy.

In concluding this first Report, the medical officers of the Hospital for Consumption hope to be able hereafter to continue the production of equally systematic and definite illustrations, not only of subjects not fully noticed here, but of others of equal interest; and thus, whilst rendering the Institution useful in developing or confirming scientific and practical knowledge, as well as in relieving the objects of the charity, to demonstrate how happily the advancement of science may be combined with the exercise of benevolence.

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INTRODUCTORY LECTURE,

DELIVERED AT THE

OPENING OF THE SESSION

OF THE

University College, London.

BY DR. E. A. PARKES,

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LECTURE,

&c.

THERE are some comparisons and similes which so recommend themselves by their intrinsic truth and aptness, that they can never grow trite and old. Such an one is that which compares life to a journey, which may be longer or shorter, smooth or rugged, strewn with flowers or desolate of verdure, smiled on by the sun or smitten by the storm, but which in every case passes over regions hastily explored and dimly remembered, towards other and unknown tracts which are terminated by an inevitable goal. At times in this passage the traveller pauses, casts back a glance over the countries he has passed, surveys his errors and his wanderings, and, from the experience he has gained, directs more surely his future course, and shuns more perfectly coming dangers. As life passes away, and as surrounding objects less obscure its final close, these pauses grow more frequent, and bear a deeper lesson. The retrospect, if it is sadder, is more extended; the anticipation, if it is less hopeful, is more true. Men and things are weighed in a finer balance, and are assayed at a truer value. The traveller commences to perceive more clearly the objects for which this journey has been imposed on him, and to recognise more fully the direction in which his future course must tend.

Such a pause may well be supposed to take place when a young man has passed the earlier period of his life, and sees opening before him his future lot. Then is crossed the Rubicon which divides the sweet and careless pleasures of youth from the stern career of manhood. The passage at the time may be little heeded, but in after years the grown man often looks back to it, and wonders that he should lightly have passed over a transition so important. For the period when we commence what is to be the occupation of our lives, is no common period, and is fraught with no common consequences. At that time are laid the foundations of social position, and the first stones of worldly success. At that time, also, the mind begins to receive its final training, and to assume its determinate direction. From the intellectual circumstances which then surround us, we can, in the majority of cases, never afterwards detach ourselves. Even, if at an after period, we abandon the

path we have entered and adopt another, the intellect can never entirely free itself from those potent influences which moulded it into form. The impressions which it received when it was soft and ductile, may be obscured, but can never be effaced by those to which it is subsequently exposed, when age has rendered it less eager to receive, and less tenacious to retain. Habits of thought once put on are not easily laid aside, and the original bias impressed upon the perception and the judgment, makes itself felt at every moment from the starting place to the goal.

It is well then, on all accounts, that those who are about to step across the threshold into the active and tumultuous arena of the world, should ask themselves, What are the purposes of the calling they are about to undertake, and what are the means it possesses for accomplishing its ends?

The aim and purpose of the Profession of Medicine hardly require to be described. As long as this world is peopled by beings, erring in mind, enfeebled in body, and in whose frames lurk the germs of ultimate decay, so long must exist an order of men, who are called upon by the necessities of their fellow-beings to determine the means by which those elements of disease and death may be best neutralised or kept at bay. The man disabled by disease, or stricken down by accident, cries imperatively for succour; it is not in man's nature to hear that cry unmoved; and in all times and among all nations, the attempt has been more or less rudely made to answer it.

But, can this appeal be answered? Is this mitigation of human sufferings possible? Are the means at our disposal equal to so great an end? A noble purpose is not only frustrated, it may be falsified by an imperfect instrument. It might be an angel's province to lighten the burdens of an imperfect nature, and to mitigate the calamities which desolate a world. But it would be the office of a demon to engender hopes in that which has no power of performance, and to inspire faith in that which has no warrantry of truth.

There are only two modes in which we can test the pretensions of a science which claims to be true. We may examine into its method, and repeat its experiments, and see how far the one is correct, and the other accurate; or we may accept it on the evidence of its results. The trust of the mass of the people in medical science is based on a recognition of its utility. It is a faith which has been deeply rooted on the experience of successive generations, and on the evidence of repeated success. It has not originated from any exact knowledge of the system believed, but from the conviction that a want has existed, and has been supplied. Yet, owning this source, it is not less to be accepted as real and substantial evidence in support of that in which it trusts.

But, what method is adopted by the practitioners of medicine in the performance of the duty which has been imposed on them, and which has been assumed by them. We know that there is only one condition on which any knowledge is possible; that, in all cases, isolated phenomena must be first noted, and then by the combination of these scattered links the whole chain must be constructed. Does medicine conform to this rule? Is it a science of observation? Does it note phenomena and trace their sequences, and form by induction, general formulæ to express them? It does so most undoubtedly. In proof of this, I need only refer to that eloquent exposition of this subject which two years ago our Professor of Medicine addressed to us from this place, and in which the true basis of pathology was so emphatically announced. From the days of Hippocrates and of Aretæus, down to those of Sydenham and of Louis, the men who have stamped the impress of their genius visibly on Medicine, have been those who have the most closely observed and interpreted Nature. We now pursue the path which Hippocrates commenced. The links which we observe are the phenomena of disease,—the chain that we construct is the theory of pathology. To do this, we call in the aid of every collateral science which can serve us. We call on anatomy, and on physiology, and on chemistry, to fix our standard of health, to furnish us with implements of research, and to explain to us the healthy action of those portions of the frame which we see imperfect and diseased. Every day we improve our knowledge of healthy action, and our means of detecting the deviations from it. Whatever phenomena of pathology may yet be obscure, we seek to render clear; whatever may yet be confused, we seek to reduce into order. Not only metaphorically, but literally, we weigh the symptoms of disease in the balance, prove them in the test-tube, measure them with the tape, listen to them with the stethoscope, and define and magnify them with the lens.

Is it not at once evident that this method is the correct one? In order to cure diseases, must we not first learn to recognise their symptoms, and to interpret as accurately as may be the conditions which these symptoms symbolise? Is it not in proportion to the precision and certainty with which the signs of disease are indicated and interpreted, that the treatment expedient for each condition can be determined? No other method than this is even conceivable. Its very announcement commands assent to its principles. It may extend and perfect its modes of investigation, but its fundamental basis must ever remain unaltered.

But when, by means of observation, the facts of pathology have been collected,—when anatomy and physiology have been called upon to aid us in gathering these facts and to assist us in explaining them, medicine does not abandon

the path she has entered. In seeking for remedies for these pathological conditions we rely still on experience; we conform still to the conditions of all knowledge, and remain, as before, only the interpreters of Nature. Therapeutical knowledge is acquired only by observation; we know what will cure only by knowing what has cured.

Our whole method of cure may be comprised under two general rules, the first of which expresses the very philosophy of therapeutics. When we have detected any pathological condition, we endeavour to trace its causes, and, having found them, to determine by experiment how they may be removed; or, if the causes are irremovable or undiscoverable, we endeavour by experiment to find out what will palliate or remove their effects. In searching for the causes of disease we look for aid to almost every science; in seeking for the remedies we do not disdain suggestion from every source. We reject no measure which can be *proved* to exert a beneficial influence, and we absorb into our system every plan, however proposed, which can demonstrably add to its utility. The regulation of the food which enters into the body, of the atmosphere which surrounds it, the introduction of substances into it, the application of substances to it,—heat, light, electricity, mechanical appliances, the actions of the body, and even the actions of the mind—are sought to be made available. In all cases, the measures, however proposed, are only tentative till confirmed by experience. The supreme judgment upon their degree of utility must be passed by experience and be attested by evidence. The kind of evidence necessary to prove a therapeutical fact, is the same as for all facts. When a sequence has been observed a certain number of times, we presume that it will occur again, and that there is some intimate connexion between the antecedent and the sequent. Doubtless, on account of the great number of circumstances which have to be eliminated, there is more difficulty in ascertaining a therapeutical fact, than in some other cases; but it is clearly quite possible to obtain this with as much certainty as in any science, by multiplying the observations under different conditions. Nor is there so much difficulty in doing this as some have supposed. That it has been done to a considerable extent, and in a manner sufficiently accurate to allow us to apply it to practice, is not only a fact which in this place I conceive I am justified in assuming, but which is assumed by all who attempt to teach, or to learn, or to practise the art of curing.

As therapeutical knowledge is thus founded on observation, it assumes as real and substantial a place in the temple of the sciences as chemistry or astronomy. That one medicine will act on the stomach, another on the skin; that opium will deaden pain; that aconite will numb sensation;

that alcohol will excite the heart; that digitalis will depress it; that such vomiting, sweating, deadening, numbing, excitation or depression, are useful in certain given conditions; or, to come more closely to actual instances, that iron will cure anæmia, or quinine ague,—that cod-liver oil is useful in phthisis, iodide of potassium in syphilitic periostitis, hydrocyanic acid and nitrate of silver in gastrodynia, or turpentine in certain hæmorrhages—that a certain manipulation is necessary in hernia, or a particular operation if this manipulation be unsuccessful,—that fractures require certain mechanical appliances, and ulcers certain applications according to their kind, are absolute facts, as capable of proof as that water is composed of oxygen and hydrogen, or that the earth moves round the sun.

Therefore, as these and many other therapeutical facts of diet, of regimen, or of medicine, are truths, it is impossible that any discovery can ever destroy their truthfulness. It might lessen their utility, as furnishing something which would supply their place, but their character as facts cannot be destroyed. If we were now to discover some mode of treating ague so superior to quinine, as to lead to the disuse of this remedy, it would still remain a truth, that quinine will cure ague. If any system of therapeutics should hereafter supersede our method, this can only be done by showing that the evidence in its favour is more extended and more complete. The argument of the homœopathist should be, not that medicine is incompetent, for this position is untenable, but that his method is more competent,—not that we do not work cures, but that he works more cures.

It may be demanded, however, whether, admitting the accuracy of our method and the power of our remedies, this power is actually sufficient to cope with the numerous ills that flesh is heir to. To this it may be replied, that there is hardly any disease for which we have not some useful rules for treatment, and hardly any bodily condition which we have not attempted to benefit with more or less success. If these therapeutical rules are not sufficient, *we know of nothing that can supply their place.* The question is not between our system and some other, but between our system and inaction. If this system of cure, which is built upon the same foundation as all inductive science,—which is impregnated with the very genius of Bacon,—which gave, indeed, long before that great observer was born, an exemplification of that very method of observation which he recommended,—if this is worthless, then the ground is struck away from under the feet of all remedial science; disease and death must exist without an attempt being made to arrest their progress; men will groan unheeded, or will pour out their complaints to those who answer them merely with tears of impotence; and the most

glorious privilege of man,—a privilege often abused, often neglected, but still not forfeited, will be taken away, viz., the power which has been mercifully given to us of being able to contend with evil, and from it to bring forth good.

But, it may be asked, and the question is one to which it is necessary to give a careful consideration, if our method is thus the only one, if we do thus possess therapeutical power, and are thus able to prove this power by evidence; if, in short, we do all which in this state of knowledge physicians ought to do, to cure diseases, how is it, that certain erroneous systems of treatment arise from time to time, and are looked upon with favour by some portion of the public, although we can find nothing in them which we may wisely adopt? How is it, that by the side of what we consider the only true art, certain pretenders should place themselves? In one word, how is it, that the domain of legitimate medicine should be invaded by quacks?

In answering this question, it is not necessary to allude to the more obvious causes of quackery, which are operative on the quack himself. I may omit all consideration of the temptations which the lust of riches, or the desire of notoriety place in the way of an unscrupulous man. These causes of quackery are, if I may use the term, subjective and internal, and as long as dishonesty exists in the world, men will be found who, for the sake of gain, will pretend to powers which they do not possess. But, unless there were something external to himself which aided him, the assertions of a charlatan would meet with no regard. What is it, then, in the public mind, which so fertilizes this weed, that under various forms, and with numerous external changes, it yet springs perennially from the soil, and displays its fatal blossoms by the side of the healing plant?

The most obvious objective cause of quackery is ignorance,—incapacity for estimating evidence,—undue credulity. Confident assertions of any kind will always meet with ready believers. As men grow wiser and learn how to weigh evidence, they grow more sceptical. Therefore we find, in the history of medicine, that in former and ruder times there was infinitely more quackery, of the worst kind, than exists now. We hear it said, that "never was quackery so rampant as now;" but this is a mistake. The golden age when quackery was not, exists only in mythology; and if that golden age can ever be, we must seek it in the light of future civilisation, and not in the obscurity of the past.

Another cause of quackery lies deeper. I need not explain to you, that our art is imperfect from the necessary inadequacy of human knowledge and the inherent weakness of the human frame, and also from the errors of those from whose necessities our art arose. Impatient, however, of unavoidable failures and of necessary delays, demanding greater per-

formances than any power can execute, the public subject themselves continually to the imposition of those who unscrupulously promise what, in reality, no power can perform. An advanced education only can remove this source of quackery, and teach men, not only to show gratitude for wisely exercised powers, but to practise submission to inherent and inevitable evils.

But, thirdly, there is a tendency in our mental constitution which, although implanted there for the wisest purposes, can yet, by excess and misdirection, give rise, as in all similar cases, to a certain degree of evil. I mean the disposition inherent in all, in a greater or less degree, to seize eagerly any new idea,—to welcome with pleasure any alteration of the beaten track,—in a word, to be attracted by novelty. In some minds this disposition is excessive. The ballast and the rudder seem alike wanting, and their course is altered with every shifting wind. In many cases we see not only individual minds, but the aggregate mind of a nation exhibiting this propensity in an extreme degree. When we are surrounded by striking objects, and are too much impressed with the consciousness of continual and mighty changes, we at length come to demand such changes as a necessity. The mind craves for any aliment which will gratify its morbid longing. Do we not see this at the present day in that mighty Republic which has been so fed with the marvels of a new world, that it has become gluttonous of novelty and of change? This is a condition of mind which is only evil because it is an exaggeration of good; it belongs to an intellectual, though not to the *most* intellectual age, for its judgment is deficient, although its apprehension is so keen. In medicine, we observe its moderate action daily; and this action is good, for it leads to experiment and to progress, but when it wants the correction of previous knowledge and a calm reflection, it tends inevitably to quackery.

Another and a deeper aid to quackery can yet be observed. Those who look into the workings of the popular mind, are aware, that, according to the age and country, there is almost always floating about some great truth; dimly seized it may be; receiving it may be, many wrong applications; associated with many errors, but yet a truth—eternal and indestructible. In obedience to a truth of this kind, the human mind has always, and perhaps never more than now, desired to recognise simplicity amidst complex elements; to include, under one universal formula, all minor laws; to trace out, amidst infinite diversity, the presiding unity; and to converge all the forces of the universe towards one omnipotent and universal cause.

To this desire for simplicity and generalisation, the dogma invented by Hahnemann, immediately applies itself. All the facts of therapeutics are sought to be expressed by one

great formula. The public do not know, and, without being told, cannot be expected to know, that this dogma, which seems to satisfy a want, does so only in appearance,—that such simplicity is at present impossible,—that the so-called homœopathic law is a law without examples and without proof,—that, in fact, the doctrine "similia similibus curantur" is no grand generalisation, but is merely the degenerate successor of abortive forerunners, and the erroneous antithesis of an ancient dogma, "contraria contrariis curantur," equally impotent and equally incapable with itself. But that the homœopathic formula should meet with a certain amount of favour was to be expected. It has been received, not on its own merits, but because it was thought to accord with what every one feels to be true. When the public have recognised that it does not so accord,—that it is a hypothesis and not a generalisation,—a guess and not an induction,—a phantom and not a reality, then the dogma of Hahnemann will pass into the same oblivion which overshadows its numerous predecessors. On the other hand, the doctrine of "infinitesimal doses," an absurdity so great that it might have been supposed incapable of maintaining its ground for a moment with an intelligent and a refined people, has so far maintained its ground, because it chimes in with another general belief. The popular mind is now beginning to recognise around it the continual working of great powers. The splendid researches of our men of science are dimly reflected and partly distorted in the mirror of popular belief. The forces which can traverse matter, which can produce not only appreciable but extraordinary effects without appearing to disturb and waste the particles of the matter they pass through, present themselves to many as instances of power almost disjointed from substance. From the phenomena of electricity, of magnetism, or of light, it appears to many but a single step to the recognition of immateriality and abstract force. Consequently, to a person in whom this frame of mind has been formed, and who has not exactly defined the meaning of the term "infinitesimal," it may appear a parallel fact, that effects should be produced by homœopathic doses. The friction of amber calls forth a latent force. Why, it is asked, may not the division and trituration of matter make manifest powers of another kind which may be useful in disease? This is, again, nothing but ignorance misapprehending and misapplying truth, and seeing analogies and resemblances where none exist. The arguments against infinitesimal doses should be directed to show, that this idea of the development of force is a mere conjecture, until proof be given of the reality of the development; that the statement, that the division of matter can evolve remedial forces, is supported by no analogous physical facts, and is strongly opposed by many; and, above all, that such pretended

manifestation is entirely unattested by any *trustworthy* evidence derived from the phenomena of disease. No doubt, certain recoveries do follow homœopathic treatment. But in these cases, drugs are unnecessary; and the healing force of nature is sufficient, while the globules, powerless alike for good or evil in themselves, satisfy the patients' distinctive desire to do something towards their cure.

Although, therefore, there is no truth in homœopathy, I think we can see how it may borrow a false light from what are truths; and, seeing this, we may make more allowance for persons who are deceived by it. We perceive that that portion of the public—not, after all, a large one—who have looked with favour upon the dreams of Hahnemann, are not necessarily dupes or knaves, but, possibly, only partial and erroneous thinkers.

As there is nothing in nature that has not its own utility, so we may draw from quackery a great lesson: that, as novelty may too much attract, and as the prevailing opinions of the day may too much influence us, as shown but too often in the history of our art, so nothing can preserve medicine from these influences but a full recognition of its own origin, and a constant employment of the method which has made it what it is. We should resort on every occasion to that observation which is the ground-work of science,—we should strive to perfect our evidence, to admit nothing, to refuse nothing, but on sufficient testimony. In this way only can the Profession keep itself free, from the more insidious forms of quackery, and preserve the unstable minds among the public from mistaking the *ignis fatuus* which floats over some marshy and dangerous spot where no sure footing is, for the safe and guiding light which points to security and life.

It has been said, by some who appear not to have seen fully the exact bearing of the case, that if we appeal to experience, so also do quacks, and are therefore entitled to as much credit as we are. But there is all the difference in the world between true and false evidence. If I am a chemist or a physiologist, I do not receive without due care and investigation statements made by individuals of whose competency I have no proof. It is not the same thing to me whether a fact is stated by a Graham, or a Sharpey, or a Carpenter, or by a subaltern of science. Am I, as a surgeon or a physician, to forego this privilege of selection? It is monstrous to suppose, that the statements of an educated practitioner, and of a man who lives by palming fictions on the public, are of equal value. By experience in medicine, we mean the collections of facts which are capable of proof, and not an agglomeration of statements which are heedlessly proclaimed by incapacity, or wantonly manufactured by fraud. Is it impossible to ascertain whether a statement of therapeutics be true or not? If it be so, then indeed we may

abandon as an impossibility the attempt to relieve in any way the sufferings of humanity.

I have thus alluded in the most general terms to the method by which diseases are sought to be recognised and to be cured. But the aims of medical science do not stop at individual and at developed diseases. We find that both individuals and societies are liable to errors which nurse the diseases which destroy them. It too often happens that we find ourselves called upon to treat, not the whole disease, nor its greater part, but only its termination and final phase.

Therefore, one great object of medicine is to point out what are the conditions of health, and how deviations from these conditions, (when carried beyond the compensating powers of Nature,) are inevitably followed by disease. From the days when the profound and subtle mind of Hippocrates first gave form and coherence to therapeutical science, down to modern times, to the days when Fracastoro pointed out the causes of the terrible fevers which then devastated Italy, or, when Hoffmann wrote his treatise, "De septem leges sanitatis," or later still, to our own days of Sanitary Reform, to Farr and Chadwick, Guy and Southwood Smith, physicians have ever recognised the grand truth, that foresight and wise precaution can *prevent* the diseases which no science and no skill can *cure*. It is not for me now to enter into the causes which have oftentimes prevented this truth from being presented with sufficient energy, or received with due alacrity. Suffice it to say, that to proclaim it is a solemn duty, and to receive it a binding obligation. To point out to individuals that the great rule of health is, that every organ shall be exercised, that none shall be overdone, that excess must pay its penalty, and vice receive its punishment, is not more our duty, than it is to urge upon the State that protection to life does not mean simply, protection from the hands of violent men, but from the actions of heedless ones; that protection to property should not be simply protection to lands, and goods, and money, the property of the rich, but also protection to health and labour, the property of the poor.

There is no fact more cheering in the present day, than that a deep sense of the necessity of removing the causes of disease has been roused in the mind of this great nation, and has commenced to be acted upon by its Government. It remains for the Medical Profession still to press forward this movement,—more fully to define its objects and specify its direction, and thus in time to remove as much as possible all causes of disease but those which arise within the individual himself, and which self-government alone can remedy.

Such are the aims of the Medical Profession. To *cure* the disease that has been produced; to *prevent* the disease whose

latent causes are ready for development. In accomplishing these objects the Profession, no doubt, commits errors, for it is fallible,—and overlooks truths, for it is human. But that its aims are worthy, and its method of pursuing them scientifically true, cannot be gainsayed. Whoever, then, is commencing this Profession to-day, let him be certain that, if he cultivate it in a proper spirit, he will never repent the step he has taken. He will find this Profession always laborious, often disappointing, sometimes distressing; but yet the excellence of its purpose compensates for all imperfections, and consoles for every failure. It is a Profession which deals with subjects the most interesting, and with sciences the most attractive. So vast is its range, that it offers new points of cultivation to all who seek for them, and industry and honesty never fail to add their contribution to its progress and improvement. Doubtless, the pursuit of it will give no worldly status; but a worldly status would add nothing to its honour, and not much to its reward. In their early career its cultivators often find their social progress slow and tedious; but perhaps there is no other Profession which ultimately gives a competence to so many of its members. But its greatest recompense is, that it lies within ourselves so to practise it, that while it shall gratify every intellectual and moral principle, it shall repress every worldly and selfish feeling. There is no Profession which gives to its members so immediate and direct an opportunity of doing good. In its beneficent working for the relief of the body, it has even been used by the Divine Author of our faith as the type of his own ministry towards the human soul. Let us try to realise this highest conception of our calling, and to render ourselves worthy of this august reference. Then, as we pass through life's journey, and from time to time note our progress and survey our position, we shall have the happiness of feeling, that a noble and an unselfish purpose may perhaps have partially compensated for the errors that we cannot but have committed, and may have sanctified the good of which we have been the humble instruments.

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ON

THE STUDY OF SURGERY.

ON THE

STUDY OF SURGERY:

AN ADDRESS

INTRODUCTORY TO THE COURSE OF

SURGERY,

DELIVERED AT UNIVERSITY COLLEGE, LONDON,

AT THE OPENING OF SESSION 1850—1851.

By JOHN ERICHSEN,

Professor of Surgery in University College, and Surgeon to University College Hospital.

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ON

THE STUDY OF SURGERY.

GENTLEMEN,

In addressing you for the first time as your Professor of Surgery, I feel that I have entered upon one of those periods of my professional career, which, being marked by the assumption of new and most responsible duties, must ever remain fixed in my mind as an epoch of peculiar interest and importance.

Under more ordinary circumstances, and in any other place than this, I should feel deeply the responsibility of undertaking to instruct a number of intelligent pupils in the Science and Art of one of the most important, perhaps I may say, *the* most important and difficult branch of our profession. But if this would be my feeling under other and more ordinary circumstances, how much more must I not experience the weight of my responsibilities in the position in which I am here placed? Were it only in being called to fill the chair of Surgery in so great an Institution as this at an earlier period of life than usually happens in the crowded and jostling walks of our profession;—as the successor of a gentleman who, by the soundness and practical value of his teaching, and by the uprightness and integrity of his character, has justly and deservedly won the esteem and respect of all those who came in contact with him; I should consider myself placed in a position that would require very

considerable exertion on my part to justify the selection that the Council of this College has made in conferring upon me so honourable a post as that which I now hold. Were these, I say, the only thoughts connected with this chair that pass through my mind, in now, for the first time, occupying it, I should indeed feel that I was entering upon a career of much labour, and of deep and anxious responsibility.

But, Gentlemen, many other recollections crowd upon my memory. When I reflect that I occupy the same position in this College, that has been successively filled by such men as Sir Charles Bell, Samuel Cooper, Syme, and Arnott;—that was, but a few short years since, within the ready memory of many of those whom it will be my daily duty to address, conjointly occupied by two of the greatest master-spirits in Surgery, of this, or, of any other country;—when I reflect that I fill a chair that has been adorned by the deep erudition and extensive acquirements of a Samuel Cooper;—from which that great practitioner of our art, Robert Liston, has addressed his invaluable precepts to you;—that I stand here as the successor, and so far as in me lies, as the representative of these great men;—it is *then* that I feel the full pressure of my responsible position;—that I am impressed with the conviction that it is incumbent upon me to endeavour to acquit myself in such a manner as not to be considered an altogether unworthy successor to these accomplished and skilful surgeons; to do what lies within the scope of my abilities to maintain the honour and credit of the Surgical School of this College as they have been transmitted to me by my predecessors; and to preserve untarnished the lustre with which they have surrounded this chair.

The full and clear and distinct knowledge of the difficulties, of the responsibilities, and I am not perhaps altogether wrong in saying, the dangers of my position; the knowledge of what *you* have a right to expect from me; of what my colleagues in office, and the Council of this College have a right to expect at my hands, is, I think, the best assurance

I can give you of my earnest and heartfelt determination to spare no exertion, to leave no efforts untried, to do MY part towards supporting this Institution in the high and honourable position to which it has been raised by the labours of those who have been, and of those who are, connected with it.

But, Gentlemen, not only for your sakes, not only for the sake of my colleagues, or even for my own credit's sake, constituting as these do singly and collectively the strongest inducements that could spur a man to action, would I cheerfully make no ordinary sacrifices of labour and of time to the duties of my office. But I have yet another incentive, if, indeed, any other were wanted to urge me on. Connected as I have been with this Institution from the very first day on which I entered the profession,—for considerably more than one-half my lifetime;—owing as I do to it the foundation of what professional knowledge I possess;—passing as I have done and still do within its walls many of the happiest hours of my life; and indebted as I am to it for many sincere and lasting friendships, some of which, indeed, have been but too soon, and suddenly and painfully severed by the hand of death; I feel myself bound by so many, and by such close ties of gratitude and of affection to University College, that, were I influenced by no other reasons, these motives alone would be sufficient to determine me to use my utmost efforts in supporting her in the high position she has attained amongst the Schools of Medicine of this metropolis.

It is customary, Gentlemen, and I think the custom is a good and useful one, not to plunge at once into the midst of our subject, but to preface the more serious business of the session with some general remarks, either of advice as to the way in which you should occupy your time, and of the course of instruction that you will have to pursue; or else, to direct your attention specially to that department of the profession, in the study of which we shall during the next six months be daily engaged together. I gladly avail myself

of the occasion that custom thus affords me of making a few remarks, that I might not have another opportunity of bringing before you, on the subject of our course; and I purpose devoting this hour to pointing out to you what Surgery is, and to tracing the causes that have specially and directly led to its present high position in the civilised world. In this way I think we shall occupy the time more profitably than we should in laying down general rules for your guidance, with which, from the knowledge I possess of your characters and habits, I may safely conclude that you are already well acquainted, and but little require.

And first, Gentlemen, let us enquire what is meant by *Surgery*. I shall not attempt to give you any definition of this term: definitions are seldom very happy or explicit, nor do they usually include all the requirements of the case, and that of *Surgery* constitutes no exception to this rule. It is in vain that we look to the derivation of the word "Surgery" for its modern meaning—*Surgery*, *Chirurgia*, χειρεργον, hand-work, handicraft, is very far from being the Surgery of the present, whatever it may have been of a former day. It is true that in ancient times the surgeons were the handicraftsmen, the mechanicians of the physicians; those to whom were delegated the manual manipulations which the scientific physicians thought it a degradation to undertake. But happily for science and for mankind, these times have long since passed away, never to return; and many ages have now elapsed since the Surgeon stepped beyond this, the original limit of his calling. It is long since the *hand* has been his sole dependence; and it is now by the *head*, as much or more than by the hand, that he exercises his avocation. The great surgeons of the past and present century were not and are not mere workers with the hand, mere handicraftsmen; but however skilled they may have been in the exercise of the manual part of their art, they yielded to none in any other department of our profession for the success with which they studied, and for the impulse they gave to the advance of

those great truths of Physiology and Pathology that constitute the basis of the science of Medicine as of Surgery. Nor again can Surgery justly be said to be limited to the consideration of injuries, and of those diseases that manifest themselves by changes of form, colour, or consistence apparent on the surface of the body: "*External Pathology*," as it is termed by the French. A very large number of diseases that are universally recognised as falling within the province of the surgeon are blood diseases, or affections that influence the deeper portions of our frame, making but little, if any, external manifestations of their presence. What then is Surgery? We may answer, that is that great department of the Healing Art which treats:

I.—Of the injuries from whatever cause to which the body is liable.

II.—Of all external diseases; and of all diseases that specially affect the organs of sense, of locomotion, and of reproduction of the male, as well as of the female.

III.—Of all those diseases that require manual, mechanical, or operative means for their cure or relief, and of the nature and application of these means.

IV.—Of the mal-formations to which the human frame is liable.

Thus it will be seen that Surgery occupies a wide field; the limits of which, though clearly and strongly defined on some sides, are not so on others; but so gradually fade and shade away into the other departments of our profession, that no distinct line of demarcation can be drawn between them, and it becomes perfectly impossible to say where one department begins and the other ends. In this respect the science of disease but partakes of the general law that we find exemplified in all the natural sciences, viz., that nature admits of no abrupt distinctions or demarcations; no arbitrary arrangements or classifications; but has united and bound together all her works in one harmonious and continuous whole; and not only can no line of separation be

distinctly and broadly drawn between Disease *Medical* and Disease *Surgical*, generally; but the same disease may, as it affects different localities, as it assumes slight modifications of form, or as it takes its origin from different causes, be sent, now into the wards of the Physician, now into those of the Surgeon.

The divisions, then, of the Healing Art, into several departments, is, in a great measure, arbitrary. But though arbitrary and artificial, it is highly useful, and is a necessary result of that division of labour which the rapid advance of science has rendered imperative, not only in our profession, but in most of the other walks of life. The circle of the medical sciences has, of late years, become so widely extended, and every spot within its area has become so diligently and closely cultivated, that it has become impossible for one intellect, however capacious and grasping, to master and retain the details of every department. It has become impossible for the same man to be able to cut dexterously for the stone, to tie an artery neatly and successfully, to be thoroughly conversant with the discrimination and diagnosis of the minute shades of cardiac and pulmonary disease, and to be competent to meet all the emergencies of childbirth.

