

## Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for scanning. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of scanning are checked below.

L'Institut a numérisé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de numérisation sont indiqués ci-dessous.

- Coloured covers /  
Couverture de couleur
- Covers damaged /  
Couverture endommagée
- Covers restored and/or laminated /  
Couverture restaurée et/ou pelliculée
- Cover title missing /  
Le titre de couverture manque
- Coloured maps /  
Cartes géographiques en couleur
- Coloured ink (i.e. other than blue or black) /  
Encre de couleur (i.e. autre que bleue ou noire)
- Coloured plates and/or illustrations /  
Planches et/ou illustrations en couleur
- Bound with other material /  
Relié avec d'autres documents
- Only edition available /  
Seule édition disponible
- Tight binding may cause shadows or distortion  
along interior margin / La reliure serrée peut  
causer de l'ombre ou de la distorsion le long de la  
marge intérieure.
- Additional comments /  
Commentaires supplémentaires:

Continuous pagination.

- Coloured pages / Pages de couleur
- Pages damaged / Pages endommagées
- Pages restored and/or laminated /  
Pages restaurées et/ou pelliculées
- Pages discoloured, stained or foxed/  
Pages décolorées, tachetées ou piquées
- Pages detached / Pages détachées
- Showthrough / Transparence
- Quality of print varies /  
Qualité inégale de l'impression
- Includes supplementary materials /  
Comprend du matériel supplémentaire
- Blank leaves added during restorations may  
appear within the text. Whenever possible, these  
have been omitted from scanning / Il se peut que  
certaines pages blanches ajoutées lors d'une  
restauration apparaissent dans le texte, mais,  
lorsque cela était possible, ces pages n'ont pas  
été numérisées.

THE

# MONTREAL MEDICAL JOURNAL.

---

---

VOL. XXXIII.

FEBRUARY, 1904.

No. 2.

---

---

## THE MORBID ANATOMY AND HISTOLOGY OF PULMONARY TUBERCULOSIS IN RELATION TO ITS GENERAL PATHOLOGY AND CLINICAL MANIFESTATIONS.

BY

G. SIMS WOODHEAD, M.A. (Cantab), M.D. (Edin.).

Professor of Pathology in the University of Cambridge, England.

When the Henry Phipps Institute for the Study, Treatment, and Prevention of Tuberculosis did me the honour to invite me to give one of this series of lectures, I felt that I had little time in which to prepare any lecture worthy of the occasion. I was just in the midst of the work of our term, and as I had to start for your shores as soon as the term ended, I knew that until I got onto the Atlantic (whose vagaries at this time of the year have to be reckoned with) I should be able to give but little time or attention to the thinking out of the details of my address.

The opportunity of visiting your great country thus presented to me was, however, so tempting and the prospect of meeting my many valued friends on this side so attractive that I determined to give you the results of some of my own work on the relation of the morbid anatomy and histology of phthisis to its general pathology and clinical manifestations. I was all the more tempted to follow this line of thought from the fact that in recent years the pessimistic views of the physician—based on the pessimistic foundation laid by the earlier pathologists—though gradually giving way before the evidence afforded by more recent research are hard to scotch and still more difficult to kill. It will, of course, be understood that the advancing and advanced lesions found in cases of pulmonary tuberculosis that had succumbed could not but prove fatal. The presence of Virchow's caseous tubercle in all its fearful and destructive simplicity seemed to leave no hope for the recovery of any patient affected; and what the pathologist found one day, the physician accepted the next. It was perhaps natural that this should be the case, but the evil wrought by this pessimism was incalculable, and I

---

Lecture delivered under auspices of Henry Phipps Institute, Philadelphia.  
Dec. 29th, 1903.

think that most of those of you here to-night, who have given even a small amount of attention to the subject will agree with me that this view as to the incurability of tuberculosis had more influence than any other single factor with which we are at present acquainted, in interfering with the successful treatment of a disease that should, I venture to say, now be looked upon as amongst the most curable—when taken early enough, treated under proper conditions, and for a sufficiently long period.

If modern pathology had been responsible for nothing beyond the effect that its findings have had on our ideas concerning the course of the tubercular processes, especially in the lung, it would have more than justified its claim to be one of the most important, if not the most important, of all the sciences ancillary to medicine.

I am here to speak as a pathologist, and it is possible, nay, even probable, that some of you may be of opinion that I claim too much for my subject; but of this I am convinced—that the more closely the pathology (including morbid anatomy and histology as read in the light of recent bacteriological discoveries) of tuberculosis is studied in the cases that come under the observation of your physicians, the greater will be the influence of the work ultimately done in this Institute. The cure of the individual must, naturally, be the most pressing and important claim on all those engaging in this work, but it must be remembered that there are far wider reaching questions behind and beyond this—the early detection of the disease, if treatment is to be most successful; and the prevention of the disease, if the community is to derive the greatest benefit from the warfare now being carried on; and these must be worked out, not in the ward merely, but also in the side-room and in the laboratory.

I have said that it is only during recent years, that much has been heard of the curability of pulmonary tuberculosis, but it must be borne in mind that after the first shock produced by the observations recorded by Rokitanski and by Virchow had lost some of its force, a number of observers drew attention to the fact that in the lungs of old people who had succumbed to diseases other than those of tuberculous origin there could often be found local apical thickening of the pleura or, still more frequently, deeply pigmented irregular scars which were evidently the result of some considerable loss of tissue at an early period of life. My attention having been drawn to this fact, I took the opportunity, after I had been appointed pathologist to the Edinburgh Royal Infirmary, to make a careful search for evidence of what I might speak of as healed tubercular lesions, and I found that in old people such evidence was to be found in at least one out of every three who came to the post-mor-

tem table. Nay, more, I soon became firmly convinced that even in those cases that succumbed to tubercular disease there was usually more or less marked evidence of a sturdy war waged by the tissues against the invading tubercular process, and that in most cases the tissues failed in their endeavour to check the advancing process simply because they were placed under disadvantageous conditions, not as the result of the action of the specific *materies morbi*, but as the result of interference with their nutrition. The cod-liver oil treatment, so long the most successful of all, had its foundation in the belief that this substance served some special nutrient or therapeutic purpose, as a result of which the tissues were strengthened and were thus enabled to resist the attacks of the disease-producing factor; whilst the present-day treatment of tuberculosis is founded on a similar belief that fresh air, good food, efficient excretion of waste products, rest (opportunity for building up the tissues, food that will supply energy with least draft on the tissues), will enable these tissues to withstand the attacks of the tubercle bacillus in the first place; to kill it in the second, or at any rate to render it harmless; and finally to assist in the removal not only of the bacillus, but of the dead or degenerated tissue in which it had managed to effect a lodgement.

It is perhaps superfluous at this stage to show slides of the tubercle bacillus but some few of you may not have seen these microbes—low vegetable parasites—so fully studied by Robert Koch in his epoch-making work sent out from the Royal and Imperial Institute of Public Health in Berlin. (A series of slides illustrating the form and relative size of the tubercle bacilli as found in experimentally produced tuberculosis, in the tuberculosis of the human subject, and in phthisical sputa was then thrown on the screen.) For some time after the appearance of Koch's wonderfully lucid and convincing paper a certain number of sceptics,—perfectly justifiably, no doubt, on account of the extreme novelty of the ideas so promulgated,—attempted to throw doubt first on the accuracy of the observations and then on the reliability of his conclusions, but it may now be fairly claimed that Koch's work has, in the main, withstood the attacks even of the ablest of his critics. There seems to be no manner of doubt that we may accept Koch's tubercle bacillus as the *causa causans* of tuberculosis. Here, however, let me put you on your guard, as I guard myself, against a mistake into which it is very easy to fall: i. e., that because a tubercle bacillus comes near, or even into contact with, the human or brute body, an attack of tuberculosis necessarily results. This bacillus must make its way not merely onto a free surface, but into the tissues of the body, before it can do any harm; nay, more, it seems that, in the human body at any rate, the tissues must be damaged or weakened and a special mode of entrance into

these damaged tissues must be prepared for the tubercle bacillus before it can work its dire effects. During the course of my work my hands have for weeks, months, or even years, been almost daily soiled with tubercle bacilli; I have no doubt that I have swallowed many, and that some have made their way into my respiratory tract; but none of these has done me much, if any, harm because whilst I have been working with them I have carefully protected any cuts on my hands and have refrained from working when I have been run down in any way, and especially when I have been suffering from any catarrhal processes in the respiratory or alimentary tracts.

From my experiments on animals I am satisfied, as are all experimenters, that tuberculosis is never produced without the presence and action of the tubercle bacillus, but my own observations on human patients especially on children, confirm those of many others, that unless the tissues are weakened or damaged—*i. e.*, the soil is prepared—there can be no reaction between the bacillus and the tissues which can end in the production of a tuberculous lesion. The exciting cause must be present, but in the human subject at any rate there must also be one or more predisposing causes. In the lung this predisposing cause appears to be catarrh; that is, a congestion of the vessels of the mucous membrane, accompanied by some slight proliferation of the epithelial cells lining the air vesicles, with an increased pouring out of fluid and an emigration of a larger number of white blood-cells. In the air vesicles of the lung, especially when expansion and contraction are weak or imperfect,—*i. e.*, at the pulmonary apices in adults, near the root of the lung in children (and in monkeys), beneath areas of adhesion between the pulmonary and costal pleuræ, and at the base of the lung when there is adhesion of the pleuræ in this position, especially if the liver be adherent to the under surface of the diaphragm, there is usually an accumulation of catarrhal products in which if bacilli gain entrance and are allowed, undisturbed by any great amount of movement, to multiply, to produce their special products, and to cause those degenerative changes with which they are found to be associated casually. Once give them a footing under these conditions, and they are in a favourable position to produce tuberculosis.

It is evident from what has already been said that the tubercle bacillus may reach the lungs by way of the air-passages; that they make their way to those points at which there is least movement and in which, as a rule, there is some degree of collapse, often associated with a condition of catarrh—*i. e.*, a condition in which the protecting layer of epithelium has been damaged, the lung tissue then being in the same position as the hand on which the epithelium has been damaged. From

this coign of vantage they may be distributed, still by the air channels, to almost every part of the lung, setting up a condition of tubercular catarrhal pneumonia characteristic of the later stages of the so-called acute phthisis. In many cases this acute phthisis is nothing but an acute secondary pneumonic tuberculosis following a rapid distribution of tubercle bacilli embedded in the caseous material derived from a chronic primary focus. It should be noted that in these cases caseation of the epithelial tissues usually takes place at a comparatively early stage of the process.

So much for the distribution by the air-passages. We now come to a second system of distributing or infection channels which appears to play a prominent part in every case of tuberculosis, chronic or acute—the lymphatic system. Between the cells of the tissues and especially around such structures as the blood-vessels, even the smallest of them, there is a kind of network of channels or spaces (the lymph spaces) that has sometimes been compared to the system of pores seen in a sponge. Such terminal spaces gradually lead into small definite channels and finally into tubes or vessels of considerable size and with distinct walls—the lymphatic vessels. These tubes lead to little filters known as lymphatic glands. Much of the fluid that in the process of nutrition passes from the blood-vessels passes into these lymphatic spaces, and from this fluid the tissues take up their nutrient material, throwing back into it their waste or effete products. The fluid throws some of these waste materials back into the blood, but certain of the more solid particles pass to the lymphatic vessels and by them are carried to the lymphatic glands, where the coarser particles are filtered out, and where, too, certain changes appear to be effected even in the composition of the fluid lymph.

Let me give you an illustration. If a patient tattooed on the forearm could be examined within a few days of the operation, small particles of pigment would be found in the tissues (cells in and lining the lymph spaces) at various points between the tattooed patch and the elbow, and even above the elbow. If the patient were to live for some months and then were to die, it would be found that, except at the tattooed patch and in some little hard nodules in front or at the side of the elbow or under the armpit, there is no pigment, but in these latter positions black, red, or blue pigment, according to the material used by the artist, has accumulated, often in considerable quantities, so that it can be seen with the naked eye.

Most of you know how the glands under the arm swell after vaccination. This is because the lymphatics of the arm carry the vaccine virus to the glands, they are irritated by the vaccine matter, there is prolifera-

tion of the cells, swelling of fibres and accumulation of fluid, and enlargement of the whole gland.

Exactly the same arrangement of lymph spaces, lymph channels and lymphatic glands is met with in the lung. There are spaces around every vessel and bronchus and between the finer tissue elements; these open into lymph vessels which in turn convey the fluid to the lymphatic glands situated at the root of the lungs. It is important to bear this arrangement of the lymphatics in mind; for we find that in tuberculosis of the lung the tuberculous virus is carried from the air vesicles by the lymphatics to the lymphatic glands. The tubercle bacillus or its products appears to exert some irritant effect directly upon the cells lining the lymph spaces, as a result of which, just as in the air vesicles, we have a proliferation of the cells and a formation of new tissue sometimes resulting in caseation, or the formation of a soft pultaceous mass which is supposed to resemble cheese; at others—and this is a point to be specially borne in mind—in the formation of fibrous tissue.

As regards this formation of fibrous tissue, it may be well to point out that the most marked feature in chronic tuberculosis is the formation of fibrous tissue in the pleura immediately above it; and it is an easy matter in most cases to determine roughly the comparative duration of the disease at any part of the lung by noting the thickness of the pleura and of the interlobular septa; so that in a chronic phthisis in which the patient succumbs rapidly as the result of an acute consolidation, there is usually well-marked thickening at the apex; this gradually shading off to the lower part of the upper lobe and being represented merely by a thin film of fibrin over the lower lobe.

Where the tubercular process specially affects the adventitia or outer coat of the blood-vessels and bronchi, this fibrous tissue formation is often exceedingly well marked. In some cases it would appear almost as though the tuberculous tissue, at first of a type which may be compared to an irregular granulation tissue, may become converted into fibrous tissue directly; but it may be accepted as a general statement that where the tubercle bacillus manages to obtain a footing, it brings about a certain degree of caseation; but that in the immediate neighborhood of this caseous material which in some sense appears to act as a foreign body, the fibrous tissue is partly at any rate the result of the action of this foreign body upon endothelial cells or connective tissue cells, which, after all, must be looked upon as cells of an endothelial type.

Wherever this fibrous tissue is formed it affords evidence of a good reaction on the part of the tissues and therefore of the powers of resistance; it is by the formation of this fibrous tissue around the areas of caseation that they are cut off and the lesion localized. Where

this localization is incomplete, as it often is, the bacilli pass along by them to the lymphatic glands, here giving rise to proliferation, caseous degeneration or fibrous tissue formation, just as is the case along the lines of the lymphatics. Having once reached the glands at the root of the lung, the process may, for a time, be localized; but unless the conditions are favourable and what we may call the reaction of the tissues is good, the tubercular virus may be carried from point to point, successive glands in the neighborhood localizing the disease for a time, but ultimately allowing of the passage of the virus to other organs.

In connection with the invasion of lymphatic glands by the tubercle bacillus, it should be noted that once a lymphatic gland is affected, the course of the lymph circulation may be diverted; and again that any area usually drained into a lymphatic gland becomes much more readily affected when that gland becomes tuberculous than before this takes place; I think I have seen cases in which the lymphatic gland appears to have become caseous or cheesy before the area drained by it has become tuberculous. It is somewhat difficult to prove this; but I show you a specimen in which we have an exact localization of a tuberculous area to that part apparently drained by a small gland at the root of the lung.