The necessary result of this inability, on the part of any one man, to master the details of all the departments of the Healing Art, has been its division into two great branches—Medicine and Surgery—the latter including in reality, though it does not in this country by custom, the subdivision of Midwifery; which consisting in a series of purely manual manipulations and mechanical proceedings, is, in point of fact, a part of Surgery, though on account of its extent and importance, it has been separated in study and in practice from this branch of our art.

This division of labour has been attended with very considerable advantage to the public, and has materially conduced to the progress of science, as it has enabled professional men to devote themselves more specially to, and thus to acquire

a more extended and minute knowledge of, that department of their art, to which their tastes, opportunities, or mental and physical qualifications may more particularly have directed them.

But, Gentlemen, bear in mind, that though this division of medical science is highly useful and convenient, and has been productive of important results; it is, as I have already said, purely artificial and arbitrary, and has no existence in nature, and that you will be unable to move a step in practice without finding that these several divisions are inseparably connected and mutually dependent;—that it is impossible for a physician to exercise his calling without an acquaintance with those principles of Pathology and Therapeutics that are common to Surgery as to Medicine; and that no surgeon can act with safety to his patient, or with comfort to himself, unless he be conversant, to a great extent, with the details, as well as with the principles of Medicine. Indeed, it requires no formal argument to prove that the great principles of medical science, the laws that govern the human frame in health and in disease—those principles that guide us in determining the causes, the progress, the probable result, and the treatment of all deviations from the normal standard, must be the same, whatever be the organ or region of our bodies that is affected by disease, whatever be the particular tissue that is implicated, and whatever be the peculiar form that the malady may assume.

When we turn to the details of practice, it is true that the two departments of Medicine and Surgery, appear at first sight to be much more distinctly separated, and that we have little difficulty in referring each case that we meet with to one or other of them. Thus, a case of heart disease, or of typhus fever, lies evidently within the domain of the physician; whilst a broken thigh, or ulcerated leg, or strangulated intestine, as specially belongs to the Surgeon. But even here the distinction is not real, and these very examples that I have, almost at random, adduced, will, if closely

examined, show you how mutually dependent, how inseparably connected the two branches of practice are, and how their circles cross at many points. The broken thigh, the ulcerated leg, the strangled gut, are, doubtless, purely surgical cases, as exclusively so as any you can possibly have to treat; and yet, in conducting these to a proper termination and cure, your treatment may have fully as much to do with constitutional or visceral, or, in other words, with purely medical disease, as with the local malady.

Take the instance of the compound fracture of the thigh. The fracture is reduced, the broken ends of bone carefully laid in apposition, and the limb neatly and comfortably put up in splints, which you may scarcely have occasion to disturb once a week during the treatment of the case. But does the Surgeon's business end here? Does all his anxiety depend in maintaining the broken bone in a proper position? If so, he would have but little disquiet; for he knows that by keeping the injured part of a sufficient length and proper shape, by very simple mechanical contrivances, for a definite time, nature will firmly solder together the broken fragments, and a sound, and straight, and useful member, will result. But the patient has been habitually living above par, taking more stimulus, and leading a freer life than is prudent or right. On the third or fourth night after the accident, the surgeon finds that the pulse has become quick and irritable, the tongue coated, the skin moist and clammy, that his patient is wakeful, suspicious of those around him, irritable and talkative, and at last becomes furiously delirious. He now knows that he has been seized with that disease, which, in the surgical words, we call "Traumatic Delirium," but which, in the medical words, you will meet under the name of "Delirium Tremens;" not excited, it is true, by a broken bone acting injuriously on an irritable and shattered system, but by some internal source of irritations, loaded bowels, or the effects of a severe debauch, operating on a similar constitution, and producing similar effects, to be met by the same

treatment as when they are the results of the fractured limb. Or, again, at the end of ten or twelve days, whilst the wound is suppurating healthily, and all is looking well, the patient is seized with severe rigors, his teeth chatter, reaction soon comes on, and at the same time an angry red blush makes its appearance about the wound, the secretions of which are dried up. Here we know the patient has been seized with erysipelas, to be followed perhaps by inflammation of the veins or of the absorbents, by pyemia, by pneumonia, and a train of the more serious secondary phenomena. Here the fracture becomes of minor moment; rest, and cleanliness, and position, are enough for it; but the surgeon requires to tax his *medical* knowledge to the utmost to carry his patient with safety through the superadded diseases.

Take the next instance:—A patient applies with an ulcer on the leg, small, painful, with a greyish, flat surface, and exuding no discharge, or what there is, small in quantity and bloody in character. You employ every possible variety of *local* treatment that your ingenuity can suggest, or you think adapted to the peculiar character of the sore. But no effort of yours can raise florid granulations, can make the surface pour out healthy creamy pus, or cause the formation around its margin of that delicate semitransparent blue line of new skin that the Surgeon loves to look upon. You go through the whole round of dressings and strappings; salves, lotions, and poultices are used, and all in vain. But look at the patient's tongue, enquire into the state of his digestive organs; you find him labouring under irritable gastric dyspepsia; cure that, and the sore will get well by the application of a piece of lint dipped in tepid water.

Again, in the case of strangulated hernia, you relieve the constriction in the most artist-like style. But if you cannot treat the accompanying or consecutive peritonitis, which, in many instances, differs in no way, except in cause, from that which arises from cold or from any other non-surgical

condition, your patient will die as certainly as if he had bled to death from a wound of the epigastric artery, or had been allowed to sink with the stricture unrelieved.

Thus I might continue giving you as many examples as there are surgical diseases and injuries, but that it were needless to multiply instances to prove to you that you cannot move a step in the practice of Surgery, that you cannot treat the commonest surgical cases, heal a wound, unite a fracture, treat piles or fistula, a diseased joint, strictured gut, or ulcerated leg, without being compelled to have recourse to *constitutional* treatment, without looking specially to the state of the digestive organs, kidneys, or lungs; without remedying disease lurking in one or other of these viscera, that keeps up or has generated the local mischief; without removing sequelæ or complications that differ in no way, except in their *causes*, from the same diseases that specially fall under the care of the physician.

Thus, then, Gentlemen, you will see that Medicine and Surgery, whether we regard them in theory or in practice, are one and indivisible, and that however convenient, however *necessary* it may be, in the present advanced state of science to arrange our cases under one or other denomination, this distinction is altogether arbitrary, that nature refuses to conform to it, and that we, in this as in all other matters, act most wisely in bowing to her dictates.

To some* it may seem almost unnecessary to take this trouble to point out what would, at first sight, appear so obvious a matter—the unity and indivisibility of Medicine and of Surgery. But I have done so advisedly, because I know that an erroneous opinion is prevalent amongst the junior members of our profession; less so now, perhaps, than it was a few years since, but yet prevalent to too wide an extent, and an error of grave moment it is, to look upon the

* Those who wish to pursue this subject further should consult the works of Abernethy and of Macilwain, and a lecture by Mr. Lawrence, in the *Lancet* for 1836-37.

study of Surgery as distinct and separate from that of Medicine. I will not stop to enquire into the causes of the prevalence of this error, but, Gentlemen, let me earnestly impress upon you, that if you would be Surgeons, in the fullest sense of the word, equal to any emergency that may occur in the course of your practice, not to neglect the study of Medicine, but to look upon an acquaintance with its principles and details as an integral part of the study of Surgery.

Looking upon Surgery, then, as a segment merely of the great circle of the medical sciences, and studying it as a part of this great whole, we will now proceed to trace the causes that have, more particularly of late years, led to those great improvements by which it has been characterised. And in so doing we shall be enabled briefly to advert to the relations that exist between Surgery and some of the other branches of the Healing Art, by investigating, as far as our time will allow, the influence that an improvement in some of them has exercised on the general progress of Surgery.

It is not my intention to enter into the history of Surgery, it would be but little interesting or instructive to you were I to do so. To point out to you what a small share of surgical knowledge was possessed by the Greek Father of Medicine. How this was improved and extended, in its operative departments, by the surgeons of the Augustan age and earlier centuries of our Era. How it gradually sunk into almost utter extinction during the long night that overclouded Europe after the fall of the Roman empire. How on the revival of learning in Europe what remained of the science of Medicine was to be found in the cloisters, and how the knowledge of our profession, being confined to a priesthood which, acting on the doctrine that "*Ecclesia abhorret à sanguine;*" and which, denouncing Surgery as an art the practice of which was degrading to a man of learning, handed it over to farriers, to barbers, to bath-keepers, and to the veriest scum of society; a class resembling the cow-leeches and bone-setters of the present day. How from

"this dark night of unlettered ignorance" our noble and useful art at length emerged, and was gradually but slowly raised by the successive labours of Fernelius, of Paré, of Sennertus, and of Wiseman; until at length towards the middle of the last century it received an impulse by the combined labours of numerous surgeons of high repute and of extensive acquirements in every country in Europe—in Great Britain by Cheselden, Sharpe, the Munros, the Hunters, and Pott; in France, by the Petits, and by the members of the French Academy of Surgery; in Germany, by Schmucker, Richter, and Haller; and in Italy, by Lancisi, Morgagni, Troja, and Scarpa — which impulse has been continued through the immediate successors of these great men to the surgeons of the present day. It would, I say, be productive of but little interest or instruction to you were I to enter into a detailed examination of the various revolutions our art has undergone whilst thus feebly struggling through many ages into existence. But I think it will not be uninteresting, and it is certainly not unimportant to trace the causes that have, more particularly during the last half century, tended to raise the character of Surgery to a pitch and with a rapidity of advance that does not yield to that which has marked the progress of any other of the natural and applied sciences. An enquiry into the causes that have led to the advance of a science is not merely of historical or retrospective interest; but it is of *Prospective* importance, affording the best clue to those causes which will lead to further Progress. For by tracing the chain of causation from the past into the present we shall be better able to divine the probable direction that will in future be taken by our art; and by following this, be less likely to deviate from that path which will most readily and directly lead us to further discoveries and triumphs.

Surgery being but one branch of the Healing Art, has necessarily partaken of the advance that has characterised the whole of the medical sciences, and has been *indirectly*

influenced by a variety of circumstances that have tended to their onward progress. Amongst the more prominent of these, may particularly be mentioned the direction that the intellectual activity of the age has taken towards the study of the natural and applied sciences; which is due to the recent advance in all the branches of natural science, in chemistry, geology, mineralogy, botany, and zoology; and of which medicine, as a branch of natural and applied science, has fully partaken. Another great cause of advance consists in the growing and daily increasing tendency to trust solely to deductions from direct observation and experiment: and thus, by weighing and testing truths by means that are equally open to all, and of which every one possessed of the necessary powers for correct observation may freely avail himself, to be guided more immediately by these results; to bow with less respect to the influence of "*Authority*;" and to refuse to adopt mere surmises or statements or opinions, from whatever source proceeding, that are not the legitimate and logical deductions from carefully recorded observations. These and other similar causes may be said to have influenced Surgery, as a branch of natural science; but cannot be said to have exercised any special or peculiar influence on its onward progress, beyond that of other allied branches of knowledge. I will, therefore, content myself with merely alluding to them, as the *indirect* causes of the progress of Surgical Science; and will proceed to the consideration of those that have immediately and directly tended to raise it to its present high position.*

The first great and direct cause of the advance of Surgery of late years, is, in my opinion, to be found in the rapid march of Physiology; in its more general cultivation by the profession; and in the immediate application of the results of

* For a full and most admirable exposition of the causes that have led to the progress of *medicine*, I would refer to the eloquent address delivered by Dr. Walshe, at University College, at the opening of the Session, 1845-46, and published in the *Lancet* of Oct. 18, 1845.

physiological investigations, and of the laws that have flowed from them, to the science and practice of Surgery. Indeed, Physiology may be looked upon as the basis of all sound Surgery; without which no rational pathology or practice can exist: and it is only in proportion as we widen and strengthen this basis, that a durable superstructure can be raised.

It may almost appear superfluous to argue, and it may sound very like a truism, to state, that a knowledge of those actions that constitute disease, or that are necessary for the repair of injury, can only be correctly entertained by those who are acquainted with the acts of the system in a healthy state; that the only way in which pathological signs can be interpreted, is by a previous knowledge of physiological ones; that, as disease is merely an aberration of the functions of a part or of the system from health, a proper appreciation of the nature and extent of this departure from a normal standard cannot be formed, except by those who are previously acquainted with the operations of the economy in health, and with the mutual dependence on, and relation to, one another of those processes that are necessary to its maintenance. A correct and enlightened view of the living organism, as afforded by a comprehensive acquaintance with Physiology, teaches the Surgeon to appreciate at a glance that concatenation and sequence of changes that are the result of a diseased action, and to distinguish those disturbances that have resulted from the progress of disease, and that are consequently secondary, from those that constitute the primary and essential elements of the morbid condition. But it is not only in this manner that Physiology will be found to be of use to the Surgeon. The study of this branch of medical philosophy constitutes the best training that the mind of the young surgeon can undergo, preparatory to his entering upon the more special duties of his calling. An acquaintance with the laws of Physiology leads at once to a knowledge of the principles of Surgery, to which there is

but one step. It prevents, more effectually than any other course of study, that empiricism which springs from superficial knowledge; from an acquaintance with facts and details, without a sufficient insight into those great laws by which they are linked together, and to the operation of which they are subservient. There are many cases of doubt and difficulty constantly occurring, in which, from the rarity of their occurrence, or the number of modifying circumstances by which they are surrounded, there may be an impossibility, from experience alone, in laying down a definite line of practice. When a Surgeon, who merely trusts to his memory of facts and details, comes unexpectedly upon a difficulty such as this, through which his experience or memory affords no precedent to guide him, he is lost and embarrassed, knowing not how to escape; but let him be versed in those laws that regulate the action of the body in health, and he will at once be able to seize the clue that will surely and safely guide him out of his entanglement.

Another inestimable advantage of physiological knowledge is, that it prevents the surgeon falling into the empirical delusions of the day. It opens his eyes to the pitfalls and snares of Homœopathy, Hydropathy, or whatever other form the quackery of the hour may clothe itself in. And I do not know whether I may not venture to account for the fact of our so seldom seeing a Surgeon in the ranks of the empirics that infest the profession, by the happy union that has, since the days of Hunter, in this country, bound the study of Physiology to that of Surgery by a closer tie than links it to either of the other departments of the profession. Indeed, were I asked to point out any one cause to which, more than to another, we might attribute the high position that British Surgery has taken during the last half century, I would unhesitatingly answer that it is to the intimate connection that has existed between the study of Physiology and of Surgery during that period. In proof of my position, I might content myself with pointing to the array of most

illustrious names that have adorned, and that still adorn, the profession of Surgery in this country. The Hunters, the Bells, the Homes, the Astley Coopers, and the Abernethys, of a past generation, not to speak of the Brodies, the Lawrences, the Travers, and numerous others of the present day, have all been pre-eminently distinguished for their physiological as well as for their surgical investigations; their names are almost as familiar to us in connection with one science as with the other, and they have left the indelible impress of their genius on both. The mere mention of these names would be sufficient to prove the importance that men of the highest intellectual rank in our profession as practitioners of Surgery, have attached to the study and investigation of physiological laws and phenomena. But it would be easy to adduce many instances of the direct bearing of Physiology on the practice of Surgery, and, indeed, the instances that present themselves are so numerous, that the only difficulty consists in selecting one from the number.

The basis of all Surgical pathology and practice, the theory of inflammation and of the healing process, the mode of repair of injuries, whether of the soft parts or of bones, the arrest of hemorrhage from wounded arteries, and many other similar Surgical actions, are all purely physiological studies, a knowledge of which has been almost wholly acquired by an investigation of phenomena occurring in living animals.

As an illustration of the bearing of a simple physiological fact on practical surgery, take the case of the puncture of a large artery,—say one of the tibials,—and its treatment. A physiologist knows that the anastomoses between the arterial branches of every part of the body are so numerous and free, that it is impossible to prevent absolutely and entirely the influx of blood into a part, by deligating the main trunk leading to it; blood invariably finding its way into the vessels below the part ligatured; and that this blood is of a dark colour, having lost its arterial hue by the changes to to which it is subject in its passage through the vascular

network of the limb. Surgeons overlooking this simple physiological fact, and thinking to arrest the flow of blood from the punctured and spouting vessel, performed the same operation that they would have done in a case of aneurism of the lower limb,—tying the femoral artery where it was most readily accessible, in Scarpa's triangle, or at some point above the wound. They found, however, to their dismay, that though bright arterial blood no longer spirted from the upper part of the wound, dark, venous-looking, blood continued to well out from the lower aperture in the artery; and that, unless some further proceeding were adopted to restrain this, they would as certainly, though not so speedily perhaps, but yet as surely, lose their patient by hemorrhage, as if no operation at all had been done. They had overlooked the simple physiological fact just mentioned,—that the ligature of the main trunk above the wound only stops the *direct* flow of blood, but that it cannot interrupt the collateral supply, which finds its way readily into that portion of the vessel below the ligature, and consequently continues to escape by the lower aperture in the artery. This, which may be looked upon as one of the fundamental facts of Physiology, and on which the success of Hunter's operation for the cure of aneurism depends just as much as the insuccess of the Hunterian operation for a wounded artery, has been most unaccountably neglected by surgeons since the days of John Bell, who distinctly and forcibly insisted upon tying the artery at the point wounded *below* as well as *above* the aperture in it, until Mr. Guthrie, having adduced numerous illustrations in support of this doctrine, has at length forced it on their attention: and we may now consider this important point of practice definitely settled by the conjoined authority of surgical experience and of physiological doctrine.

Important as an acquaintance with the great fundamental facts of Physiology thus is to the surgeon, and greatly as such a knowledge advances his profession, there is yet another application of Physiology to Surgery that has more particularly

and directly tended to the progress of our art. It is the application of physiological investigation to the direct elucidation of important pathological phenomena; and it is in this way only that the obscurity which enveloped many points in the pathology and practice of Surgery has been, and could have been, dispersed. This particular application of physiological investigation to practical surgery has been very properly termed "Experimental Pathology." It may be said to have originated with Hunter; and in his hands, and in the hands of a long line of distinguished surgeons, it has been productive of the most important results.

I cannot give you a better example of this than is afforded by the history of the use of the ligature. Now, the whole of the questions connected with this, the most important of all the surgical manipulations, by which alone operations can be performed without risk of loss of life from hemorrhage, have been decided by Experimental Pathology.

The ligature had been occasionally and partially employed by the later Roman surgeons, but with the decline of Surgery fell completely into disuse; giving way to such barbarous and inefficient modes of arresting hemorrhage as the employment of the actual cautery, the performance of operations with red-hot knives, the application of boiling pitch or of molten lead to the bleeding and freshly-cut surface. About the middle of the sixteenth century, it was revived or re-invented by that great luminary of the French School of Surgery, Ambrose Paré. But so slowly did the ligature make way amongst surgeons, that Sharpe, surgeon to Guy's Hospital, writing in 1761, two centuries after its introduction into practice by Paré, found it necessary, in his well-known work entitled "A Critical Enquiry into the Present State of Surgery," formally to advocate its employment for the arrest of hemorrhage from wounded arteries, in preference to stypties or the cautery, on the ground that "*it was not as yet universally practised amongst surgeons residing in the more distant counties of our own kingdom.*"

What, it may be asked, was the reason that it took two centuries to promulgate the use of the simplest and most efficacious means we possess in Surgery,—a means that no Surgeon could now for a day safely dispense with? The reason simply was that surgeons were totally ignorant of the means employed by nature for the occlusion of arteries; that they consequently knew not how to apply a ligature to these vessels, or what kind of ligature should be used; and that, in their anxiety to avoid the recurrence of secondary hemorrhage, and to make all safe, they fell into the very errors they should have avoided, and that they would have been careful to avoid, had they been acquainted with the Physiology of the processes that nature employs for the closure of the artery and the separation of the thread.

Between twenty and thirty years after the time at which Sharpe wrote, we find that Hunter introduced that great improvement in the surgical treatment of aneurism, the deligation of the artery at a distance from the sac, and in a healthy part of its course; but this great accession to the treatment of a most formidable disease—which, by the way, was in itself, in a great measure, a deduction from physiological investigations—was but coldly received, and ran some risk of being lost to the world in consequence of the ill success that attended the earlier operations. In Mr. Hunter's first operation four ligatures were used, some tight and others slack; the artery was denuded, so that a spatula could be passed under it; and although, in his subsequent operations, Mr. Hunter contented himself with employing but one ligature, yet the vein was included in this; and he did not draw the noose tightly, for fear of injuring the coats of the vessel, in accordance with the doctrine of the day;—surgeons generally at this time being haunted with this dread of injuring, and thereby weakening, the coats of the artery; and in order to avoid doing so, adopted modes of treatment that almost infallibly led to ulceration of the vessel and consecutive hemorrhage. The application of several ligatures

of reserve, applied slack—the use of broad tapes—the interposition of plugs of cork, wood, agaric, or lead—of rolls of lint or plaister between the thread and the vessel—were some amongst the plans that were in common use. And how can we be surprised that the patients perished of hemorrhage, and that the ligature of the vessel was nearly as inefficient and fatal a means of arresting bleeding as the use of a cautery, or of a button of white vitriol?

It was not until Mr. Jones, by an appeal to experiment, and by means of a series of admirably-conducted investigations, showed that the very point that Surgeons were anxious to avoid—the division of the coats of the vessel, by the tightening of the noose—was that on which the patient's safety depended; pointed out the form and size of ligature that was most safe; the degree of force with which it should be applied, and the processes adopted by nature for the occlusion of the vessel; that a more rational practice was introduced, and that surgeons at length had full confidence in the use of the ligature. The whole question of the arrest of hemorrhage, whether this be effected spontaneously, by ligature, or by torsion, has been entirely decided and placed upon its present secure basis by the application of "Experimental Pathology," to its elucidation. So also with regard to wounds of the intestines, various points connected with the mode of treatment of these injuries, such as the impossibility of obtaining union between the mucous and serous surface, the uselessness of introducing one cut end into the other—the part played by the investing serous membrane, and many other questions in connexion with this interesting subject, have been determined by Travers, by Jobert, and others, from carefully conducted experiment.

Take again another subject of much importance to the practical Surgeon—the admission of air into the veins in certain operations about the neck and shoulder. The questions as to the situations in which alone this accident can

occur—the mode of the admission of the air, the cause of death—and the methods of prevention and of treatment, have all been deduced by appeal to "Experimental Pathology."

I would particularly recommend these investigations to those amongst you, who, having finished your studies, can, before entering upon the active and full practice of your profession, devote some time to an attention to its science; for not only in this way may you add greatly to the science of Surgery, but you educate yourselves to the observation and examination of vital phenomena. There are numerous points not yet decided that will occur to every enquiring mind, and which if carefully followed out and explored, would yield to the investigator important results, not only in such a degree of fame as attaches to successful scientific investigations, but in what is of much greater moment, the consciousness of having, to the best of his abilities, worked for the common good.

The increased attention that has of late years been devoted to clinical observation, has, in a special manner, tended to advance the study of Surgical Pathology. Surgery, more than any other department of the Healing Art, is of a practical and positive character. The more careful and extended manner, therefore, in which bedside observation has been conducted; the number of facts that have thus been accumulated, and the careful deductions that have been made from them; have been found of inestimable advantage to the progress of surgical science, and may certainly be looked upon as one great cause of its advance.

The very accumulation, however, of so large a number of facts and observations, has led to the practice of men of great experience and of sound general professional knowledge, concentrating to a certain extent their attention on particular points of Surgical pathology and practice. We have already seen that the extent of the medical sciences is so great, that convenience and custom have led to their division into Medicine and Surgery; and we shall find that each of these

divisions again has become too extended for most men, however gifted they may be, however great their opportunities, and however unflagging their industry, to cultivate each and every department with equal care. But with a profound general acquaintance with the whole range of Surgery, a surgeon may with great advantage devote his time and talents to the particular elucidation of some section of it to which his tastes or his opportunities have specially led him; and thus, by moving this favourite subject some steps in advance of where he found it, give a more decided impulse to the general onward movement of the whole of Surgery, than if his strength had been expended on too wide a sphere of action. This practice, which has prevailed of late to a considerable extent, has exercised a marked influence on the science and literature of our profession, and I may with justice adduce, as illustrations of the good results that have been thus obtained, the investigations of Sir A. Cooper on Hernia, on Fractures and Dislocations, and on Diseases of the Mammæ and Testes; those of Hodgson on Diseases of the Blood-vessels; of Lawrence on Hernia; of Brodie on Diseases of Joints; of Stanley on those of Bones; and of numerous surgeons on Diseases of the Eye and on other points of Surgery. But though I freely admit the great advantage that has resulted to Surgery by this concentration of attention on particular diseases, and recognise this secondary subdivision of labour as one of the great causes of the recent advance of surgical science; yet let me not, I beg of you, be misunderstood, nor let it be supposed that I advocate the general and indiscriminate establishment in the profession of what are commonly termed "*Specialities*." I believe, as I have just said, that it is, in a high degree, conducive to the advance of surgical science, that men of sound judgment, of clear perception, and profoundly acquainted with, and devoted to, the general science and practice of the profession, should bring the light of their knowledge to bear upon, and should employ their opportunities to elucidate particular sections of

their own department of our art. But I do not believe that it ever has been, or ever will be, conducive to the interests of medical science; indeed, I believe that it is directly prejudicial to its proper cultivation; that men imperfectly acquainted with, and neglecting the great general principles and practice of their profession, should devote themselves to one particular, and, perhaps limited, class of disease; and neglecting all others, losing sight altogether of those intimate bonds that associate all diseases to which the human frame is liable, in one great nexus, and which render it impossible to study or to treat any one complaint without constant reference to those laws to which the whole of Pathology is subject,—for men such as these to set themselves up as the apostles and exponents of their own particular "*speciality*."

In connexion with clinical observation and research, I cannot omit to mention the aid that Surgery has of late years received from microscopical investigations and chemical analysis. An acquaintance with the intimate nature of the process of inflammation and of its results; of the structure of various tumours and morbid growths, and of many diseases of the urinary organs, has been acquired through the medium of these invaluable means of research. To these means of investigation in the able hands that now wield them, amongst which I may with justice say, that not the least able are to be found within the walls of this College, we must look for much future advantage to our art.

In passing from the *science* to the *art* of Surgery, in turning our attention to what is commonly called *Practical* or *Operative Surgery*, it might at first be supposed that we had entered upon a new and distinct branch of our subject,—one, that being more or less completely separated from the general range of medical science, could not owe its advance to the same causes that have, as we have seen, tended to the great onward movement of the other departments of our profession. To a certain extent this is true; and there would appear to

be some circumstances that have specially tended to the progress of Operative Surgery in a separate and distinct manner from the rest of medical science. But a little reflection will prove to us that as *art* has been justly defined to be *"the application of knowledge to a practical end;"* so whatever advances and improves that knowledge must *pro tanto* advance and improve the art which is its application. It is true that the mere performance of a surgical operation, the mere act of cutting off a limb, of gouging out a piece of dead bone, of dissecting away a tumour, or of tying a vessel, is a pure instance of mechanical and manipulative skill; and I am not prepared to say that these acts may not be performed, and, perchance, be even skilfully done by men merely conversant with anatomy, but totally unacquainted with the principles and practice of Surgery. For that men ignorant not only of surgical science, but even of the very rudiments of anatomy, may occasionally operate with a certain degree of dexterity and success is shown by the proceedings of the professed Lithotomists, the Frêre Jacques and Frêre Cômes of the seventeenth and eighteenth centuries. That this may be done by any one gifted with those qualities which Celsus looked upon as necessary, and apparently *alone* necessary to a Surgeon, by any one who possessing some share of anatomical knowledge is endowed with the *"manu strenuâ, stabili, nec unquam intremiscente,"* by any one *"animo intrepidus, immisericors,"* is doubtless true. But this is not all that we look for in an operator; nor are these qualities, necessary though they be, those that we expect to meet with, or, indeed, those that we find in the most distinguished operators of the day.

Greatly as manual skill and dexterity are to be prized; diligently as we should endeavour to acquire the art of using our instruments with neatness, with rapidity, and with certainty; desirable as it doubtless may be to be able to remove a limb, or to cut out a stone in so many seconds; important in a word as it is to become DEXTEROUS operators, it is still

of far greater importance to become SUCCESSFUL ones.* The object of every operation is the removal of disease that either threatens the life or that interferes with the comfort and utility of existence; and the more certainly we accomplish this, the better shall we do our duty to our patients, and the more *successful* shall we be as Surgeons.

Success then in the result of an operation, whether that result be the preservation of life or the removal of a source of discomfort, is *the thing* to aim at. To this dexterity and rapidity in operating are in the highest degree conducive; but there are various other considerations equally or still more necessary; the solution of which can only be afforded by an intimate general acquaintance with the *science* of Surgery and of Medicine. The diagnosis of the nature and extent of the connections of the local disease has to be made; lurking visceral affections must be detected, and, if possible, removed; the constitution of the patient must be prepared for the operation; the best time for its performance seized; and, after its completion, the general health must be attended to in such a way as shall best carry the patient through the difficulties he has to encounter: and any sequelæ or complications that arise must be met by, and must be subjected to, appropriate treatment. These, as well as the simple performance of the operation, are the duties of the operator; and on the manner in which these are performed, as much or even perhaps more than on the mere manual dexterity displayed in the operation itself, will the fate of the patient depend. It is well known that the *result* of operations differs much in the practice of different surgeons of acknowledged

* Rapidity of operating, in the attainment of which it is to be feared that the safety of the patient was formerly often jeopardised, is of comparatively little moment since the introduction of Anæsthetic agents. The principal argument in favour of rapid operating was its curtailment of the sufferings of the patient. As Surgical operations are now almost invariably performed whilst the patient is rendered insensible by Chloroform, nothing can justify a Surgeon in attempting to operate with a degree of rapidity that is not perfectly compatible with the safety of the patient.

dexterity, and this variation in the proportionate number of recoveries cannot be accounted for by any difference in the degree of manual skill displayed in the operation itself; but must rather be sought in the greater attention that is paid by some surgeons to the constitutional treatment of their patients before and after the operation, and to their more perfect acquaintance with the general science and practice of Surgery.

Improved means of diagnosis, a better acquaintance with Pathology, and more rational and simple treatment, have exercised an important and marked influence in the progress of Operative Surgery, rescuing many patients from the knife by showing that various diseases, formerly thought incurable, are perfectly amenable to proper treatment. But whilst these means have tended to limit the employment of operative interference in some cases, a more correct diagnosis and more rational pathology have certainly enlarged the field of operative surgery in other directions. Thus, though surgeons are not so ready as formerly to amputate in many cases of diseased joints, which recent researches have shown to be more curable than was formerly supposed to be the case; yet this very improvement in pathology has taught them not to hesitate to remove tumours from the jaws, various growths from the neck, and to operate in cases of aneurism, that were formerly looked upon as *immedicabiles arte*.

But, though I would insist on the intimate connection that exists between the *science* and the *art* of Surgery, I do not wish you to think that it is my intention to convey the idea that a knowledge of the science *alone* will constitute a Surgeon; or that it is possible to become one without a complete and practical acquaintance with the *Art* of Surgery, with the manual and mechanical departments of our profession. No man can be considered a safe and able practitioner of Surgery, unless he be thoroughly acquainted with the details of his art, however minute many of these may appear to be. Though minute, they cannot be considered

trivial or unimportant, for as the whole aim of our practice should be to benefit our patients, whatever tends to this end cannot but be deserving of our fullest attention.

And, Gentlemen, allow me to digress for a few moments, to dwell on the great importance for you to endeavour to attain, by all means in your power, at the outset of your careers, manual dexterity and neatness. If you do not acquire this early in life, it will be in vain for you to seek it in the after part of your career. And if you fail in the *art*, however much you may excel in the *science* of Surgery, you will not be saved from discredit or from that inward consciousness and self-reproach, which, to an upright mind, is worse even than public discredit, of not being competent to do that which they who have placed confidence in you, who have entrusted their own lives, and the safety of those they hold dear, to you, have a right to expect.

In thus urging you to acquire dexterity and neatness in the manual departments of our art, I do not mean in reference merely to the more important surgical proceedures, but also in those thousand and one details that constitute minor surgery. Few amongst you may be called upon to engage largely in the performance of the more serious surgical operations; but you will all have to bleed, to pass the catheter, to set broken limbs, to strap and bandage ulcered legs, and, in the proper performance of these comparatively trivial matters, not only may the health of your patients, but your own future success in life, and much of the comfort in the practice of your profession, depend.

In no department of practice have greater advances been made of late years than in Operative Surgery. These improvements have consisted, not only in extending manual interference to an infinity of cases that were formerly considered to be beyond the pale of art, and thus restoring to health and activity many poor creatures who had otherwise inevitably been doomed to a life of suffering, only to be terminated by a miserable death; but also, and more particularly, in making

surgical proceedings, wherever undertaken, more simple in their execution, as well as more certain in their results.

If, standing as we now do in the middle of this century, we look back to what Operative Surgery was at its commencement, we cannot fail to be struck with the great triumphs it has achieved, and with the rapid advance it has made within the lifetime, and, in a great degree, by the assistance of many of the surgeons of our day. At the close of the last century, patients labouring under aneurism of any of the large arteries, except the popliteal and femoral, were left to perish unrelieved; but now, every arterial trunk has, with one exception (the brachiocephalic), been repeatedly ligatured with success. The removal of tumours from the upper and lower jaws, of many large growths springing from the neck, various operations on the eye, the excision of several joints, the operation of lithotrity, the substitution of compression for the ligature of several of the larger arteries in the cure of aneurism, the section of tendons for the cure of distortions, of the recti muscles for squinting, and, indeed, the whole of the wide range of plastic surgery, are among the more direct and marked achievements of modern Operative Surgery. If, in addition to this, we mention the more rational treatment of wounds, whether accidental or chirurgical, and compare these with the complicated methods of treatment and of dressing formerly in use; and note the greater tendency to trust to the resources of nature, and less to the violent interposition of art; we cannot but be struck with the advance made in this department of our profession.*

* In connection with the recent improvements in Operative Surgery, it is impossible to omit the mention of the employment of Chloroform for the production of insensibility to pain. Without doubt, after the discovery which has rendered the name of JENNER immortal, the greatest boon that has been conferred by medicine upon mankind. It is to be hoped that this generation, less forgetful of its benefactors than a former one, will not allow the zealous and talented discoverer of the Anæsthetic properties of Chloroform, Dr. Simpson, to pass without a substantial testimony of gratitude for his invaluable discovery.

To what causes may we then with justice ascribe these great improvements in Operative Surgery? I have already stated that so close is the connection between the *science* and the *art* of Surgery, that whatever cause tends to advance the one, must necessarily, to a great degree, influence the progress of the other; and that in this way Operative Surgery has been carried onwards by those causes which were mentioned as the immediate agents in the advance of Scientific Surgery. But besides these there are some special circumstances to which we must more particularly and directly ascribe the improvement in Operative Surgery.

The great zeal and assiduity with which Anatomy has been studied must certainly be looked upon as the first great cause of this advance. That a correct and intimate acquaintance with the structure of our frame is essentially and absolutely indispensable to every Surgeon, is so evident that I need not insist upon it; and is so universally recognised that there would be but little chance at the present day of finding a surgeon unskilled in anatomy; and I do not think it at all probable that the terrible scene of a Surgeon ignorant of anatomy attempting an operation, which John Bell has depicted with so much graphic power, is ever likely again to be witnessed in our hospitals. And not only is the ordinary dissecting-room and regional anatomy indispensable to the surgeon; but he should also be well acquainted with surface anatomy, he should accustom his eye and finger to the correct outline, shape, and consistence of different parts of the surface of the body in its normal condition, in order to be able to form a correct diagnosis of the seat, the nature and connections of various diseases, of tumours, herniæ, &c., that modify the outline. This kind of anatomical knowledge is also of great value in ascertaining the nature and extent of various injuries. Fractures and dislocations about the shoulder, elbow, and hip joints are often detected, and their nature ascertained, only by a comparison with the normal

condition and relation of the osseous points and intervening hollows.

Another kind of anatomical knowledge that is also of special importance, is, an acquaintance with the appearances presented by tissues that have undergone various pathological changes; and it is desirable that the student should seize every opportunity of accustoming himself to the alterations in colour, consistence, and general appearance that tissues undergo under the influence of inflammation, infiltration, commencing suppuration, &c., and which, to an unpractised eye, renders it scarcely possible to distinguish them as the same parts that are familiar to it in a healthy state.

Another marked cause of the progress of Operative Surgery, consists in the greater simplicity of means employed at the present day, and in the firmer reliance on nature entertained by modern surgeons, than was felt by their predecessors. The instruments used, and the mechanical contrivances adopted, are divested as much as possible of all unnecessary complications; and at the same time that their simplicity has been increased, their efficacy has been proportionately augmented. We no longer see the *Armamentaria* of the older surgeons, in which every operation, and, indeed, almost every disease, had its own set of instruments and contrivances provided for it. But the modern Surgeon rather prides himself on the various processes to which he can apply the same mechanical means.

Not only have manual proceedings of all kinds been greatly simplified, but more trust has been reposed in the curative powers of *nature*, and less confidence placed in the constant interference of *art*. The doctrines promulgated by John Hunter relative to adhesion and the union of wounds by adhesive inflammation, gave, doubtless, the first impulse to a more rational practice. Before surgeons became familiar with these doctrines, the severity of operations was greatly increased, the cure retarded, and the danger to the patient proportionately augmented by the employment of various

agents and medicaments, the direct effect of which was, by exciting suppuration, by producing exfoliation, and other morbid actions, to oppose the efforts of nature in promoting the healing process. The modern Surgeon, on the other hand, follows nature as closely as possible; and finds that position, a few strips of plaister, or a little water dressing, are sufficient for the cure of the most extensive wounds.

The simplicity of practice thus introduced by the precepts of John Hunter, has been more immediately brought before the profession, and carried out in the full extent to which it is at present adopted, by the doctrines and example of the late Mr. Liston, to whom, in this, as in so many other departments of Operative Surgery, the profession will ever owe a deep debt of gratitude.

Thus, then, Gentlemen, you have heard that Surgery has been raised to its present state of high cultivation by being studied as a part of Medicine generally; by a close attention to Physiology, to Anatomy, to bedside observation and research; and by a firmer trust in, and closer adaptation to, the simple operations and processes of nature. In order to become sound and accomplished surgeons, you must study your department of medical science with constant reference to, and in connexion with, those other branches of the Healing Art with which it is so intimately allied; and you must found your practice on the attentive observation of the actual phenomena of disease.

But you must study and observe with unswerving diligence and untiring perseverance. There is no royal road, no short cut, to a knowledge of Surgery. An acquaintance with the principles and practice of our science can only be obtained by years of severe and self-denying labour. Some amongst you doubtless possess higher intellectual attainments, quicker perception, stronger judgment, more mental vigour, and may accomplish more within a given time than others; but let not those who are less gifted despair: let them bear in

mind that all may command industry and perseverance, and that these qualities, aided by a firm determination to succeed in whatever they undertake, will to a certainty lead to eventual success. It may be true that in the imitative, the plastic arts—in those matters that appeal simply to the imagination, and that are worked out by its aid alone--nature may do as much, or even more, than education or will; and that a man may be born, but cannot be made a sculptor or a poet. But this is not the case in a profession that deals with facts and their legitimate deductions. What is wanted for success in the study of medicine is industry in collecting, truthfulness in observing, and perseverance in studying the phenomena presented by the living body in health and in disease. If you will employ these means (and every man, by the exercise of a little self-denial, by a determination to allow nothing to divert him from his course, may do so), and if you will fix your gaze steadily on the point you wish to attain, your success in life, though it may be retarded or accelerated by circumstances beyond your control, will at last be secured; and when attained, you will have the proud satisfaction of feeling that you have won your spurs in the great battle of life without favour from any one, but solely by your own exertions and self-reliance, and determination to bear down and conquer opposing difficulties. I feel, however, Gentlemen, that it is scarcely requisite to point out to the students of this College the necessity of diligence and perseverance in acquiring knowledge. For many years the pupils of University College have been distinguished pre-eminently for their industry, and the attention they have paid to their studies. Not only has this been remarked within the walls of the College itself, but wherever they have come into competition with the alumni of other schools, when honours were to be won elsewhere, have they maintained this character. In proof of this, the lists of prizemen of the University of London, and the examination for honours at the Apothecaries' Hall, will afford the best illustrations. It is for *you*, who are about

to enter upon your studies, to maintain the distinction thus earned by your predecessors. And let me assure you, on my part, and on that of my colleagues, that we shall ever be ready to assist you in supporting the well-earned renown of the students of this Institution; and that all we look to for a continuance of that success which has hitherto attended their efforts, is a hearty and determined resolution on your parts to co-operate with us, a desire to emulate your predecessors, and to earn distinction for yourselves.

But, Gentlemen, remember that in a liberal and beneficent profession, such as ours, there is something more wanted than attention to your studies, than the acquisition of knowledge. It is an old saying that "*knowledge is power*," but this, like many other trite sayings, is but partially true; it is not the whole truth; knowledge by itself is no longer power. It has become too diffused, is possessed by too many for it to confer advantage by its possession alone. For knowledge to confer power, that is to say, the respect and confidence of your fellow men, it must be conjoined with other qualities. Alone, it is not enough for permanent success in your profession; though necessary, most absolutely and indispensably necessary, it must be conjoined not only with the ability to use it, but with the determination to use it aright; to apply it to none but worthy and honest purposes. If you do not do this; if you fail to make a proper use of your professional acquirements; if you turn them to any unworthy or selfish ends; you may be successful, but your success will only be temporary, and will but render more bitter the eventual failure and disgrace that will eventually overtake you. If you will study the biographies of any of those men who have risen to acknowledged and *continued* eminence in our profession, (and I do not know a more useful and interesting study than this,) you will find, I venture to say, without one single exception, that in no one case has a high professional and social position been attained by professional acquirements *alone*, but that in every instance have these been conjoined with, and their

success secured by, moral rectitude, and by an upright and honest character.

Remember then, Gentlemen, that in order to win permanent success in our profession you must learn to deserve it. Ever bear in mind that you have entered a learned and liberal profession, the great object of which is to be of service to mankind; an object more noble and exalted than characterises any other walk in life, and one which each of us should endeavour to carry out to the extent of his power. If you will keep this great object constantly before you; if you will make it your daily prayer to Him from whom all knowledge is derived, that you may live to be of use to your fellow men; if you will be guided in your intercourse with one another by a sense of honour, of candour, and of liberality; you will not only possess an inward feeling of self-respect that will support you through the trials of life, but you will gain the esteem and affection of your professional brethren and of your patients, and you will consequently practise your profession in happiness and comfort.

In your intercourse with the public, conduct yourselves in a manner that is not only worthy of you as gentlemen, but in such a way as should characterise the members of a learned and dignified profession. Let no man say that it can signify little to the body to which he belongs how he may individually act. From the very first day of your career as students you constitute a part of the profession, and owe a duty to it as well as to yourselves, and may, according as you act therein, exercise an influence for good or for evil upon it. The profession to which you belong will be judged of in a great measure in your own circle, by the friends who immediately surround you, from your behaviour. Let that, therefore, always be marked by liberality, by courtesy, by truthfulness, by the cultivation of the amenities of polished life; in a word by all that should constitute the character and deportment of a gentleman. Let these be the guides of your conduct, not only as students, but in after life, when you will be called upon to

take your part in questions affecting the interest and welfare of the body to which you belong; endeavour then to act, not merely for your own interests, nor for the interests of your own class or section of the profession alone, nor for the advantage of this Institution or that College; but act to the best of your judgment in an enlarged and catholic spirit of liberality, with a hearty desire to do what seems best to you for the profession as a whole, and for the general welfare of its members.

If you will do all this, if you will ever be on the watch to increase your professional knowledge, by constant observation, by daily study and reflection; if you will never lose sight of the true and noble object of your profession, that of utility to your fellow men; if in your intercourse with your professional brethren and with the public, you will ever be guided by principles of honour and of candour, and by an abnegation of self-interest; you will live to be respected and beloved by those who know you best, you will have the inward satisfaction of knowing that you pass an honoured and useful career, and, amidst all the trials and anxieties and difficulties that will at every turn meet you in the most anxious and responsible of all professions, you will never have cause to regret the day on which you have become one of its members, or to envy those who follow other, and perhaps more prosperous walks in life.

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THE

HUNTERIAN ORATION

FOR 1850.

BY FREDERIC C. SKEY, F.R.S.,

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DEDICATION.

TO THE

RIGHT HONOURABLE LORD JOHN RUSSELL,

FIRST LORD OF THE TREASURY.

My Lord,

In requesting your permission to dedicate to you the following oration, I cannot but feel sensible how imperfectly I have done justice to the memory of that great man, in honour of whom it was delivered, and how unworthy it is of the high patronage of your Lordship's name.

Amidst the multiplicity of important subjects that engage your Lordship's attention, may I venture to hope that you will not exclude that of the profession of medicine, satisfied that no one can prove a more efficient physician than your Lordship in ministering to its diseases, and in raising its professors to a rank commensurate with their successful devotion to the cause both of science, and humanity.

It was the boast of one of the most eminent of our countrymen, that physicians were among the best friends and companions of his life.

While I would gladly see the social services of my profession at the command of your Lordship, I trust that a long period of years may elapse before our professional services may be personally required by you: and that you may be permitted to enjoy in health and happiness the respect and gratitude, which a long, and no less brilliant, career of statesmanship has won for you, is the fervent wish of your admiring countryman, and grateful servant,

FREDERIC C. SKEY.

Grosvenor Street,
February, 1850.

PREFACE.

I do not flatter myself that the sentiments I have ventured to advocate in the following pages, will meet with universal approval throughout the profession. If much of what I have advanced, be prospective of the condition of those now entering on their career, I confess my persuasion, that it is reserved for the incoming generation to witness the complete redemption of our profession.

The way to a better state of things, lies through the demolition of habits and routine systems which established practitioners can change, but with difficulty. Their more youthful brethren have not this reasonable argument, for persistence in an established, but not less

objectionable practice; and for them I also urge the adoption of an improved system of training, which, while perfecting students in the practical knowledge of their art, shall also aim to imbue them with those amenities of literature and a cultivated taste, which give grace and dignity to social life, and should be the distinguishing characteristic of a profession like ours.

Nor should they be regarded as mere elegant superfluities, for although not entering into the formation of the skilful physician or the dexterous surgeon, they are almost necessary to complete the measure of our preparation for enlightened intercourse with the world, to exalt the aim of life above that low and sordid level which limits our aspirations to the pursuit of gain, and presents no object of nobler attainment, than a name for professional skill.

A long and friendly intercourse with a large body of my professional brethren engaged in general

practice, has convinced me of the all but universality of the sentiments I dared to promulgate in the theatre of the College of Surgeons; and I have reason to believe that an improved form of remuneration, and one more consonant with *professional* usage, if sanctioned by Parliament, would be generally acceptable to this large department of the profession of medicine. I quarrel not with the general practitioner, but I quarrel with the system, nor can I understand how any high-minded man, can fail to repudiate it. My object is to elevate the entire body in the professional scale, to a level commensurate with the value of its services.

The term "degenerate," as applied to the profession of medicine, has been objected to. In justification of its employment, I would urge on the recollection of the reader, the condition of the profession at the latter end of the seventeenth century. At that time the physician monopolised the entire rank and name of the practitioner of medicine,—the surgeon was a mere operative, identified with a menial trade, and the apothecary, a drug

vendor, having, like the surgeon, no claims to medical knowledge, *quoad* the treatment of disease, as may be inferred from the following lines from Dryden :—

> "Physicians from the tree have found the bark,
> They laboring for relief of human kind,
> With sharpened sight some remedies may find,
> The apothecary-train are wholly blind."
>
> 13*th Epistle.*

While Pope, in a letter to his friend Allen, says, "Physicians" (that is, medical men) "are among the most agreeable companions, the best friends, and the most learned men I know." Am I not justified in assuming, then, that, taking our profession as a whole, the entire body is degenerate from its former eminence?

It may be also objected that I have travelled out of my subject, by addressing myself to that of the profession of the law. My purpose was not to depreciate the law, but to contrast with it, the more useful, and, as I conceive, the higher calling of the profession of medicine. The profession of the law appeared to me a fair and legitimate subject of comparison with our own, and I

took advantage of it in order to show that an artificial pursuit, which has proved destructive to the happiness as well as to the property of thousands, is less entitled than our own, to the esteem and sympathy of the world.*

In the latter pages, the reader may recognise in more than one passage quoted under his name, the sentiments, and probably even the language of that elegant writer.

* There is no other real source of greatness than that arising either from intellectual or moral pre-eminence. Dignity of noble birth, or the possession of wealth as sources of greatness, are the mere conventionalisms of the world. Their nature is extrinsic—not inherent. They may be said to be rather the representatives of greatness, than the possessors of it. Great and good deeds infer either intellectual or moral superiority. The professors of medicine, estimated by their *unpaid* services rendered to the world, are among the greatest benefactors to mankind.

THE HUNTERIAN ORATION.

Mr. President,

We are assembled in this place to do honour to the genius of Hunter, a name celebrated throughout the civilised world, and to record the merits of such recently deceased members of our profession, as, imitating his example, and possessed of a single spark of his genius, have claims on the respectful remembrance of their surviving brethren.

The period of Mr. Hunter has formed an epoch in the history of medical science. His wondrous and unceasing ardour, his genius for investigation, and no less his intellectual greatness, while they demand the homage of our veneration, leave competition far behind. In the race of modern physiological science, no one has approached his eminence, to participate in his exaltation, or to share his glory. His mind was the depository of the pure ore of true philosophy, in which neither bigotry nor selfishness could find a momentary resting place. No thoughts of private interest—no aspirations after posthumous fame—no ambition of personal distinction; neither the claims of anxiety, of sickness, nor of professional

occupation, could divert his mind from the one great object of his life,—the pursuit of truth in the investigation of Nature and her laws.

Over the almost untrodden ground of his researches, replete with mental food, intensely interesting to the philosopher of science, his mind revelled in the luxuriance of his intellectual riches, and nobly did he redeem the pledge of industry, and of intellectual as well as moral pre-eminence, that Nature's own hand had accorded to him. That his mind was imbued with the very spirit of earnest inquiry, his gigantic productions in his museum will amply testify: that his researches were conceived, and planned, and directed, by a superior intelligence, let me point to the philosophy of his written works. Crude they may be, and ill-digested, but they yet form the record of one who deservedly ranks among the highest orders of men.

It was said of Bacon, by Ben Jonson, that his words were so pregnant of meaning, that his hearers could not cough nor look aside from him, without loss. In like manner did Hunter's reflecting mind teem with original conceptions. With rapid flight he winged his way from the infancy to the mature age of science, discovering, developing, and maturing every subject that engaged his fixed attention. The intellect of Mr. Hunter has been the theme of repeated eulogium in this theatre, and on which my numerous predecessors in this office have expatiated with force and eloquence.

Associated with his high intellect were certain moral qualities which in no less a degree demand our praise, while they fortify and confirm our convictions of his claims to the gratitude, as well as to the admiration, of posterity. The

student of Hunter cannot fail to appreciate qualities which threw a charm over his character.

Ingenuous, disinterested, unreserved in his communication of knowledge, he exhibited many of the excellencies that mark the true philosopher. From his eminence above the world, he surveyed the great book of Nature. His thoughts expanded by a natural elasticity, in proportion as he was elevated above the grovelling passions and influences of the world. With a love of Nature was inseparably interwoven a still stronger love of *truth*. It is impossible to read the history of his laborious investigations, his personal sacrifice of time, of health, and of property, without believing that to the ardour and enthusiasm which incited him to toil over the great field of Nature, he added with equal force an undeviating adherence to *truth*.

A spirit of arrogance, of self-esteem,—a disposition to depreciate the works of a competitor or rival, is the characteristic of the pretender to science, and exposes the unsoundness of the motives which carry him on in the pursuit of knowledge. And the cause is obvious; for, if animated by a true love of science, as the primary motive of exertion, any contribution to his favourite study is hailed with gladness; whereas the same contribution would be received by the empiric, with coldness, if not with disapprobation.

How broad is this distinction! how unlike the men! how dissimilar the motives! How often does the desire of distinction, or of notoriety—the ambition of pre-eminence above others, dictate our efforts, and develope an envious and uncharitable interpretation of the exertions of those who venture to compete with us in the struggle for fame!

In the great temple of knowledge, there are no contentions for place, or for personal distinctions, no strivings for pre-eminence. Among its true votaries, a spirit of genuine fraternity prevails, that harmonises the soul. He who would become its occupant must throw aside all sinister and indirect motive, every degrading thought, every selfish passion, as alike derogatory to himself, and injurious to his cause. Between two students of Nature, their common object, their identity of thought and pursuit, maintain an harmonious interchange of kindly intercourse. They have no motives for rivalship or ill-will. They are directed by one common, and by the same high motive; they have neither time nor tendency to step out of the direct path of inquiry, to indulge in angry passions, to deal in personalities, to question motives. On one distant object their eyes are fixed; to reach this goal is their common end; and applying to their journey onward the principle of a mathematical truth, they pursue their course in a straight direction, as the shortest given line between the two points.

The excellence of Mr. Hunter is to be sought in his unwearied efforts to advance the cause of physiological science; in his untiring industry; in his unselfish indifference to riches, which he coveted solely for the purpose of advancing his favourite studies; in the benevolence of his nature, which identified itself with moral and physical suffering; in his earnest desire to communicate knowledge; and in his possession of those homely qualities of the heart, that inspired love in the breasts of his pupils and of his friends.

I hold in my hand an autograph letter of Mr. Hunter's, written in the year 1786, to the Master, Wardens, and Court

of Assistants of the Corporation of Surgeons, which affords strong evidence, were any required, of his earnest desire to extend the advantages of medical literature and general knowledge to all who could avail themselves of them*.

One of the last, and perhaps the most interesting link that has connected the great man, whose name and whose labours we are met to-day to celebrate, and the present generation of Surgeons of England, is broken by the death of Mr. Clift, whose name, next to its great founder, is more fully iden-

* "TO THE MASTER, WARDENS, AND COURT OF ASSISTANTS OF THE CORPORATION OF SURGEONS.

"GENTLEMEN,

"At this period in which the Surgeons of Great Britain have deservedly acquired the highest reputation in Europe, both by their practice and publications, it appears to be a reflection upon them that the Corporation of Surgeons of London should not be possessed of a public surgical library;—a circumstance so extraordinary that foreigners can hardly believe it.

"If a custom had been established at the time the Surgeons were incorporated, that every member should send a copy of his publications to the Company's library, it would have at present contained the works of many of the best writers in Surgery, which might have proved a valuable collection of instructions for the improvement of the profession.

"As the smallest beginnings may in the end lead to the greatest acquisitions, I have done myself the honour of presenting to the Company, through your hands, the few observations on Anatomy and Surgery which I have published; and should the other members of that body be induced to follow my example, and by presenting their works establish a library which shall hereafter become both a public benefit and an honour to the Corporation of Surgeons, I shall consider it as one of the happiest events of my life to have been at all instrumental in such an establishment.

"I have the honour to be,
"Gentlemen,
"Your most obedient humble Servant,
"JOHN HUNTER."

"LEICESTER SQUARE,
"*August 14th*, 1786."

[From the collection of Autographs in the possession of MR. STONE, Librarian of the College.]

tified with the Hunterian Museum than any other man, living or dead.

It is not intended in this brief memoir to place the name of Clift even in juxta-position with that of Hunter, although fellow-labourers in the same field of industry. I will, however, endeavour to do justice to him who was *great*, because he was *good;* who was faithful to a sacred trust, under circumstances of peculiar embarrassment and temptation; whose mind was fortified against betrayal by high principle, strengthened by lasting affection, and engendered by a term of brief companionship with him who first raised in his breast the ardour of a congenial occupation; who was uncontaminated by the world, and the world's vices; who carried to the grave the same single-mindedness and simplicity of character, that stamped with truth, every act of his past life.

Such was WILLIAM CLIFT, and such the bond of fidelity that fixed on his character its indelible stamp!

Mr. Clift was born at Burcombe, near Bodmin, in 1775; and he owed his connection with Mr. Hunter to the circumstance of an intimacy subsisting between a lady resident at Bodmin, and Miss Home, who had then become the wife of Mr. Hunter, by whom he was recommended on the ground of his promising abilities, and graphic powers.

He was received into Mr. Hunter's house as an apprentice, in the year 1792, and devoted to him his services as an amanuensis, anatomist, and artist. Mr. Hunter died in 1793, from which date until 1800, when the Collection was purchased by the Government, it was placed under the exclusive care of Mr. Clift, who, with two gallons of spirit meted out occasionally, and seven shillings a week granted for his own

support out of the limited funds at the disposal of Mr. Hunter's executors, at a time when the quartern loaf was occasionally at two shillings, contrived to maintain the entire Museum, valued at that time by Sir Joseph Banks and others at £20,000, in a sound condition for seven years; his additional occupation being that of culling from the mass of manuscripts also placed under his charge, such knowledge as would enable him to class, and otherwise profitably arrange it. "His merit," says one man who was especially well calculated to appreciate such services, "consisted in his single-minded fulfilment of arduous duties under peculiar difficulties, and his noble self-devotion to the achievements and memory of his great master."

Sir Everard Home, the brother-in-law of Mr. Hunter, having undertaken the charge of preparing a catalogue of the Hunterian Collection, Mr. Clift was much occupied in promoting such investigations as appeared requisite for that purpose.

The results of most of these labours have been recorded in the Transactions of the Royal Society, and with few exceptions, the illustrations of the numerous papers on "Comparative Anatomy," are from the accurate pencil of Mr. Clift.

In the year 1826, the proffered assistance of Sir E. Home having been withdrawn, consequent on the alienation between himself and Mr. Clift, arising out of the well-known destruction of the Hunterian MS., Mr. Clift applied to the Council for the aid of some person well versed in human anatomy; and Mr. Abernethy, then a member of the Board of Curators, proposed the appointment of Mr. Owen, with a view to render that assistance in the formation of the cata-

logue, the deficiency of which furnished a weekly topic of censure, in a newly-established weekly periodical.

The office was accepted by Mr. Owen, happily for the cause of science, happily for the reputation of the College of Surgeons of England, and not less happily for the reputation of the great founder of the Hunterian Museum, as well as for that of Hunter's distinguished successor, on whom I may say that the mantle of Hunter, which had been held in charge for so many years by Mr. Clift, has so deservedly fallen. The result of the labours of Mr. Clift, in conjunction with his newly-appointed colleague, was the production of two volumes in 1830 on the "morbid series." It was then considered that the catalogues would proceed more rapidly if each person took a different subject. Mr. William Home Clift completed the catalogue of the "dry vascular and miscellaneous preparations" in 1831, and the catalogue of the "osteology" in 1832. Mr. Clift undertook that of the "monsters and malformations," which was printed in 1831, after which he chiefly occupied himself in collecting cases and materials from all the medical publications contemporary with Hunter, that related in any way to the morbid specimens.

The shock which poor Clift's nervous system had sustained after his rupture with Home, and the catastrophe of the Hunterian manuscripts, had produced an almost morbid apprehensiveness of putting any description into print. He never could assure himself of its accuracy and its conformity with Hunter's opinions. This state of indecision, and the loss of his usual clear intellectual power, increased after the fatal accident that befel his only son; and his chief literary and scientific occupations, until he retired from the College,

consisted in copying out from various periodicals and works, whatever he thought might elucidate such preparations as especially related to pathology.

Mr. Clift's immediate contributions to science, at least those bearing his name, are but few. Two only appear in the Transactions of the Royal Society. The first is entitled, "Experiments to ascertain the Influence of the Spinal Marrow on the action of the Heart in Fishes," and is published in Vol. CV. of the Philosophical Transactions in the year 1815; and the second consists of a description of some fossil bones found in the caverns at Oreston, printed in the volume for the year 1843.

"By the judicious choice," says his son-in-law, Mr. Owen, "and the care and skill with which these experiments were performed, Mr. Clift, in the first of these papers, established, in contravention to the conclusions to which M. Le Gallois had arrived, that the action of the heart continues long after the brain and spinal marrow are destroyed."

Mr. Clift was elected a Fellow of the Royal Society in 1823, soon after the publication of the first of these memoirs, and served on the Council of the Society in the years 1833 and 1834. The Transactions of the Geological Society also contain some memoirs from the pen of Mr. Clift, "On the Fossil Remains from the Irawaddi," and on the "Megatherium;" and undoubtedly most of the works on the fossil remains of the higher class of animals, which have appeared since the publication of Sir E. Home's first paper on the "Proteosaurus," in 1814, until a recent period, are more or less indebted to Mr. Clift.

Very unequivocal have been the acknowledgments of his

services by Dr. Mantell and by Baron Cuvier, and by the public voice in the case of the publications of Sir E. Home. But the highest acknowledgment of the productive labours of Mr. Clift, are to be witnessed in the present efficient condition of the great museum itself, which is a lasting monument of the integrity, and of the activity, as well as the honesty of his stewardship.