The third method of transportation of the tubercle bacillus from one point of the body to others is by way of the blood-vessels. For some time it was supposed that the acute miliary tuberculosis that so frequently supervenes on the more chronic processes, was something essentially different from the larger primary lesions; but the identity of the two sets of lesions had been accepted even before Koch had pointed out that the exciting cause of the two processes was the same. It was difficult to determine, however, how the tubercle bacillus made its way from the primary lesion to every organ and tissue of the body. Weigert was able to point out that in a case where there was tuberculosis of the wall of the thoracic duct, the bacilli were carried from this lesion to the veins, from which they passed through the heart and thence were distributed to the capillaries of every part of the body. In these capillaries, blocking them and becoming attached to the endothelial lining, they again set up a proliferation in and around the capillary vessel, as a result of which the minute tubercles met with in this condition soon became manifest to the naked eye. (Section shown.)

It must be remembered that these different methods of spread of the virus seldom occur alone. Whenever the air passages are affected we find, invariably, that the tubercle bacilli make their way into the surrounding lymph spaces, there giving rise to the proliferative and regenerative changes already described. Similarly, we find that in acute



miliary tuberculosis there is, in each nodule, evidence of the invasion of the lymphatics by the tubercle bacillus, and it is because we have this affection of the lymphatics that the various lesions ultimately become localized. It is only through them that we can have a stimulation and proliferation of the connective tissue cells, new formation of fibrous tissue, and localization and absorption of the diseased tissues. I mention these methods of spread of the disease because in the various kinds of tuberculosis met with by the clinician, we have ample evidence that one or other predominates at different stages of the disease.

It may be well here to indicate, briefly, the history of a case of pulmonary tuberculosis, especially as by referring to this history in its various phases we may be able to gather how it is that, at one stage the disease may be perfectly curable, but how it is that, as the disease advances, the chances of permanent or even partial cure are more or less rapidly diminished. I wish you to pay special attention to the periods at which the various processes come on; and also the times during which they are prolonged; otherwise it may be difficult to understand why a patient who has had phthisis for perhaps two or three years and appears to have lost very little ground indeed, should suddenly begin to go down hill rapidly and die within a few months.

It has already been mentioned that in a case of phthisis apical catarrh is the first condition noticed, this being accompanied by congestion and followed by some consolidation the result of proliferation of the epithelial cells, such cells gradually accumulating and coming to fill the air vesicle. This breeding-ground for the tubercle bacillus may gradually spread in area; but it will be found that the bacilli causing degeneration of the epithelium make their way into the surrounding lymph-spaces, there, especially if the tissues are well nourished, giving rise to the formation of fibrous tissue.

If at this stage the patient be placed under favourable conditions, of nutriment, of rest, so that the waste products of the body may be carried away regularly and systematically, the reaction of the tissues is so complete that the dead patch is practically surrounded and cut off; the bacilli remain inactive in the dead mass; or they may even be killed. The degenerated tissue is absorbed very gradually and there may be complete "cure," especially when the initial lesion has not reached any very great size. The loss of respiratory surface is so slight and the reserve so great that the patient may be considered to be practically normal again.

If, however, the patient be not placed under favourable conditions, or if after a short period of treatment he returns to his old life and habits, this focus of dead material may ultimately break through the

surrounding layer of limiting tissue and a further considerable patch of tubercular consolidation may be the result. (Slide shown.)

In most cases, especially if there be intermittent congestion of the surrounding tissues, the degenerated or caseous material may become softened, and it is during this stage of softening that secondary infection goes on perhaps most readily.

Let us suppose that this mass cut off from the bronchus with which the air vesicles were originally associated, extends to the wall, perhaps of another bronchus; as it advances in this wall it cuts off the vascular supply, first that of the peribronchial tissue and then that of the sub-mucous tissue, until at last by destroying the vitality of the bronchial wall it brings about a process of ulceration; then the tuberculous material with its contained bacillus may immediately be carried into the air passages, whence it may be expectorated almost entirely, though in most cases a certain proportion of the softened material along with the bacilli is carried to other areas, where fresh tubercular catarrhal pneumonia is induced, and the whole process may be repeated but upon a more extensive scale. This process may be again repeated—at each repetition, larger and larger areas being affected. It is evident that in such cases as those just described, the loss of lung tissue may be very great indeed, whether it be broken down or not—i.e., whether the lung be merely consolidated or whether it be cavitated. Even the great reserve mentioned above is unequal to the draft made on it, and even should the patient be patched up for a time he must face the fact that he is not cured and never can be; though under proper treatment and with great care he may continue to lead a useful if not very active life.

It is sometimes difficult to understand why the small hæmorrhages so characteristic of the early stage of phthisis should occur so frequently especially when we remember that in the tuberculous areas themselves the blood-vessels are practically obliterated. It must be remembered, however, that around each tuberculous area the conditions of the vascular circulation are somewhat altered, owing to the fact that some of the vessels are closed; as a result of all this a collateral circulation must be set up and maintained. Moreover, an increased quantity of blood is required to meet the wants of the proliferating tissues; but we find that the hæmorrhages usually take place as the result of some extra temporary strain and are an indication of local changes. It will be noted that in some of the specimens I show that we have a systematic invasion of the lung commencing at the apex and gradually working toward the base. It will be noted, moreover, that the basal processes are always more extensive, that the consolidation is more diffuse, and the degeneration more rapid than at the apex; that we have in fact a more mark-

edly caseating catarrhal type in this position than at the apex. The whole of the lower lobe of the lung may be invaded in a few weeks, especially when the resisting powers of the tissues have been gradually broken down by overwork, general ill health, want of sufficient nutriment, imperfect oxidation of the blood and accumulation of waste products in the tissues.

These factors do not act at once; but at work over considerable periods they gradually wear down the resistance of the tissues, with the result that the tubercle bacillus finds an easy prey wherever it finds lodgment.

In addition to the catarrhal process, there is in most of these rapid cases of basal phthisis a more acute pneumonic condition, the air vesicles in the spaces between the catarrhal pneumonic patches in such cases being filled with a fibrinous exudate. This process seems to be associated with the alterations in the circulation, but partly to be the result of a secondary infection; wherever it occurs, however, it is a serious factor in the production of consolidation, and always accelerates the rapidity of the process, patients so affected, as a rule, dying quickly.

It will be seen at once from this rough description that a physician has a considerable period during which he may hope to treat his patient successfully, but that at any moment, almost, a series of more acute changes may supervene after which he has no right to expect recovery; though it must be acknowledged that in a few cases patients do recover even after such expectation is no longer justifiable. Nature is always more powerful than we give her credit for, and often helps us when we have given up all hope. This, however, is something we should never presume on, and the importance of the early diagnosis of tuberculosis can scarcely be too keenly appreciated, nor that of early treatment.

We now come to a phase of the question that has been recognized by many physicians but one that is not so generally recognized by the patient. A patient who has once suffered from tuberculosis must remember that although he may be partially protected (though of that, however, we as yet know nothing), he does not enjoy any definite immunity against future attacks of the disease; and it is absurd for any one to decry a system of treatment because it does not confer a lifelong immunity to the disease against which it is directed. I show you a specimen in which there is an old scar in the lung, from which all tuberculous material had disappeared leaving a little nodule of pigmented fibrous tissue surrounding a few particles of calcareous matter. That patient suffered from phthisis many years ago and had recovered; but

you will see that throughout the remainder of the lung we have now the lesions of an acute miliary tuberculosis; the patient succumbed to an infection in all probability of entirely new origin; though it is possible that it may have been the outcome of some old but latent lesion either in the lung or in some other part of the body, from which tubercular virus has made its way into the blood-vessels and thence has been distributed throughout the body.

Such a case as this to my mind, though exceedingly encouraging in many ways, should lead us to insist that patients even after discharge from sanatoria where the treatment has been successful, should continue the treatment, perhaps in a modified form, throughout their whole life; as it is impossible to state when a patient can come back to the old conditions of life with impunity, in fact, one may lay it down as a general proposition that it is only as we insist on the improvement of the conditions of life wherever such improvement is possible, that we shall be able to diminish the morbidity as apart from the mortality, of tuberculosis. It is here that the medical officers of health, and sanitary officers can play so large a part; and that an institution of this kind can do so much to spread a knowledge of the importance of light and air in the home and in the workshop, of sufficient food even though plain, of the danger of prolonged periods of overwork, except in the case of the very strongest; and of the importance of periods of rest during which the organs and tissues of the body may not be built up, but may get rid of the waste material that accumulates so rapidly during periods of active exertion.

This brings us to a very important question indeed. Although I have every faith in sending patients who can afford it to places where they can comfortably remain in the open air and where there is plenty of light, I think there is a danger, and a very great danger, of overlooking the fact that the open-air treatment may be carried out at the patient's home, and that so far as this branch of the treatment is concerned it is not so much a matter of getting a good climate as of getting pure, fresh air for the patient.

There can be no doubt that the sanatorium treatment has been successful, not because of any special climatic conditions associated with each institution, but because whatever the climate the patient has been encouraged to live practically in the open; diet, exercise, and rest, of course, being carefully attended to. All acknowledge that a sanatorium treatment is of inestimable value in tiding over the difficult and dangerous early period of the disease; but it will be still more valuable just in so far as it teaches the patient to carry out in his own home the principles and methods adopted in the sanatorium. It always seems to me

that a patient will be much more likely to have faith in the efficacy of the methods used, if they are carried on in familiar surroundings and under conditions of climate, etc., to which he is usually exposed. If he is sent to a special climate resort, he is apt to think that the success of his treatment depends on something special in the climate; and whilst this is of course the case to some extent, in so far that in a bright, dry, bracing climate the open-air treatment is more agreeable and a cure effected somewhat more quickly perhaps, there is no fundamental difference between the two, the closer you can bring your patient to his every-day manner of life during treatment the more likely he will be to carry out your instructions after discharge from the sanatorium.

I may say that at Cambridge, a place little above the sea-level, situated in the fen district where fogs are frequent and sometimes very dense, great success has been attained in the open-air treatment of phthisical patients in the Addenbrookes Hospital. I mention this fact for what it is worth; but I think that it bears out the contention of those that the method of treatment is in most cases more important than the exact place in which it is carried on.

(Lantern slides were shown to illustrate a number of the points mentioned. Most of the sections were made through the whole lung, and were thin enough for examination under a quarter-inch objective).

Ladies and gentlemen, those who are responsible for the inception, organization and working of this Institution, have undertaken what most of us consider to be one of the most beneficent works on which men can engage. The endowment is munificent; and as the workers are both capable and enthusiastic, I think that we may look forward with every bright hope to the outcome of the work carried on. But the work to be done cannot all be overtaken even under the favourable conditions that here obtain; and I would ask you not to be disappointed should you not attain all that you hope in the immediate future. There is much quiet and steady spade work to be done. You will, I know, relieve and cure many patients; but you have then touched but the fringe of a great problem. You have to determine the exact pathological conditions met with in individual patients and in groups; you have still much to learn concerning the condition of nutrition, of waste, and of repair; you have physical problems, chemical problems, bacteriological problems and others of the greatest complexity; these can be undertaken only by men skilled in methods and trained in accurate observation. They may have to work for years before they are able to gain results that can be utilized, or that can be brought into a great scheme of knowledge, from which further advances can be made; but we may all entertain the hope, and one well founded, that under honest, persevering, patient investigation

even the most difficult problems may be compelled to give up their solution. Whilst working for the benefit of the individual, we must keep our mental vision fixed on a point beyond; on the possibility of preventing the invasion of the tissues by the tubercle bacillus; of studying the life-history of this organism so that in time as we gain the knowledge of the conditions under which it exists, both outside and in the body, we may gradually so circumscribe its sphere of operations that it may no longer remain a factor of disease especially when we are wise enough to insist on those improved sanitary and social conditions without whose aid the tubercle bacillus even to-day would lose much of the terror attached to its name. I congratulate the Henry Phipps Institute on what it has already achieved; but I hope for it and those associated with it a still more useful, beneficent and brilliant future.

### VISCERAL PERFORATIONS—REPORT OF FIVE CASES.

BY

WILLIAM JAMES DEROME, B.A., M.D.

The discussion at a recent meeting of "La Société Médicale de Montréal," upon intestinal rupture, and the autopsy finding, suggested to me the idea of reporting the few cases of pathological and traumatic visceral perforations which have come under my observation during the past eight years.

I shall present the cases in chronological order. Case I. (Surgical Reports, Notre Dame Hospital). In the fall of 1896 the ambulance was called, for a French-Canadian, mortally wounded during a quarrel with Italians. Besides a few unimportant wounds, the victim presented in the left hypochondrium, on a level with the short ribs, a penetrating wound, parallel to the ribs, and having a downward direction. This wound gave but little blood, but through it protruded quite a portion of the omentum, the abdomen was retracted: the patient was conscious and suffered great pain in the abdomen. He refused all intervention at first, but finally consented to the resection of the omentum. Two days later death occurred and the autopsy revealed a perforation of the descending angle of the transverse colon, without any tendency to healing, little or no peritoneal infection, slight effusion in the pelvis, but no fecal matter. The weapon found a few days later, was a large file with flattened edges and sharpened to a point like a dagger. I must add that the diagnosis of perforation had not been positively made, though it was only natural to think of such a lesion. The treatment was ice and opium.

Case II. Clinique, Hotel Dieu, Paris. Professor Dieulafoy's department; year 1897-98. A young man was carried to the hospital in a

dying condition, about 4 a.m. Dr. Dieulafoy, informed at an early hour of the arrival of this patient, hastened to the hospital. Upon examination of the patient, a diagnosis of perforation of the stomach or of the duodenum was made. Mr. Kaun, the professor's assistant, was instructed to call in the surgeon and have an operation immediately performed. Dr. Dieulafoy made the following observation: "A man who rapidly passes from a state of good health to an almost moribund condition; anxious face, sunken eyes, profound collapse, following a sudden and grievous pain in the abdomen, *véritable coup de poignard péritonéal*, is not a victim of appendicitis; such a man has a perforation of the stomach or of the duodenum."

Dr. Cazin, assistant to Dr. Duplay, was called upon to perform the operation, the latter being absent. An exploratory incision in the indicated region, disclosed a perforated ulcer of the duodenum, with extravasation of the intestinal contents. The immediate suture of the perforation was followed by a most careful toilet of the cavity. The patient made an uneventful recovery.

Case III. (Surgical Department—Notre Dame Hospital).—During the summer months of 1898, while in St. Joseph's Ward, in the Notre Dame Hospital, my attention was drawn by the house surgeon, Dr. Chapdelaine, to bed No. 9. As I approached, I noticed, a strong fellow, whose look of suffering aroused my interest. I was told that the day before, he had been picked up unconscious on Notre Dame street, near Notre Dame church, having been struck by the shaft of a cart, while riding a bicycle at a considerable speed. I made a hasty examination of this powerful, well built young man, whose moribund appearance was not of good omen. The eyes were sunken, the nose pinched, the breathing labored, as he endeavoured to immobilize the muscles of his already much distended abdomen. The left hypochondrium was more distended than any other part of the abdomen, tenderness in this side was also more pronounced, but nothing could be seen externally, no ecchymosis, nor other signs of injury. The diagnosis of internal lesion had been made. The "internal lesion" proved fatal the same day, and at the post mortem, a tear measuring  $1\frac{1}{4}$  inch. was found in the stomach wall. The treatment was ice and opium.