It is in no vein of flattery that I advert to a remarkable resemblance both in person and in character between John Hunter and Mr. Clift. Both exhibited the same ardour and devotion to the cause of physiological science, employing however, the force of minds of different calibre; and both exhibited the same single-mindedness.

The personal resemblance between the two, has been the theme of frequent observation, and has elicited the most ill-founded suspicion of a real relationship. This observation having been on one occasion made to Mr. Clift, such was his veneration for Mr. Hunter, that he replied, "He should only be too happy were its truth confirmed."

This day is also the anniversary of the birth of both Mr. Hunter, and Mr. Clift.

Mr. Clift retired from the College in the year 1842, on an increased salary of £400 per annum. He died on the 20th of last June, having survived his wife, to whom he had been united, and tenderly attached, more than fifty years, a period of six weeks only. His only daughter is married to his successor, in whose expressive words, inscribed on his tomb by his son-in-law, I shall conclude this hasty and imperfect sketch of Mr. Clift:—"He carried a child-like simplicity and single-mindedness to the close of a long, and honoured career."

Charles Aston Key, a name identified with the highest class of scientific surgery in this country, occupies a prominent position in the large obituary I am painfully compelled to place before you.

A biographical sketch having been published by one whose intimate knowledge of Mr. Key must have rendered him so competent to the task, it will be unnecessary for me to enlarge on the details of his early life, or of his deservedly eminent career as a leading surgeon of the metropolis.

Mr. Key was appointed one of the chief surgeons of Guy's Hospital in the year 1824, which office he continued to hold till his death, in 1849, a period of twenty-five years. Possessed of a mind, of which a refined common sense was, perhaps, the most striking feature, that most practical and most valuable of all its individual qualities, he added, in a very high degree, that peculiar talent for observation, which has ever marked the eminent surgeon.

His knowledge was his own. Without undervaluing the services of written surgical authorities, he studied disease where alone it could be thoroughly learnt, viz., at the bedside. To the advantages arising from a field of observation, as ample as this large city could furnish, he added a deep interest in the cultivation of professional knowledge, great industry, and a most justifiable ambition of professional distinction.

On such conditions Mr. Key could scarcely fail in reaching the eminence which was the object of his aspiration. He possessed a remarkably cool judgment. He was not content with a general inquiry into the history of any case that interested him, but he pursued his investigation into every

detail that could illuminate it. His reasoning on such a case, would often become mathematically inductive.

This habit became a prominent feature in his professional character. His knowledge of anatomy was cultivated just so far, as to fit him for all the exigencies of surgical duty, for without depreciating the labours of the microscopist, he grasped only at that level which he could render subservient to the treatment of disease. Without possessing an absolute claim to inventive power, he was happy in his improvements of the inventions of others, of which the employment of his strait staff in lithotomy is one example.

Mr. Aston Key is equally well known to the profession both as a teacher and as a writer. During nineteen years he addressed one of the largest assemblages of medical students in the metropolis on his favourite subject, viz., the principles and practice of surgery; and fully maintained the almost unequalled reputation of the great school of Sir Astley Cooper, by the correctness, the force, and the lucidity of his instruction.

As a writer, he has contributed some valuable papers to our surgical records. His first work, in 1824, introduced to the profession a new mode of operating for the stone, which has acquired a decided influence on the present operation of lithotomy. In 1827, he published an edition of Sir A. Cooper's great work on Hernia; and, in 1828, a memoir "On the advantages of Dividing the Stricture in Strangulated Hernia without opening the Sac."

In this recommendation, also, the practice of Mr. Key has obtained many proselytes in the profession.

His papers, communicated to the Guy's Hospital reports,

particularly one on lithotomy, are highly valued by the profession, and indicate both an independent and a reflecting mind.

A large portion of the success of Mr. Aston Key may be assigned to the interest he took in the cases consigned to his charge, whether in public or in private. Neither time nor trouble were spared in his endeavour to sift every case of difficulty to its root.

It cannot be denied, I fear, that he held somewhat eccentric opinions with respect to food and diet, and to which eccentricity his own untimely death may be in some measure attributed. I am informed that he leant much to the recommendation of a vegetable diet, and that he frequently denied his patients the indulgence in animal food. Whatever was his practice in reference to others, I believe there is little doubt that he adopted for himself a system of diet that was little likely to afford him efficient protection against the horrible pestilence that pervaded the metropolis during the last summer.

An anecdote was mentioned to me by a common friend, which speaks loudly as to his condition at the date of his unfortunate attack. When asked as to the state of his health, only a few days prior to his last illness, his answer was, "I am as well as a man can be with most irritable bowels." Within a week of this event, he was himself thrown prostrate by cholera in its most fearful form. One profuse action of his bowels was followed by almost immediate collapse, from which all the skill and experience of the eminent physicians who surrounded him, failed to extricate him, and he expired in nineteen hours from the period of his

attack, in the fifty-seventh year of his age, regretted by the entire body of the medical profession.

In his relations of husband and father, Mr. Aston Key's conduct was peculiarly exemplary, and affectionate.

The past year has terminated the career, at the age of sixty-five, of Mr. John Goldwyer Andrews, who was the Senior Surgeon of the London Hospital, and a Member of the Court of Examiners of this College.

Thomas Morton was born, at Newcastle-on-Tyne, in 1813. While a boy, he was distinguished by great quickness of apprehension, by his intelligence, and by that peculiar kindness of heart, that so endeared him to his friends in later life.

At about fifteen years of age, he was articled to the house-surgeon of the Newcastle Infirmary, and during the period of his studentship he was frequently entrusted with the sole charge of the patients of the institution, consequent on the illness of his master, Mr. Church. He left Newcastle in the year 1832, with a well established reputation for superior acquirement, and entered University College as a student, where his talents and indefatigable industry obtained for him a renewed approbation, evidenced by his successful competition for various prizes awarded to his industry, by the College. The intervals of the sessions were devoted to anatomical and other pursuits, holding reference to his profession, in Paris; and each year contributed its quota to an increasing and well-earned reputation for professional acquirement; and throughout the whole of his career he was no less notorious

in the circle of his friends and personal acquaintance, by the kindliness of his nature, and the simplicity of his mind and manners. In 1815, he became house-surgeon to University College Hospital, and in the following year demonstrator of anatomy in the College to which that Hospital is attached, imparting knowledge to others with the same success as he himself had acquired it. In 1841, Mr. Morton was elected assistant-surgeon to the Hospital, and subsequently surgeon to the Queen's Bench Prison. In addition to the practical duties of these offices, Mr. Morton appeared before the public as an author: besides many contributions to various medical periodicals, he published a series of works on the surgical anatomy of the most important regions of the body;—in 1838, that relating to the perineum; in 1839, that of the groin; in 1840, hernia; and, in 1845, the surgical anatomy of the head and neck. These works are admirably illustrated by the late Andrew Morton, an artist of very superior merit, and they bear testimony to the accuracy, and to the diligence of these two talented brothers. In 1848, he was appointed surgeon to University College Hospital, an office which he held for little more than one year. As a surgeon, Mr. Morton was distinguished by an ardent love of his profession, and by the patience and accuracy of his observation; his treatment of disease was remarkable for its simplicity; and his operations were characterised by peculiar neatness, and dexterity. Simple in his habits, and equally earnest in his pursuits, he was remarkable for a modesty approaching to diffidence. He suffered at times from mental despondency, which was attributed by his friends to a too close application to his professional studies. Certain changes which occurred

in the medical department of University College, which produced on his mind an impression that he was deprived the prospect of further advancement, were unfortunately superadded, and, in a moment of despair, he sought at his own hand, relief from his suffering, and his anxiety. He died in the thirty-seventh year of his age, leaving with his contemporaries the reputation of a talented surgeon, and with his friends the memory of a kind and estimable man.

I should do injustice to the memory of a highly respected member of our profession, were I to omit reference to the late Mr. Pennington, who played no unimportant part in the great medical drama of both the last, and the present century.

Unknown as a writer, and unconnected with public professional life, he pursued a career of almost unexampled activity, in the department of private practice. Warmly attached to the order to which he belonged, I believe it may be said of him, that by no one act did he ever tarnish the lustre of his own high character.

At the age of fifteen, Mr. Pennington left his native town of Alford, in Lincolnshire, in company with the late Archdeacon and Major Pott, the sons of the great surgeon of that name, and they repaired to his house, where Mr. Pennington took up his abode. Mr. Pott, appreciating at its true value the intelligence and earnest zeal of his young friend, took him as a private pupil. In Percival Pott, up to the period of the death of that justly eminent man, Mr. Pennington found a benefactor, an instructor, and a friend.

One is naturally disposed to inquire into the history and

cause of the unusual success that marked the career of the late Mr. Pennington, and to consider how far his reputation was a just or a factitious one. His extensive practice, so far as I can ascertain, appears fairly deducible from a well-grounded confidence of the public in his professional skill, obtained by patient industry and an ardent love for his profession. Mr. Pennington ascribed his own early success to the great advantages he acquired from his daily intercourse with the person, and practice of his great benefactor, and to his possessing the intimate friendship and the benevolent assistance of the late Dr. Pitcairn, then Mr. Pott's colleague at St. Bartholomew's Hospital.

To a thorough knowledge of the Therapeutic art, he added an indefatigable energy in its practice, from which all the attractions of society failed to entice him. The experience of his later years was derived entirely from observation, the most valuable school of medical proficiency; and, among his medical friends, his powers of diagnosis were considered of a very high order. He, early in life, took a high station in the profession as a family medical adviser, and it was his no inglorious boast that, at one time, he attended professionally every Cabinet Minister, and every Judge upon the bench.

In his private character, he was practically a most kind and benevolent man; his philanthropy was large and generous, his sympathies were readily enlisted, and his purse opened to distress and difficulty, more especially among his younger professional brethren. His mind revolted from an act of meanness or dishonour, and I believe it may be said of him, without flattery to his memory, that he never sullied his integrity by a single ungenerous or sordid act during a long

life of unexampled professional activity. Mr. Pennington died, in the month of March last, in his 85th year.

From the earliest period of the world, the science of medicine has been esteemed among the noblest occupations of the mind. Amidst the varied pursuits of educated man, it would be difficult to find one more calculated to inspire the mind with intellectual ardour, or to kindle the energies of thought, and speculation.

The study of physiology, as it unfolds the machinery of life, whether applied to the revelation of the structure of the body, by investigating the microscopic details of the material framework which it inhabits, or to the attempt to fathom and explore the mysterious immaterial agent of life itself—the study of the scarcely less interesting phenomena which characterise the defects in its machinery, whether local or general—the study of *psychology*, applied to the mind in its healthy condition, while exercising a never-ceasing control over the physical actions of the body, or that of the phenomena of *mental* disease, demanding the highest order of intellect for their exposition and treatment—the ingenious discoveries of innumerable agents obtained from the *vegetable*, *animal*, and *mineral* kingdoms—the application of the resources of *mechanical philosophy*—the profound researches of the chemist, whose operations are so closely interwoven with the study of almost every branch of medical science—the necessary cultivation of a peculiar *refinement* of the external senses, of *sight*, of *hearing*, and of *touch*, that may well deserve the title of erudite. In fact we can hardly point to one department of philosophy, whether of mind or matter,

that is not in a greater or less degree incidental to the service of medicine, and the records of which have not been enriched by the exertions of medical men.

These are among the intellectual occupations of the medical mind. Observe how readily our occupations blend into the wider circles both of philosophy and science, for there is no definite boundary to the scope of medical study. Plutarch says, "Of all the liberal sciences, physic is one which, as it gives place to no other in attractiveness, and in the pleasure it affords, so it makes a great return to those that love it, even as much as their life and health come to; and, therefore, philosophers who discourse and dispute of matters concerning the management of health, are not to be charged with passing beyond the legitimate bounds of their studies. We ought rather to blame them for avoiding subjects of that description, and for not removing those limit-marks of science, so as to labour in the common field between themselves and physicians, in the study of things good and becoming."

Nor are his moral requisites less indispensable to his utility and success in life. The practitioner of medicine in every rural district, is a member of each social circle into which the service of his profession calls him. Into his charge, the father resigns the health of his wife and children. Into the privacy of his dwelling, into the recesses of his very chambers, he is admitted at all hours, and at all seasons, where he may exercise even a more than parental authority. Nor are his functions limited to his direct professional duties. He becomes a familiar, an adviser, and a friend. His ear is the depository of private histories and family secrets; he has extensive rights and peculiar privileges. Add to these the

fact, that the path to medical knowledge is steep and dangerous, and that its requirements are often of a nature repugnant to delicacy of feeling—that it involves an intercourse with objects, from which the senses may well revolt, with disgust and loathing. Be it remembered, that his services are perilous from their outset, and that a large proportion of the profession pursue their anxious and laborious career, often unchequered by the recreation of a single day, throughout a life of daily companionship with sorrow, contagion, disease, and death. Of domestic joy, he knows nothing but in name. From the comforts of his home, his easy chair, his winter's fireside, he is estranged by incessant toil, the slave of caprice, of ignorance, of groundless apprehension. While other members of his family seek that repose which nature calls for at the termination of the day, he is perhaps summoned to a distant village, to minister to the temporary relief of a disease he cannot cure; devoting to reflection while on horseback, amidst the sleet of a winter's night, those hours that should be engaged in invigorating his mind and body for the pursuits of the morrow.

For the influence of these occupations on the physical health of the members of our profession, let me point to the bills of mortality, which teach us, that they sink too often unrewarded into an early grave.

Such are the intellectual, and such the moral requisites of our profession—such the qualifications, and such the duties of him who, beyond any competitor, ministers to the physical and moral sufferings of humanity.

Nor is this condition, altogether unmerited by the practitioner of medicine. With largely increased resources, the

profession of medicine is at the present day a degenerate pursuit. Even its indispensability to the wants of society, has failed to wrest it from the influence of neglect, if not of obloquy. The rank of individuals, the rank of a select few may yet remain; but as a profession, it has ceased to be sustained to the level of its intrinsic value by the applause of the public voice; and there must exist, in the very nature of things, some deteriorating influence in operation, which overbalances that esteem which the conviction of our utility to the world would naturally engender.

It is not, I presume, a subject of consideration inappropriate to this annual address, to inquire into the cause of the low elevation of that profession which, considered in the abstract, appears to possess such high claims on the respect and esteem of society; for I know not in what manner I can more efficiently do honour to the memory of Mr. Hunter than by commenting on the present condition of that profession, of which he was so bright an ornament. These causes are, I conceive, various; but by far the greatest of all the difficulties under which the profession of medicine labours, may be referred to the want of *education*. The object of education is two-fold:—First, to develope the powers of the mind,—to teach it to think, to reason, and to remember; and secondly, to apply the powers thus obtained to the acquisition of knowledge. The unfolding and developing mental power, in the endeavour to comprehend the resources of the great world around us, and ally those powers with the highest purposes, this is to realise the great end of life itself. "It is *mind* that does the work of the world." * Mind is the great

* Channing.

leveller that blends all the arbitrary distinctions of social life. He who would study the history of man in his moral and physical condition—he who proposes to himself to investigate the sources of the thoughts and opinions of the world,—or he who would render himself familiar with the capabilities of his own language, must cultivate an acquaintance with the writers of antiquity; he must take up his abode in the nursery of time. An inquisitive and ardent mind will take nothing upon trust; he will trace the streams of knowledge to their source; he will investigate its springs before he avails himself of the force of the current. "If there be," says Godwin, "in the present age, any powers of reasoning, any acquaintance with the secrets of Nature, any refinement of language, any elegance of composition, any love of all that can adorn or elevate the human race, this is the source from which they ultimately flowed." *That* of ancient Rome is the adopted language of the great congress of medicine and science throughout the world. The common university of medicine has employed it in the individual nations composing it. It is the language of Celsus, the adopted language of Haller, of Boerhaave, of Morgagni. Its cultivation is more directly indispensable to the practitioner of medicine, than to any other member of society. It is the accomplishment of all refined and educated society. But classical study should have no monopoly of the early mind, since, however valuable, it forms but the substratum of acquirement. Its excessive cultivation generates a learned folly, which in a remarkable degree disqualifies its possessor for the acquisition of that working knowledge demanded in our intercourse with the world. And I may take the liberty to remark, that no

greater wrong is inflicted on the cause of education, than that indiscriminate, and almost exclusive devotion to classical reading which prevails in our public schools. No man is competent to the task of education, whose mind is not well stored with general, as well as with particular knowledge, philosophy, history, and elementary science.

The application of the *knowledge* acquired by classical study, is in an inverse relation to the benefit conferred on the retentive powers of the mind; for by its early cultivation, of all the faculties, the memory is its greatest benefactor. The actual knowledge acquired by classical study will therefore greatly depend on the age of the student.

A no less important branch of study, rather than of knowledge, most pertinent to our profession, is that of the exact sciences; and here again, we are largely indebted to antiquity. By mathematical study, we acquire the principles of inductive, and other forms of reasoning; we learn to compare and analyse. We acquire habits of close thought, the power of detecting the sources of error, and of "exposing the fallacies under which false reasoning is disposed to lurk."* Logic also, is an important source of mental discipline, which invigorates the faculties by its application either to the precise interpretation of words, or to the higher purposes of abstract reasoning on things.

I conceive that the almost universal neglect of these pursuits in early life, and the want of cultivation both of philosophy and general science, are among the chief causes by which medicine is degraded at the present day; and that unless by a general Act of the Colleges which preside over

* Herschell.

each department of the profession, rendering some form of *preliminary* education in these branches of study, compulsory on those, destined to become members of our body, the entire removal of all the other causes combined, will fail to extricate it from the degenerate position it now occupies.

I cannot persuade myself to pass without comment, the still prevalent system of, so called, *education*, by means of apprenticeship, which appears little more or less than an ingenious device by which to exhaust or render nugatory, four or more invaluable years of the early life of the student.

Yet there are few pursuits without their advantages. During these four or more years the so-called student is compelled to practise the art of manipulation, which consists in the wielding the important instruments placed at his command; while he holds converse with the languages of the philosophers and orators of the past world, in a refined latinity obtained from his master's day-book; and amidst the varied occupations of each eventful day, happily some small portion is allowed him for that most profound study,—the *study of himself*.

To this disgraceful system of officinal drudgery the medical profession has lent itself, in direct contravention of the laws of moral right, of reason, and of common sense; and glancing for a moment at the necessities of the future practitioner, I ask you, whether the rooted injury thus perpetrated by four or more long years of personal servitude, at this most critical period of a student's life, in which the only distinction discoverable between his lot and that of an ordinary servant, consists in the fact, that he is made the purchaser of his own degradation, does not inflict a wrong on the mind and habits of a

youth, which in a very large majority of cases, no future opportunities of study, no future discipline can redress or justify.

This is the spring of his existence; this is the season, and the only season, in which the mind takes the impression for a whole life. The child is said to be "father to the man." I have sketched his education, look at the result!

The construction of society demands a distinction in the grades of the medical profession; the rewards of exertion must be necessarily unequal in value; his physical relations must regulate in some measure the nature and extent of his occupations, the value of his time, and the rank he holds in society, but the giant evil of the day is want of education. The quantity or degree may be regulated by the future position and means of the student, but all should be educated in mind and manners up to the level of good society.

I conceive that education is required by all, whether rural, provincial, or metropolitan; but in every grade his general acquirements as to his competency for this high pursuit should be tested by actual examination; and I rejoice to think that the Council of this College, under the superintendence of its distinguished President, who have at heart the earnest desire to promote the highest interests of that department of the profession over which they preside, have acknowledged the necessity, by taking the initiative on this subject, and instituting examinations in classical and mathematical knowledge, for all future junior candidates for the rank of Fellow of this College, and on this head I have only to express my regret, that this important requisition is not made referable to the *first*, rather than to the *last*, stage in the career of the student.

The second cause of inferiority in rank of the medical profession is founded on the degenerate standard of medical ethics; and if I dwell but briefly on this ungrateful topic, it is because we have in education alone, its legitimate, and only corrective. If we take the body corporate of the profession, as the field of comment, do we not find the want of that high tone that characterises the other professions? There is a moral elevation that should distinguish the cultivator of natural science, from that resulting from conventional laws. Do I wrong our profession when I say that there is a want of tone, a jealousy of the exertions as well as the success of others; a tendency to misconstrue good, or to suggest evil motives; the absence of that enlightened spirit, that marks the gentleman of education?

Liberal and generous habits of thought and action, are the indisputable growth of a high degree of civilisation and refinement. What better evidence need be adduced of the want of that cultivation of mind, so indispensable to all?

There is no profession the conventional refinements of which are more stringent than the higher departments of law. This fact is explained, perhaps, when we consider law to be a purely artificial pursuit.

In a conversation I once had with a notorious burglar, but obviously a man of good education, who had broken into and robbed my house, he told me that the laws of the society he moved in, were also stringent; that inasmuch as his profession was not altogether indispensable to the well-being of society, so the world was their common enemy, and that no calling or pursuit, exacted a more rigid observance of the authority of conventional regulations. It is the same necessity, possibly, that renders the conventionalism of law so imperative. This man had been educated to the law, and he added that he found his professional knowledge of remarkable service.

"Law in the abstract is an inflexible and impartial principle, holding out one standard of moral right, and moral wrong to all the world. It has been devised by sages in the privacy of retirement, to protect society against the encroachments of selfishness and power, and to be an accessible instrument in the hands of all." *

As an abstract principle, none is more sublime or more deserving the veneration of the world. While, by the progress of knowledge and civilisation, the profession of medicine, having enlarged the circle of its utility, has become degenerate in rank; that of law, has gained an ascendancy, in the same proportion as it has lost sight of its early simplicity. That which was an instrument, has become a machine, ponderous, complicated, and unwieldy; and in the same degree as it has ceased to be the tribunal of impartial justice between man and man, have the conventional laws of its professors, their learning and education, obtained an ascendancy in the world, before which the claims of medicine sink immeasurably. It would appear that the estimate of *truth* recedes in value, in proportion as the world advances in civilisation. No man had a juster perception of the moral evils, inseparable from the practice of an advocate, than the late excellent Dr. Arnold, who, in a letter to an old pupil on the choice of a profession, says:—"To see any man delivered from the snare of the law as a profession, is with me a matter of

* Godwin.

earnest rejoicing. I rejoice in your escaping while it is yet time, and following the right hand path to any pure and Christian calling, which to my mind that of an advocate, according to the common practice of the bar, cannot be. For advocacy does seem to me inconsistent with *a strong perception of truth*, and to be absolutely intolerable, unless where the mind sits loose, as it were, from any conclusions, and merely loves the exercise of making any thing wear the semblance of truth which it chooses for the time being to patronise."

It is impossible for a mind imbued with a love of truth to witness the contentions for victory, exhibited in our courts of justice, without acknowledging with painful regret, that the highest intellectual powers are too often enlisted in the cause of the lowest moral degradation; and if we remove ourselves to a distance of time, and divest our minds of the influence of daily observation, which has reconciled us in some measure, to the growth and maturity of a system which pays homage to precedent, at the expense of reason, and which distorts the line of truth by the interposition of unprofitable subtleties, employed with the force of one of the mechanical powers to wrest the whole machine of justice from its centre, we cannot but deeply lament that this sacred cause, which is the only true cement of society, and the aspiration of all good men, should be rendered the object of secondary worship only—the first being devoted to the cause of victory.

For one, I rejoice to think that the mind and the habits of the medical man, are differently constituted. Truth is his field of action, good his aim, the world his study. With all our differences and contention, we have one common end

and object; one appeal to nature, from one common enemy, disease.

In a remarkable degree have the duties of our profession a tendency to keep alive the best emotions of our nature, and to engender a warm sympathy with the sufferings of humanity; towards the mitigation of which, a considerable portion of our time and knowledge, is devoted. Yet, with all its attendant evils, the practice of the law is regulated by a sense of decorum, of propriety, and even of refinement, which in a far less positive degree, are practised by the sister profession.

"I hold every man," says Lord Bacon, "a debtor to his profession, from the which, as men do receive countenance and profit, so ought they of duty to render themselves, by way of amends, to be a help and ornament thereunto. This is performed in some degree, by the honest and liberal practice of a profession, when men shall carry a respect not to descend into any course that is corrupt and unworthy thereof, and preserve themselves from the abuses wherewith the same profession is noted to be infected. But much more is this performed, if a man be able to visit and strengthen the roots and foundations of the science itself, thereby not only gracing it in reputation and dignity, but also amplifying it, in profession and substance."

Thirdly,—The state of the law exerts an important influence in depressing the rank of the profession of medicine.

It is general practice that gives the stamp to the whole, and it is to this department that my remarks are intended specifically to apply.

The general practitioner is an amphibious link between a

profession and a trade. For the exercise of his intellect, the law yet awards him a tardy, if not a questionable, remuneration. He is permitted a remunerative profit on the materials of his druggist,—on the mechanical agents of treatment, not on the exercise of the judgment that selects them. For his loss of time, or his knowledge, however superior to others, he obtains no certain compensation.

This system is fraught with the greatest evils, not only to the profession of medicine, but to society, who are its greatest sufferers. It is an injustice to the profession, by depriving it of the legitimate recompence due to years of study, by assimilating us to the tradesmen who supply our daily wants.

If the law awards payment for physic only, of necessity the medical attendant disposes of as large a quantity as is compatible with the digestive capabilities of his patient; and as this quantity demands some skill and judgment, in this sense, confessedly, his intellect is remunerated. It is not a question how little physic such a person requires, but how much will he take,—how much will repay his daily loss of time, for so many days, weeks, or months. His object is "to buy in the cheapest market, and sell in the dearest."

I do not hesitate to assert that it is impossible in many cases for the medical attendant to be remunerated, but by the resort to means, which high principle must proclaim in his own breast, to be indirect, and even disingenuous. Is it to be expected that a medical man should ride to a distance from home, to devote his talents and knowledge to the immediate relief of a person in great bodily suffering from accident, such as a dislocation of a finger, or of the jaw,—to pass a probang, to remove a piece of dead bone, or to employ a

catheter,—without compensation to be in some degree guaged by the nature and extent of the service he has rendered? If the law does not award him legitimate compensation, he is necessarily driven to an indirect excuse for subjecting his patient to a course of physic, with a view to prevent the recurrence of the malady.

The objections to this system cannot be overcharged. It is inseparably interwoven with the rank of our profession, with the respectability of our characters, and with the well-being of every station of society.

It upholds the most pernicious doctrine, that medicine is the sole, or at least the primary, antidote against disease. It invites empiricism. It engenders erroneous principles of pathology, and it weakens the allegiance of our profession to nature, as the great author of disease, and the beneficent worker of its treatment. The true principles of the art of healing, consist in the endeavour to develope and awaken the influence of nature, in the cure of disease. By the adoption of the present system, we forget the operation of first causes, in our false reliance on second; we largely circumscribe our curative powers, and we strike a fatal blow at the just rank and respectability of our profession.

If there exist one feature more injurious than another to the rank of the general practitioner of England, and the persistance in which, presents a more fatal obstacle to the success of any attempt to ameliorate his condition, it is that which places a pecuniary value on the drugs he dispenses.

With quite as much reason, might the surgeon claim compensation, in the name of the instruments he employs, *for their services*, after an operation.

I conceive that so long as the general practitioner consents to subject his professional practice to such degrading conditions, he is unworthy the rank and estimate of a professional man. Medicines should be dispensed at their real, not their adventitious value. With one voice, this department of the whole profession should cry aloud, and claim their indisputable right to repudiate a practice so vicious, both as regards their own high claims, and their utility to others; and obtain from parliament the title to a remuneration, more consistent with the real services they have rendered, and less derogatory to the repute of the high profession to which they belong.

Fourthly,—One of the highest incentives to superiority that can animate the human mind, is ambition of distinction above the rank of our fellow-men.

I do not stop to inquire how far this sentiment is identified with the excellence, or the weakness of our nature, but it is undeniable that its exercise in every age has led to great deeds, by which the world has profited.

It affords, however, a stimulus to exertion, far less available to the professor of medicine, than to any other of the so-called professions.

We have in England no public honours or distinctions. Inasmuch as our duties are limited to the bedsides of our patients, so are our claims to public gratitude, unacknowledged by the world. For, the mere privacy of our duties should not disqualify us for public reward; and I look forward to the time, when the profession of medicine will stand forth in higher relief; when the award of the public voice, shall grant to it some public memorial or acknowledgment;

when its high services, shall no longer pass unnoticed and unrewarded. I would claim for eminent superiority in either department, some "*order of merit*," to be granted by the Government, to such men as have distinguished themselves, either in the cause of medical science, or in that of humanity.

I may be told, perhaps, by such as are content "to stand upon the ancient ways," that the purposed distinctions will be invidious, and I will point in reply, to the jealousies of our profession; or, I may be told that however plausible the scheme, it cannot work practically, without great difficulty. I will reply that difficulty is no argument. If the profession be resolved to possess such a boon, they have but to demand it with one voice. Divinity, arms, law,—each has its public rewards, in the dispensation of which, if the voice of society does not exercise an immediate control, at least its sympathies are enlisted in their award, and most jealous is the public mind of their misappropriation.

These causes exercise a most pernicious influence on the public estimate of the profession of medicine, and for the removal of which, so indispensable are our duties, we may fearlessly call on society to co-operate with us in our endeavour to remove them, nor should we call in vain.

Among these four causes of depression, viz.—I. The want of high classed education: II. The low standard of medical ethics: III. The present imperfect state of the law: IV. The absence of public and national honours—it is obvious that the first and greatest, is irremediable as regards the present generation; but there is no other reason why the remaining causes should not undergo consideration with a view to their

removal, beyond the difficulty of rousing attention, the difficulty of bringing into action a distracted power, and directing it towards one focus.

We waste our energies in a fruitless struggle to raise ourselves in individual classes, by a sort of internecine contention, instead of making one general effort to elevate our *pursuit*. Every class has its grievances, real or supposed. In one department, fretting under the indignities imposed on it by law, we find contention for the honours of collegiate government. A second has sought emancipation from the contact of pharmaceutics, in the assumption of a title. The third has claimed superiority in the exclusive right to treat disease, within a certain locality; and on these lesser objects of contention, we fritter away on comparative trifles, that influence that might be profitably exerted in the far higher aim, of obtaining for ourselves as a profession, the estimate and the respect of the world.

It cannot be expected that society will aid us, unless we aid ourselves, unless we root out those evils that we alone can deal with; that we purge ourselves of the imputations of littleness, and throw ourselves on the highest resources of our profession.

We may point to the grandest discoveries in general science, or to the practical deductions of the profoundest philosophers and mathematicians without envy, we may marvel at the triumphs of human intellect, manifested in the recent discovery by Le Verrier and Adams of the planet Neptune, the nature and existence of which, was deduced from its recognised obedience to the Newtonian law of gravitation, and constituting one of the most sublime examples of

induction the world has ever seen—to the knowledge of the remotest stars of the solar system—to the discovery of Voltaic electricity—to that of the atomic theory of Dr. Dalton—to the wondrous inventions in the mechanical arts that have in recent times all but realised the fervent appeal of the lover in Martinus Scriblerus, "Ye Gods, annihilate both space and time"—to the names of Ferguson, of Hallé, of Priestley, of Herschell, and of Davy, and feel that in the limited circle of our own profession, we may boast names and discoveries, not inferior in greatness or utility, and which, if they display themselves in a less degree as the result of the highest order of inductive reasoning, than on that of experimental science, greatly exceed them in their intrinsic value, if guaged by their subserviency to the well-being and happiness of mankind.

Familiarised by daily intimacy with any recognised fact or phenomena, however grand its discovery, the mind ceases to wonder. We lose the power, or rather the habit of appreciating it in its early grandeur, forgetful of the intellect that has been employed in developing it, and it takes its place in a prominent position in the great temple of science, to support the superstructure of yet more recent discoveries.

In our own profession, I may allude not unworthily to Mr. Hunter's inductive reasoning on the subject of arterial disease,—to the yet older discovery of the circulation—to that of the recent investigations of Dr. Marshall Hall, which have established the important doctrine of the independence of the true spinal cord,—to the introduction of the vaccine virus as an antidote to smallpox, a disease more destructive than the plague;—to the identity of the cellular formation

of animal and vegable life; and finally, to the discovery of a property possessed by certain physical agents, of suspending unimpaired, the powers of sensation and consciousness.

These are indeed discoveries worthy of any age, or any science, discoveries of universal application, benefitting every class of society, from the peasant to the king.

If we could persuade ourselves occasionally to turn aside from the daily path of practical observation, to retrace the chain of thought on which our principles are based, and to recall to our recollection the names of Harvey and of Hunter, of Desault, of Cuvier, of Jenner, of Bichat, of Abernethy, of Cooper, and of Laennec, as the link that connects their great works with the occupations of our daily life, our souls would expand with the real greatness of our pursuit, and we might be induced to combine in one united effort to elevate our honoured profession to a higher rank, than it now occupies in the esteem of the world!

In considering the subject of the remunerations of our profession at the present day, so palpably below the level of our responsibilities, I do not lose sight of the fact, and a painful fact it is, that the necessities of society increase in proportion to its inability to afford us compensation,—that poverty is the very nursery and focus of disease, and that whether under the form of Hospital, Dispensary, or Union practice, a large portion of our time is devoted to the relief of human suffering. Doubtless the motives that dictate these high services rendered to the world, are composite in their nature. If to motives of philanthropy, a love of professional knowledge, an honourable ambition of distinction, and a not unworthy desire of future independence, meet in combination,

the world is yet our debtor, and it is *because* society cannot afford us pecuniary compensation, that we have an especial claim on it for an honorary distinction. The award of the sovereign encircles the soldier's brow with victorious wreaths, his bruised arms are hung up for monuments of his glory—distinguishing orders of pre-eminent rank await him on his retirement from public life; and while these and other honours, open to his ambition, operate as the reward of his past services, and stimulate the younger members of the same profession to high achievements; it is perhaps a natural sequence, that the professor of medicine, whose life is equally at the expense of his own, devoted to the purpose of *extending* the term of human existence, should pass unnoticed and unrewarded.

It is almost singular that this significant fact, should have escaped the inventor of the Malthusian doctrine.

I have alluded to the impracticability of extending the advantages of education to the practitioners of the present generation. Thus far the evil is irremediable, but there is no reason why much good may not be effected by the active agency of a refining spirit, employed for the purpose of rooting out the vulgarisms in conduct, that unhappily prevail in our profession, to an injurious extent, and prey upon the vitals of our reputation.

I desire to see a better spirit infused into our vocation, a spirit that will tend to avert those evils of conduct between man and man, that savour of the mercantile transactions of barter, and that are founded on questions of mere profit and loss. As an antidote against this spirit, I would venture to suggest the endeavour to cultivate a *more refined taste* than

now pervades the profession, the accomplishment of which would, I apprehend, be a less difficult task than many would suppose.

By taste, I mean simply the power of appreciating beauty in any form, whether in nature or in art, and the cultivation of which, forms, I conceive, an important and a valuable substitute for more profound pursuits, but to which it may be superadded, with still greater advantage to its possessor. Good taste and good feeling are found in daily companionship with each other, and without its development in some shape or other, a blank is left in the circle of man's most refined enjoyments, while even his intellectual frame-work is incomplete, and mutilated. For men are differently gifted, both as regards their sensibility and their taste. One man delights in the simple beauty of a flower, and expatiates with earnestness on its form and colours, a source of beauty quite distinct from that of its organisation; while another observes the same object with indifference.

I do not presume to enter into any definition of the nature of the beautiful, its essence or its source; but I will venture to assert, that its study forms one of the most elegant resources of our minds, by enlarging the number of our intellectual pleasures; and in no direction can the mind, preoccupied by the responsible and active duties of our profession, expand more pleasingly or more profitably for the happiness of its possessor, than in that, which opens to its sense of admiration, the beauty of nature and of art.

This interesting study embraces a wide range of human knowledge, from its primitive form, exhibited in the sensations of pleasure that reach the heart from the perception of

the beauty of form or colour, or from a succession of harmonious sounds, equally grateful to the ear, to the highest manifestations of refined and cultivated taste, possessed by the poet or the painter. Such objects, in some form or other, are brought home within the range of every man's observation, but in an especial degree, does a country life furnish materials for the development of untutored thought and admiration of such objects of beauty and refinement, which are calculated to take a man out of the sphere of his personal occupations, and to direct his thoughts to the contemplation of objects that tend to calm, and at the same time to elevate his mind.

The sources of this knowledge, and the pleasure that it produces, are infinite; the whole universe is charged with the office of instruction to the hitherto untaught mind—innumerable voices reach it from earth and heaven! It takes lessons from every object within the sphere of its senses, from the form of a rosebud to the profoundest beauty of ancient or modern art.

Who can behold the exquisite colours of the tulip, or the gorgeous drapery of a golden sunset, or even the variegated colours decomposed by the common prism, without a sensation of pleasure? Whose eye is so dead to the beauty of form or outline as to betray indifference to the delicate tracery of mosses, of ferns, of heaths, or to the grandeur and no less varied outlines of the sturdy oak, the graceful sweep of the weeping willow, or the lighter pencilling of the ash—the beautiful undulations of distant hills, or the yet more sublime form of gigantic and ponderous-looking clouds, when viewed against the blue sky, or fringed with light reflected

from the sun?—or more sublime than the boiling thunder of a cataract, or the broad expanse of the boundless ocean,—

> "That glorious mirror, where the Almighty's form
> Glasses itself in tempests, in all time
> Calm or convulsed, in breeze, or gale, or storm,
> Icing the pole, or in the torrid clime
> Dark heaving, boundless, endless, and sublime,
> The image of Eternity,—the throne
> Of the Invisible." *

The relish for such enjoyments has a tendency to adorn the solid acquisitions of the student. His mind awakening as from a trance to new existence, becomes conscious of infinite sources of delightful speculations, and objects around that have met his daily gaze for years, start into existence and disclose charms, hitherto unknown, and he may be said to breathe a new existence in the novel associations of every day, and hour.

The transition of the beauty of nature to that of art, is easy; and here the painter, and the sculptor, and the architect, exhibit all that is beautiful to the eye in composition, and elaborate in artistic skill.

But nature is still the prototype from which are reflected the efforts of the artist, and from her simplicity we dare not stray.

Doubtless, the aptitude for these studies—I mean for the perception of the beauty of art—is possessed in various degrees of perfection by different individuals, but probably the germ is dormant in all; and in many, or in most, by early development and early cultivation, it may be rendered competent to perceive and to enjoy the highest perceptions of artistic

* Lord Byron.

power, from the simple beauty delineated in the form of an arabesque, to the highest sublimity of genius exhibited in the majestic beauty of the Theseus, or the other Greek adornments of the great temple of Athens, which British taste and enterprise, have safely deposited within the walls of our National Museum.

It cannot be denied that the full appreciation of the highest sublimity of art, requires a specific development, but its study must always exercise a refining influence over the character; and I pity the man who could see unmoved the sublime exhibitions displayed in the marbles of Nineveh, and who, quite irrespectively of their intrinsic beauty, in which they far exceed the later productions of Egyptian art, does not attach to them a sacred character, as he enters the chamber allotted to them, with an emotion of awe, forming the great link in the chain of evidence, of the biblical history of a former world.

If I appear to enlarge unnecessarily on the subject of taste, it is because I believe, by its more general cultivation, we may eradicate much of the human dross that pervades our profession; for taste is not more a matter of perception and feeling *than of conduct*, and forms a regulating principle of our lives. It associates itself with our every action, as well as with the motive that animates them.

"Where taste exists in the highest perfection," says Dugald Stewart, "we may expect to find an understanding discriminating, comprehensive, and unprejudiced, united with a love of truth and nature, and with a temper superior to the irritation of the little passions, while it implies a spirit of accurate observation, and of patient induction, applied to the most

fugitive and evanescent class of our mental phenomena, it evinces that power of separating universal associations, from such as are local or personal, which more than any other quality of the mind is the foundation of *good sense*, both in scientific pursuits, and in the conduct of life. The intellectual efforts by which such a taste is formed, are in reality much more nearly allied than is commonly suspected, to those, which are employed in prosecuting the most important and difficult branches of the philosophy of the human mind."

In truth, a man's just taste for what is elegant, whether in art or in nature, and his delicacy in moral conduct, are but one and the same sense, exerting itself on the same subject,—viz., a love of beauty, of order, of propriety, extended to all their various intellectual exhibitions. "We observe in such a man, the same elegance, pointing towards the simplicity of nature; the same refined, correct, and judicious mode of thought expressed in all his relations to the world, whether in his step, in his attire, his furniture, his equipage, his garden, or *his actions*."

"The dignity of every occupation," says Burke, "wholly depends on the quantity and the kind of virtue that may be exerted in it." What are the requisitions of our profession? Test it by the claims of the other professions, or test it by its own. Can it be said that our duties demand a lower standard of moral excellence? Are we content with mediocrity of intellectual power? On the contrary, does any pursuit demand for its full efficiency a higher order of intellect, a deeper fund of moral courage, more quickness of perception, a greater boldness in action? Truly, the soldier is the occasional arbiter of the fate of thousands, but there are few who

reach the standard of superior excellence. The law is supposed to be the arbiter of character and of property.

The medical man is, under Providence, the arbiter of human life, more precious in a ten-fold degree, in the esteem of that very world, whose favourable verdict is awarded to us with a niggard generosity, than the highest stake which calls forth in a court of law, the exercise of the most brilliant forensic talent of the advocate. "Ars corporis curandi tuendique, atque utilitas, Deorum immortalium, inventioni est consecrata."* A pursuit which, although in its infancy, and incomplete in its development, was yet so great as to claim a descent from the Gods, which is so interwoven with the physical and moral welfare of every individual member of society, and on the cultivation of which, even something of our national character depends, and no less our scientific rank in the world, demands for its perfect condition of utility, first, the most vigilant observance and exposition of its defects, and secondly, the active co-operation of all who profess to study our national happiness, or desire to promote the welfare of this great nation throughout the globe.

We justly boast in this glorious country, our noble hospitals and infirmaries, erected and endowed by private benevolence, and dedicated to the relief of the diseased, and the necessitous. To what region of this globe can you point, and say, "Here are equal examples of private munificence to those of Britain?" Is not the practice of charity stamped upon the national character? In the various hospitals of this metropolis alone, about 300,000 persons obtain annual relief from suffering. What are the endowments of a hos-

* Cicero, Tusc. Disc.

pital, however noble, what is the value of its concentrated wealth and power, and all its complicated machinery of good, if we withhold from it, the active agency of our profession? The medical mind is to a hospital, what life is to the body—the spirit of religion, to the mere edifice in which its practice and its doctrines are enforced! It gives to it all its utility, and all its rank. It stamps it with its high name. It infuses a spirit of life into the inanimate and otherwise all but worthless body; and in vitalising the vast machine, it becomes in an instant, the instrument of incalculable good to thousands, the pride of virtue, the boast of the world!

THE END.

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THE

MESMERIC MANIA

OF

1851,

WITH

A PHYSIOLOGICAL EXPLANATION OF THE PHENOMENA PRODUCED.

A LECTURE,

BY

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PREFACE.

During the present year (1851), society in Edinburgh has been greatly agitated by a delusion, consisting in the supposition, that certain persons may be influenced by an external mysterious force, which is governed and directed by particular individuals. Fashionable parties have been converted into scenes of experiments on the mental functions. Noblemen, members of the learned professions, and respectable citizens, have been amusing themselves in private, whilst discourses and exhibitions to an unusual extent have been got up for the entertainment of the public. On one occasion the Royal Medical Society was operated on; and if a proof of the correctness of the facts to be described is required, it will be found in the circumstance, that the nervous aberrations noticed, were readily exhibited in some of its most sceptical members. The result of this excitement has been an increased degree of nervousness in many individuals. I have been told that in some educational establishments, girls and boys throw themselves into states of trance and ecstasy, or show their fixed eyeballs and rigid limbs, for the amusement of their companions. Sensitive ladies do not object to indulge in the emotions so occasioned, and to exhibit themselves in a like way for the entertainment of evening parties. Several instances are known to me where intelligent young men —students in this University—have, for a longer or shorter time, been incapacitated from following their ordinary occupations, and obliged, from want of attention and mental power, to absent themselves from their classes. Some of these, from a feeling of the injury they have sustained, have very properly refused to allow any experiments to be tried on them; and the parents of very sensitive young persons, from the obvious detriment their health has undergone, have also forbidden a repetition of these occurrences.

The disorder has not been confined to Edinburgh. Following the course of certain itinerant lecturers, and especially of Mr Lewis and Dr Darling, it has appeared in many towns of Scotland. The latter gentleman has produced the greatest excitement in his course towards London, where, according to the papers, there are at present repeated the same public scenes, and the same phenomena, as were produced among us. Surely there is a great similitude between this state of things and what occurred in the middle ages (see note, p. 16), so that, I think, we are warranted in calling it—"The Mesmeric Mania of 1851."

When this kind of mania is seen at a public exhibition, in the persons of strangers, the first impression always is, that it depends on collusion and imposture. But when it is observed in private, affecting our friends and relations, even those whom we know to have been sceptical, the reality of the facts can no longer be doubted. Indeed, that a peculiar condition of the nervous system may be occasioned, in which individuals otherwise of sound mind are liable to be temporarily influenced by predominant ideas, must be admitted by all who have seen anything of the disorder. Nor will the existence of such a condition appear after all very extraordinary to those who reflect on the singular phenomena occasionally presented in the states of reverie or waking dream, of ordinary somnambulism, ecstasy, trance, monomania, and other allied affections. In every case the symptoms consist of perversions of intelligence, sensation, or motion, identical in their character with what medical men have been long familiar. It is the manner in which they may be produced, together with the frequency with which they are made to occur, that is new; and this certainly demands the attention of the medical and legal practitioner, connected, as it is, with human health and human testimony.

To separate what is true from what is false, to strip the subject of the charlatanism which has been thrown around it, and offer a physiological explanation of the phenomena really produced, is the object of the following lecture.

J. HUGHES BENNETT.

30, Queen Street,
April 16*th*, 1851.

INTRODUCTION.

GENERAL STRUCTURE AND FUNCTIONS OF THE NERVOUS SYSTEM.

To the eye, the nervous system appears to be composed of two structures,—the gray or ganglionic, and the white or fibrous. The ganglionic, when examined under high powers, may be seen to be composed of nucleated corpuscles, varying greatly in size and shape, mingled with a greater or less number of nerve tubes, also varying in calibre. The important fact, with regard to these, is, that many of the corpuscles may be demonstrated to throw out prolongations, which are in direct communication with, or constitute, the central band or axis of Remak and Purkinje within the tubes. The fibrous structure may be shown to consist of minute tubes, which are smallest towards the periphery of the cerebrum, larger towards its base, and largest in the nerves. They are of three kinds,—1st, Cylindrical, as observed in the optic and auditory nerves; 2d, Varicose, as seen in the white substance of the cerebral lobes and of the spinal cord; and 3d, Of regular size throughout, as seen in the nerves. There are also bundles of gelatinous or flat fibres, the nature of which is much disputed, very common in the olfactory nerve and sympathetic system of nerves. There can be no doubt that some nerve tubes run into the ganglionic corpuscles, whilst others originate from them (Wagner, Kölliker). It is even possible that the same ganglionic corpuscle may receive and give off nerve tubes, each having distinct properties, the one of conveying the influence of impressions to, and the other of conveying influences from, the nervous centres. The peripheral termination of the nerves is in loops or arcs.

The general arrangement of the two kinds of structures should be known. By cerebrum, or brain-proper, ought to be understood that part of the encephalon constituting the cerebral lobes, situated above and outside the corpus collosum; by the spinal cord, all the parts situated below this great commissure, consisting of corpora striata, optic thalami, corpora quadrigemina, cerebellum, pons varolii, medulla oblongata, and medulla spinalis. In this way, we have a cranial and a vertebral portion of the spinal cord.

In the cerebrum, or brain-proper, the ganglionic or corpuscular structure is

external to the fibrous or tubular. It presents on the surface numerous anfractuosities, whereby a large quantity of matter is capable of being contained in a small space. This crumpled up sheet of gray substance has been appropriately called the hemispherical ganglion (Solly). In the cranial portion of the spinal cord, the gray matter exists in masses, constituting a chain of ganglia at the base of the encephalon, more or less connected with each other and with the white matter of the brain-proper above, and the vertebral portion of the cord below. In this last part of the nervous system the gray matter is internal to the white, and assumes the form of the letter *x*, having two posterior and two anterior cornua,—an arrangement which allows the latter to be distributed in the form of nerve tubes to all parts of the frame.

The white tubular structure of the vertebral portion of the cord is divided by the anterior and posterior horns of gray matter, together with the anterior and posterior sulci, into three divisions or columns on each side. On tracing these upwards into the medulla oblongata, the anterior and middle ones may be seen to decussate with each other, whilst the posterior columns do not decussate. On tracing these up into the cerebral lobes, we observe that the anterior columns, or pyramidal tracts, send off a bundle of fibres, which passes below the olivary body, and is lost in the cerebellum (*Arciform band* of Solly). The principal portion of the tract passes through the corpus striatum, and anterior portion of the optic thalamus, and is ultimately lost in the white substance of the cerebral hemispheres. The middle column, or olivary tract, may be traced through the substance of the optic thalamus and corpora quadrigemina, to be in like manner lost in the cerebral hemispheres. The posterior column, or restiform tract, passes almost entirely to the cerebellum. In addition to the diverging fibres in the cerebral hemispheres which may be thus traced from below upwards, connecting the hemispherical ganglion with the structures below, the brain-proper also possesses bands of transverse fibres, constituting the commissures connecting the two hemispheres of the brain together, as well as longitudinal fibres connecting the anterior with the posterior fibres.

The great difference in structure existing between the gray and white matter of the nervous system, would *à priori* lead to the supposition that they performed separate functions. The theory at present entertained on this point is, that, while the gray matter eliminates or evolves nervous power, the white matter simply conducts to and from this ganglionic structure the influences which are sent or originate there.

The brain-proper furnishes the conditions necessary for the manifestation of the intellectual faculties properly so called, of the emotions and passions, of volition, and is essential to sensation. The evolution of the power especially connected with mind is generally considered to be dependent on the hemispherical ganglion. The white tubular matter serves, by means of the diverging fibres, to conduct the influence originating in this ganglion to the nerves of the head and trunk, whilst they also conduct the influence of impressions made on the trunk, in an inverse manner, up to the cerebral convolutions. The other transverse and longitudinal fibres which connect together the two hemispheres, and various parts of the hemispherical ganglion, are probably subservient to that combination of the mental faculties which characterises thought.

The spinal cord, both in its cranial and vertebral portions, furnishes the conditions necessary for combined movements; and the nervous power necessary for this purpose is supposed to depend upon the gray matter, whilst the white matter of the cord acts as a conductor, in the same manner that it does in the brain proper, and there can be no doubt that the influence arising from impressions is carried along the tracts, formerly noticed, which connect the brain and two portions of the spinal cord together. It is now also determined, that many of the fibres in the nerves may be traced directly into the gray substance of the cord,—a fact originally stated by Grainger, but confirmed by Budge and Kölliker.

The various nerves of the body consist for the most part of nerve tubes, running in parallel lines. Yet some contain ganglionic corpuscles, as the olfactory, and the expansion of the optic nerve constituting the retina, whilst the sympathetic nerve contains in various places, not only ganglia, but gelatinous flat fibres. The posterior roots of the spinal nerves possess a ganglion, the function of which is quite unknown. These roots are connected with the posterior horn of gray matter in the cord, while the anterior roots are connected with the anterior horns. As regards function, the nerves may be considered as—1st, Nerves of special sensation. 2d, Nerves of common sensation. 3d, Nerves of motion. 4th, Senso-motory, or mixed nerves. 5th, Sympathetic nerves. If there be any one proposition in physiology better established than another, it is, that a nerve having one function, can never assume that of another.

All nerves are endowed with a peculiar vital property, called sensibility, inherent in their structure, by virtue of which they may be excited on the application of appropriate stimuli, so as to transmit the influence of the impressions they receive to or from the brain, spinal cord, or certain ganglia, which may be considered as nervous centres. Stimuli are of two kinds, PSYCHICAL and PHYSICAL (Todd). The nerves of special sensation convey *to* their nervous centres the influence of impressions caused by odoriferous bodies, by light, by sound, and by sapid substances. The nerves of common sensation convey the influence of impressions *to* their nervous centres, caused by mechanical or chemical substances. The nerves of motion carry *from* the nervous centres the influence of impressions whether psychical or physical. The mixed nerves carry the influence of stimuli both to and from, combining in themselves the functions of common sensation and of motion. Although the sympathetic nerves also undoubtedly carry the influences of impressions, the direction of these cannot be ascertained, from their numerous anastomoses, as well as from the ganglia scattered over them, all of which act as minute nervous centres. But there *are* cases where certain psychical stimuli (as the emotions) act on organs through these nerves, and where certain diseases (as colic, gallstones, &c.) excite through them sensations of pain.

Sensation may be defined to be *the consciousness of an impression*, and that it may take place, it is necessary,—1st, That a stimulus should be applied to a sensitive nerve, which produces an impression; 2d, That, as the result of this impression, a something should be generated, which we call an influence, which influence is conducted along the nerve to the hemispherical ganglion; 3d, On arriving there, it calls into action that faculty of the mind called consciousness or perception, and sensation is the result. It follows that sensation may be lost by any circumstance which destroys the sensibility of the nerve to impressions, which impedes the process of conducting the influence generated by these impressions, or, lastly, which renders the mind unconscious of them. Illustrations of how sensation may be affected in all these ways must be familiar to you, from circumstances influencing the ultimate extremity of a nerve, as on exposing the foot to cold,—from injury to the spinal cord, by which the communication with the brain is cut off, or from the mind being inattentive, excited, or suspended.

Of the *nature* of nervous influence we know nothing. Its traversing the nervous cords with inconceivable rapidity, presents a certain analogy to electricity passing along a wire. But that nervous influence is not electricity, is proved by the fact, that the former can never be transmitted by anything but nerve, whereas the latter may be sent along a variety of conductors, of which nerve is one of the worst. Again, whenever an animal really evolves electricity, like the electric eel, it is furnished with a distinct organ for the purpose.

The independent endowment of nerves is remarkably well illustrated by the fact, that whatever be the stimulus which calls their sensibility into action, the same result is occasioned. Mechanical, chemical, galvanic, or other *physical* stimuli, when applied to the course or the extremities of a nerve, cause the very same results as may originate from suggestive ideas, perverted imagination, or other *psychical* stimuli. Thus a chemical irritant, galvanism, or pricking and pinching a nerve of motion, will cause convulsion and spasms of the muscles to which it is distributed. The same stimuli applied to a nerve of common sensation will cause pain, to the optic nerve flashes of light, to the auditory nerve ringing sounds, and to the tip of the tongue peculiar tastes. Again, it will be seen that suggestive ideas, or stimuli arising in the mind, may induce peculiar effects on the muscles; give rise to pain or insensibility, and cause perversion of all the special senses.

Motion is accomplished through the agency of muscles, which are endowed with a peculiar vital property, called contractility, in the same way that nerve is endowed with the property of sensibility. Contractility may be called into action altogether independent of the nerves (Haller), as by stimulating an isolated muscular fasciculus directly (Weber). It may also be excited by physical or psychical stimuli, operating *through* the nerves. Physical stimuli applied to the extremities or the course of a nerve, may cause convulsions of the parts to which the motor filaments are distributed directly, or they may induce combined movements in other parts of the body *diastaltically* (Marshall Hall),—that is, through the spinal cord. In this latter case the following series of

actions takes place:—1st, The influence of the compression is conducted to the spinal cord by the afferent or *exodic* filaments which enter the gray matter. 2d, A motor influence is transmitted outwards by one or more efferent or *exodic* nerves. 3d, This stimulates the contractility of the muscles to which the latter are distributed, and motion is the result. Lastly, contractility may be called into action by psychical stimuli or mental acts—such as by the will and by certain emotions. Integrity of the muscular structure is necessary for contractile movements; of the spinal cord, for diastaltic or reflex movements; and of the brain-proper, for voluntary or emotional movements.

Thus, then, we may consider that the brain acting alone furnishes the conditions necessary for intelligence; the spinal cord acting alone furnishes the conditions essential for the co-ordinate movements necessary to the vital functions; and the brain and spinal cord acting together furnish the conditions necessary for voluntary motion and sensation.

THE MESMERIC MANIA OF 1851.

Dr Henry Monro,[1] speaking of Monomania, says that "in these cases neither the controlling agency of the will nor the reason is suspended on most subjects, though it is so on certain points; these people can guide their thoughts well enough on most questions, can see the full relations that cause bears to effect, and that mental impressions bear to external things, but they cannot properly control those impressions which are most strongly fixed on the mind. This state has very frequently a stage of contest and conscious difficulty at first, when the struggle between the morbid impressions and the faculties by which to control them is great; indeed, we may say that all morbid and excessive impressions which exclude all other considerations bear the rudimentary form of this affection, though insanity cannot be said strictly to be fully developed until the contest is decided by such a victory on the part of the morbid impressions that the moral liberty to exercise their reasoning faculties on these subjects is gone."

During the present year several itinerant lecturers have shown that the first stage of the process here so accurately described,—viz., that in which certain persons cannot control those impressions which are most strongly fixed on the mind,—may be produced artificially in about one out of twenty individuals of the entire population. Thus, if that number of persons be chosen indiscriminately, and directed to gaze steadily at any object for about ten minutes, a peculiar condition of the cerebral functions is produced in one or more (especially if they be young), in which those affected may be made, not only to act upon any train of ideas which may be suggested to them, but motion and sensation may be controlled in a variety of ways.[2]

[1] Remarks on Insanity, &c. 1851.

[2] The mode of producing this condition may be varied, but it is in all cases essentially the same. Thus Mesmer caused individuals to sit in a kind of trough, and they were directed to look at a wire placed in their hand. The Fakirs of India throw themselves into a trance by looking at the extremity of their own noses. Mr Braid of Manchester holds an object a little above the eyes, so as to fatigue them sooner. Dr Darling causes them to look at a small coin placed in the palms of their hands, whilst Mr Lewis and others fix the attention of persons on themselves, or on the tips of their fingers extended towards their eyes.

This peculiar condition manifests itself while the individual is gazing upon the object—in the first instance, by a mistiness of vision, succeeded in some by a feeling of lassitude and desire to sleep, in others only by stiffness of the eyelids, and in a third class by deep-drawn sighs, hurried respiration, heaving of the chest, or other signs of general excitement. If now such persons are repeatedly told that they cannot open their eyes, it will be found that they are unable to do so, especially if their attention be more strongly directed to the eyelids by touching or pointing to them. But on receiving permission, or on being told to open them, this is done at once.

In the same manner, an individual may be made to make every conceivable kind of motion against his will, or, on the other hand, such movements as he may wish to make can be prevented, arrested, or perverted. Thus I have seen a person prevented from speaking, on account of the jaws being closed; not able to bend an arm or a leg; fixed to a chair, or prevented from sitting down; unable to approach a particular object, or irresistibly impelled towards it; unable to cross a real or imaginary line on the floor; the arm suspended and fixed in the act of drinking, or the body arrested in the act of dancing; the individual made to walk, dance, or run, as directed; to imitate riding on horseback, when seated on a chair; or stagger about the room in a supposed state of intoxication, &c. &c.

A very singular experiment consists in directing a person to lift some light object, such as a walking-stick, and then suggesting to him that it is very weighty,—indeed getting heavier and heavier, so that he cannot hold it. It may then be observed, as the idea of weight gathers strength in his mind, that the muscles of his arms supporting the walking-stick become more and more rigid, exactly as if it were a ponderous bar of iron; all his strength at length is evidently exerted to hold it, but in vain, for it falls from his grasp, he appearing exhausted and out of breath from his previous exertions.

In like manner, in this condition all the sensations may be increased, perverted, or destroyed, through the medium of suggestive ideas communicated to the mind. By fixing attention on any part of the skin it may be made to feel hot or cold, tingling and painful, or benumbed and destitute of sensibility, according to the ideas communicated. Sight may be lost or rendered painful, spectral images may be presented to the vision, or various objects made to resemble others to which they bear no analogy. Smell also may be perverted, and any kind of odour given to inodorous substances. A rose, in the mind of such an individual, may have the smell of an onion, and plain water the fragrance of *eau de Cologne*. Various noises, in like manner, may be heard; frequently hearing is very acute, at other times it is apparently abolished. Lastly, the taste may be affected, and plain water made to present to such a person the sweetness of honey, the bitterness of wormwood, or the acidity of vinegar.

Then, as regards the mental faculties, memory may be lost, whilst judgment and comparison for the time being cannot be exercised. The imaginative faculties, on the other hand, are very vivid, so that the individual may readily assume the manners of other persons in various walks of life; go

through the operations of different mechanical trades, conceiving himself to be an artisan; endeavour to escape from imaginary dangers or try to repel them, and act as he himself or others might be supposed to do under any given circumstances or conditions. Thus he may be made to fight, to swim, to run, to stagger as if intoxicated, and so on. Even the sex may in this manner be changed, and a lady may assume the manners, tone of voice, and language of her husband. Such persons also may readily be conducted in imagination to various distant countries or cities, when they will act and talk as if they were really there; or they may be conducted through a very complicated series of actions, such as a quarrel terminating in a duel; a fishing or shooting excursion in which they catch numerous fish, or bag a quantity of game, &c. &c.