Case IV.—The subject of the present observation is a woman, aged 48. Her digestive history has been bad for more than ten years. She had 18 pregnancies, 13 of which were full term, consequently an exhausted woman. For the past year she has been under my care for digestive troubles, exhaustion and weakness. On December the 30th, 1901, at 2 p.m., a telephone message summoned me in great haste

to attend her. I found her stretched on a bed, where she had been laid a few minutes before my arrival. The apparent state of her health, a few hours ago, had been good, but now she was almost moribund. The face was anxious, the eyes sunken; the patient complained of an excruciating pain in the epigastrium, moaned pitifully, and had a shallow and panting breathing; vomiting had already occurred once. Upon examination, I found the abdomen retracted, and of a wooden hardness, "un ventre ligneux," with an area of exquisite tenderness on the right of the median line a little above the umbilicus. The symptoms as a whole, led me to diagnose, without hesitation, a perforation of the stomach or of the duodenum.

The gravity of the case was made known to the family and a consultation asked for. About an hour after, a surgeon entered and hastily made the diagnosis of simple indigestion, but upon further examination we finally came to the same conclusion, that of a perforation. There still remained the question of treatment. I proposed an operation, substantiating my opinion by a remark of Dieulafoy, that operations performed within four hours from the time of perforation, are almost always, if not always successful.

At first food was vomited, then mucus, then bile, and finally faecal matter. At the end of 24 hours the abdominal tympanities was extreme. There was obstinate constipation, flatus even was absent, but the patient hicoughed almost continuously. Peritonitis was present but of a localized nature, since pain was, at no stage of the disease, general over the whole abdomen, being restricted to the original seat of the lesion. A large inflammatory swelling filling up the entire right hypochondrium and extending to a point below the umbilicus, was soon observed. Three days after the consultation I met the consulting surgeon who made enquiries as to the condition of the patient. I detailed to him the progress of the malady, that there was present a localized peritonitis and that the sick woman might perhaps pull through. The event justified my prediction and a month afterwards digestion was fair, but still difficult in so far as the intestinal digestion was concerned.

The patient, as well as myself, have often heard over the right hypochondrium, a silvery sound such as water makes when flowing through a tube whose diameter is suddenly narrowed at any one spot. This metallic noise persisted for several months. On the night of the 10th of March, 1902, there occurred an attack of acute pulmonary oedema which I naturally referred to the gastro-intestinal affection. A rise of temperature some days later, was followed by the discovery through a general examination of an area of dulness in the region of the umbilicus which I attributed to a peritoneal lesion. Things went on in an indif-



ferent manner until the month of September, when I was again called to see the patient, who had been suddenly seized with repeated vomiting, following a violent emotion. This time I thought I had a case of simple acute indigestion, for two hours hardly had elapsed since she had dined. I prescribed a laxative which was retained a few hours but vomited in the evening. There were no stools, nor even flatus. On examining the abdomen a swelling of the umbilical region was made out, more marked in the right hypochondrium, and intestinal obstruction was thought of. On palpation, near the spot where nine months previously I had detected a perforation, I made out a fairly solid mass, very dull, with the area of peri-umbilical dulness already mentioned spread over a greater surface. The suspicion of the presence of a neoplasm, of tuberculous adhesions, of volvulus or of an enterolith was thought over and rejected for that of intestinal obstruction through inflammatory peritoneal bands.

Another consultation, this time with Dr. Parizeau, was decided upon, and the case being urgent, an immediate operation was proposed and accepted. A laparotomy was performed the same evening, September 12th. On opening the abdomen, the intestines were found to be very much injected. They ballooned so much through the incision that they were with difficulty thrust aside, until Dr. Parizeau could explore the abdomen near the mass in the right hypochondrium. This mass was with difficulty freed from its very firm adhesions and exposed. It consisted of the great omentum folded on itself, and tightly bound to the intestines by a close meshwork of inflammatory bands. These adhesions were carefully broken up, and a cicatrix of the duodenum was revealed, that of the perforation of the month of December. At the same instant, an abscess, buried under a fold of mesentery, burst spontaneously, inundating the abdominal incision with a flow of pus of about half a litre. This pus was carefully sponged away, and the abscess cavity, now exposed, showed a fistulous trace extending to a point near the perforation. The intestinal adhesions were then broken up, the abdominal cavity flushed out with large quantities of normal saline solution, and the abdomen closed. Unfortunately the operation was a failure, the patient dying the same night. From this case one may deduce the following conclusions. 1st. This patient, who had, during 9 months, successfully overcome all the dangers of infection, of peritonitis and of pyæmia, could have without doubt undergone a laparotomy and a suture of a recent perforation, since the operation might have been performed within the first four hours. 2nd. That a physician may be ignorant of surgery, but that no surgeon should be ignorant of medicine.

Case V. Gall stone colic: Spontaneous rupture of the gall ducts:

Operation: Recovery. On Nov. 17, 1903, I was called by my colleague, Dr. Roux to see Mde. L.—, *at.* 31, mother of 2 children and at that time 3 months pregnant, I report this case with the permission of Dr. Roux. Mde. L. was suddenly taken, on the evening of the preceding day about 9 o'clock, with severe pain in the epigastrium, radiating towards the left sub-clavicular region, followed by collapse so marked that the last rites of the church were administered. Some hours afterwards the patient vomited, but there were no stools nor passage of gas. The attending physician, judging the case to be one of exceptional gravity remained all night at the patient's bedside. On arriving towards 9 o'clock next morning, I found the sick woman in bed half reclining on pillows, her knees drawn upon the abdomen, her face pinched and anxious, her eyes sunken, moaning pitifully: pulse 146, small; temp. 96.4°F. On inspection, the abdomen was fairly distended, the upper segment on percussion was resonant. There was dullness in the flanks and iliac regions: signs of fluid. There was tenderness on palpation extending over the whole abdomen, but more especially marked in the right hypochondrium and in the region of the appendix. Muscular rigidity was also marked on the right side. The slightest abdominal palpation made the patient scream with pain. I was finally able to map out exactly an area of tenderness covering the entire right side of the abdomen with intense hyperæsthesia of the sub-hepato gastric region. So intense was this hyperæsthesia that the least pressure caused as much pain as more marked pressure would in any other spot.

The patient having had symptoms of cholelithiasis I made a diagnosis of biliary colic and the symptoms of perforation having occurred at the same moment as the gallstone colic, I concluded that there had been a rupture of the biliary ducts, and to account for the appendicular symptoms, I added a probable appendicitis. The diagnosis was, therefore, gall stone colic with rupture of the bile ducts and probable appendicitis.

Immediate surgical intervention was advised, but rejected. On leaving, I told Dr. Roux to insist on the importance of immediate operation. In case such were persistently refused I advised to apply ice, to inject morphine and above all to hold an autopsy the next morning.

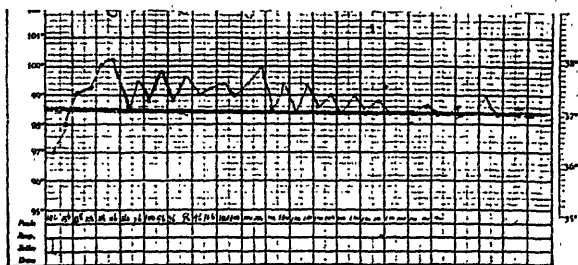
Dr. Roux at length convinced the family of the gravity of the case, and about noon the patient was taken to the Notre Dame Hospital and placed in Dr. Mercier's hands. After examining the case an immediate abdominal section was decided upon. Dr. Mercier was at first in favour of opening the abdomen in the median line, but Dr. Roux remarked, that, in view of the diagnosis of a lesion of the liver and of

the appendix, the median incision would be too far removed from both regions, and that perhaps it might be better to begin with the appendix and then go higher up if the circumstances warranted it. This was done.

The classical incision was made, the appendix found to be normal, but bile began to well up through the wounds. There was no infection of the intestines and no adhesions. A large iodoform gauze drain was introduced and the abdomen closed.

A second incision was then made in the region of the gall bladder, the cavity irrigated with normal saline to remove the bile, and the fluid carefully sponged up. The gall bladder showed a normal distension, and consequently was not ruptured. A more careful examination showed a rupture of the common bile duct, buried in a fibrinous plastic exudation with marked injection of all the neighbouring region and extensive adhesion of the great omentum and parietal peritoneum. On palpation no trace of calculi was found. The gall bladder was, nevertheless, sutured to the abdominal wall and opened, a glass drainage tube was inserted to drain the abdomen. Through the fistulous opening of the gall bladder there have passed since the day of the operation 39 gall stones (the fistula still persists), all smaller than a pea, some having well marked facets.

Although the operation was performed at least 15 hours after the perforation it was a success. The post-operative results were of the mild-



est. The patient's appetite is good, there is no more pain except from the digestive tract. This trouble can be perhaps referred to the state of pregnancy which has continued uninterrupted.

Diculafoy, in a recent clinic insists on the frequency with which calculous cholecystitis and appendicitis co-exist. How then can we explain the absence of appendicular infection in spite of the presence of non-equivocal signs of the malady? We know how intimate are the relations, how direct is the communication existing between the portal circulation and the right ovarian circulation, and consequently the peri-

ovarian region. Could we not then think of a communication between these two regions through the nervous system, and invoke reflex action to explain the appendicular symptoms which are almost always, if not always, met with in cases of calculous cholecystitis? At any rate this is the explanation I would give of this syndrome which I have always made out in cases I have operated on for gall stones, and on which I have deliberately made an exploratory incision without having ever found any lesion of the appendix. It is true then, in the case under consideration, the appendix was not removed and the question of a catarrhal appendicitis remains open for discussion.

*Conclusions*—The symptoms as a whole, as set forth in these observations enable one to make an almost positive diagnosis of a lesion of such a nature as to justify surgical intervention.

The post-operative results of case V, which is probably unique, prove that even a somewhat tardy operation is not to be rejected, although all these cases demand immediate interference.

The profound collapse inevitably found accompanying these cases is in no wise a contraindication

Immediate intervention is imperative and must not be delayed until the patient is the victim of a general peritonitis or profoundly septic and moribund.

Expectation is more to be feared, than active interference.

## TUBERCULAR PERITONITIS.

BY

L. COYTEUX PRÉVOST, M.D.

The peritoneum, like all other tissues which enter into the composition of the human body, may become the seat of the pathological process to which the name of "inflammation" has been given. Here, as well as elsewhere, the inflammation is caused originally by the presence and harmful influence of pathogenic micro-organisms. Whatever may be the nature of the infective agent, whatever the family to which it belongs may be, it is in all cases the *fons et origo* of the disorder, the primordial cause of peritonitis.

This proposition, to my mind absolutely indisputable, shows how utterly irrational is the classical classification of peritoneal inflammation into idiopathic and symptomatic peritonitis. We know perfectly well nowadays what to think of the condition formerly called inflammation *a frigore*. Cold and traumatism, cannot by themselves create the inflammatory process, as we know them; they are never anything

else than indirect factors of the disease, and their action is limited to the local disorder they produce in the intimacy of the tissues, inducing a state of receptivity, a lack of vital resistance, which render the soil favourable to the attacks of the germs which constantly swarm in the neighbourhood.

We must bear in mind that the peritoneum covers all the abdominal viscera; the liver, the stomach, the intestine. These viscera shelter all sort of micro-organisms; the staphylococcus, the streptococcus, and especially the bacterium coli are there, waiting for favourable conditions to commit their misdeeds. Let those virulent germs be allowed to enter the abdominal cavity during laparotomy, or be poured into the abdomen following the perforation of the stomach, of the gall bladder or of a purulent collection: Is there any wonder that the peritoneum, this susceptible serous membrane, should immediately respond, becoming the seat of inflammation whose severity will vary according to the activity of the virus?

But, outside of these cases in which the enemy is caught, as it were, *flagrante delictu*, there are others the explanation of which is just as rational. A physiological disturbance may supervene in the intestinal functions, such as, for example, a transitory attack of indigestion, constipation, vitiated alimentation, or even the sudden impression of cold, immediately the germs contained in the intestine enter into play and determine inflammatory reaction in the peritoneum which is momentarily deprived of its habitual means of defense.

Viscera are not the only dens wherein pathogenic germs are swarming; there exists, as you are aware, conditions in which the blood carries infective agents which sooner or later will catch some points of the organism in a state of physiological inferiority. This is what occurs in cancerous and tubercular diathesis. One day or other, what I have just supposed to take place in the intestinal tract will occur with regard to the chyloferous vessels, and the peritoneum protected until then by its normal physiological condition, will become exposed to the noxious action of the virus should a fortuitous disorder happen to put it in a state of receptivity. Your remember Max Sculler's celebrated experience? He produced a contusion on the joint of a guinea pig and then injected in the blood a culture of Koch's bacilli; immediately the contused articulation became tubercular.

But enough upon these etiological considerations which, after all, only rest upon hypothesis. What we must accept as a certain fact is that there exists a peritonitis, of a tubercular nature, characterized by the presence on the peritoneum of a more or less considerable number of typical granulations, small, hard or having already undergone a

beginning of softening. The serous layer, congested, thickened, has lost its normal lustre and shows fresh lymph on the inflamed surfaces. The intestinal cells are frequently agglutinated and the entire mass of the intestine may form a firm tumour retracted against the spinal column. Caseous abscesses are often met with and in some cases, fibroid formations are found, showing that here as well as in the lungs, there exists sometimes a tendency towards a spontaneous favourable termination. Ascites is frequent, the fluid being yellow or bloody, encysted by adhesions or free in the general cavity. All the organs contained in the abdomen may be studded with miliary tubercles which are then found everywhere, on the tubes, the ovary, the uterus, the stomach, the liver, the intestine. The omentum, thickened, puckered and rolled up, forms sometimes a firm, elongated tumour lying transversely across the upper part of the abdomen.

Now, where does that tuberculosis of the peritoneum come from? Is it derived from a tubercular affection of the tubes or the uterus; has the pathogenic agent directly been brought by the circulation, or, was it originally situated in the intestinal tract? I have neither the time nor the desire to lay stress on this side of the question, and I hasten to proceed to the far more practical examination of the symptoms and the treatment.

Tubercles may exist all over the peritoneum without giving rise to any symptom. It happens in the abdominal cavity what we sometimes meet in the lungs where tubercles may be smouldering for a long time with all the signs of perfect health, until the day when a sudden hæmoptysis will come and reveal their unsuspected presence. This latent tubercular peritonitis is really far from being uncommon. Osler has dwelt upon this latency of the disease, the eruption sometimes taking place without the least symptom. Kelly says that in 80 per cent. of his cases, he has observed good colour, good appearance in patients having good family history whose peritoneum was covered with tubercular granulations. Courty cites the case of a patient offering the appearance of perfect health three weeks before her death.

In the month of May, 1903, a young girl, aged 19, was sent to me from Almonte. Three weeks before her entrance to the hospital, she had been complaining of abdominal pains, accompanied by digestive troubles. She looked extremely emaciated, her face was flushed and she had a hectic appearance. Temperature: 105; pulse weak and frequent. No cough; nothing appreciable in the lungs. The abdomen was distended, tympanitic and tender on pressure. No ascites. Some hard lumps could be felt in the upper quadrant of the abdomen. She was put to bed and soon seemed to improve. Feeling much better,

she insisted on going home. She left the hospital ten days after her entrance and died three days after getting home, with meningeal symptoms. There is no doubt about this case being one of tubercular peritonitis; still, until one month before her death, she never complained of anything else than slight disturbance of the digestion, without any abdominal symptoms whatever.

During the summer of 1903, Mrs. S. came to me from Renfrew. Four years before, she began to suffer from a pain in the right ovarian region which resisted all treatment. She looked well and was complaining only of dysmenorrhœa and of that pain in the right side. Laparotomy was done. A great many tubercles were found on the peritoneum, the small intestine and the posterior surface of the uterus. Right ovary was cystic; tube adherent; appendix adherent to the posterior surface of the cæcum. Appendix and appendages were removed. The patient was discharged perfectly well.

Mrs. McL., seen in consultation with Dr. Mair, Cobden. Age 45, nulliparous. Had always been in good health until ten days before, when she was taken with severe abdominal pains and frequent vomiting. Slight tympanitis; no fever; visible increased intestinal peristalsis accompanied by crampy pains in the umbilical region. Obstinate constipation. Laparotomy was done and a large quantity of serous fluid tinged with blood issued. No tubercles were seen on the peritoneum. To the right of the median line the omentum was pulled down towards the pelvis by strong bands of adhesions. Deeply in the right iliac fossa, a small band was found forming a cord stretched across the coils of the small intestine. The peritoneal surface of the ileum showed a congested line due to the constriction produced by the band which was divided with scissors. Another band spread out from the small intestine to the pelvis, incarcerating the appendix, which after being freed was removed and found only slightly congested. In that region, numerous tubercular granulations were seen disseminated in every direction. Patient is now perfectly well.

These cases, although not very uncommon, must still be considered as exceptional and patients suffering from tuberculosis of the peritoneum usually present some symptoms which attract our attention towards the abdominal region. Ascites is frequent and in some cases, the only appreciable symptom, and the existence of fluid in the abdomen in the absence of heart, liver or kidney diseases, must always make us think of tuberculosis, even if the patient complains of no pain, has no temperature and offers no other sign whatever, which we would naturally expect to find in cases of peritoneal inflammation.

Last spring, a Polish girl, aged 20, was sent to me from Renfrew.

Servant girl, no tubercular antecedents. One year before, she complained of dyspepsia which lasted for several months and was accompanied by swelling of the feet and legs. Ascites developed. She was tapped by her physician and twelve quarts of serous fluid was removed. The effusion returned and she was sent to the hospital. She looks well, has rosy cheeks. Considerable œdema of lower limbs. Enormous ascites. Pulse, 112; embryocardia. Hardly any abdominal pains, but severe backache extending downwards. Slight abdominal tenderness. Temperature normal. Appetite good. She was tapped and six quarts of amber coloured serous fluid removed. The next day the abdomen began to fill up again; respiration became accelerated and temperature for several days reached 103 every night. Laparotomy was done. Peritoneum very thick. Abdomen contains a large quantity of serous fluid. Omentum adherent to parietal peritoneum. Numerous tubercular granulations were found covering the whole abdominal cavity, peritoneum, liver and intestines. Temperature fell after the operation, went up again in the evening for a while, but gradually disappeared. Ascites did not return. Was discharged several weeks afterwards feeling well. I have heard of her lately; she is in perfect health and has resumed her work.

In some cases, ascites is absent but there is generally quite a perceptible enlargement of the abdomen due to a certain amount of meteorism and also to the thickening of subperitoneal tissues which produces on the finger a doughy sensation, a sign considered by Edehols as characteristic of tubercular peritonitis.

We must not therefore lose sight of the fact that in several cases patients suffering from tubercular peritonitis come to the consultation complaining only of digestive troubles or merely of enlargement of the abdomen with or without ascites. The diagnosis then is rather difficult and always very puzzling. The only particular which is liable to arouse our suspicion is the long and obstinate duration of the symptoms, in spite of prolonged and appropriate treatment.

Typical cases manifest their nature by the following symptoms: Abdominal pains, generally without special localization, but sometimes simulating appendicitis with which tubercular peritonitis has after been mistaken. Vomiting is not uncommon. There is always a certain amount of tenderness of the abdomen which is tense, thickened and containing more or less fluid in its cavity. Gastric disturbances are very frequent and in the majority of cases, constitute the initial symptom. There is fever with evening exacerbations, the temperature varying between 99 and 100 and, in some cases reaching 103, 104. Fever is not always present, and, out of 11 cases, I found 5 entirely



apyretic. But when it exists, elevation of temperature with evening exacerbations is a precious sign, especially when such course of temperature is associated with tympanites and effusion in the abdomen. Ascites is rarely large, although at times the effusion may be considerable. In the observation cited above, the abdomen contained more than twelve quarts of fluid. The fluid is generally amber coloured, but it may be tinged with blood. Still, the bloody character of peritoneal effusion is always very suspicious as it occurs most usually in malignant diseases of the abdominal cavity.

In cases where there exists a sacculated effusion, the differential diagnosis may be somewhat embarrassing, the disease resembling then ovarian cyst or ascites due to affections of the heart or the liver. But, careful percussion will show that in cardiac, renal or hepatic ascites, there is resonance in front and dulness in the flanks; in ovarian cysts, dulness in front and resonance in the flanks, and, in sacculated tubercular peritonitis, dulness all over. Diarrhoea which associated with evening temperature is so frequently the sign of tubercular enteritis, seems to be rare in tuberculosis of the peritoneum. On the contrary, constipation was present in 50 per cent. of the cases observed by Kelly who also found painful defecation in 20 per cent. The same author lays great stress upon pain in urination which he contends to be a most characteristic symptom. Out of several cases, I have observed this symptom only once, which shows that it must not be of very frequent occurrence.

Like all cases where there is some impediment in the portal circulation, dilatation of subcutaneous veins is often observed, but contrary to what occurs in cirrhosis, where collateral circulation is seen in the upper quadrant of the abdomen, in tubercular peritonitis, it is situated below the umbilical region.

Tumours are often felt in palpating the abdomen when the quantity of the effusion does not prevent satisfactory examination. These tumours are due to masses formed by the agglutination of intestinal coils. In other cases, they are formed by the omentum curled up in irregular nodules and always situated, according to Musser, in the upper quadrant of the abdomen.

I wish to draw your attention to the fact that, out of 11 cases the detailed history of which I have before me, 10 were observed in women and none of these women had ever been pregnant. Would there be any relation between sterility and the predisposition to tuberculosis of the peritoneum? This is quite possible when we consider on the one hand the frequency of the involvement of Fallopian tubes in these cases and, on the other, the well known predilection of infectious dis-

eases for organs in abnormal conditions. The same thing is observed in ectopic gestation which is supposed to occur generally in tubes previously diseased and in the majority of cases, is preceded by a more or less prolonged period of sterility. The greater frequency of tubercular peritonitis in women, and also the previous disturbances of genital functions for a certain time before the breaking out of the tubercular symptoms, lends, I fancy, some likelihood to the correctness of this proposition.

#### *Treatment:*

It is really remarkable how strange errors do sometimes occur. De Graafe, one day, thinking he had to deal with a cataract, performed a preliminary iridectomy to remove the supposed opaque lens. The latter, to his great surprise, was not diseased; it was simply a case of glaucoma. However, the patient recovered his eyesight and the treatment of glaucoma by iridectomy became classical, thanks to that error of diagnosis.

In 1862, Spencer Wells, who could not help seeing ovarian cysts everywhere, one day opened the abdomen, believing he had to do with one of these cysts. He was mistaken, and laparotomy revealed tubercular peritonitis, accompanied by ascites. The patient recovered from the operation and also from her disease. Much later, in 1884, Koenig proposed laparotomy as a method of treatment of peritoneal tuberculosis. But, it is only within the last few years that this mode of treatment became definitely adopted by surgeons and, to-day, the cases of tubercular peritonitis treated and cured by the opening of the abdomen are simply innumerable.

I have personally treated a great many cases by laparotomy, but I have been able to follow only 11 of them after the operation. This number is comparatively small I know, satisfactory as the results may have been, since 7 were cured out of 11; however, it is so much added to the statistics cited by others, namely Koenig, who had 30 per cent. of permanent cures; Aldibert, 82 per cent.; Ochsner, 84 per cent.; Parke Syme, 30 per cent.; Roersch, 75 per cent.; Maurange, 80 per cent.; and finally, Galvani, who in a remarkable article published in "La Revue de Gynécologie et de Chirurgie abdominale," cited lately 111 cases in his own practice with 86 per cent. radically cured or improved by laparotomy.

The fact that some patients remain permanently cured is shown by the personal experience of observers who have published cases of patients feeling perfectly well several years after the operation. Schuc-ling's patient was living and in good health fifteen years after; Stelwag's,

thirteen years, and Spencer Wells' woman, in whose case the error of diagnosis became the origin of the actual surgical treatment of the disease, was still living twenty-two years after the operation.

Moreover, in cases where a second laparotomy was deemed necessary, the tubercular lesions—and some of them very extensive—found at the first operation proved to have entirely disappeared. Ashfeld, Keetly, Schmidt, have published several observations of that kind. Halsted operated once upon a patient affected with tuberculosis, who several months later died of pneumonia; the autopsy showed complete absence of tubercles. Herslag performed laparotomy on a woman whose abdominal cavity was studded with confluent granulations; eight months after, she died of pulmonary phthisis, and at the autopsy the peritoneum was found perfectly clean; no trace of granulations.

Galvani, who seems to have had in these cases more experience than anybody else, insists on the necessity of doing a second or even a third operation when improvement does not seem definite after the first laparotomy. Well, in the course of a subsequent operation, he has repeatedly noticed the total disappearance of tubercular masses which existed previously in the abdomen.

Naturally, here, the same thing occurs as it does in all other questions pertaining to the medico-surgical domain; the enthusiasm of the majority is not shared by a certain number, who deny the efficacy of this mode of treatment, in spite of the astounding results published everywhere. Thus, Brockgrevink is far from being convinced. He has observed 22 cases of peritoneal tuberculosis treated by laparotomy and of 17 without. Out of the 22, 9 died, 8 out of those who had fever, and 1 out of the apyretic. Out of the 17 cases treated without laparotomy, 14 recovered. Oheler treated 39 cases without operation, and 21 got well. Fargas, at the Congress of Moscow, in 1897, contended that spontaneous cure occurred in 50 per cent. of cases and that the opening of the abdomen was not necessary.

On the other hand, Treves has published the following compared statistics:

Cases treated by laparotomy:—	Mortality, 3 per cent.
	Improvement, 80 per cent.
	Permanent cure, 30 per cent.
Cases treated without:—	Mortality, 19 per cent.
	Stationary, 71 per cent.
	Cured, 9 per cent.

The conclusions which naturally arises from the above more or less contradictory statistics, is the undeniable fact that tubercular peritonitis is susceptible of spontaneous cure, but I do not think that it militates

against the uselessness of laparotomy when we take into consideration the rapid and brilliant results obtained by this mode of treatment employed in suitable cases, that is, above all, at the early stage of the disease, or at least, before the patient is actually moribund. In these favourable cases, twenty-four, forty-eight hours after coeliotomy, the fever disappears, appetite returns, all painful symptoms vanish and in a few weeks, the patient is well enough to resume her occupation.

Of course, I know perfectly well that we are bound to meet with a certain amount of failures, and the good results will necessarily vary with the different conditions which are liable to occur. For instance, we cannot overlook the influence of the age, the form and the duration of the disease and especially, the numerous complications such as fever, involvement of the lungs and the character of the pathological lesions existing in the abdomen. I quite willingly believe that the results of our intervention are ever so much more satisfactory when we have to deal with the miliary rather than the caseous form of tuberculosis, but until we are in possession of reliable clinical signs indicating the exact nature of the process, we should, in my opinion, persist in opening the abdomen as early as possible, that is, as soon as we have acquired a satisfactory presumption that there exists tuberculosis in the peritoneal cavity.

I do not contest the fact that several cases get well spontaneously, but I cannot agree with those who contend that we should always wait, to see what nature will do, before resorting to the surgical treatment which after all, besides being entirely devoid of gravity, will at any rate serve to enlighten the diagnosis in obscure cases. Why should *waiting* be here the proper course to follow, when the most elementary experience has repeatedly taught us the deplorable consequences of procrastination in other pathological conditions?

And finally, when we consider the difficulty in the majority of cases, of placing our tubercular patients in such a situation as will ensure efficacious results from purely medical treatment, such as irreproachable hygienic conditions, over-feeding, prolonged and absolute rest, I am compelled to come to the conclusion that laparotomy is the treatment of choice in tuberculosis of the peritoneum, because experience has proved that it is curative in the majority of cases, provided it is resorted to before the progress of the disease has made it impossible for the patient to be cured by any surgical or medical treatment whatever.

And then, I consider the mere fact of opening the abdomen as altogether sufficient, without it being necessary to resort in the meantime to antiseptics, irrigation or the removal of pelvic masses. The supposed primary genital focus should not be attacked unless suppurating.

If adhesions are not extensive, they may be separated with care, but when the intestines are adherent in a bunch, they should not be touched.

And no drainage; the tract of the drain may remain open indefinitely. Kelly has shown temperature to drop to normal in the second week without drainage, and in the ninth only, when drainage is used. He has abandoned it for more than five years. If in a few weeks or months, the disease shows signs of recurrence, we should not hesitate to follow Galvani's example and reopen the abdomen a second and even a third time.

Should it be our good fortune to have to deal with a recent case, accompanied by ascites, we are justified in expecting a definitive and permanent cure, and even in cases where alteration of the general state and elevation of temperature induce us to suspect that we have perhaps to deal with the caseous form, here again, although our prognosis should be reserved, we have good chances of obtaining considerable improvement and even permanent cure, as several observers have cited examples.

We are not yet in possession of satisfactory theories to explain the means of healing after abdominal section in tubercular peritonitis, but whether the penetration of light and air in the abdominal cavity has any influence or not upon the disappearance of the lesions, we have ample reasons to believe—and this is my final conclusion—that the mere opening of the abdomen is all that is required to obtain the necessary results. It is, at any rate, the first and the most important step in the treatment which, subsequently, should be continued and directed according to the classical rules governing the treatment of tuberculosis in general.

---

### MIGRATION OF NEEDLES FROM THE INTESTINES INTO SURROUNDING TISSUES.

BY

JAMES BELL, M.D.