In the same way sleep is most readily induced, and may be made so sound that all ordinary stimuli will not awake them, and occasionally sensation is for the time annihilated. Yet it often happens that at the command of him who has been communicating the suggestive ideas, they immediately awake from a condition of sopor from which local painful applications would not arouse them.[1] Susceptible persons may be even commanded to sleep at a particular hour on a certain day, and awake at a particular time, and this they will do under the idea that at the hour named some peculiar influence is exerted on them.[2] This condition is analogous to that of somnambulism, trance, or ecstasy, and presents all the intermediate gradations between these states and ordinary dreaming and reverie.

What is very curious in connection with many of these nervous aberrations, is, that a person may be perfectly conscious during the whole time of what he is doing, and even of the absurdity of the thing. He may know that the water is not milk or syrup, and yet he declares it to have the taste of those liquids. Frequently, when his motions are influenced, he evidently resists, but seems to be controlled by, a will stronger than his own. He even laughs at his own ridiculous actions, but acknowledges his helplessness. He sees and knows that it is a mere walking-stick, but is still obliged to exert all his strength to support it. The efforts at resistance only induce fatigue, and tend to render him more

[1] All such persons go to sleep under the idea that the operator exercises over them a peculiar and exclusive influence. It is his voice, therefore, that is associated with his dreaming thoughts. Thus, a person impressed with the fear of having his house burnt down, has been known not to have awakened when various noises have been made, or pungent odours applied to his nostrils, but has started up immediately the word fire was whispered in his ear, or burning tinder placed under his nose. A signal lieutenant under Lord Hood, after harassing and prolonged duty, could not be aroused by the ordinary means without great trouble, until his comrades found out that on shouting the word "signal" he sprang up immediately as if for duty.—(Macnish.)

[2] This fact has excited great astonishment, and it has been supposed that at the hour named the operator magnetises them; thinks of them, and may even direct an influence from his body some 50 or 100 miles through the atmosphere to the individual affected. But all such persons have been *told* to go to sleep, and consequently received the necessary idea, in the same manner that most of us having an important duty to perform, or a journey to make early in the morning, retire to rest with an impression of the necessity of waking sooner than usual, and do so accordingly.

certainly the victim of the idea by which he is governed. This condition is certainly closely allied to the incipient stage of monomania. It should also be noticed that, although young and nervous persons are undoubtedly those who are most commonly affected, such is by no means always the case, as many individuals, apparently in good health and robust, have been made to exhibit all the phenomena described.

Such are only some of the phenomena which may be produced in those affected with the nervous disorder under consideration. They admit of infinite modifications, but the symptoms are all referable to increase, diminution, or perversion of intelligence, sensation, or voluntary motion, variously combined, according to the endless train of suggestive ideas that may be communicated to the individual. It has always been found, that the more frequently those effects are occasioned in one person, the more readily may they be again induced, and the more sensitive and nervous does the person become.

Similar phenomena to those now described have occurred in all ages, produced in certain persons by predominant ideas, and variously modified according to the education, politics, or religion of the period. Thus the effects produced on many votaries during their initiation into the ancient mysteries; the ecstasies of the Pythian and other priestesses; the influence of religious enthusiasm; the dancing epidemics of St Vitus, or of Tarantism, in the middle ages; the hallucinations of the Convulsionaires at the tomb of St Medard, in Paris, &c. &c., are of a like character.[1] Numerous perversions of the nervous functions, identical in their nature with those described, consisting of sensory illusions, muscular convulsions or rigidity, and peculiar trains of thought influencing acts and conversation, may be found in the histories of witchcraft or demonology, in the legends of the saints, the journal of Mr Wesley, and in the accounts given by travellers of the religious camp-meetings in the woods of America. They are perhaps more common now than previously, and excite even more astonishment among the ignorant, the only difference being that the same phenomena which in a dark age were attributed to divination or incantation, now assume the garb of science, and are ascribed to Magnetism or Electricity.

I consider it unnecessary to enter into any lengthened argument to refute the numerous hypotheses which ascribe these effects to external influences. I know of no series of well-ascertained facts capable of supporting such a doctrine. Lately, I have tried numerous experiments with the aid of those who believe in Animal Magnetism, all of which have only convinced me that no such principle exists, and that all the phenomena really occasioned depend on suggestive ideas communicated to the person affected.[2] But while these theories

[1] Hecker's Epidemics of the Middle Ages.

[2] The various movements and manipulations of the so-called animal magnetists are wholly at variance with what should be practised if their own theory was true. For whilst their actions are highly suggestive to the mind, they are never directed in such a manner as to stimulate those muscles which are necessarily called into action, as they ought to be, did any stimulating influence flow from their fingers. For instance, when they wish to close the jaws, the hands are never directed towards the temporal muscles, but to the mouth or larynx. When a person is bent forward or made to sit down, the hands are passed from above downwards or forwards, so as

scarcely merit attention, the facts themselves are highly important, and demand the careful consideration of the physiologist and medical practitioner. Let us, then, examine into what can reasonably be advanced in explanation of these nervous phenomena.

We have seen that sensation may be defined to be *the consciousness of an impression*, and we know that the mind strongly intent upon an object is unconscious of those impressions which are going on around,—so that no sensation results from them. Every physiologist is aware that the body of a decapitated animal may be thrown into violent convulsions, and cases have occurred even in man of the limbs having been thrown about, as if in the greatest agony, although in reality no pain whatever has been experienced. All-absorbing mental ideas prevent sensation of local impressions unconnected with them; hence wounds are not felt in battle, blows and falls are unheeded during the excitement of intoxication or of nitrous oxide gas, and many Indian warriors and religious enthusiasts, intent on particular trains of thought, have not suffered from any of the supposed torments which were inflicted on their bodies. These facts, then, offer a sufficient explanation to the physiologist of the occasional insensibility of somnambulists, or others labouring under some predominant idea.

Whilst, however, an individual may be unconscious of impressions unconnected with his particular train of ideas, everything in relation to these is often perceived with extraordinary readiness. The abolition of sensation with regard to general impressions seems to be counterbalanced by an exquisite sensitive-

to suggest the action, but never directed to the large flexor muscles by the contraction of which the action is performed. In the same manner, when a limb or the trunk is extended, it is not the extensor muscles which are principally operated on, but motions are made to represent the act of extension itself. If the hand or elbow is to be bent, they point to the joints, and not to the muscles of the forearm or arm the contraction of which produces the effect. Indeed, to operate scientifically, according to their own principles, requires a considerable knowledge of anatomy, which is by no means necessary for success as a "magnetiser."

All the experiments made before me (and they have been numerous), having for their object to prove the influence of the silent will, have failed. Hence I conclude, that the motions, passes, and other acts of the so-called "animal magnetists," are only useful in fixing the attention, and communicating suggestive ideas. I have been confirmed in these views by carefully watching the proceedings of Mr Lewis. His gestures are most expressive, and he conveys ideas by means of pantomimic action of the most perfect kind. Circumstances have convinced me that in the excitement of the moment he himself is often unconscious of his own proceedings. Indeed, on stating to him my belief that the effects were owing to suggestive ideas, he opposed the notion on the ground that he always told the person to do the very opposite of what he wanted them to do. In fact, when he wished a person to rise from a chair, he always told them to sit down, but in a tone of voice, and accompanied by such gestures, as pretty clearly indicated what were his real intentions. On several occasions, he endeavoured to act on others by what he named the silent will, looking at them steadily, and standing motionless. It generally happened, however, that his own efforts were of a kind which unconsciously caused him to rise on tiptoe, elevate his head, or throw out by gesture some hint, which was immediately seized by the person operated on. Here it may be well to mention, that any one can see through the eyelids, although they be so close together as to appear shut to those looking at them. The truth of this may be readily proved by experiment.

ness relative to the one impression either actually made or suggested. Dr Holland has very ably pointed out the effects of mental attention on the bodily organs,[1] showing that there are few persons who do not experience irritation or some imaginary feeling in parts to which their attention is much directed. If at night, owing to some unusual position, we feel a beating at the heart or at the temples, we easily imagine there is something alarming; the respirations are altered, if we think about them; if we suppose the mouth is dry, we immediately swallow the saliva, and render it so; if we fancy we have a cough, we cough immediately, and clear the air passages; and if we suppose any source of irritation exists on the skin, we involuntarily apply our hand to and rub the part. Nothing is more common for medical students, when first studying individual diseases, than to imagine themselves to be the victims of each in succession. Then, in certain conditions of the system, it is well known that actual pain may be produced in a part by fixing our attention upon it. Hypochondriacs are martyrs to these erroneous impressions. Supposed pain in the limbs or stomach prevent their walking or eating, and their health suffers from want of exercise or want of food. Sir Benjamin Brodie has given some singular cases where so-called nervous pains of this description have actually led to tenderness and swelling of the integuments covering the part.[2] It may easily be understood how facts of this kind may be made to assume the appearance of prophecy, and how informing a valetudinarian that he will certainly have a rheumatic or neuralgic pain on any given day, is likely to produce it.[3]

Then, as regards irregular movements in connection with predominant ideas, the phenomena of hysteria and chorea will at once suggest themselves to you. In the latter disease, peculiar movements are always occasioned by the exercise of volition, or by certain impulses which cannot be controlled. In hydrophobia there is a remarkable susceptibility to the most minute circumstances, giv-

[1] Medical Notes and Reflections, Chap. 5.

[2] On Local Nervous Affections. 1837.

[3] As illustrative of the strong influence of predominant ideas even in healthy persons, I may mention the following circumstances:—Mr Macfarlan, the druggist on the North Bridge, informed me, that on one occasion a butcher was brought into his shop, from the market place opposite, labouring under a terrible accident. The man, on trying to hook up a heavy piece of meat above his head, slipped, and the sharp hook penetrated his arm, so that he himself was suspended. On being examined, he was pale, almost pulseless, and expressed himself as suffering acute agony. The arm could not be moved without causing excessive pain, and in cutting off the sleeve he frequently cried out, yet when the arm was exposed it was found to be quite uninjured, the hook having only traversed the sleeve of his coat.

A clergyman told me, that some time ago suspicions were entertained in his parish of a woman, who was supposed to have poisoned her newly-born infant. The coffin was exhumed, and the procurator-fiscal who attended with the medical men to examine the body, declared that he already perceived the odour of decomposition, which made him feel faint, and in consequence he withdrew. But, on opening the coffin, it was found to be empty, and it was afterwards ascertained that no child had been born, and consequently no murder committed.

Numerous instances might be given where at duels, or on other occasions, individuals have supposed themselves to be wounded, and fallen down as if dead, without having received the slightest injury.

ing rise in any way to the idea of drink, which invariably excites the most fearful spasms. Numerous singular instances of occasional and partial perversion of the voluntary movements might be quoted, either arising spontaneously, acquired by habit, produced in animals by injuring certain parts of the nervous system, or by giving particular drugs; but I shall content myself with two, lately under the care of Dr Christison, which he was so good as to communicate to me. The first was that of a gentleman, who frequently could not carry out what he willed to perform. Often, on endeavouring to undress, he was two hours before he could get off his coat, all his mental faculties, volition excepted, being perfect. On one occasion, having ordered a glass of water, it was presented to him on a tray, but he could not take it, though anxious to do so, and he kept the servant standing before him for half an hour, when the obstruction was overcome. In the other case the peculiarity was limited. If, when walking in the street, he came to a gap in the line of houses, his will suddenly became inoperative, and he could not proceed. An unbuilt-on space in the street was sure to stop him. Crossing a street also was very difficult, and on going in or out of a door he was always arrested for some minutes. Both these gentlemen graphically described their feelings to be "as if another person had taken possession of their will." These and similar perversions of motion, whether of excess or diminution, however produced, cannot always be governed by predominant ideas, but that they frequently are so is proved by a multitude of facts. The old story of Boerhaave is as apposite as any other, who is said to have immediately cured several girls at school of chorea, by threatening that the next who was attacked should have the actual cautery applied.

The power of imitation, which must operate through the mind of the individual, is known by medical men to be very strong, however inexplicable. Immoderate laughter is very catching; few can resist even a well-imitated yawn, and on board ship nothing more certainly brings on sea-sickness than seeing others ill. Habits, modes of expression, dialect, carriage of the body, and peculiar movements, are also readily acquired from those around us. On visiting the Bosjesmen, who were exhibited here some few years ago, the effect of their dance on the audience was striking. Beginning slow, to the rhythmical beatings of their clubs, the noise became gradually louder, more and more exciting, every step and gesture keeping exact time. I myself, and some friends with me, at length felt a peculiar jar all through our systems, our own feet involuntarily kept time with the dancers, and from the feelings then experienced, we could at all events comprehend the nature of those impulses, which have caused multitudes to join in the dance of St Vitus or of Tarantism.[1]

[1] In Hecker's Epidemics of the Middle Ages will be found an admirable account of the dancing mania which occurred in Germany and the Netherlands—called the dance of St John or St Vitus—as well as of similar epidemics occurring in Italy called Tarantism, and in Abyssinia named Tigretier. With regard to St Vitus's dance, he says, that "so early as the year 1374 assemblages of men and women were seen at Aix-la-Chapelle who had come out of Germany, and who, united by one common

In all these, and various other cases which might be cited, it must be evident that the effect is produced by operating on the mind of the individual, and through that on his bodily powers. In short, predominant ideas, whether originating spontaneously or suggested by the words and actions of others, seem to be the exciting cause in individuals, affected with a peculiar condition of the cerebral functions. As regards the nature of this condition, it seems analogous to that of sleep or dreaming, in which certain faculties of the mind are active, and may be even stimulated into excessive action, whilst others are suspended. Hence it has been very appropriately called Hypnotism by Mr Braid.[1] All the phenomena produced, indeed, are strictly analogous to what medical men are acquainted with in various morbid states; and it must now be considered as well established, that in certain conditions of the nervous system they may be induced at will. This conclusion, however, is something new, for it has not yet been received in physiology or pathology, that a condition of the cerebral functions may be occasioned in apparently healthy persons in which suggestive ideas are capable of producing those phenomena we have described, and which render them, for the time, as irresponsible as monomaniacs. Yet such is really the fact, and once admitted into physiology, must have an important influence on the theory and practice of medicine. Such condition may probably be accounted for physiologically in the following manner.

delusion, exhibited to the public both in the streets and in the churches the following strange spectacle:—They formed circles hand in hand, and appearing to have lost all control over their senses, continued dancing, regardless of the bystanders, for hours together, in wild delirium, until they fell to the ground in a state of exhaustion. While dancing they neither saw nor heard, being insensible to external impressions through the senses, but were haunted by visions, their fancies conjuring up spirits whose names they shrieked out; others were governed by religious hallucinations according as the notions of the age variously affected their imaginations.—(Pp. 87, 88.) The dance attacked people of all stations, especially those who led a sedentary life, such as shoemakers and tailors; but even the most robust peasants abandoned their labours in the field, as if they were possessed by evil spirits, and continued to dance without intermission until their very last breath was expended."—P. 108.

Tarantism at first followed the bite of the Tarantula, commencing with melancholy and stupefaction. This condition was united with so great a sensibility to music, that at the very first tones of their favourite melodies, they sprang up, shouting for joy, and danced on without intermission, until they sank to the ground exhausted and almost lifeless. As the disease spread and made noise, an extraordinary sensitiveness seized upon the people's minds. Women were especially affected. At length the number of those seized with it increased beyond belief, for whoever had either actually been, or even fancied they had been bitten, made their appearance annually wherever the Tarantula resounded. Females joined the throng and caught the disease, it is said, not from the poison of the spider, but from the mental poison which they eagerly received through the eye, and thus the cure of the *Tarantati* gradually became established as a regular festival of the populace, which was anticipated with impatient delight.—Pp. 117, 118. Some women overcame the effects of the poisonous bite, by renewing their dance for 30 years in succession,—so long did they believe that it lingered in the system; in reality, so long did the delusion exist after it had ceased to depend on corporeal excitement.—(Pp. 125, 126.)

In the same work will be found interesting accounts of certain modern religious sects called respectively the Jumpers, the Shakers, and the Ranters, who have presented very similar phenomena to those just described.—*The Sydenham Society's Translation of Hecker's Epidemics, by Dr Babington.*

[1] Neurypnology, or the Rationale of Nervous Sleep. 1843.

We have previously seen that the cerebral lobes contain white fibres, which run in three directions. 1st, Those which pass from below upwards, and connect the hemispherical ganglion with the spinal cord. 2d, Those which pass transversely, forming the commissures, and which unite the two hemispheres. And 3d, Those which run from before backwards, uniting the anterior with the posterior lobes on each side. It has also been stated, p. 7, that these fibres are probably subservient to that combination of the mental faculties which characterises thought. Now all metaphysicians and physiologists are agreed that the mind is composed of various faculties, and that different portions of the nervous mass are necessary for their manifestation. True, it is by no means determined what, or how many faculties mind should be divided into, still less is it known which parts of the brain are necessary for the manifestation of each. But let the first proposition be granted, then there is no difficulty in supposing that one or more of these may be paralysed or suspended, whilst others are entire, any more than there is in knowing that sensation may be lost, whilst motion remains intact, although the nerve fibres of both run side by side. I presume, then, that certain mental faculties are temporarily paralysed or suspended, whilst others are active; that in consequence the psychical stimuli of the former, make no impressions on the cerebral conducting fibres, whilst those of the latter are increased in intensity; that as a result the proper balance of the mind is disturbed, and the individual for the time being acts and talks as if the predominant idea was a reality. The condition is analogous so far with ordinary somnambulism, certain forms of hypochondriasis and monomania, but admits of infinite changes according to the nature of the idea suggested.

According to this theory, therefore, we suppose that a psychical stimulus is generated, which, uncontrolled by the other mental operations acting under ordinary circumstances, induces impressions on the peripheral extremities of the cerebral fibres, the influence of which only is conveyed outwards to the muscles moved. In the same manner the remembrance of sensations can always be called up by the mind; but under ordinary circumstances we know they are *only* remembrances, from the exercise of judgment, comparison, and other mental faculties; but these being exhausted, in the condition under consideration, while the suggested idea is predominant, leave the individual a believer in its reality.

In this manner we attribute to the faculties of the mind a certain power of correcting the fallacies which each is liable to fall into, in the same way that the illusions of one sense are capable of being detected by the others. We further believe, that the apparatus necessary for the former operations, consists of the nerve fibres which unite different parts of the hemispherical ganglion, whilst that necessary for the latter, are the nerve fibres connecting together the organs of sense and the ganglia at the base of the encephalon. A healthy and sound mind is characterised by the proper balance of all the mental faculties, in the same manner that a healthy body is dependent on the proper action of all the nerves. There are mental illusions and sensorial illusions, the one caused by predominant ideas, and corrected by proper reasoning; the other caused by perversion of one sense, and corrected by the right application of the others. Both these conditions are intimately united, and operate on each other, inasmuch as voluntary and emotional movements and sensation are mental operations.

This theory, if further elaborated, appears to me consistent with the facts described at the commencement of this lecture, and capable of explaining them on physiological principles.

We may now ask ourselves, whether the facts which have been ascertained, and the generalisations which flow from them, are susceptible of being rendered useful in the practice of medicine? The beneficial influence of hope and confidence over disease is as well known to medical men as the injurious tendency of fear and despondency. This effect of mind on the body has from the earliest periods been seized upon by individuals as a ground for veneration or astonishment. In ancient times the heathen priests were the physicians, and the temples were converted into so many dispensaries, at which the sick applied for relief. In catholic countries, during the middle ages, the offices of priest and physician were frequently united in one person, so that the powerful effects of certain shrines, and the benefits of pilgrimages in cases not admitting of simple cure, met with every encouragement. From what has preceded, it must be allowed, that so far from its being improbable that real cures were so occasioned, all that we know of the effects of confident promises on the one hand, and belief on the other, render it very likely that many such occurred. The legends of the saints, the history of witchcraft, the journal of Mr Wesley, the accounts of celebrated pilgrimages, the virtues of particular shrines, and the writings of religious enthusiasts generally, abound in wonderful cures. Charms, amulets, and relics are stated to have at once banished all kinds of agony, and removed numerous nervous diseases. Many of these are certainly incredible, whilst others are perfectly conceivable. The benefits of the royal touch are confirmed by the observations of Richard Wiseman, and the cures performed by Greatrakes are warranted by Robert Boyle. In all these cases, there can be little doubt that any benefit which did occur may be attributed to a strong belief, on the part of the patient, in the efficacy of the means employed.[1]

In recent times more systematic attempts have been made to relieve pain, control nervous excitement, and muscular debility; and when it is considered

[1] The wonderful cures performed by Mesmer, and all those who have convinced themselves and others of the advantages of the ephemeral systems which are continually springing up around us, are much indebted to belief in their efficacy on the part of the patient. Dr Haygarth, of Bath, performed all the cures of Mesmer and Perkins with two bits of wood made to resemble the metallic tractors of the latter,—that is, so long as he kept the secret,—for the moment he published his book, and the imposition was known, no more cures were accomplished. In the same manner, there is every reason to believe that the efficacy of many public nostrums resides in the reputation which surrounds them. Miss Harriet Martineau, in publishing her own case, naïvely remarks:—"If at any time during my illness I had been asked, with serious purpose, whether I believed there was no resource for me? I should have replied that Mesmerism might perhaps give me partial relief."—(*Letters on Mesmerism*, 1845, p. 4.) No wonder, therefore, that when at length it *was* tried, it produced the desired effect; and the medical attendant, seeing the delusion that existed, was quite correct in bringing the lady *en rapport* with the first magnetiser he could procure.

that the power of producing profound sleep, and acting on the nervous functions, may be manifested in so many individuals as one in twenty of the whole population, it must be evident that in a class of persons particularly predisposed, the number capable of being affected would be much greater. This subject, however, is yet in its infancy, and has to be separated from the charlatanism in which it has hitherto been involved. The labours of Dr Eisdale in India, and of Mr Braid of Manchester, exhibit a worthy commencement in the rational treatment of disorders by the means now alluded to; and there can be little doubt that in no long time its influence, when further studied, will be acknowledged. But how far this influence is dependent on the confidence of the patient, or the belief in some mysterious agency, which is presumed to produce the effect, further observation alone can determine.

On the other hand, the indiscriminate performance of experiments on nervous individuals may be injurious. The great object of all who seek proper self-education is to control the emotions and passions, and regulate the imagination by the severer faculties of judgment, comparison, and attention. Hitherto medical men, so far from exciting, have done all in their power to prevent, such phenomena as have been described; but now it has been clearly shown that they may be produced in numbers of people by the ignorant and mercenary, there is too much reason to fear that nervous disorders will increase among us. It is well known that cases are on record of individuals who, commencing by the imitation of hysterical or epileptic convulsions, have at length found themselves really labouring under those diseases; nor is it unreasonable to suppose, that the mental faculties will be greatly injured in persons, who frequently surrender up their own wills, and act in accordance with the extravagant ideas suggested to them. After all, the pleasure of excitement principally consists in feeling that it can be regulated, and is under command. The moment it ceases to be so, a sense of the imperfection becomes most agonising to the mind, and gives rise to that despondency so common among the insane. Unwilling, however, to exaggerate, I forbear entering upon a topic, the practical bearings of which must be obvious to you.

Fortunately, if treated early, the disease admits of easy cure. Once banish from the mind of the affected persons the idea that they are under the control of some external influence,—let them refuse to gaze at any fixed object for an unusual time,—let them, in short, resist the preliminary mental exhaustion, and the cure is accomplished. Several gentlemen, highly educated medical students, who were exceedingly sensitive, and very injuriously affected by the numerous experiments performed on them, have now recovered from the mesmeric mania. Conscious that the phenomena are mental, and only connected with their own minds, they can always, by summoning up a counteracting idea, set all operators and so-called "magnetists" at defiance. They retain, indeed, the power of *putting themselves* into a nervous condition, in which their minds are temporarily influenced by suggestive ideas, in the same manner as they may indulge in reverie; but the delusion of being governed by a magnetic, or other external influence, has disappeared.

It may be well to observe, that the phenomena which have been spoken of have no connection whatever with the peculiar sympathy and so-called "clairvoyance" of animal magnetists. I have seen numerous efforts made to exhibit these, but they have all failed. Further, I do not hesitate to express my conviction, that no experiment has ever yet been made in a scientific spirit, which in the slightest degree supports the unphysiological doctrine of the transference of the senses.

In conclusion, I would observe that no physiological principle can be established by interesting the merely uninformed, by exciting sleep or day dreams in young or sensitive persons, by astonishing the generally educated, or even scientific classes, or enlisting in its favour the agreeable pens of the writers of fiction. It is not reasonable to suppose that a mathematical question can be decided by a botanist, or that mechanics can be advanced by a naturalist. Nor is it easy to imagine that the laws of vitality, and the difficult problems connected with the influence of the mind over the body, are to be determined by natural philosophers, by chemists, or the cultivators of light literature. Every science has its own laws; and those persons who are unacquainted with physiology, and the functions of the nervous system, are surely not those who can be expected to come to a correct conclusion on the subject which has engaged our attention. If, then, important facts can be demonstrated, let them be judged of by those whose habits of thought and previous studies qualify them for the task. It is easy indeed to say that medical men are prejudiced, and oppose themselves to novelties; but I must leave you to determine how far such a charge is reasonable, and especially how, from the manner in which I have treated this important question, it is applicable to myself.

WHAT IS MESMERISM?

AN

ATTEMPT TO EXPLAIN ITS PHENOMENA

ON

THE ADMITTED PRINCIPLES

OF

PHYSIOLOGICAL AND PSYCHICAL SCIENCE.

BY

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MDCCCLI.

PREFATORY NOTE.

THE substance of this paper, under the title of "Contributions towards the study of Certain Phenomena, which have been recently denominated Experiments in Electro-Biology," was read before the Medico-Chirurgical Society of Edinburgh, and subsequently published in the "Monthly Journal of Medical Science." As the subject of which it treats has excited no small interest among the non-professional public, a few copies have been thrown off in a separate form.

The original title sufficiently indicates the nature of the paper. It prefers no claim to be a complete disquisition on the whole subject, far less to account for every one of the very singular phenomena which, as has now been demonstrated, can be produced at will by one human being in another; it will have sufficiently fulfilled the end intended, if it is found to accomplish the humbler task of acting as a guide to farther inquiry, and, by attempting to show how many of the experiments can be accounted for, to lead to the discovery, in other hands, of some general laws which may eventually be found adequate to the solution of the whole.

Those who believe in the real existence of certain mesmeric phenomena, are divided into two classes. The first attempt to account for them, by supposing the existence of some imponderable or other mysterious agent by whose operation they are caused. The second content themselves by referring the matter to certain mental peculiarities,—and there they leave the matter, much as the child who, wearied with conjecturing how the motions of some ingenious toy are produced, throws it aside with the exclamation, "Oh, it is all done by machinery!" The author of the following paper, while professing to belong to the second class, and therefore disclaiming all novelty in his views as regards the conclusions to which he has come, has attempted a more minute analysis of the connection between the particular phenomena observed, and the particular mental states by which he believes them to be produced, than, as far as he knows, has elsewhere been tried.

WHAT IS MESMERISM?

IT would be a most interesting investigation to trace the progress of medical science, comparing it at each stage of its development with the peculiar characteristics which the corresponding period in the history of other sciences exhibited. Unfortunately, the materials for such a task are neither very numerous nor very accessible, but they are nevertheless sufficient to show that characteristics of the ages of "dogmatism," "empiricism," &c., as they are styled in medicine, were due less to causes of an intrinsic character, than to peculiarities of popular belief affecting it in common with every other science.

The present age may surely be denominated one of strangely-blended scepticism and credulity. Strangely-blended, however, they appear only to those who have never observed that these two apparently extreme states of mind often co-exist; and that a sceptical spirit in regard to truths which rest on evidence or authority, is very commonly associated with a peculiar credulity in regard to supposed facts or theories which all evidence and all authority would concur in disproving. While, then, there is no science which has not been more or less affected by this pernicious tendency, there are some which it evinces a peculiar disposition to haunt; and nowhere has it ever lingered with more deleterious effect than over that debatable land which separates the world of matter from the world of spirit. Call this "the night side of nature" if you please, and let each fantastic dreamer reckon it his or her peculiar privilege to people it with the airy visions of a disordered imagination, even here must stern philosophy claim obedience, and compel submission to her rigorous laws.

Ignorant as we are of the precise nature of that connection by which the spiritual and corporeal entities of man are linked together, it is not wonderful if the mysterious influences which they mutually exercise on one another, should offer many tempting subjects for theories, often of the most crude and baseless kind. It has been so

in the ages that are past; it is so in the age in which we live; and it will continue to be so till the end of time, unless before that the nature of the connection ceases to be a mystery at all.

Of these various theories, the one which has perhaps attracted the largest share of attention, is that which seems to have been first propounded by Anthony Mesmer, about the middle of the last century, and which, under various names, viz., Animal Magnetism, Mesmerism, and more lately, Electro-Biology, and in many diversified forms, has largely engaged public attention.

Many theories of mesmerism have been propounded, and some of these have been supported by much ingenious, as well as absurd reasoning; they all rest on, and derive strength from, certain phenomena which are exhibited to wondering and credulous spectators, by itinerant performers who feed on popular credulity.

But it will not do in the present age for physicians to stand with folded arms, and regard such proceedings with the sneer of scornful contempt. Some of the phenomena elicited are of an interesting and instructive kind, and while we refuse to admit their production by the agency to which their exhibitors ascribe them, it is a duty incumbent on us to endeavour to ascertain the laws by which their development is regulated. The thorough supporters of animal magnetism as a distinct science, demand our belief in two classes of phenomena, differing widely in the amount of credibility which each may claim.

First, Those which may be denominated analogous, and which have their analogues in many diseased states.

Second, Those which may be termed heterologous, such as the alleged manifestations of clairvoyance, the phenomena presented by which not only have no analogues in the body, healthy or diseased, but seem totally opposed to all the recognised laws by which the physical or psychical phenomena of the living body are regulated.

With regard to the second class, it is sufficient simply to assert, that, in the present state of the evidence regarding them, they are utterly unworthy of the consideration of a society such as this. Why should we occupy our time in discussing the rationale of supposed facts of a marvellous and extraordinary character, until we have satisfied ourselves that the evidence for the existence of these supposed facts, is sufficient to outweigh their very great and serious improbability? It may be unhesitatingly affirmed, that every case of alleged clairvoyance, when examined, is found open to so many sources of fallacy, that it is more easy to suppose that some of these had escaped detection, than that the marvellous phenomena recorded actually did occur in the manner which their annalists have supposed. Indeed, many of the most surprising of these cases which for a time baffled the minute and careful watching of observers, have been eventually found deceptive.