J. C., æt. 30, was admitted to the Royal Victoria Hospital, January 3rd, 1902, having been sent from a distant town, with a diagnosis of appendicitis, of a subacute character. He gave the following history:—He had always enjoyed the best of health until May, 1901, when he began to suffer from obscure pains in the abdomen. During the whole summer and autumn he had suffered more or less from these pains and felt generally "not quite well." He attributed his ill-feeling to overwork and irregular meals. About the middle of November he was taken suddenly ill one morning about an hour or an hour and a half after breakfast with vomiting and severe pain across the abdomen.

Up to this time he had had no vomiting and the bowels had been regular, but he had had a poor and capricious appetite. Vomiting continued for two days and was very abundant, and he was laid up for four days. He then went about his work for two weeks, when he had another attack similar to the first; vomiting was very profuse and the pain was more localized towards right side. This attack came on about five in the afternoon. He then had no bowel movement for four days and kept on vomiting whenever he attempted to take food for the next eight or ten days. The pain was so severe that he had to have hypodermic injection of morphia. He recovered from this attack and was free from pain and vomiting for two days, when he went for a drive and began vomiting again and had to go to bed, vomiting each time he took food or drink. He had a great deal of nausea and the pain was increased by vomiting or bowel movements. These conditions persisted until his admission to hospital on January 3rd, 1902.

He stated that his physician had told him that during all his illness he had not had any elevation of temperature. One month before admission he weighed 175 lbs., two weeks later 155 lbs., and on admission 135 lbs. He had therefore lost 41 lbs. in a month. There had never been any blood or anything unusual in the stools, but on one occasion there was a streak of blood in the vomited matter. He had always been a man of regular habits, had no venereal history; had been married three years and had one child. His father, mother, three brothers and one sister were alive and well, and the family history was in every respect excellent. His heart, lungs and kidneys were sound and the blood count normal.

Test meals were given and stomach lavage carried out, but nothing abnormal was discovered. From his admission on the 3rd of January until the 30th of the same month, 27 days, he was kept under observation. The symptoms were, vomiting, nearly every day, pain on right side of abdomen and an obscure and indefinite tenderness over the appendix region. There was slight resistance over the upper part of the right rectus muscle, but there was only occasionally a very slight rise of temperature.

I was not satisfied with the diagnosis and hesitated to operate, and I had both Dr. Stewart and Dr. Martin see him with me on several occasions and we all concluded that there was, at least, a considerable element of neurosis in the case. Finally, on the 30th of January, I removed his appendix. I found it about two inches long and adherent to the caecum at its distal extremity. On examination after removal it was found to be chronically thickened and to contain a little mucus in which colon bacilli were the only micro-organisms found. All his

symptoms subsided and he made an uninterrupted recovery and he was discharged on the 25th of February, 25 days after operation. Nothing was discovered at the operation beyond the diseased appendix and the results of operation seemed to be convincing, that the appendix was the source of all the trouble, though I could never explain how it had caused such anomalous symptoms.

On the 2nd of June, 1903, 15 months after his discharge, he was readmitted with practically the same symptoms and history as he had on the first admission. He stated that he had been fairly well for four or five months after leaving the hospital (until the end of June), and then the same train of symptoms developed, beginning with a sudden severe attack, but on the whole more gradually than before. During these four or five months in which he considered himself fairly well he had attended more or less to his work, but had suffered somewhat from pain beneath the scar and about the lower ribs on the right side. All his organs were found normal; there was now, however, a more marked and definite tenderness at the right costal margin, about the point of the 9th rib. He was under observation from the 2nd of June until the 3rd of July, with symptoms in all respects similar to those observed when he was in hospital, before the removal of his appendix; vomiting, obscure pain, pretty constant, but with varying intensity, loss of appetite and tenderness over the abdomen.

Dr. Martin again saw him with me and could only suggest that there was a marked neurosis and no definite organic lesion discoverable. Finally, I proposed an exploratory operation, to investigate the gall-bladder, bile ducts and pancreas.

I opened the abdomen on the 3rd of July at the outer margin of the right rectus, the incision extending upwards from the upper end of the previous incision. I found some adhesion about the pylorus and liver margin and, while investigating these, my finger was pricked by a needle. Further investigation showed that the point of the needle lay free in the stomach and the eye end was imbedded in the liver, having passed through the anterior surface of the pyloric end of the stomach. The point was pushed through the stomach wall, grasped by forceps and removed. It was a darning needle, about four inches long, much corroded and the upper part of the eye gone. I then proceeded to explore the region of the cæcum and found a mass of swollen mesenteric glands extending from the brim of the pelvis up to the pancreas. Manipulating this mass and tracing down the duodenum, I discovered another needle, with the end lying free in the duodenum just to the right of the spinal column. I pushed this through the duodenal wall and removed it with forceps. This proved to be a sharp

shawl or hat pin without the head and about four inches long. I then proceeded to make a more systematic exploration, beginning with the stomach itself. My incision was so far over towards the right side that I was unable to deliver the stomach through the wound, so I withdrew it partially and proceeded to palpate it, in situ. I found at the cardiac dilatation of the stomach a long hard mass, evidently a foreign body, which I concluded was another needle. In endeavouring to work it towards the pyloric end of the stomach my finger was again pricked by a needle in the gastro-colic omentum. I turned my attention to this and removed an ordinary sewing needle about two inches long. On returning to the stomach I could not, now, find the body which I had been manipulating before and as I was able to palpate the stomach most thoroughly, and could not find the supposed needle, I concluded that it must have passed on and out through the pylorus. Moreover, I felt that having already found so many needles the skiagraph would probably discover more and that another operation would be necessary. I therefore closed the abdomen without incising the stomach wall.

The subsequent history of this patient was uneventful except for the history of the foreign body which I had failed to remove from the stomach. He complained of pain, occasionally, sometimes in one part and sometimes in another, but mostly in the left side, and below the level of the umbilicus. On the 8th of July, five days after the operation, he was skiagraphed with negative result. On the 17th, a foreign body was obscurely seen and located over the left sacro-iliac articulation. Several skiagraphs were subsequently taken and showed a linear body which varied in position and direction from time to time, but was never very distinct. On the morning of the 26th of August he had some pain in the rectum when at stool and found that there was some blood on the toilet paper. The stool was examined and a triangular piece of glass found about  $3\frac{1}{2}$  inches long and  $\frac{3}{4}$  of an inch in width at the base.

His abdominal wounds were now healed, and as he remained entirely free from symptoms and was feeling quite well he was discharged on the 29th of August, and I have not heard from him since. All his bowel evacuations were examined after the operation, as it was felt that the foreign body might be passed at any time.

I, personally, made the most careful enquiry about his previous history from himself, his wife, his physician (the latter by letter only), and from some friends and acquaintances, without discovering anything to show how or why the foreign bodies should have found their way into the positions in which they were discovered. There was no per-



sonal or family history of neurotic manifestations. He had always been an active, healthy and successful man. He began life as a clerk in a dry goods store, then learned the carriagemaking trade, and finally had become an agent for carriages and implements. He professed to be unable to account for the presence of these foreign bodies in any way and declared that he had never swallowed them either accidentally or otherwise; that he had never been in the habit of putting needles in his mouth, but admitted that he had, when working as a carriagemaker been in the habit of putting tacks in his mouth, and would not have been surprised to have found that he had swallowed one or more of them, although he declared that he had no knowledge or suspicion of ever having done so.

Personally, I have no doubt but that he had swallowed the needles! As for the piece of glass, it was in his stomach on the 3rd of July, 30 days after his admission to hospital and passed through the alimentary canal, being found in the stool 23 days later. Although not a total abstainer, he was never a drunkard, and he had only used morphia for the relief of pain on the advice of his physician. Incidentally it may be mentioned that on his arrival at the hospital on the 3rd of June, 1903, he was deeply narcotized from the use of tablets of morphia which he said had been given him by his physician. He showed no signs at any time of being addicted to the use of a narcotic or other drugs.

---

## RADIUM.

BY

E. RUTHERFORD, F.R.S.C., F.R.S.

Macdonald Professor of Physics, McGill University.

The term Radio-activity is now applied to a class of substances like Uranium, Thorium and Radium, which possess the property of spontaneously emitting radiations capable of passing through metals and through substances opaque to ordinary light. The first discovery on this subject was made by Becquerel, in 1896, shortly after the discovery of Roentgen-rays. He found that the compounds of uranium possessed the property of naturally emitting penetrating rays, similar in some respects to Roentgen rays.

The photographic action of uranium is extremely feeble, and a day's exposure of a photographic plate is required to produce an appreciable impression. The rays from radio-active substances possess the same property as Roentgen rays of discharging electrified bodies. The effect

---

Abstract of lecture with experiments, delivered before the Montreal Medico-Chirurgical Society, 8th January, 1904.

can be very well illustrated by the ordinary gold leaf electroscope. The gold leaves ordinarily collapse very slowly, but on bringing a radio active substance near them the electroscope rapidly loses its charge, and this is shown by the rapid collapse of the gold leaves. This discharging action of the rays is the best method of studying the properties of the radio-active substances.

Thorium was found by Schmidt and Mme. Curie to be about as radio-active as uranium. In the course of an examination of the uranium ores, or pitchblendes, by the electrical method, Mme. Curie found that some kinds of pitchblende, notably from the Joachimstahl mine in Bohemia, possessed a far greater discharging power than was to be expected from the amount of uranium present. She concluded that pitchblende must contain another radio-active substance of greater activity than uranium or thorium. As a result of a chemical examination of pitchblende, Mme. Curie found that two new radio-active substances were present in small quantities. These two new substances were called polonium and radium. Radium has been chemically isolated, and is found to be an element of heavy atomic weight with a definite spectrum. In chemical properties it is closely allied to barium. Its activity is over one million times that of uranium and, in consequence, it exhibits all the phenomena produced by uranium to an intense degree. Using a few grains of pure radium bromide, a photographic plate is immediately blackened and a gold leaf electroscope instantly discharged.

Radium exists in pitchblende in the proportion of about one part in a million. The cost and difficulty of a separation of a small quantity of radium is thus very great; the value of radium is at present about ten thousand times that of gold.

Radium bromide is feebly luminous in the dark. The radiations emitted from it are for the most part invisible and only manifest themselves when they are transformed into visible light by the action of a suitable substance. A Roentgen ray screen, or screen of zinc sulphide, or villemite, is very suitable to show the strong phosphorescence set up by the rays.

The rays from radium are of three kinds, known as the  $\alpha$ ,  $\beta$ , and  $\gamma$  rays. The writer found that the  $\alpha$  rays consisted of a flight of positively charged particles, consisting probably of either hydrogen or helium, projected with a velocity of about twenty thousand miles a second. These rays are very readily absorbed and are stopped by a sheet of note paper and in passing through a few inches of air.

The  $\beta$  rays are more penetrating and consist of negatively charged particles projected with a velocity of over a hundred thousand miles

per second. The  $\beta$  particles are the smallest bodies known to science, and have a mass of 1-1000th part of the mass of the hydrogen atom. They are readily deflected by a magnetic field, and have been shown to be identical with the cathode rays produced in the vacuum tube.

The  $\gamma$  rays are of an extraordinarily penetrating character. They readily pass through several inches of lead or of iron and are very similar in properties to Roentgen rays.

Sir William Crookes devised a simple little instrument, called the Spintharoscope, which shows in a beautiful manner that the  $\alpha$  rays consist of a flight of particles. A trace of radium is placed near a little piece of cardboard, covered with a layer of zinc sulphide. The zinc sulphide is rendered luminous by the  $\alpha$  rays, and, on examining it with a lens, the luminosity is found to be not uniform, but to consist of a multitude of scintillations coming and going with great rapidity. This effect is due to the luminosity produced on the screen by the impact of the projected atoms or  $\alpha$  particles. Each particle has a sufficient energy of motion to produce a visible flash of light when it impacts on the screen.

In addition to these three types of rays, radium also emits a large quantity of heat and, in consequence, its temperature is always several degrees above that of the air surrounding it. A pound of radium would emit heat energy at the rate of about 1-15th of a horse power, and would keep up this rate of heat emission for probably hundreds of years without any appreciable change.

Radium also possesses another very important property. It continuously produces from itself an emanation or gas, which is strongly radioactive. This gas, which is produced in minute quantity, is chemically inert but condenses at a temperature of liquid air. The emanation can be removed from radium by heat or by solution. The activity of the radium emanation is not permanent but decays in time, falling to half value in about four days. It is capable of being carried from point to point with a current of air and may be stored like a gas in an ordinary gasometer. The emanation possesses the remarkable property of exciting activity on all bodies near it. A body, made active in this way, behaves as if it were covered with an invisible deposit of radio-active matter. Like that of the emanation, this excited activity is not permanent, but disappears in the course of a few hours.

Although the emanation is given off in minute quantity from radium, it possesses a marked heating effect. It can be readily deduced that, if a cubic centimetre of the emanation were collected in a glass tube, the powerful radiations from it would melt down the glass tube containing it. One pound weight of the emanation would initially give out energy at the rate of about ten thousand horse power and, while

its radiations lasted, would emit an amount of energy corresponding to about sixty thousand horse power days. A few pounds of the emanation would thus supply energy sufficient to propel a steamer across the Atlantic.

It has been mentioned that the emanation is freed from radium by heat or solution. The emanation, so removed, gradually loses its activity, but at the same time the radium is again producing the emanation from itself and, by the time that the separated emanation has lost its activity, a fresh amount of emanation can be derived from the radium.

In order to explain the remarkable properties exhibited by radium and also by uranium and thorium, Mr. Soddy and the writer have advanced a view that the radio-active substances are undergoing atomic disintegration. All of the processes occurring in radio-activity are unaffected by great changes in temperature or by any physical or chemical agency. In this respect, they differ greatly from ordinary chemical changes in which temperature exercises a very marked influence. It is supposed that a certain small fraction of the atoms of the radio-active elements are at any moment unstable, and that each unstable atom throws off from itself an  $\alpha$  particle. The system left behind, which is changed in chemical properties, is again unstable and projects another  $\alpha$  particle, and this process continues through five or six well marked changes. On this view the emanation from radium consists of the radium atom minus one or more  $\alpha$  particles. The matter which produces excited activity is in turn derived from the expulsion of an  $\alpha$  particle from the article of the emanation. On this view the energy given out by radium is derived from the atom itself. The energy is latent in the atom and is released during the processes of successive disintegration.

We are thus led to the view that radio elements are able to emit, weight for weight, an amount of energy enormous compared with that released in the most intense chemical reactions. Since the emanation is unstable it cannot consist of any known kind of matter. It is possible, however, that the  $\alpha$  particle and the final product of the change, which is not radio-active, may consist of some known kind of matter. If the products of these radio-active changes consist of any known kind of matter, they should always be found associated with the radio-active minerals in the earth's crust.

Now it is remarkable that helium is an invariable companion of the radio-active elements. For these and other reasons, Mr. Soddy and the writer, more than a year ago, suggested that the rare gas helium was probably a product of the transformation of the radio-active elements. This suggestion has recently been confirmed in a striking

manner by Sir William Ramsay and Mr. Soddy, who have found that helium is produced in minute quantity by the radium emanation. It seems extremely probable that the helium is in reality the  $\alpha$  particle which is projected from the radium with such great velocity. It thus seems probable that in the radio-elements, we are actually witnessing the slow spontaneous transformation of matter. This process is so slow that, even in the case of radium, probably several thousand years must elapse before any appreciable fraction of the radium is transformed. In the case of uranium and thorium, transformation takes place only at the rate of about one-millionth of that of radium. This process of transformation cannot yet be altered or controlled by any physical or chemical agents at our disposal.

It was early observed that rays from radium produced burns, very similar in character to those produced by the continued application of Roentgen rays. The tissue is in many cases destroyed and the wound takes a long time to heal.

It has been found that the rays are capable of destroying life in caterpillars and mice and that they also have an effect in stopping or retarding the growth of certain cultures of bacteria. The rays have been used with advantage in certain cases of cancer, where the effect is apparently similar to that produced by Roentgen rays. Radium, however, possesses the very great advantage that it may be introduced in a small tube at the exact point required so that the action is to a large extent localized.

It has been suggested that the emanations from radium or thorium might prove useful in the treatment of consumption. The emanation may be inhaled into the lungs, mixed with air, and thus produce an action at the point required. The emanations leave behind them a minute film of radio-active matter, and this, in the case of thorium, would continue to radiate for several days and, in the case of radium, for several hours.

Giesel has observed a very interesting action of the radium rays on the eye. If a few milligrams of radium are brought near the closed eye in a dark room, a sensation of diffused light is observed. This is partly due to a phosphorescence produced by the  $\beta$  and  $\gamma$  rays in the eyeball and retina. It is stated that the blind are able to perceive the sensation of light provided the retina is not diseased.

It must be borne in mind that very little has so far been done with regard to the medical application of the rays and it is by no means certain that the action of the rays would be in all cases beneficial. The effects produced by the rays often do not manifest themselves for several weeks after their application, and experiments, in consequence, must be carried out with great caution.

THE

# Montreal Medical Journal.

*A Monthly Record of the Progress of Medical and Surgical Science.*

EDITED BY

JAMES STEWART,  
A. D. BLACKADER,  
G. GORDON CAMPBELL,  
FRANK BULLER,  
H. A. LAFLEUR,

GEO. E. ARMSTRONG  
J. GEORGE ADAMI,  
WILLIAM GARDNER  
F. G. FINLEY,  
F. J. SHEPHERD,

ANDREW MACPHAIL, MANAGING EDITOR.

WITH THE COLLABORATION OF

EDWARD ARCHIBALD,  
W. L. BARLOW,  
H. S. BIRKETT,  
T. J. W. BURGESS,  
W. G. M. BYERS,  
KENNETH CAMERON  
J. C. CAMERON

W. W. CHIPMAN,  
J. M. ELDER,  
D. J. EVANS,  
J. J. GARDNER,  
A. E. GARROW,  
W. F. HAMILTON,  
F. A. L. LOCKHART.

C. F. MARTIN,  
JOHN McCRAE,  
A. G. NICHOLLS,  
E. J. SEMPLE,  
J. W. STIRLING,  
C. W. WILSON,  
C. H. BROWN

Remittances, advertisements or business communications are to be addressed to the Montreal Medical Journal Co., Box 273; all others to the Managing Editor, 216 Peel Street, Montreal.

---

VOL. XXXIII.

FEBRUARY, 1904.

No. 2.

---

## THE STUDENTS' UNION.

There are two forces working for the betterment of the conditions under which the students of McGill University live. The one is represented by the Executive Committee of the McGill Union, the other is embodied in the Young Men's Christian Association of McGill University. The work to be accomplished by these two forces is the same; the object to be attained by these two bodies is identical, that is, the students' good, as each conceives it.

The two movements for the creation of a Students' Union began about the same time and at many points they ran together. There was nothing strange then, in the desire and intention, which arose in the minds of many reasonable persons, that the two forces should be combined, that they should proceed upon convergent lines until they united, rather than that the advance should be along lines which were parallel, with the danger that at some future time those lines might ultimately diverge.

As a matter of fact the two movements have not come together; indeed, they are farther apart to-day than they were on the evening of March 4th, when the memorable meeting of graduates was held. It is worth examining the whole situation anew to find where lie the real lines of resistance, whether in the nature of the case or in the opposition of individuals on either side. It may be said at once that the outcome of the meeting of graduates lacked the appearance of spontaneity; the meeting was too well arranged, and it was not made sufficiently clear that the graduates at large who were present, were actually taking the initiative in the admirable resolutions which were finally so unanimously adopted. Again, it is questionable if the earlier conferences, looking to an amalgamation between the Association and the Executive of the Students' Union, were conducted with the highest wisdom. The negotiations appear to have been conducted without much warmth, and it would seem from the correspondence which passed, that both sides were more concerned with discovering new difficulties, than in removing those which all knew were already in existence.

Within two weeks of the meeting referred to, the advisory committee of the Association met and discussed the advisability of entering into an agreement with the graduates, to avoid duplication of work, and it was decided to recommend to the graduates that they should erect a gymnasium, whilst the Association should proceed with their own building, adjacent to and continuous with the gymnasium. They proposed that the Association Hall should be owned by the University and controlled by the Advisory Committee of the Association; that all students should be eligible to membership in the Hall, and that they should have ample representation in its management.

This in effect meant that the graduates should do something entirely different from their original proposal, that the Association scheme should go untouched, and many persons could not understand how an institution owned by one body could be controlled by another. The graduates, after due consideration by a joint committee of the two bodies, felt obliged to decline the proposal, at the same time professing their desire, that some scheme of reciprocity might be discovered.

But the matter did not rest there. Persons detached from either side, whose one aim is the good of the University, took up the negotiations at a more recent date in the kindest spirit, without, we are sorry to admit, any very satisfactory results. They suggested to both sides that each should contribute an equal amount of money, that it should be vested in nine trustees, three to be appointed by the Association, three by the graduates and three by the University as a corpora-

tion, and that all questions in regard to the construction of the building and the government of the Union should be left to the ultimate control of the body thus constituted. The graduates and the University, we believe, would have accepted this proposal and would have carried it out in good faith. The interests of all would be conserved, the susceptibilities of none would be wounded and no legitimate aspiration or ambition would be repressed.

In view of the present rapid growth of the University and of the plans that are already laid for its development, it is within the rights of the Governors to scrutinize closely any scheme or schemes for one or two unions. The University has not yet attained to its full growth, nor even to its prime of life; it is yet in the lustiness of its youth, though it will attain to its seventy-sixth anniversary next year. The situation of McGill is peculiar. It stands alone in a province and amongst a population to which its ideas are alien. The English speaking population in the country districts, from which in times past it drew most of its students, is diminishing. McGill can never expect to become a Provincial university, so dear to the heart of Ontario, even if that result were desirable. These things which at first sight might appear to militate against McGill are in reality in its favour, and being cut off from purely local influences it must look to the whole of Canada for its field. In short, it bids fair to become the National University.

In view of these facts the future of McGill depends upon the development of a university spirit, which will animate all its parts and incorporate into one living body every element which will serve to nourish and build it up. Its function is not to teach religion, nor to permit of any form of religion being taught which will tend to narrow its sympathies, or to teach social observances, or inculcate the seeking after comfort, unless these can be made to minister to its spirit. It must not be dominated either by a Students' Union or a Young Men's Christian Association.

The advocates of both schemes are animated by the purest of motives, but unless they are in harmony with the University idea the success of one or both would be a calamity. Is the students' union in harmony with the idea? It aims to supply a meeting place for all undergraduates, where the theological students, the medical, science, arts and law students, rich and poor, can meet together on common ground, in their own home; where the university spirit will have free play, as free from open religious sectarianism as from the influence of the secret society which is a sectarianism of another kind.

The ends of the Association also are entirely good. They realize



that the majority of students are away from home and are condemned to spend from four to eight years in boarding houses, and that they stand in need of some wholesome influence. No modern university assumes formal responsibility for the social and moral care of its students, and the Association aspires to fill that want. It is well organized; it communicates with every new student before he leaves home and offers to be of any possible service to him, meets him at the train if he requests it, assists him in securing a suitable boarding house, visits him in his rooms, gives receptions to all the new students during the first week and at intervals throughout the year, and this session it will conduct an employment bureau; it offers the privilege of its rooms to every man in the University; it has seventeen classes for the systematic study of the Bible; it conducts the only religious meetings in the University; it organizes the students in unselfish efforts for others and aims by every means to conserve and develop what it calls a manly Christian character.

A careful reader may wonder how a Medical Journal comes to have so profound an insight into the motives which direct the leaders of the Association, and we hasten to add it was obtained by the easy device of reading the newspapers. At a time when delicate negotiations were afoot for the union of the two bodies, a remarkable outburst of enthusiasm for the work of the Association occurred, and a propaganda started itself synchronously in three newspapers, which had been silent for a long time. From internal evidence it would appear that the writer of these articles possessed deep knowledge of the subject, and that they were in some degree an official presentment of the case for the Association. It is disclosing no private information to say that those proclamations were looked upon as ending all attempts at amalgamation. It was so regarded by friends of the Association, by friends of the union and by friends of both. Nor is it any secret that powerful friends of the University wrought hard for a combined institution. The Chancellor declared his views openly; the Principal is known to be in favour of the plan; one subscriber to the Association offered to quadruple his subscription if they would unite, and another has signified his intention of withdrawing his subscription if they do not unite.

If the graduates cannot make it clear that they raised no artificial obstacles to the amalgamation of two bodies which should come together, then their Hall will never be built; if they make it clear that the Students' Union is designed for the greatest good of the University, it will be accomplished, and they will have proven that any other plan, which could not be brought into harmony with theirs, was de-

signed for some object which was not at least primarily the greatest good of the University.

The ends of the Association, we believe, may best be achieved in a place where all the students can be reached. There is no use calling the righteous to repentance continually. Not that all the four hundred students who call themselves by the name of the Association are essentially of the righteous; that would be assuming too much, because there must be some who are actuated by other motives than the desire to attend one or more of the "seventeen classes for the systematic study of the bible" and the other religious ordinances mentioned. The fear is that the Students' Union will draw away from the Association those who now join it for the sake of the social and physical advantages which it offers, and leave behind only the professedly religious.

We have not yet seen it made clear that the Association is open to all students of the University. As we understand the situation, membership is confined to members of the Evangelical churches, and to our knowledge, there are many desirable students who are not members of any Evangelical church, and have no intention of making any such alliance. If persons like Edward Everett Hale, or, to take an example nearer home, Rev. W. S. Barnes, were to become undergraduates—a remote contingency, of course—they would be debarred from membership, though, undoubtedly they would be eligible for admission to associate membership as "persons of good moral character." There is a growing belief that an association which would place such men under a disability might do something yet more unwise.

We appeal to the members of the Association not to limit their usefulness. We appeal to the graduates to approach the problem for a third time with an open mind. The University has need of the Association. The graduates do not ask for the money they have so sedulously collected. They do not desire to raise the suspicion in the minds of subscribers that their money was sought for the propagation of the religious rather than the university spirit. Both are good if kept within bounds, but in the end, unless both come together, the issue will be defined. The one organization will stand out as a religious body pure and simple; the other will stand for the University Spirit. It will be open to all future subscribers, and to former ones who subscribed conditionally to elect which they will support.

---

#### PROFESSOR RUTHERFORD AND RADIUM.

The lecture upon Radium, with illustrations and experiments, given before the Medico-Chirurgical Society, by Professor Rutherford, "our Professor Rutherford," as the *Saturday Review*, with unusual

largeness of spirit, calls him, was a mark of great courtesy to the medical profession, and, as such, was highly appreciated. It is no small matter that we should have the latest results in this branch of research at first hand.

Scarcely ten years ago Roentgen and Lenard announced their startling discovery of a light that did not illuminate—invisible radiations from the cathode of the Crooke's tube. In 1896 came the still more important discovery of Becquerel, that certain compounds of uranium and thorium gave off penetrating rays possessing characters not unlike those of the cathode rays of Roentgen. Following close upon this announcement came the work of M. and Mme. Curie on radio-active minerals resulting, as described by the lecturer, in the isolation of two new elements, radium, polonium, and later—possibly—actinium.

These radiations were regarded as electrical in origin—radiant electricity—ether waves, or, as a mere manifestation of energy of the order of light or magnetism. It was Professor Rutherford, assisted by Mr. Soddy, who was the first to prove that these Becquerel radiations with their marvellous penetrating power, were due not to ether waves, nor were they any mode of motion, but were substance-matter in motion, and thus connected Thomson's "electrons" and Crook's "fourth state of matter" with the phenomena of the Becquerel rays.

The word "emanation" was first applied to these radiations in the Physical laboratory of McGill, and the thesis that these radiations were matter in motion was for a year or more maintained against the opinions of the Curies and Becquerel and others, who are now convinced of their material nature. Professor Rutherford's position is now recognized and the scientific world has acknowledged that radium, thorium and other of the heavy metals are giving off continuously particles of their substance at a speed that almost approaches that of light.

It was only during the last summer that the form of matter which constitutes a large portion of these emanations was by its spectrum found to be one of the rare gases recently isolated and studied by Sir William Ramsay, namely, helium. Thus it is that one element is found to be giving off not only another form of matter, but also a material something else which has not yet been identified as a recognized element. It would seem as if the researches of Professor Rutherford would lead to a partial realization of the dream of the alchemist, that one form of matter could be transmitted into another. Helium coming from radium is not less miraculous than the change of lead to silver or mercury to gold. The narrow door thus placed invitingly ajar may lead to truths of which the students of the Middle Ages had a clearer perception than those of our own time, who know more and dream less, their imagination being restricted by their having to "prove all things."

It is absolutely contrary to all our notions that matter can give off matter and still remain undiminished, and it is reasonable to suppose that this interpretation is due to non-appreciation of some important factors entering into the case. Again, from Prof. Rutherford's statement it is evident that we have a definite increase in the ponderable matter of the earth, from the action of radium, another fact which, if established, must cause a complete *volte face* of some of our earlier conceptions.

The interest in the epoch-making observations on the properties of this most extraordinary substance becomes, however, most absorbing when we consider their possible bearing on the Pyknotic or condensation theory, and on the allied theory of the genesis of the elements. That the "emanations" are but the evidence of condensation of space-filling primal substance due to the action of radium, and that we may regard these facts as an actual demonstration of the origin of an element or elements seems, in view of the facts, not impossible.

One thing is certain, we must extend the conception of some of our physical laws as applied to our earth, to the universe which, seeing that we are part of that universe is but reasonable. It is impossible to estimate the outcome of this practical intrusion into a realm hitherto recognized only by the daring speculations of advanced theorists.

---

#### THE SUBURBAN EPIDEMIC OF TYPHOID FEVER.

That typhoid fever is a water borne disease is one of the commonplaces of medical knowledge, and when this disease makes its appearance in an epidemic form, the Public Health official instinctively turns first to enquire into the nature of the water supply of the affected areas. He may not find—the probabilities, in fact, are that he will not find, typhoid bacilli. Cases, indeed, are singularly rare in which these organisms have been discovered in any large municipal water supply. Already, by the time the incubation period is passed, and attention has been called to the existence of numerous cases of active fever, it is likely that the contaminating organisms have been flushed away. He may, however, find that cases of the disease have occurred in the neighbourhood of the source of the water supply, or that there has been leakage of polluted water or sewage into the main supply, or again that the infection has not been due directly to the water, but to the milk supply of a considerable number of individuals in a district, and, in such cases, he is not infrequently able to demonstrate that there have been cases of the disease at the farm supplying the milk or in the families of those handling it, and that the well water used to cleanse the utensils had become polluted with sewage from cases of infection.