In a little work published by Dr Forbes, entitled, "Illustrations of Modern Mesmerism from Personal Observation," we have the examination by that exact and honourable physician of four or five

cases of clairvoyance, and a perusal of these will serve to show how little any, even the most apparently well-substantiated narration, can stand the test of real scientific investigation. An examination of the evidence adduced in it will be sufficient to secure a general acquiescence in the following passage extracted from the preface.

"No one conversant with these proceedings, as hitherto conducted, can deny that few, if any, of the greatest marvels recorded by the mesmerists, and promulgated as unquestionable facts, repose on more sound foundations than before trial seemed to support those which the investigations detailed in the following pages proved to be utterly baseless and false. As *all*, then, *may* be untrue, are we not authorised to demand a new course of inquiry, or a new series of evidences, before we are called upon to admit the truth of clairvoyance, and the other transcendental phenomena of mesmerism? Are we not justified, for the future, in refusing to receive from the mesmerists marvellous statements as truths and facts, unless it is, at the same time, proved to be *impossible* to explain or account for them on other ordinary, or what may be called natural, principles?"

Restricting this inquiry, for these reasons, to the first class exclusively, it is proposed to consider the phenomena which it includes under the following divisions:—

1st. Certain physiological and psychical laws will be laid down which seem to offer a probable explanation of the phenomena exhibited by patients in the mesmeric trance.

2d. An attempt will be made to refer the various mesmeric phenomena to these laws respectively.

3d. It will be shown that these views are in strict accordance with the recently received doctrines of the anatomy and physiology of the nervous system.

4th. It will be considered to what extent the power of producing at will these phenomena, and the manner of their production, can be explained on any known principles.

I.—WHAT ARE THE ADMITTED PHYSIOLOGICAL AND PSYCHICAL LAWS TO WHICH THE PHENOMENA EXHIBITED BY PATIENTS IN THE MESMERIC TRANCE CAN BE MOST SATISFACTORILY REFERRED?

A. Volition—Its power and its offices in the body.

The greater proportion of the outward actions of an intelligent being in its ordinary state, result from what we call volition—that spontaneous power which the will can exercise at pleasure. From the manner in which the various powers of the mind are ordained to act on one another, the will is usually regulated by the reason, and thus man is constituted a reasonable being. Thus Bacon says (*De Aug. Scien.* V. i,)—"The philosophy that regards the *intellect*, and that which regards the *will* of man, are, as it were, twins in their origin. For light in the understanding, and freedom in the will, arise and fall together."

Volition must be regarded as the product or expression of a purely mental change. Now we find in the human brain, a part apparently destined to be the bodily organ of such mental states.

The cerebral or hemispheric ganglia are the bodily organs by which ideas are formed, by which reasoning processes are carried on, and by which the reason directs the will. It is of great importance to remark, that supreme as is the control of the will over the voluntary muscles in most cases, the power which it exercises is not direct. It determines that a certain action shall be performed, and the necessary muscles begin to act, but it does not command the particular muscle, but leaves their selection and combination to be effected by that apparatus under the control of which muscular power is directly placed. This function is evidently seated in the spinal cord, and just as impulses on the peripheral extremities of the nerves of sensation excite in it *automatically* motorial power, so do the impulses of the will, conveyed down to it by the fibrous strands connecting the hemispheres with the rest of the brain, produce *automatically* also, in one sense, an exertion of power.[1]

Dr Todd (*Cyc. of Anat. and Phys.*, art. *Phys. of Nervous System*) thus explains it :—

"The impulse of volition excited primarily in the brain acts at the same time upon the grey matter of the cord (its anterior horn), and through it on the anterior roots of the nerves implanted in it. This grey matter, in virtue of its association with the brain, becomes part and parcel of the organ of the will, and, therefore, as distinctly amenable to acts of the mind as that portion which is contained within the cranium. If we destroy the commissural connection with the brain through the pyramidal fibres, the spinal cord ceases to take part in mental nervous actions; or if that connection be only partially destroyed, that portion of the cord, which the injured fibres had associated with the brain, is no longer influenced by the mind. Again, if the seat of volition in the brain be diseased, the cord, or part of it, participates in the effects of the disease as far as regards voluntary actions." Thus it is seen,—

1*st*, That the operations of the will are usually regulated by the reason.

2*d*, That the will, though a purely mental affection, acts through bodily organs, and that the cerebral hemispheres are its corporeal seat.

3*d*, That the will can exercise no direct power over the muscles, but affects them secondarily through the spinal marrow, the ordinary prompter of muscular action, and thus in a certain sense automatically.

4*th*, That by destroying wholly or partially the commissural connection, subsisting between the corpora striata and the automatic

[1] Dr Cairns, in his work on moral freedom, seems to have had a clearer perception of the bodily relations of volition than is usual with pure metaphysicians, and divides volition into simple and complex.

apparatus, the power of the will over the muscles can to a corresponding extent be impaired; or if the seat of volition in the brain be affected, the same result will follow.

B. Volition—Its power and its offices in the mind.

The power of the will, however, is not limited to the direction of the motor nerves; it also influences the mental operations.

In the human mind, there is a law implanted by which the order and succession of our thoughts is regulated, one idea naturally suggesting another.

> "For when the different images of things,
> By chance combined, have struck the attentive soul
> With deeper impulse, or, connected long,
> Have drawn her frequent eye, howe'er distinct
> The external scenes, yet oft the ideas gain
> From that conjunction an eternal tie,
> And sympathy unbroken. Let the mind
> Recall one partner of the various league,—
> Immediate, lo! the firm confederates rise,—
> And each his former station straight resumes:
> One movement governs the consenting throng,
> And all at once with rosy pleasure shine,
> Or all are saddened with the glooms of care.
>
> (*Pleasures of Imagination*, Book iii.)

But, though the train of our thoughts depends immediately on the laws of association, it is much under the control of volition. We can stop the current at will by singling out one thought, and making it a special object of attention; we can also divert that current into a new channel. Farther, by study and by practice, we acquire a command over certain classes of our ideas, so that we can at pleasure call them before us.

The objects of our knowledge are derived from two sources, consciousness and perception; but ideas once received are not lost, but may arise spontaneously, or be summoned up by the powers of memory, conception, and imagination. As the contrast which exists between perception and conception is of importance in accounting for the mesmeric phenomena, it will be necessary briefly to advert to some points in their philosophy which more directly bear upon the subject.

By perception, we obtain ideas of external objects through the medium of the external senses. By conception, we form ideas of past objects of perception, or of sensations formerly felt, and which cannot then be made the subjects of perception. This power is well styled by Shakespeare (*Hamlet*, Act i., Sc. 4) the "mind's eye." By imagination we combine the parts of different conceptions together so as to form new wholes of our own creation (*Stewart's Elements*, ch. iii.).

Of course, the ideas received through the external senses, or the objects of our perception, are believed to exist, and justly, unless there exists some lesion of the organ of sense, depriving its informa-

tions of their wonted correctness. The ideas, which the objects of conception (or imagination) suggest to the mind, are also believed, but their impression is so momentary, and, if wrong, is so immediately corrected by the surrounding objects of perception, that in the ordinary state of our minds, they never produce that permanent conviction which influences our conduct (*Stewart, op. cit.*).

It is very different, however, when conceptions become the sole tenants of the mind. Then the belief which the illusions of imagination produce, is as strong as that ordinarily arising from the informations of the senses, so that we ascribe to them as separate and independent an existence as we usually do to the objects of perception.

The relation of this to volition is very simple. The power which it gives us over the train of our thoughts, enables us at will to recall or dismiss the image before us. We cannot do this in regard to the perception of an external object—hence we learn by experience to acknowledge its independent and permanent existence; we can do it in regard to the creations of fancy—hence we learn to consider them as illusory and vain. But let the influence of the will be suspended, and this test can no longer be applied, and we come to attach the same notion of reality to the products of conception that we have been accustomed to do to the objects of perception.

But another test, by which we are in the habit of trying the ideas brought before us by this mental power, is that of comparing them with surrounding objects of perception; should the external senses, however, be closed, this other means of correction is withdrawn, and the mind has no choice, but to receive as real existences any strange or fantastic images which the fancy may present.

Hence the clear and defined impressions of our senses are adverse to the development of the imagination; hence the highest activity of that power is manifested, not in the broad light of day, but as the shades of evening creep on; at such times it is, that our fancy, uninstructed, or at least uncorrected, by the sober test of clear perception, invests with its thousand forms of beauteous or terrific aspect, the surrounding objects whose shadowy outline has failed to produce a distinct impression on the mirror of the mind.

> "A thousand fantasies
> Begin to throng into the memory,
> Of calling shapes, and beckoning shadows dire;
> And airy tongues that syllable men's names
> On sands and shores, and desert wildernesses;
> These thoughts may startle well, but not astound."—*Milton.*

Under this head, then, it may be concluded,—

1*st*, That the will in the natural state has a power of regulating and controlling the current of our thoughts: and that these, when not so governed, fall under the regulation of the ordinary laws of mental association.

2*d*, That, independently of consciousness, the materials on which

the mind is exercised are supplied by the faculties of perception and conception.

3*d*, That we learn by experience that the objects of perception have a real and independent existence.

4*th*, That we learn the unsubstantial and illusory nature of the conceptions: *first*, by finding that we can recall and dismiss them at will; *second*, by comparing and contrasting them with our perceptions of external objects.

5*th*, That when the power of volition over the mind is suspended, and the external senses are wholly or partially closed, we cannot apply either of these tests; and hence we come to regard the creations of imagination as equally real with the objects of perception.

C. Sources of Motion, other than a simple exercise of Volition.

I. *Emotion.*—The various motions are usually arranged in three classes—voluntary, emotional, and automatic. Of the first, mention has already been made; and it is of importance to observe, that in it the spinal cord seems to be the direct originator of the motion to which the volition acts as an excitor, and the efferent nerves as the channels of motive power.

The emotional actions are often exerted independently of the will, and sometimes in direct opposition to it. Two circumstances prevent us from allowing to them their full share of importance in the production of muscular motion. *First*, That, unless when very strongly developed, they are more usually displayed in one class of muscles only—those, namely, receiving their supply of nerves from the medulla oblongata, mesocephale, or crura cerebri. Thus the connection of the fifth nerve with the lachrymal gland seems to point to it as the conductor of that power which causes the tears to flow at the moment of grief. Sobbing, crying, and laughing, again, are all performed by the same muscles, and all these muscles are supplied by the portio dura, the glosso-pharyngeal, the fifth, the phrenic, spinal accessory, and other respiratory nerves. But these nerves are not the exclusive channels by which emotional feelings can be conveyed, neither are the muscles which they supply the only ones which can exhibit emotional excitement. The thrill of horror or of joy, the involuntary shudder at the very idea of danger, involve a much wider range of command. The phrenzied gestures of violent rage, the mute dejection of abject despair, are the witnesses of its power. Call to mind the description of anger given by the old Roman moralist:—"Ut furentium certa indicia sunt; audax et minax vultus, tristis frons, torva facies, citatus gradus, inquietæ manus, color versus, crebro et vehementius acta suspiria; ita irascentium eadem signa sunt. Flagrant et micant oculi, multus ore toto rubor, exaestuante ab imis præcordiis sanguine! labia quatiuntur, horrent ac subriguntur capilli, spiritus coactus ac stridens; articulorum se ipsos torquentium sonus, gemitus mugitusque, et parum explanatis vocibus sermo præruptus, et complosæ sæpius manus, et pulsata humus pedibus et totum

concitum corpus magnasque minas agens, fœda visu et horrenda facies depravantium se atque intumescentium. — (*Seneca de Irâ*, i., 1.)

The *second* circumstance which tends to prevent our being fully aware of the power of emotion over muscular action, is the fact of the propensities and passions frequently affecting the muscles through the will rather than directly. It is only in extreme cases that we recognise their full power—these extreme cases being of two classes, the one, those in which the vehemence of the emotion has overcome the will; the other, where the power of the will has been from any cause diminished, so that even comparatively weak emotions may act directly on the muscles.

The last class are sometimes interestingly illustrated in pathology. Thus Dr M. Hall records a case of hemiplegia, where the paralysed hand and arm were convulsed whenever the patient met an acquaintance (*Memoirs*, p. 102). Dr Magnus, of Berlin, had a patient in whom the muscles of the face were paralysed to volition, but she smiled, and even laughed, under the influence of mental emotion.—*Brit. and For. Med. Review*, iv., p. 500.

II. *Reflex Motions.*—These reflected motions are prompted by some sensitive impression made either on the organic or animal nerves. The healthy movements of this kind are not of much interest, as regards our present inquiry, but occasionally, as an effect of disease, phenomena are presented which may be found to have some bearing on the mesmeric state. Thus, under the head of "Case of Cerebral Reflex Action," Dr Laycock has published (*Lancet*, vol. ii., 1845, p. 364), a case communicated to him by the late Dr Cowan, of Reading, because "evincing very strikingly reflex, visual, and auditory phenomena."[1]

"The shadow of a bird crossing the window, though the blind and bed curtains are closed, the displacement of the smallest portion of the wick of a candle, the slightest changes in the firelight, induce a sudden jerking of the spinal muscles, extending to the arms and legs

[1] When this paper was read before the Medico-Chirurgical Society, my friend, Professor Simpson, objected to this case being regarded as one of reflex action. It is, however, so considered by both Dr Cowan and Dr Laycock, and I think a consideration of the whole facts abundantly proves them to be correct. Dr Cowan expressly states:—"The sensorial impression, and the motion consequent upon it, appear irrespective of every painful sensation or mental emotion, and are only noticed by the patient in consequence of the resulting movement." The will did not produce them, emotion did not influence them; to what, then, are we to refer them, if not to reflex action? In an admirable article, to all appearance from the pen of Dr Carpenter, on the "Physiology of the Nervous System," in the "British and Foreign Medico-Chirurgical Review," No. ix., we find the following remarks, completely confirmatory of the view taken above, basing it on the data of comparative anatomy. "Interpreting the anatomy of vertebrated animals, then, by that of the articulated, we should view the spinal cord, the medulla oblongata, and the whole series of ganglionic centres connected with the nerves of sensation, and lying along the base of the skull, in man *as far forwards as the olfactive ganglia, as constituting the apparatus of automatic action.*"

when violent, and this without the slightest mental emotion of any kind, beyond a consciousness of the movement. At times the vocal organs are implicated, and a slight cry, quite involuntary, takes place. At these periods she is usually equally susceptible of all noises, especially the least expected and least familiar. Movements in the next house, inaudible to others, the slightest rattle in the lock of the door, tearing a morsel of paper, and a thousand like sources of sound not to be catalogued, induce similar results to visual impressions. Tactile sensibility is also great at these periods, though not to an equal extent.

III. *Movements arising from Ideas in the Mind.*—This class merits our most attentive consideration. The physiological action is often seen. Let a ridiculous idea pass through our mind, instantly we smile, or even sometimes laugh outright, despite the opposition of the will. The idea of yawning will at once excite the act. The thought of a fearful or disgusting object will cause an involuntary shudder, and the recollection of the latter will often produce vomiting as readily as its actual presence.

It is recorded of the illustrious Boerhaave, that, riding in the heat of summer, he chanced to pass a place where the carcass of a horse was rotting in the sun; at the very moment, when distended by pent-up gases, it gave way, and such was the overpowering stench, that he fainted. So strong with him was the association of ideas, that ever after, on passing the same place, the mere recollection of what he had encountered, caused a repetition of the fainting. In hydrophobia, not only does the sight or contact of water produce spasms, but the very idea of it, whether obtained by the eye, the ear, or the memory, has the same effect.—(Vide case by Dr Marcet, *Lond. Med.-Chir. Trans.*, vol. i., p. 13; and case by Mr Thornhill, *Med. Gaz.*, vol. xvii., p. 220.)

IV. *Movements arising from Imitation.*—Its power is especially strong in weak minds, and prompts to the performance of many actions independent of the will. "There is scarcely," says the author of the article "Imitation" in Rees' Cyclopædia, "an irregular action of any organ of the body, which has not been caught (to use a common phrase) in consequence of this tendency to imitation, by different individuals; thus *squinting*, *stammering*, *winking* with the eyes, and various unseemly habits, have been frequently acquired by associating with those to whom they were already habitual. Every physician knows the frequency of the propagation of hysteric and choreic affections, by imitation." These are the more common phenomena; but there are others, whose connection with this principle is not so readily recognised. Dr Symonds says, "Any set of muscles may acquire particular actions and assemblages of actions, by passive imitation only, and to such a degree, indeed, that desire (volition?) is often vainly employed in opposition to this principle. One person yawns, or sighs, or laughs, because another does so; a child or susceptible female, if frequently in company with a person who winks

or stammers, or falters in his gait, will fall into similar habits, notwithstanding there may be a variety of inducements for attempting to avoid them."[1]

The well-known account of Boerhaave's cases at the orphan hospital at Haerlem, is illustrative, as are also those cases of epidemic convulsions, which, too often associated with religious excitement, have manifested themselves in various quarters of the world. Of this nature was the malady which appeared in 1796, in the Island of Anglesey, attacking *females* between the ages of ten and twenty-five, of which Dr Haygarth has left us an account. The Shetland epidemic, of which the minister of Unst contributed an interesting narrative (*Ed. Med. and Surg. Journal*, vol. iii.) or the Tenessee epidemic in 1803 (*Inaugural Essay on Chorea*, by Felix Robertson, Philadelphia)—as well as many others, reports of which have been handed down to us from remoter times.

There is one fact regarding imagination, which may perhaps explain the readiness with which the mesmeric state can be reproduced in one who has repeatedly been in it—the excessive or often-repeated imitation of mental emotions may in the end bring on similar ones. After Garrick had acted his Lear or Othello, he passed some hours in convulsions in bed.

V. *Influence of the Will of Another.*—This must chiefly affect us through the emotions, and therefore might have been considered under that head. The power of the mind of one man to sway that of another, and even of whole bodies of men, is of a complex character, and need not now be analysed. Those who thus acquire power to guide the understandings of others, display themselves a volition which overmasters all opposition. The instinctive propensities in them give place to the strong volitional power by which their every action is guided,—that power, however, acts under the direction of reason.

How willingly does the weak mind surrender itself to the guidance of the strong! or how instinctively does it render homage to that determination of character which claims universal obedience! How often does the physician recognise the mastery which this confers, when, at some moment of unforeseen and sudden danger, all around are yielding to the instinctive propensities, and acting by impulse rather than reason, his self-possession restores composure, and irresistibly compels the necessary obedience!

The poet, too, has taken advantage of this, and thus beautifully expresses it :—

> "Ac veluti magno in populo cum sæpe coorta est
> Seditio sævitque animis ignobile vulgus;
> Jamque faces et saxa volant, furor arma ministrat:
> Tum pietate gravem ac meritis si forte virum quem
> Conspexêre, silent, arrectisque auribus astant:
> Ille regit dictis animos, et pectora mulcet."—(*Virg. Æn. i.*)

[1] On the Relations between Mind and Muscle.—West of England Journal. Vol. ii. p. 169.

To a similar principle, too, we believe the power of oratory may be ascribed. Its effect on the emotions is well known, and has often prompted to deeds which reason would have restrained; and which the judgment condemned.

"In the ancient republics," observes an acute and beautiful writer (Thomas), "eloquence made a part of the constitution. It was it which enacted and abolished laws, which ordered war, which caused armies to march, which led on the citizens to fields of battle, and consecrated their ashes when they perished in the combat. It was it which, in the tribune, kept watch against the tyrant, and brought from afar to the ears of the citizens the sound of the chains which were menacing them. In republics, eloquence was a sort of spectacle. Whole days were spent by the people in listening to their orators,—as if the necessity of feeling some emotion were an appetite of their very nature. The republican orator, therefore, was not a mere measurer of words, for the amusement of a circle or of a small society. He was a man to whom nature had given an inevitable empire. He was the defender of a nation,—its sovereign,—its master!"

Well might Milton speak of those whose resistless eloquence

> "Wielded at will that fierce democracy,
> Shook the arsenal, and fulmined over Greece
> To Macedon and Artaxerxes' throne!"

If, then, in all states of the mind, the influence of another acting with the concurrence of the mental associations, and chiefly through the influence of the emotions, has been found powerful in overcoming for a time the restraint of reason, can we wonder if, in persons prone to emotion, and in whom the will is already spell-bound, the same power should be adequate to compel obedience to its imperious mandates?

From the foregoing facts, it may be concluded, that the following sources of motion are found to exist in the body, independently of volition :—

1*st*, *Emotion.*—Often conjoined with volition, often independent of it, sometimes even opposed to it, always strongest the less powerful the volition.

2*d*, *Automatic Action.*—Usually confined to the muscles of respiration; sometimes, in diseased states, involving others.

3*d*, *Movements from ideas in the Mind.*

4*th*, *Movements from Imitation.*—Accounting for the propagation of many hysterical and choreic affections, and often producing stammering, lisping, squinting.

5*th*, *Influence of the Will of Another.*—Controlling the weaker and less volitional minds of others.

II. WHAT ARE THE ACCREDITED MESMERIC PHENOMENA, AND HOW CAN THEY BE EXPLAINED ON THE PRINCIPLES LAID DOWN?

A. Summary of the phenomena observed.

"Among the instances supposed to be made good as facts during the late exhibitions," writes the clear and cautious Edinburgh correspondent of a London journal, "are the following":—

"That the arm of a susceptible person being stretched out at right angles to the body, can be rendered cataleptic to the extent that it will remain in that outstretched state, in spite of the efforts of the owner to let it drop, till it please the mesmerist to dissolve the charm; that a susceptible person may be made to put one foot across the other, notwithstanding his efforts to keep it on the floor; and, *vice versâ*, that he may be deprived of the power to put the one foot across the other, if it be the mesmerist's desire that it should remain on the floor; or that the fists may be made to spin round each other against one's will, or be rendered powerless for that movement, at the desire of the operator. Again, that a susceptible person may be made to believe that plain water is sweet or bitter at the bidding of the mesmerist; that the arm, or any other part of the body, may be rendered insensible to the pain, for example, of pinching; or that the subject may be at once put fast asleep, so as to be incapable of being roused by violent shaking, or loud shouting, or ringing a dinner-bell in his ear; and, lastly, that he may be forced to laugh or weep, or may be restrained from laughing or weeping, as the operator thinks fit."—*London Med. Times*, vol. ii., *N. S.*, p. 129.

Such is a succinct summary of these wonderful manifestations, for the explanation of which philosophers have thought it necessary to "call spirits from the vasty deep;" although it appears that "these spirits" have not shewn a very decided inclination to obey the summons. Be it now our task to endeavour to see how far these phenomena are explicable on admitted principles;—how far what is mysterious in them can be solved by reference to laws known and recognised.

B. In the magnetic trance, the power of the will, over both body and mind, is either suppressed or greatly weakened.

To form an accurate view of the pathological state of somnambulism, it must be traced through those gradations by which it is connected with health. Sleep and dreaming seem to form the connecting link. Let us examine,—1st, their causes; 2d, their conditions.

"The approach of sleep," says Stewart (*Elements*, p. 321), "is accelerated by every circumstance which diminishes or suspends the exercise of the mental powers, and is retarded by every thing which has a contrary tendency."

Its causes have been tabulated as follows:—

1. Fatigue, *i. e.* suspension of active power.
2. Absence of thought.
3. Stupefaction (through certain drugs).
4. Mechanical pressure on brain.
5. Monotonous sounds.
6. Yielding to reveries.

An examination of these, shows that certain of them act by diminishing the vital powers in the organs of sense and motion, and checking the manifestation of the will over both mind and body (1, 3). Others, again, without much lowering of power, impede the manifestation and activity of the will (2, 5, 6). They all have the effect of withdrawing the mind from its own thoughts, without at the same time supplying it with anything to engage its attention. Children, and those who are more occupied about external things than accustomed to mental exercise, fall asleep whenever the objects of perception cease to engage their attention. In the 4th, the connection between the sensorium commune and the mind is probably impeded by some physical change.

A consideration, then, of all these causes of sleep, leads irresistibly to the conclusion adopted by Stewart, "that the will loses its influence over all our powers both of mind and body, in consequence of some physical alteration in the system, which we shall never probably be able to explain."—(See, on this subject, *Stewart's Elements*, chap. v. *passim*; and *Feuchtersleben, Med. Psychology*, § 57, 58.)

In this state, agreeably to laws already laid down, dreaming takes place.

> "While o'er our limbs sleep's soft dominion spread,
> What tho' our soul fantastic measures trod
> O'er fairy fields, or mourned along the gloom
> Of pathless woods, or down the craggy steep
> Hurled headlong,—swam, with pain, the mantled pool,
> Or scaled the cliff, or danced on hollow winds
> With antic shapes, wild natives of the brain."—*Young*.

The mind, having no external objects to engage it, and no volition to control it, is entirely occupied with the pictorial world of fancy. The illusions of imagination are not dispelled by clearer and more lucid images; and hence the existence of realities corresponding to them is believed, and influences our actions. Just as in the body, during sleep, the vegetative powers go on unimpeded, while the volitional are weakened or suspended; so, in the mind, those powers which volition habitually controls cease to operate, while those which can be exerted independently of the will continue in active exercise.

Carry the physiological state of dreaming into the pathological state of somnambulism, and you find, as usual in nature, no very abrupt distinction. No wide gulph separates at any time the limits of health from those of disease. The exercise of the external senses is usually either impeded or perverted. The images of fancy have become so strong, that, with volition weakened or suppressed, they now act as suggesters or exciters of the centre of motive power. The vitality of the cerebral nerves seems paralysed,—automatic activity is increased. These phenomena indicate, as Feuchtersleben has shown, "not a more exalted, but a more fettered, state of the mind, in which it is subject to the will of other men, to the sway of its own instinct, and of fancy."

Such we believe to be the real key to the solution of those appearances which have so delighted the foolish, and in some instances seemed even to mock proud philosophy itself. Let us now attempt to classify and explain them, agreeably to those principles which have been laid down.

C. Many of the phenomena are clearly traceable to the operations of fancy, the images of which are either developed spontaneously, in accordance with those laws which regulate the association of our ideas, or are suggested by the magnetiser,—the mind, in either case, being no longer under the control of volition.

First Class.—Perversions of the External Senses.—When the strong assertions of the operator cause the patient to believe that the same water is at one time sweet, at another bitter, it is evident that the only change is in the assertion, and therefore that it must be the cause of the phenomenon. In attempting to explain this, we must bear in mind, that the qualities of bodies are changes in the state of the mind which they affect. All sensation, therefore, resolves itself into a mental effect produced by a material cause; and by finding that the effect usually succeeds the operation of the cause, we come to associate them together. The feeling in the mind, then, is all of which we are conscious; and if it does not follow the application of the external body, there is no sensation. In somnambulism it does not. In the eye this is evident:—"A candle may be held so close to the eye, as to burn the eye-lashes and eye-brows without the slightest indication of sensation." (*Feuchtersleben.*) In the ear it does not:—"Even the report of fire-arms does not wake the dreamer." (*Ibid.*) In the smell it does not:—"Brimstone and phosphorous are said to have a pleasant scent to the somnambulist; often the sense of smell wholly fails, as in the case of the apothecary's assistant, who held to his nose the tincture of castor, and murmured to himself, as if in excuse, 'I have a cold;' or, as in the case of the man whose snuff-box was filled with coffee, which he took for tobacco." (*Ibid.*) And so in the case of taste. Of the two parts necessary to produce sensation, one is wanting,—the external impression is made, but the mind is asleep, and does not follow it by the internal change. In this case no taste would be perceived; and, just as the dreamer may be unaffected by sound, although the undulations of the air reach his tympanum as usual, so may he remain unconscious of tastes. But at the fitting moment the operator suggests to the patient the idea of a taste,—sweet, sour, or bitter; this idea, following immediately the bodily act, takes the place of the internal change with which this is usually associated, and is thus mistaken for the ordinary consequent mental change, and appears to him to be the real taste.

In conversing with a victim of this delusion, he informed me, that while asserting before a large audience the sweetness and bitterness of the water, he was throughout satisfied that the strong

affirmation of the magnetiser had caused him to believe what he was all along sensible was really not the case. In him, as was often seen in these experiments, the control of the will was not completely suspended, but only partially overcome, by the operation of a more potential agency.

Much of the accuracy of our taste depends on the exercise of volition, not over the mind alone, but over the bodily organ likewise.

The epicure, over his savoury dish, or while tasting the aroma of his wine, rolls about his tongue and smacks his lips by voluntary effort. Even in the waking state, and in the exercise of full mental powers, this sense is subject to various deceptions, of which many amusing examples are recorded. One may suffice, for which I am indebted to a friend, on whose veracity I can place the strongest reliance:—

> At a dinner-party given by a gentleman, himself a connoisseur, and at which, among others, a gentleman of acknowledged taste, often employed by the wine houses, was present, the host, after dinner, promised his guests a glass of "some superlative whisky."
>
> The dram went round, the mouths were duly twisted, the lips smacked in orthodox style, and the liquor pronounced to be "*first class.*" It may be imagined what surprise was depicted on the face of the host, and what must have been the mortification of these renowned judges, when it was discovered that a bottle of gin had been circulated by mistake for the whisky.

Not less amusing, apparently surprising, or readily explicable, are the apparent perversions of the sense of sight. Closed against real perception, the mind readily mistakes for the informations usually received through the eye the obscure ideas of fancy acting under suggestion. Thus, in the account of the Edinburgh experiments already quoted, it is stated—

> "That an officer in Edinburgh was persuaded that a piano was a horse, which he intended to buy, for which purpose he went forward in a business-like way, and attempted to take up the feet of this supposed horse for examination."

Another case, also alluded to, I myself witnessed:—

> A young man was persuaded that a gaping audience was a murmuring stream, and a thorn stick a hazel fishing-rod. To this, in idea, he attached an imaginary line, to which was suspended an imaginary hook, which he baited with an imaginary fly, and with inimitable gravity he proceeded to hook an imaginary fish, whose leaps he grotesquely followed over the stage. In him Johnson's definition of angling was scarcely realised; for though the fool existed in admirable perfection at one end of the apparatus, the fly was wanting at the other.

In these instances, no doubt whatever can be entertained, that an illusion was practised on the mind through the medium of the imagination, and that the manner in which this was done is readily explicable on the principles previously laid down regarding Perception and Conception.

Second Class.—Perversion of Common Sensibility.—One of the most remarkable effects of the magnetic sleep, is the complete insensibility to pain, which seems in certain cases to be produced,

the patients bearing to be pinched, pricked, or even burnt, without any apparent suffering. Well authenticated instances are also recorded, of severe operations having been performed without pain while the patient was in this state; as, for example, an amputation of the leg by Mr Ward ("British and Foreign Medical Review," xix., 434), and another by Mr Toswill ("Zoist," October 1844), and a number of severe operations performed in the same way in India by Dr Esdaile ("Mesmerism in India"). This state of insensibility has its analogues in nervous disorders, and many cases accompanying hysteria have been recorded.