It is in these latter cases that more frequently the bacteriologist is able to isolate the causative organisms from the polluted water. But in cases of epidemic, it is on the water supply that suspicion first falls, and in the cases in which we find that the disease is restricted to those employing a given water supply, whereas, in the immediate neighbourhood where other waters are used, the number of cases of typhoid shows no increase above the normal, then no sensible man can come to any other conclusion than that the water supply is implicated; and if in addition, he finds evidence that that water is polluted, that it contains microbes indicating sewage pollution, and if, lastly, having determined that there is sewage pollution, he is able to show that typhoid fever has occurred in the district from which that sewage is derived, then it is difficult to see how anyone can reach any other conclusion than that the water supply has been at fault and is the cause of the epidemic.

We here state general propositions. How far are these applicable to the state of affairs existing in our immediate neighbourhood here in Montreal? A grave epidemic disease is present in the districts of St. Henri, St. Cunegonde, Westmount and Mile End. All these districts are really part of our city, separated from it only by municipal boundaries. There is no similar epidemic in Montreal itself.

Is this, in the first place, typhoid fever? In the press attempts have been made to give the impression that it is not. We can only bring forward the following facts, that large numbers of these cases have been brought to our great city hospitals—one hospital has had as many as thirty cases in its wards at a time, another over forty—that the cases there have been diagnosed as typhoid fever; that, so far as we know, whenever the Grunbaum-Widal test has been applied to the blood of these patients, definite agglutination has been obtained; that, where patients have died and autopsies have been performed, the lesions characteristic of typhoid have been discovered. It may, of course, be argued that this last is a coincidence, that sporadic cases of typhoid have occurred in these districts and have been severe, resulting in death. But, while this is undoubtedly a possibility, we have to confess that, so far, no disease is known in which there is typical agglutination of the typhoid bacilli which is not typhoid. These cases have occurred by the hundred; in St. Henri itself there is official information regarding at least two hundred cases. The number is too great and the cases are too widely separated to east and west of the city to be ascribed to milk infection; add to which that the milk runs of the larger dealers—and with such a number of cases only large dealers can be implicated—are not confined to the suburbs, they supply also consumers in the city.

What is remarkable is that all the affected areas have a common water supply. With these facts at our disposal, we immediately turn to see whether this common water supply of the affected districts is above suspicion and we find certain facts which, to put it mildly, give us cause for grave consideration. We find that the intake of this supply, instead of being from the main body of the river water, has, apparently for purposes of economy, been placed at a point which, if not absolutely condemned by the Provincial Board of Health, was regarded by it as distinctly inadvisable, and that the company was notified to this effect. It is situated, namely, in the channel between the Nun's Island and the mainland. When the river is high there is an abundant volume of water passing through the channel, when it is low that volume is greatly reduced. We find further that this intake is situated nearly opposite the mouth of a small sewage-contaminated river, the St. Pierre, which runs through the outskirts of the manufacturing portion of the city. It is true that a dam has been erected stretching across the mouth of this river, but the dam is not complete and does not direct all the current of the St. Pierre downwards along the edge of the river. We find also that, despite the recommendation of the Provincial Board of Health the district of Verdun has, during the last few months, led a new main sewer to open a few hundred yards above the intake, and the configuration of the river bottom here is such that, particularly in times of low water, some at least of the sewage tends to be carried, not along the river's edge, but well into the main stream of the channel, that is to say, towards the intake of the water supply. Nor, so we are informed, has Verdun been free from typhoid fever during the last few months. We learn further that, shortly before the outbreak, the river was singularly low, lower than it had been known to be for long years.

There is thus what would seem a possibility of contamination of the water supply of a large district with infected sewage. There is the sudden development of a grave epidemic of typhoid fever confined to the districts supplied by that water supply.

With these facts at our disposal, we cannot see how any but one conclusion can be arrived at. It is not necessary to wait until typhoid bacilli are actually discovered, for, as we have already stated, the experiences elsewhere are, under like conditions, that these bacilli are not discovered. They were not found, for example, in the main water supply in the recent grave epidemic at Ithaca, N.Y., and yet what sane man with the facts of that epidemic before him, would venture to suggest that the epidemic there was not due to the water supply? Nor can we see any essential difference between the two cases. It is,

therefore, we think, unnecessary and but a waste of time to wait the reports of bacteriologists when those reports cannot materially influence the decision one way or the other. And, for ourselves, we would urge that no further delay should be allowed to take place in dealing with this matter. With these facts before us, the duty of members of our profession is obvious.

---

The percentage of marks required to pass an examination in the faculty of Arts has been raised from thirty-three to forty. This simple device will put a stop to what the principal called the parrot-cry, that the Arts faculty was not keeping pace with the other departments in the University. A similar proposal was made many years ago, but the Professor of Mathematics, who was also dean, made the sensible observation that two-fifths is not always greater than a third. His illustration that a third of a whale is larger than two-fifths of a smelt was very convincing. With this new regulation the Arts faculty will not only be right, but it will seem to be right.

---

The number of deaths in Montreal for the year 1903, was 6,941, as against 6,275 in the previous year. Upon the basis of a population of 324,000, the death rate was 21 per thousand. During the months of June, July, and August, the deaths were 469 in excess of the average quarterly number, and this may be attributed to the high infantile mortality occurring in the summer period, which during the month of July ran up to 375. This heavy mortality amongst children is in part a result of the high birth-rate in Montreal, but also in part due to the less easily preventible cause of imperfect sanitary conditions. There is good ground for Dr. Laberge's plea, for a "more scientific harmony between mother and child in the matter of food and nursing."

---

The association of Dr. Osler with McGill University did not end when he went to Philadelphia and later to Baltimore. He has always maintained a bond with his old friends and his old school, and that connection is now being marked in a friendly way. A small committee is undertaking to receive subscriptions, limited to five dollars each, for a testimonial fund, to which only graduates in medicine will be permitted to subscribe. The intention is to procure a portrait of Dr. Osler for the Faculty room, and a replica to adorn his own walls, with a photogravure reproduction for each full subscriber. Within a few hours of issuing the circular there was sufficient response to insure the success of the plan, which is a testimonial in itself, but any amount in excess of that required for the pictures will be expended in such a

way as Dr. Osler shall designate. It is worth the subscription to see what he will do with it. Contributions may be sent to Wm. Gardner, M.D., 899 Sherbrooke Street.

---

Montreal is receiving an education in bacteriology, by way of the advertising columns of the newspapers, and every municipal councillor feels qualified to discourse publicly upon the minimum number of "living things," which a cubic centimetre of "potable" water may contain. The B. Coli is now as familiar a figure as a boodler. The recent epidemic of typhoid fever has caused an outbreak of activity amongst laboratory workers, qualified and unqualified, but most of the activity is of the Brownian variety—movement without progress. The ordinary bacteriological examination of water yields certain shreds and scraps of information, which in itself is often misleading and of very imperfect value in arriving at an estimate of the goodness or badness of a general water supply. The Provincial Board of Health has the matter in hand, and we can well await their results, with confidence that they will be based upon a full consideration of all the factors in the problem.

---

The Canadian Nurses' Association has issued a tariff of charges, which are considerably higher than those previously established by custom. In addition the Association has set forth a number of regulations, which are presumed to be binding upon all who employ nurses. The advice and support of the profession was sought by the Association, but the Council of the Society declined to interfere, on the ground that it was beyond their province to meddle with the management of the Association. It is as difficult for a nurse to specify the minimum wage she shall accept, the number of hours for sleep and recreation she shall obtain, as it is for a physician; her remuneration should depend upon her efficiency, the responsibility she assumes and upon many other considerations which instantly suggest themselves; it will depend ultimately upon the willingness and ability of her employer to pay. It is wrong in principle that all nurses should be paid alike; some are deserving of more, and some are deserving of less than the rates they specify. The reason put forward by the nurses for increasing their charges, namely, increased cost of living, is not a cogent one—in reality it is a reason for reducing them. The thing will right itself. If the nurses are demanding too much—we do not say they are—they will not be employed; the public can do without nurses or doctors either, to a much greater extent than one might suppose.



## Reviews and Notices of Books.

---

THE PRACTICE OF OBSTETRICS. By J. CLIFTON EDGAR, M.D., Professor of Obstetrics and Clinical Midwifery in the Medical College of Cornell University, New York. Roy. octavo, 1,111 pages, 1,221 illustrations. Cloth, \$6.00. Published by P. Blakiston's Son & Co., 1012 Walnut Street, Philadelphia; Chandler, Massey Co., Toronto.

In this work another good text-book has been added to the rich series produced by American authors within the last few years. Edgar's Obstetrics is a very extensive work, consisting of over 1,100 pages, royal octavo, profusely illustrated and evidently carefully edited.

The work gives evidence throughout of the most painstaking thought in the arrangement and presentation of the subject matter. It is divided into ten parts, the first of which deals with the physiology of the female genital organs; then in alternate sections, first the physiology then the pathology of pregnancy, labour, puerperium, and the newly born are considered, while the tenth and last section is devoted to obstetric surgery.

At the beginning of each "Part" the table of contents of the part in question has been placed, this being in large type and well spaced. Each "Part" is divided into sections, and each of these is in turn headed with a sub-title of its contents. The cross-references in the text are very numerous and greatly add to the value of the work, while the index (46 pages) is most complete. This whole arrangement leaves nothing to be desired on the part of the busy student or practitioner as regards ease of reference.

The consideration of each important subject is concluded with a short practical resumé, which should prove of great assistance to the student saving him from devoting too much attention to the unimportant details.

The section dealing with antenatal pathology, including monstrosities, is of particular excellence, as are also the portions of the work devoted to the physiology and pathology of the newly born.

An unusual section, but of great practical importance, is that devoted to posture in obstetrics.

The sections on pelvimetry and cephalometry, and the portion dealing with the bony pelvis, are very full and cannot but prove of great value to those engaged in teaching and to advanced students of obstetrics.

The medico-legal aspects of obstetrics are fully considered; the subject of rape being enriched with the results of the author's experience in over 600 consecutive cases which have come under his observation.

Dr. Edgar has evidently for years gathered statistics and recorded cases in the institutions with which he has been connected, and from

this valuable material he has drawn freely, thus giving originality and power to the subjects discussed.

Thus in the interesting pages on abortion and immature and premature labour, he quotes from an exhaustive study of such cases in ten thousand labours. In 10,000 cases of labour he found 635 premature interruptions; 242 abortions, before the 12th week; 175 miscarriages, from the 12th to the 27th week; and 218 premature labours from the 27th to the 38th week. In other words, pregnancy in this series was interrupted prematurely once in every 15.7 cases.

In discussing deformed pelves the author pays particular attention to development of the child. Prochowinck's dietary is given in full detail, it being evidently considered that this treatment is not without value. He rightly points out that the proper management of labour in cases of deformed pelves is one of the most difficult problems in midwifery. His clear and masterly discussion of this theme makes this part of the work one of the most instructive and helpful in the book.

By way of mild criticism one may be permitted to question the wisdom of placing the removal of the placenta by Crèdè's method in the section on obstetric surgery. One may also ask why should three pages be devoted to the highly unprofitable question of determination of sex, while only three-quarters of a page is devoted to the important subject of the formation of the placenta. One also notes the lack of explicit directions as to the use of axis traction forceps; while the author's directions as to the correct manner of holding the handle of the forceps blade during its introduction is open to criticism. Again, in dealing with the subject of the dilatation of the os uteri during the first stage of labour no reference is made to the importance of "polarity."

On the whole the work is of a very high order and will, no doubt, prove exceedingly popular, for it is practical and full of helpful suggestions to the practitioner. The author's style is good in general, but in places, as in the section dealing with the development of the ovum, it is involved, making the meaning difficult to comprehend.

The illustrations are largely from original sources and are not put in for padding, while the printing is clear and distinct. Prof. Edgar is to be congratulated in having accomplished a valuable and highly creditable work, one which will surely add to the credit of American obstetricians.

D. J. E.

JOHNS HOPKINS HOSPITAL REPORTS, Vol. XI., Baltimore, 1903.

This, the last volume of the Johns Hopkins Hospital Reports is largely given over to a most elaborate study of pneumothorax, by Dr. Charles P. Emerson, which is, in fact, a complete treatise upon the subject, ex-

tending over 450 quarto pages. There are, in addition, two valuable papers which appear to be short in comparison, though one of them, that of Drs. Cooke and Briggs, is some 80 pages in length. This is a very important contribution on the results of clinical studies upon blood pressure. The third paper, by Dr. Martin B. Tinker, is a thoughtful resumé of the results obtained in Baltimore by the employment of tuberculin in surgical diagnosis.

We find it a little difficult to properly appraise the study upon pneumothorax. It is most conscientious; it represents clearly a prodigious amount of labour in the study of the literature of the subject from the old Greek physicians onward; with rare exceptions,\* every paper of any importance bearing upon the subject has been under review and has been epitomized; each case of the condition which has presented itself in both the medical and surgical departments of the Johns Hopkins Hospital is the subject of careful description and study, while, further, the mechanics of the condition are treated at great length and have been the object of individual research by the author. The result is a most complete compendium of all that is known upon the subject and the results are well summed up in the last two chapters. But all the same, the impression left upon the reader is that the work, as a whole, to employ the expression of old Thomas Fuller, is a most "painful" product—using this term both in its Elizabethan and its modern acceptance. Reading it, we seem to pass back to the tomes of two centuries ago in which, with elaborate diffusiveness, every fact mentioned by every writer upon a subject was extracted in detail, careless of order and careless of repetition. This impression, we think, is given by the unfortunate arrangement of the subject matter. The literary digest occupies the first place and, in itself with its abstract of some 356 papers, consumes close upon 200 pages, mainly of small print. By the time that the honest reader has mastered this portion of the work—and, let us confess, it is most interesting—he has already gone over the subject in practically all its aspects again and again and is thoroughly satiated, so that his interest is dulled for the perusal of the individual studies of the author. As a piece of book-making, it would, we think, have been preferable had the details and analysis of the Johns Hopkins cases been given the first place together with the experimental observations of the author, and had he based his classification and description of physical signs, symptoms, characters, prognosis and treat-

---

\* We note that that by A. G. Nicholls (British Med. J., Dec. 25, 1897), important as being the first demonstration of spontaneous pneumothorax due to gas-forming bacilli, and uncomplicated by surgical interference, has been overlooked, while those of Finley and Hamilton, on the same subject, published in this JOURNAL are duly abstracted.

ment upon the cases, with current reference to the work of earlier observers, delegating the abstract of the observations and studies of previous observers to an appendix. In saying this, we fully sympathize with the state of mind of Dr. Emerson and possibly, had we been in his place, and had we made so remarkable and exhaustive a study we might have been similarly led to give it the place of honour. Nor would we in the least imply that we do not appreciate the value of the article as a work of reference. For long years to come this must surely be the *locus classicus* on pneumothorax.