It may help to throw some light on this subject, if we remember that certain muscular actions seem to relieve pain, such as screaming out, a fact which Dr Darwin seeks to explain, by supposing that it carries off so much nervous energy, that it does not leave enough for common sensation.

In order to produce the feeling of pain, two prerequisites are necessary:—

1st. That an impression should be made on the sensorium commune, or that part of the brain in which the sensory nerves are implanted; and,

2d. That that change should be recognised by the brain-proper, or, in the words of the report made to the French Academy of Sciences on the Memoire of M. Flourens, the "cerebral lobes are the sole receptacle where the sensations can be consummated and made perceptible to the animal."

If, then, we suppose that by some temporary cause the action of one or other of these is suspended, or the connection between them interrupted, it may help to account for the insensibility to pain which is displayed by many persons when in the magnetic sleep.

Third Class—Perversion of Voluntary Motion.—In certain cases, those operated upon appeared unable to assume or alter certain positions, or, in other words, to call into play certain muscles. Such experiments are equally explicable on the principles laid down. The power of volition being either weakened or suspended, the patient might believe that he put forth a volition to execute a certain change, or might even feebly do so; but the firm assurance and determined aspect with which the operator asserted the impossibility, acting through the medium of his disordered fancy, produced the effect which his enchanter desired. This is surprising—not so much in the kind, as in the degree, of the effect produced. "The idea of our own strength," says Müller (*Physiology, by Baly*, vol. ii. p. 1398), "gives strength to our movements. A person who is confident of effecting anything by muscular efforts, will do it more easily than one not so confident in his own power. The idea that a change is certainly about to take place in the actions of the nervous system, may produce such a change in the nervous energy, that exertions hitherto impossible become possible. This is still more likely to be the case if the individual is at the

time in a state of mental emotion." If an idea of the mind can, as is here stated, supply strength, there is surely no difficulty in the supposition that it may also abstract it. If, in the ordinary state of mind, with all the faculties in full play, the confidence of being able to effect anything by muscular exertion confers the power of doing so, there is surely no difficulty in admitting the possibility of the converse in the extraordinary state in which a patient is thrown while in the mesmeric trance. To the influence of the ideas on muscular motion, and to this alone, we believe that the phenomena of muscular rigidity, as well as muscular activity, are due.

One interesting experiment is sufficient to illustrate this.

At a private magnetic soirée, a celebrated operator, at the request of certain parties present, undertook to magnetise the arm of a young lady, whom he had previously affected in a similar way. She was seated on a chair in the centre of the room, the rest of the party stood in silent expectation round the observed of all observers. Opposite her was placed the operator: an expression of resolute determination was thrown into his countenance. His eyes were fixed on, and his hand pointed to, the arm. Not a pass, not a motion, was made. Slowly the muscles of the arm began to contract, the arm was gradually elevated, and eventually became rigid—so rigid, that an ordinary drawing-room chair being suspended over the wrist, no deflection was produced.

I ventured to express a doubt that this case proved too much for the maintainers of the doctrine of odyle or the magnetic fluid. How had it passed from the operator to the patient? No attempt was made to communicate it by the ordinary passes or wonted excitants. Of course, the ready explanation was, that the operator had willed it to pass from his eyes to the arm, and that, with the ready obedience so characteristic of all its movements in certain persons, it had complied.

Having cited this case, in illustration of rigid contraction of the muscles evidently produced by the influence of the imagination, I may also refer to the striking analogy which it offers to certain cases, arising from similar diseased states. "Jam autem in catalepticis vides dum e. g. elevamus brachium, id non delabi, sed tumere et durescere elevatores; manifeste enim Deltoidem turgere sentimus, et si relinquamus brachium non delabitur" (*Tract. Path. de Catalepsi, auctore C. Fabri*). Fernelius records the case of a student who was seized with catalepsy while at his desk, and who continued, during the fit, with the pen in his hand, and in a fixed attitude of intense application. (*Ambians. Pathol.*, lib. v. chap. ii.) Sauvages remarks of the same disease, that if the patient happens to be seized while laughing or weeping, the laughing or weeping will continue throughout the entire attack. (*Pathol. Meth.*, p. i. class vi.) One attacked while in the act of drinking, continued to hold the cup to the lips, and apparently to continue drinking throughout the entire fit.

In the various anomalous cases of chorea recorded by authors, similar phenomena have been observed. Thus, in Magendie's "*Physiology*," two remarkable cases are preserved, one from M. Pudagnol, of a man who was seized with an irresistible tendency to move forwards, only stopping when exhausted; and another by M.

Laurent of Versailles, of a girl who was irresistibly propelled backwards, and with some rapidity, being unable to avoid obstacles or hollows, and, in consequence, receiving falls and bruises in her course. M. Magendie also records a still more extraordinary case, justly entitling this disease to an appellation once given it, of "insanity of the muscles," in which the will entirely lost its control over them. "It is impossible," he says, "to paint by language the variety and oddity of his motions and positions. * * * * At certain times his motions would pass into the train of ordinary actions. Thus, without the least participation of his will, he was seen to rise and walk with rapidity, until he met with a solid body that opposed his passage. Sometimes he walked backwards with the same readiness, and was only stopped by a similar cause." Dr Watt of Glasgow has related, in the fifth volume of the "Medico-Chirurgical Transactions," the case of a girl from Ayrshire.

"After suffering from headach, vomiting, loss of speech and motion, for about a month, she was suddenly seized with a propensity to turn round on her feet like a top, with great velocity, always in one direction, and was gratified when the attendants assisted her in increasing the rapidity of her motions. After a time these motions ceased, and she would lay herself across the bed, and, turning round like a roller, move rapidly from one end to the other. The fits continued at first for about two hours; but they were gradually increased to six or seven hours daily. A month or six weeks later, the movements became of an entirely new kind. The patient now lay upon her back, and, by drawing her head and heels together, bent herself like a bow, and then allowing her head and heels to separate, her buttocks fell with considerable force upon the bed. She repeated these movements ten or twelve times in a minute, at first for six hours daily, and at last for fourteen."

Still more close is the resemblance presented to that disease called by some authors *malleatio*, and consisting principally of a striking of the knees with one or both hands like a hammer. Dr Andrew Crawford mentions a case of this kind which he saw in the Hampshire County Hospital, in which there was a constant and uniform striking of the palm of one hand upon the side of the thigh, to such a degree as speedily to wear out the part of the dress on which it fell.

In considering the cases above related, all of them can without any difficulty be classed under one or other of the heads to which motion occurring independently of volition has been already referred; most of them would be ranged under the first or third. In some cases it would appear that choreic, and therefore other analogous affections, seem to arise from some obscure painful affection, or peripheral irritation, which might on further inquiry, enlarge the number of cases in the third section.

C. Certain of the phenomena produced during the magnetic trance are clearly referrible to the faculty of imitation which, always strong in weak minds, becomes especially manifested when the volitional control is withdrawn.—Fully to understand this, we must distinguish qetween that imitation exercised at will, as in the mimic, and that

which involuntarily, or even against every effort of the will, copies the peculiarities with which it is brought into contact. It is the latter to which reference is here made:—Cabanis gives an account of a man in whom the tendency to imitate was so strongly marked and active from disease, that he experienced insupportable suffering when he was hindered from yielding to his impulses.

One case will sufficiently illustrate its effect in mesmerism:—

At an evening party, at which a celebrated magnetiser was present, a lady long resisted his efforts to make her stammer. She was a bad subject for him,—not very susceptible of the influence. Again and again, he issued his commands,—again and again with considerable effort, she succeeded in disobeying; at length he thundered out his mandate, and immediately thereafter, putting his face close to hers, and protruding his chin, he made his own jaw to imitate the convulsive twitches of the stammerer. The effect was irresistible.

Laughing and weeping may either be produced in the same way, or arise from emotional excitement.

D. Attempt to explain the power manifested of controlling certain of the involuntary muscles.—Hitherto our attention has been confined to the muscles usually employed in voluntary motion, but the believers in odyllic influence appeal to the power they possess over organs not usually controlled by the will, as a proof of their theory, which cannot be gainsaid. "The heart and lungs can be affected by us" say they. "Power over the voluntary muscles may be explained away on your theory, but this you cannot account for." But we can. Dr Holland, in his Medical Notes and Reflections, observes,—"There is cause to believe the action of the heart to be quickened or otherwise disturbed, by the mere centering of consciousness upon it without any emotion or anxiety. The same may be said of the parts concerned in respiration. If this act be expressly made the subject of consciousness, it will be felt to undergo some change, generally to be retarded at first and afterwards quickened." Such facts readily explain a class of cases of which the following may be quoted as a fair example:—

The patient, a young gentleman who had been previously magnetised, was seated opposite the operator; we were all told *in his hearing* that the motion of the heart was to be controlled: the magnetist stood with his hand and fingers stretched out and directed to the heart; I remained to watch the pulse. A few passes were made, and suddenly the pulse rose; a few others, and it fell.

E. Attempt to explain the cases in which one person supposes himself, while in the magnetic trance, to be another, and acts the character which he has assumed.—Of all the vagaries which a person in the trance can be made to play, this perhaps is the most amusing, but certainly it is not, as has been sometimes alleged, the most surprising. It might have been referred to a former head,—that, namely, in which the illusions of the senses were considered; but such has been the prominence assigned to it, and such the marvel-

lous character attached to it, that it has been thought more advisable to make it the subject of separate consideration. We must go back to first principles, and determine on what the aberration depends. I dismiss all metaphysical subtilties at the outset; I will not discuss the question of intuitive truths at all; in reference to them, Reid and the Scottish school of philosophers have laid themselves open to the attack of Priestley and the Materialists, and the latter have not been slow to take advantage of the opportunity afforded them.

All this, however, need not occupy our attention, for it is evident that just as we derive our knowledge of the existence of the external world by our external senses, and just as the information which they afford is strengthened and corrected by experience, so we come to understand our own existence by internal sense, the ideas which it supplies being rendered more definite and distinct by our experience of the differences between our sentient body and the various objects by which it is surrounded.

And again, just as our external senses, or ideas supposed to arise from them, but in reality referrible to another source, may deceive us into the belief of the existence of some nonentity, or of the transformation of one object of perception into another,—whether of a horse into a piano, or a walking-stick into a fishing-rod,—so our internal sense may in a similar manner deceive us into the belief of changes and transformations in those states of the existence of which it is its office to inform us.

But further, metaphysicians have failed altogether to advert to the amount of evidence which the operation of our will affords us as to our self-consciousness. The condition of our body we change by an exercise of volition; things without us alter independently of this. We will an action, it is performed; that performance is attended with sensations, and these we learn to distinguish from the sensations caused by external objects. This means of distinction we lose, then, when volition is suspended; and just as formerly it was shown how its arrest suspended the tests we had for the truthful representations of one class of ideas, so now it will be seen how the same change deprives us of all means of ascertaining the fidelity of this other large and important class. Let us next glance at its derangements in disease, from the slighter and more transient to those analogous to what are observed in the mesmeric trance.

A certain corporeal sensation seems to exist in all organised beings, whether they are possessed of a nervous system or not. Each individual having a ganglionic system of nerves, possesses farther a common feeling by which the state of the body is revealed to the mind.

When this common feeling is altered, it deceives the patient into the idea of the existence of corporeal conditions which are not real. Examples of this are frequent at magnetic exhibitions. A patient will at one moment be too hot, and throw off his coat; the next he shivers with cold, and buttons himself up; or a snow storm descends, and he seeks to protect himself from the cutting blast. In

all these states it is the bodily feeling which is deceived, much in the same way as the external senses were in other experiments already referred to.

Passing on to a higher degree of the same derangement, we encounter in the diseases of hysteria (or hypochondriasis) the resemblance of many of the phenomena to those of the magnetic trance, which have already been considered. The will, and mental powers generally, are for the time weakened, the bodily sensations acquire an undue preponderance, and eventually the mind becomes its subject, —its slave. "Non raro aegrum ab hoc sensu, et medicum ab aegro falli, cum aeger ex sensu communi hausisse hinc inde affirmat, quod imaginatio et præcepta etiam opinio illi suggesit." (*Hartmann, Pathology.*)

Still further ascending to the higher degrees of disordered manifestations originally springing from the same root, we arrive at delusions. These are admitted by the most esteemed writers on these subjects to own two sources of origin,—1st. The alterations of the individual feeling which we have just been considering, and the delusions arising from them, as displayed in the severer cases of hypochondriasis and hysteria. 2d. The hallucinations of sense which, as has been already shewn, exist in persons in the magnetic state. "Un homme qui a la conviction intime d'une sensation actuellement perçue, alors que nul objet extérieur propre à exciter cette sensation n'est à portée de ses sens, est dans un état d'hallucination: c'est un visionaire."—*Esquirol des Mal. Mén. Tom.* i. p. 159.

Instances of delusion of this kind have not been uncommon in the history of man. In Arcadia, as Sprengel informs us, the shepherds often believed themselves to be changed into wolves, and imitated the actions and howls of these animals.

According to Hippocrates, an epidemic insanity at one time prevailed among the Scythians, and those seized with it imagined they were changed into women, and this idea was so strong as to influence their actions. In modern times innumerable instances of a similar kind have occurred. "Bishop Warburton, in a note to one of his works, speaks of a person who thought he was converted into a goose pie; and Dr Arnold saw a man who fancied himself in the family way. Pope describes, in his 'Rape of the Lock,' many of these fancies." (*Elliotson*). "All lunatic asylums," says an esteemed author already quoted, "are full of princes and princesses, kings, popes, seers, and even sons of God. The unfortunate poet Wetzel arranged his writings before him, and inscribed on the back of the binding '*Opera Dei Wetzelii.*' The more fortunate Professor Titel rejoiced as being a Roman emperor, possessed of an immense dominion."

Such are the analogues of this condition in disease, and they, like the others already considered, ought to suggest a caution to medical men how they trifle with patients, by producing phenomena so closely allied to the most serious and afflictive maladies. Such

fancies, if encouraged and frequently repeated, may pass into fixed delusion, and then what distinction can be drawn between them and insanity?

It may be objected, however, that in all the instances given the delusion *was* already fixed. This is true; but it is not difficult to find similar ones of a less permanent character.

In intoxication, which resembles sleep and the magnetic trance in its power to suspend the control of the will, while it differs from them in the fact that it stimulates the brain, the fancy excited by the emotions, passions, and desires, propels through the mind a crowd of images which it cannot control. The similarity of many of the phenomena of intoxication to those of the magnetic trance need not be pointed out. And surely it is scarcely necessary to show that, in that state, self-deceptions, similar to those we have now been considering, frequently occur. On this Dr Geddes's celebrated Scottish song of the "Wee Wifukie" is founded.[1]

III. The explanations of the phenomena which have been now offered, are in direct accordance with the received doctrines of the anatomy and physiology of the nervous system.

The power of suspending certain functions of the nervous system,

[1] We suppose, in the composition of this song, the author studied the facts rather than the philosophy of his subject. It is, therefore, all the more interesting to observe how the several stages of the mental state of the "Wee Wifukie" illustrate some of the views on which an explanation of the magnetic phenomena has been rested.

First we have the cause:—

> "There was a wee bit wifukie, was comin' frae the fair,
> Had got a wee bit drappukie, that bred her meikle care.
> It gaed about the wifie's heart, and she began to spew,—
> Oh! quo' the wee wifukie, I wish I binna fou."

The packman laddie having clipped her hair, she comes to the conclusion on which the song turns—

> "And when the wifie wakened, her head was like a bee,—
> Oh! quo' the wee wifukie, this is nae me."

The deceptions of fancy, however, are not complete, and she tries to test their reality,—1st, By memory; 2d, By appealing to the objects of sense.

> "I met with kindly company, and bir'd my bawbee!
> And still, if this be Bessukie, three placks remain wi' me;
> But I will look the pursie nooks, see gin the cunyie be,—
> There's neither purse nor plack about me!—this is nae me."

Still, however, not thoroughly persuaded, she seeks familiar objects to assure herself, but in vain, till, dropping asleep, the fumes of the liquor are dispelled, and Bessukie is herself again, to the great delight of Johnnie, who had been at the parson's, seeking advice in his perplexity.

> "Now Johnnie he cam' hame again, and oh! but he was fain
> To see his little Bessukie come to hersel' again.
> He got her sitting on a stool, wi' Tibbuck on her knee.
> Oh! come awa, Johnnie, come awa to me;
> For I've got a nap wi' Tibbuckie, and this is now me.'

has, if not proved, been at least assumed; while, at the same time, it has been farther contended that the others still continued to act independently of this change. This necessarily presupposes the existence of separate and independent organs for each of these; for whatever be the change by which the magnetic trance is produced, the agent who produces it must act on the bodily organs of him who is its subject, and the effects which are observed are probably due to some inappreciable change in the nervous centres. It is not for us as pathologists to determine what this change is; the physiologist must pave the way for such an inquiry, by showing what those changes are by which ordinary nervous action is produced. If the one is undiscoverable or undiscovered, so must the other remain, for many errors would be avoided in pathology, did we sufficiently admit, that a knowledge of healthy function must precede all inquiry into its conditions under disease. The following facts, then, seem to be admitted in regard to those points in the anatomy and physiology of the nervous system which concern our present inquiry.

A. The brain-proper—the bodily seat of intellectual actions—has no power of directly effecting muscular movement.[1]

The grey tract in the spinal cord proves, that it is more than a mere conductor of nervous power from the brain,—while the demonstration by Mr Grainger of some of the roots of the spinal nerves terminating in the grey substance, seems to indicate that these nerves are the conductors of a power generated in the cord itself. Besides, were the brain constructed, so as *directly* to operate on the muscles through the nerves, these nerves would have to go as *directly* to the brain, in which case the white matter of the cord would gradually increase in bulk from below upwards, which is not the case, as has been conclusively established by the observations of Volkmann. These facts seem conclusively to establish the doctrine, that the spinal cord is the chief centre for the roots of the spinal nerves, and consequently, that in those acts called reflex, it operates directly on the muscles through the efferent nerves proceeding from it; and, also, that in muscular acts originating in, or controlled by the mind, the cerebrum does not itself act directly on the muscles, but merely exercises an influence on the spinal cord, from which their nerves directly proceed. Thus all muscular action proceeds directly from the spinal cord, and that portion of the nervous centre can be stimulated to act by any other portion which can originate such a power, and which has a medium of communication with the cord.

[1] For fuller details, and for proof of the doctrines here advanced, I beg at once to refer to the articles from which I have borrowed them:—"Physiology of Nervous System," by Dr Todd, in *Cyclopædia of Anatomy and Physiology*; a review of "Noble on the Brain," in the *Brit. and For. Med. Rev.*, October 1846; a review of Dr Todd, in the *Brit. and For. Med.-Chir. Rev.*, January 1850.

B. That the corpora striata and adjacent parts are the centre of volition; that this nervous centre is independent of, although connected with, the central hemispheres, and that it has ample communications with the spinal cord.

According to the experiments of Longet and Lafargue, animals remain immoveable after removal of the corpora striata; and pathology teaches us, that even a very slight lesion of that part of the nervous centres is invariably followed by paralysis. In short, the connection of these bodies with voluntary motion has been admitted by all physiologists, from the time of Sir C. Bell.

Then, supposing the corpora striata to be the seat of volitional impulse, that, as we have already shown, is closely connected with the judgment,—the material organ of which is in the cerebral convolutions, and, therefore, ample means of communication should exist between them. It is so in fact, extensive radiations of fibrous matter pass from the hemispheres to the corpora striata. But, again, it is no less evident that they must have the means of transmitting their volitional impulses to the spinal cord as the centre of motion, and so we find that the pyramidal bodies connect them with the grey matter of the cord.

C. That there also exists a centre of sensation, independent like the others, but at the same time closely connected with the centre of volition, because sensation is a frequent exciter of motion, and voluntary motion is always, in health, attended with sensation. This centre of sensation must also have ample communications with the hemispheres that the sensations received by it may be made to act on the mind.

These conditions are all found to exist in the thalami optici. All the nerves of sense are connected more or less directly with them, or with the olivary columns, which are continuations of them. These, conjointly, appear to form a ganglion for the sensations communicated by the nerves of touch, and therefore destined for the reception of sensitive impressions. The close association between them and the proper optic ganglia, is explained by the close association between the senses of sight and touch, which is apparent both from the manner in which our ideas of external objects are communicated to us, and also from the joint operation of these senses in directing muscular movements. The first of these farther presupposes a close connection with the central hemispheres, which is found to exist through the inferior crus cerebri; the second with the centre of volition, which is maintained by the passage of innumerable fibres from one to the other; while, through the olivary columns, it is connected with the sensitive nerves which join the spinal cord, chiefly in the posterior horn of the grey matter.

D. That there farther exists a separate centre of the nervous system for the emotions, and that it too must have connections both with the seat of the intellect, and with the special originator of muscular motion.

This is to be found in the mesocephale, of which Dr Todd remarks—"Its influence extends upwards to the central convolutions —backwards to the cerebellum—downwards to all the nerves of sensation and motion. Through its connection with the posterior horns of the spinal grey matter, it can excite the sensitive as well as the motor nerves of the trunk. Hence it is not to be wondered at, that a highly disturbed state of this centre is capable of deranging all the sensitive as well as the motor phenomena of the body, and even the intellect. Hence we may explain the extraordinary movements in hydrophobia and general chorea, in both of which diseases this part of the nervous centre is doubtless affected."

E. That another centre, also independent, and at the same time closely connected with the others, is found to be the instrument of mental operations — perception—memory—judgment—imagination, &c., and that the cerebral convolutions form this centre.

This is abundantly evident from experiments, and still more from pathological anatomy. It is necessary, to perfect soundness of action, that these centres should be able to communicate with each other, and to co-operate in action, "that," to quote again from Dr Todd, "the centre of intellectual action should be capable of exciting, or of being excited by, the centres of volition and sensation. This connection and mutual influence is effected through the innumerable fibres which pass from the one to the other."

F. That, in addition to the four centres already described, there is also a centre for the co-ordination of muscular movement, and one for respiration and deglutition, but these have no sufficient connection with the present subject to require attention.

G. General conclusions in regard to the anatomical relations of this inquiry.

After reviewing these anatomical facts, we are, I think, entitled to come to the following conclusions respecting them:—

1*st*, That the great centre of muscular motion is the spinal cord, and that its functions are unimpaired during the mesmeric trance.

2*d*, That the great centre of volition in the brain is found to be in the corpora striata, and that their functions are impaired during the mesmeric trance.

3*d*, That the centre of sensation lies in the optic thalamio and olivary columns, and that their functions are more or less impaired in the mesmeric trance.

4*th*, That the close anatomical connection which subsists between the corpora striata and optic thalami explains the frequency with which lesions of the one affect the other, and also explains their joint affection in the mesmeric trance.

5*th*, That the true optic ganglia are very closely connected with

the thalami optici, and hence the latter may be affected through them, and in their turn affect the functions of the corpora striata.

6th, That the central convolutions are the great centres of intellectual action. That their functions are not impaired, but that, owing to a temporary suspension of some of those sources of information which they ordinarily depend on, they may suggest erroneous ideas.

7th, That the upper and posterior part of the mesocephale is the seat of emotion, and that it can either act on the muscles by volitional impulse, or directly, as the case may be.

8th, That the central hemispheres can excite the cord to motion, independently of the other centres; hence ideas in the mind may produce motion, independently of volition.

IV. To what extent can the power of producing these phenomena at will, and the manner of their production, be explained on any known principles?

Hitherto, in tracing the phenomena of mesmerism, we have been guided at almost every step by analogical resemblances which have been found to exist between it and certain pathological conditions; and in this last branch of the inquiry such guides are by no means wanting, although the information they supply is less definite and precise than that which was procured in reference to some of the other points discussed. It has been shown that, in the mesmeric state, the manifestations of volition are repressed, and therefore its power of directing the mind and body suspended; and that in it, therefore, the energy of some of the nervous centres is as it were paralysed, while that of others predominates. This cannot be regarded in any other light than that of a pathological state; and hence, in accordance with the usual arrangements of pathology, its production may be considered under the heads of predisponent and exciting causes respectively.

A. Predisponent Causes.—Every one is not found to be susceptible of the mesmeric state. There are certain individuals more prone than others to hysteria, chorea, and the other allied affections. The causes of the predisposition seem somewhat similar in all, viz.,—a delicate and susceptible state of the nervous system, a predominance of feeling over judgment, an absence of commanding energy of the will. On the other hand, the mesmerisers, like all who in any way are destined to control and direct the minds of others, are usually persons of strong powers of volition, and whose wills exercise a supreme control over their own instinctive tendencies.

B. Exciting Causes.—It has already been shown that, in order to give free scope to the play of the imagination, the external world must be to a great extent excluded; for, otherwise, the perceptions of the true will neutralise the conceptions of the false, on which the subsequent delusions hinge. Of all the senses, those of sight and touch are the ones most evidently concerned, both in the origination

of mental perceptions and in the direction of muscular movements. The sense of sight, then, must first be suppressed. To accomplish this end, the eye is directed with fixed and steady gaze, and, if possible, in a fatiguing position, to some object which is not of a kind to occupy the mind. In these circumstances the organ of sight is fatigued, it ceases to be able to distinguish, and demands that repose which is the consequence of all continued action; for tension must ever be succeeded by relaxation. Many who try the fixed gaze cannot succeed in maintaining it; their eyes seek relief by glancing to surrounding objects,—and in them the process fails. It is not difficult to understand the reason of this. The monotonous attention soon fatigues, while change and variety dispel the lassitude which would otherwise be induced. But this fixed gaze affects the mind as well as the body. It is sufficiently engrossing to withdraw it from other perceptions, and thus to suspend its activity, and throw it into reverie. We endeavour to induce common sleep by ceasing, as much as possible, to exercise our different powers; and the magnetic state, which in some respects would appear to be a deeper manifestation of the same phenomena, is probably produced in a similar way. Dr Braid informs us (*Neurypnology*, p. 58) that the magnetic sleep cannot be produced unless by the eye, except in persons who have been previously magnetised. May not this be in great part explained by the connection which, in the anatomical section of this paper, was shewn to exist between the thalami optici and true optic ganglia. I think one great difference between natural sleep and that produced in magnetism is this,—In the former, *all* the nervous centres are tired out, and *all* repose; in the latter, those of sensation and volition are chiefly affected,—and they being lulled to rest, the others retain their wonted activity. "It is long since it was observed that inordinate attention to one subject caused dreaming rather than sleep."—(*Braid, op. cit.*, p. 46.) Cullen also states, "If the mind is attached to a single sensation, it is brought very nearly to the state of the total absence of impressions,—or, in other words, to the state most closely bordering on sleep. Remove those stimuli which keep it employed, and sleep ensues at any time." In farther confirmation of this, it may be remarked that distraction of mind prevents it. By the kindness of Professor Simpson, I am enabled to give the following case, which I saw along with him:—

> A lady, after repeated experiments, became so susceptible, that she would go to sleep when desired. A painful operation was to be performed on her, and it was determined to try whether, during the magnetic trance, she could bear it without suffering. Every attempt, however, to produce insensibility failed, although sleep followed the efforts. The patient herself explained the cause:—"She was sure the mesmerism would not be a sufficient protection from pain; and to prove this to her attendants, and induce them to give her chloroform, she resisted as much as possible the tendency to sleep."

When induced by the fixed gaze, sleep seems to arise partly from the connection between the optic ganglia and the corpora striata

through the thalami optici, and partly by the exhaustion of volition consequent on the powerful effort required to maintain the gaze. In this last way, of course, the corpora striata are directly affected. But again, recalling the intimate connection which has been shown to exist between the centre of volition and the centre of sensation,—so intimate, that disease can scarcely affect the one without impairing the functions of the other, we are led to see how the various medicines, such as opium and chloroform, which, when applied locally to a nerve of sensation, have the power of deadening it to impression, should, when carried to the central seat of sensation by the blood, have the power of suspending its operations, and, by virtue of its connection with the centre of volition, arrest the control of the will over mind and body. This explanation, so far as I know, has not been before proposed, and it seems to promise some assistance in clearing up some of the mysteries of the magnetic sleep. Opium, for example, blunts sensation, shuts up the avenues of perception, and excites the liveliest mental conceptions, which sometimes prompt even extravagant actions. Sir Humphrey Davy thus describes his sensations on inhaling nitrous oxide gas:—"By degrees, as the pleasurable sensation increased, I lost all connection with external things; trains of vivid visible images rapidly passed through my mind. I existed in a world of newly-connected and newly-modified ideas." But whatever be the manner in which the process is conducted, its effect is manifestly to deprive all those powers whose exercise depends on the will, of the influence by which the mind usually controls them. The precise manner in which this is accomplished, it may be less easy to explain. Certain it is, that the attempt to explain these phenomena by the supposition of a fluid allied to that developed by magnetism or electricity, and passing from the body of the operator to that of his victim, is the most improbable of all. In not a single experiment which I have witnessed, could the results have been satisfactorily explained on this hypothesis, and in most of them there were conditions observed, sufficient to neutralise the passage of any such fluid, if obedient to those laws by which the transmission of similar imponderables is usually regulated.

In conclusion it may be remarked, that it were well that both operators and patients were more distinctly aware that the phenomena induced are those of disease. The predisponent causes are the same as those of chorea, epilepsy, and insanity. The phenomena accompanying the manifestations are, when otherwise induced, known to be most dangerous means of producing such diseases. Excessive development of the imagination, or undue subjugation of that judgment which should direct the will, can never be mentally beneficial, but will in all probability be the reverse. Intense exercise of the fancy has a powerful effect on the organs both of mind and body. "The visionary," says Feuchtersleben, "is a candidate for the lunatic asylum."

To the pathologist, such exhibitions are undoubtedly interesting, as specimens of disease, and he will no more be inclined to turn from them with disgust, than from the morbid preparations so loathsome to the unprofessional eye. The philanthropist, however, will regard them in other light. He will consider them as additions to the catalogue of human woes—morbid states induced to form the ground of philosophical investigation,—or, worse still, to wile away a passing hour. A calm consideration of them will serve to show that the physician is scarcely warranted to induce them, unless by their means he can banish a more powerful disease, or alleviate severe suffering; and were the non-professional public made aware of their real nature, they would surely come to the conclusion of the poet Spenser:—

> "Of all God's works which do this world adorne,
> There is noone more fair and excellent
> Than is man's body, bothe for powere and forme,
> Whiles it is kept in sober government;
> But none that is more foule and indecent,
> Distempered through misrule and passions bace,
> It grows a monster, free from all restraint,
> Doth lose its dignity and native grace."

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