The clinical observations of the blood pressure by Cooke and Briggs form a most valuable contribution to our knowledge of a subject which is at last taking its rightful position in clinical work. The modified Riva-Rocci sphygmomanometer employed by the authors is, we have found from personal knowledge, a compact, easily portable and accurate instrument. We appear at last to have devised for us an instrument which is sound and practicable. Its only weakness is that it does not afford accurate reading of the mean diastolic pressure. But the systolic pressure can be determined to within two or three mm. of mercury. We have little doubt that this will become the favourite instrument for the purpose. The authors give a very full study of the blood pressure obtained in certain cases (effects of anæsthesia, of operation, shock and hæmorrhage), observations on the pressure during pregnancy, labour, and in eclampsia; observations upon the pressure in medical conditions (states inducing hypertension and hypotension and the course of the blood pressure in acute infections). Lastly, they give a valuable comparative study of the effects of general stimulant measures. The results obtained, while given in fuller detail, are in general confirmatory of the extensive series of observations by Dr. Orr communicated to the Canadian Medical Association in 1902. (This JOURNAL, Vol. 31.)

GENERAL ANATOMY OF THE LYMPHATICS by G. DELAMERE, with Special Study of the Lymphatics in different parts of the body by P. Poirier and B. Cuneo: Translated by Cecil H. Leaf; Archibald, Constable & Co., Westminster.

The first part of this most complete and well written book is done by G. Delamere. He studies in detail, 1. the lymph; 2. the leucocytes; 3. the lymphatic vessels; 4. the glands. Under these headings the author gives an exhaustive review of the experimental work done on the subject, with a history of the theories held, and most interesting details of the technique employed, quite enough to enable future experimenters to see what was actually done in each case.

He concludes by describing the general arrangement of the lymphatic vessels, their growth, functions, and atrophy in old age.

The second part is written by P. Poirier and B. Cunco, who describe the lymphatics of the lower limb, pelvis and abdomen, thorax, upper limb, head and neck in succession ending with a study of the right lymphatic and thoracic duct with their variations and anomalies.

It is difficult to speak too highly of the thoroughness with which these regions are described and pictured in the many excellent illustrations that make the text so valuable. But without wishing to appear ungrateful in the face of so much that is good, we would call attention to the classification of the superficial inguinal glands, with a question as to its advantage over the one that has so long been accepted. They are divided into five groups by a horizontal line crossing a vertical at the saphenous opening, the divisions being named supero-external, supero-internal, infero-external, infero-internal, and central.

The authors almost apologize for disturbing the "classical division" into a superior or horizontal and an inferior or vertical group by saying that although it may suffice from a clinical, it does not do from an anatomical point of view. To quote the text, "the two superior groups are formed by a series of glands fairly regularly arranged below the crural arch and having their long axis parallel to it; the arrangement of the lower group is much more irregular, though the lowest are usually elongated in the vertical direction, the majority of them are round or oval and irregularly scattered about." It is not quite evident to us that this is sufficient reason to justify the breaking up of two fairly well marked groups into five whose divisions seem still more artificial.

In the description of the thoracic lymphatics, experiments are described which prove that the vessels of the two sides of the median line communicate freely and reference is made to the communication of the lymphatics from the inguinal glands with those of the axilla along the line of the epigastric arteries, a fact borne out clinically in several cases recently seen in hospital practice here, where an inguinal adenitis was soon accompanied by an involvement of the axillary glands on the same side.

The fact that the right lymphatic opens by a single trunk only once in twenty-five times may be news to some, and the extent and number of the variations in the termination of the thoracic duct would show how difficult an accurate description of its normal condition must be.

The classifications are clear, and the experiments that have been carried on to prove the facts are conclusive. The translation is also good. Altogether the book is a most valuable reference work for any one wishing full and accurate knowledge on this important subject.

The Transactions of the Society of Anæsthetists, Vol. vi, published by John Bale Sons & Danielson, London, have reached this far. The report contains a frank record of deaths from the administration of chloroform, and yet one looks in vain for any reference to the work of Dr. Waller upon chloroform anæsthesia, which was brought to the attention of the profession at the Montreal meeting of the British Medical Association at least seven years ago,—and many times since, notably in the *Lancet*, 28th November, 1903.

According to the returns of the Registrar-General, the death rate from the administration of chloroform has risen thirteen-fold since 1863, and taking the cases as they stand in the Transactions of the Society of Anæsthetists, one would be inclined to say, that, in some countries at least, three of them would be considered proper matter to lay before a coroner and jury. It would be no defence for an anæsthetist to say "he had to do as he was told," a statement which was made by one member in discussing the percentage of chloroform which might be given within the limit of safety.

Anæsthetics in every country are habitually administered by persons who are ignorant of the elementary principles of anæsthesia. It appears to us to be an elementary principle in the administration of any drug, that life may be destroyed by a large dose of a drug, which in small amounts is harmless. The most dangerous man in any profession is the "practical" man: the most dangerous anæsthetist is the one who refuses to recognize that there is such a thing as one, two, or five per cent. of chloroform, and judges of its power only by the indisputable fact that the patient is dead. All experience goes to show that anæsthesia, sufficient for any legitimate purpose can be promptly produced by a vapour containing not more than two per cent. of chloroform, and there are several inhalers, which ensure that no more be given. In the event of a fatal issue the administrator should be put to the question to prove that he had kept within that limit. The surgeon has enough to do without giving instructions to the anæsthetist. The Society of Anæsthetists has done much to take chloroform out of untrained hands, but it does not appear from their Transactions that they have yet attained to a full apprehension of the possibilities of their office.

THE NEUROLOGICAL PRACTICE OF MEDICINE. A COURSE OF SELECTED LECTURES, by CHARLES H. HUGHES, M.D., Barnes Medical College, St. Louis, 1903.

This course of lectures is written in the grand style by the president of the faculty, Professor of Neurology in Barnes Medical College. They were delivered to the students, and the book is dedicated to them, the aim being to make "the dark and crooked path in neurology and neuriatry

bright and straight." The lectures are planned on a wide scale and make reference to everything that is known and much that is surmised about the nervous system. The writing is done in the breezy western way, but many jests that pass muster with medical students do not look so well in print, especially if the type is not very good. If the work were intended to become a classic, it would be well to scrutinize a little carefully some statements of fact and many historical references. Dr. Hughes, as a lecturer must be admirable, friendly and wholesome, but these qualities are not sufficient in themselves to ensure the production of a great work on the nervous system.

THE TREATMENT OF TABETIC ATAXIA BY MEANS OF SYSTEMATIC EXERCISE. By Dr. H. S. FRENKEL, Medical Superintendent of the Sanatorium "Freckof in Heiden." Translated and edited by L. Freyberger, M.D. (Vienna), M.R.C.P. Lond. M.R.C.S., Eng. Rebman, Limited, London, New York and Toronto.

It is now nearly fourteen years since the Frenkel treatment of ataxia by movements of increasing complexity was introduced into America and the results have been in every case an improvement, more or less marked, in co-ordination, the extent depending largely on the thoroughness and persistence of the patient and the attending physician.

The carrying out of the course requires much personal attention and constant supervision, and so is more easily accomplished in a sanatorium where the patient's daily life can be regulated. It can be successfully applied at the patient's own home under favourable conditions, and this book gives a full description of the exercises and mechanical devices employed by Dr. Frenkel in the treatment of his cases. He begins his work by an opening chapter on tabes in general and ends by a bibliography of the whole subject. Every physician who has occasion to treat such cases should be possessed of this book.

INTERNATIONAL CLINICS. Vol. III. Edited by A. O. J. KELLY, M.D., 301 pages. J. B. Lippincott Co., 1903. Charles Roberts, Montreal.

This volume deals with diseases of the gall bladder and gall ducts; the treatment of pneumonia, the medical treatment of gastric cancer, carbonic acid treatment in rectal disease, the serum treatment of typhoid fever; malarial infections, clinical types of pneumonia, sudden death due to respiratory disorder, an unusual form of leukæmia, clinical evidence of myocardial damage in rheumatic fever; cocaine anæsthesia, general anæsthesia, asepsis and antisepsis, gastrostomy, intracostal tumours, the modern treatment of varicose veins. There are five coloured plates, five plates in black and white, and twelve figures. The contributors are of

the highest class, and their contributions are well worthy of a place in this admirable Quarterly, which contains the best that has been done and said in medicine, during the period with which it deals.

**THE STANDARD DICTIONARY:** Funk and Wagnalls Company, New York and London, 1903.

The first edition of the Standard Dictionary was issued in 1893, and the second edition has appeared ten years after, enlarged and re-edited enriched with fresh information and embellished with new plates. It contains over 2,300 pages and 304,000 terms and is excellently bound in one and two volumes. The production of this dictionary, with its splendid press work and admirable binding, was a great undertaking, which has met with the success it deserved. The present reviewer has used the Standard Dictionary every working day for ten years, and has never found it at fault in any particular. The definition of words is close, and the secondary meaning is given literally with gracefulness and style; the quotations are fresh and highly illustrative, and variations from the common spelling of words are faithfully recorded. The work is edited with great sagacity, with great critical and literary ability and is entirely satisfactory for any purpose to which a dictionary may legitimately be put.

**PHILADELPHIA HOSPITAL REPORTS, Vol. V.** DR. EDWARD MARTIN, Director.

This volume is issued by the Department of Public Health and Charities having charge of all institutions the control of which is intrusted to the city. The work is deserving of study by all who have to do with the management of hospitals and the care of patients.

**THE PRACTICAL CARE OF THE BABY.** By THERON WENDELL KILMER, M.D., New York School of Clinical Medicine, 158 pages, 68 illustrations., \$1.00, F. A. Davis Co., Philadelphia.

The illustrations are very dainty and interesting; the advice is sound, and a baby brought up after Dr. Kilmer's method would certainly be a model child. A very interesting feature of the book is the side lights it affords upon the domestic economy of an American household.

---

### Medical News.

---

The Provincial Board of Statistics gives Toronto's population as 212,221; the number of deaths during the year were 3,730; births, 5,040, and marriages, 2,631. The death-rate is 17.46 per 1,000, as compared with 19.00 in 1901 and 19.95 in 1891.



## THE ROYAL VICTORIA HOSPITAL.

STATEMENT OF PATIENTS TREATED DURING 12 MONTHS ENDING 31ST DEC. 1903

## ADMITTANCES.

	1903.	1902.	DECREASE.	INCREASE.
Protestants.....	1,774	1,704	.....	70
Catholics.....	1,034	979	.....	55
Jews.....	101	105	4	.....
Others.....	22	26	4	.....
Total.....	2,931	2,814	.....	117
Free.....	1,583	1,524	.....	59
Public Pay.....	850	827	.....	23
Private Pay.....	498	463	.....	35
	2,931	2,814	.....	117
Medical.....	1,004	986	.....	18
Surgical.....	1,185	1,084	.....	101
Disease of Women.....	320	310	.....	10
Eye and Ear.....	282	273	.....	9
Nose and Throat.....	140	161	21	.....
	2,931	2,814	.....	117
City.....	2,126	2,070	.....	56
Country.....	805	744	.....	61
	2,931	2,814	.....	117
No. of Patients—Days.....	74,111	70,609	.....	3,502
Daily Average.....	203	193½	.....	9½
Private Patients—Days.....	10,169	8,097	.....	2,072

## DISCHARGES.

Discharged.....	2,769	2,702	.....	67
Died.....	142	125	.....	17
Died within 48 hours of Admission.....	38	26	.....	12
Death Rate.....	4.88	4.62	.....	.26

## OUT-PATIENT DEPARTMENT.

Medical.....	9,890	9,381	.....	509
Surgical.....	4,578	4,547	.....	31
Diseases of Women.....	1,542	1,292	.....	250
Eye and Ear.....	4,122	3,303	.....	729
Nose and Throat.....	3,506	3,337	.....	169
	23,638	21,950	.....	1,688
Ambulance Calls.....	742	591	.....	151

The income for the year was \$140,368, while the ordinary expenditure amounted to \$120,419; the balance of \$19,949 being applied in

reduction of the indebtedness incurred by additions and the new operating extension. There was an increase of \$7,225 in the expenditure for 1903 over 1902. The total cost a day per patient has been \$1,62½; the cost per day of maintaining each person in the hospital, staff, servants and patients, being 89 cents.

### NOTRE DAME HOSPITAL.

The twenty-third annual report of the Notre Dame Hospital has just been issued for the year ending 30 June, 1903.

In the private and public wards were treated over 300 patients more than last year, 2,433, as compared with 2,132 in 1901-02.; in medicine, 854 instead of 811; in surgery, 1,044 instead of 859; in ophthalmology, 200 instead of 179; in gynecology, 335 instead of 283. The number of days residence of the 2,433 patients formed a total of 39,057 days, an increase of 4,301 days treatment over last year; however, the average sojourn of each patient remains about the same, namely, sixteen days instead of fifteen. Among these patients were registered 1,446 men and 987 women; of these 2,076 were Canadians and 357 foreigners, 2,284 were Catholics and 149 Protestants. The average cost for each patient was less per diem than last year, .87¾ instead of .91. Of these 2,433 indoor patients admitted during the year, 2,088 left the Hospital cured or improved; in 143 cases there was no improvement, or the treatment could not be followed out; 56, when admitted, were moribund; 116 died in the wards of the Hospital after a more or less prolonged sojourn, giving a death rate of 7.06 per cent. The number of patients not improved or not treated was less, 143 as compared with 185, and the number of patients cured or improved, is greater, 2,088 instead of 1,812.

In the Dispensaries there were 2,530 consultations, being a total of 21,245 as compared with 18,715 last year; 25,416 prescriptions instead of 20,500 were filled. The emergency cases were more numerous; the house surgeons, who, last year treated 899 patients, have had this year 1,041 cases; there were 530 ambulance calls for accidents instead of 323, and if there be added to these 339 trips for private cases and 179 useless calls, there is a total of 1,048 trips as compared with 809 last year. To meet all these demands the ambulance service had to be increased; it now comprises three ambulances and six horses.

The total expenditure has been \$34,238.90, an increase over last year of \$3,438.80.

During the month of December, 192 indoor patients were admitted, and 1,346 were treated in the several outdoor departments. There were 123 ambulance calls.

## WESTERN GENERAL HOSPITAL.

The annual meeting of the Western Hospital was held on the 19th January. During the year 1903, 600 patients were admitted to the Hospital an increase of 11 over the year 1902. Of these 304 were Protestants, 260 Roman Catholics, 33 Jews, 3 of other religions; 261 males, 339 females; 315 were free patients, 80 public ward patients paying 50 cts a day or less, 112 semi private patients at \$1.00 per day, 93 private patients; 547 were residents of Montreal and 53 from outside localities; there were 175 medical, 310 surgical, 115 gynæcological. There were 30 patients in the Hospital on 1st January, 1903. During the year, 563 patients were discharged, 31 died, and 34 remained in Hospital on 31st December. The death rate for the year was 5.16% or deducting deaths within 48 hours, 3%. The total number of patient days was 11,176, giving an average of 18.6 per patient. The largest number in the Hospital on any day was 39 on 25th January and the lowest 22 on 21st December. The average daily number was 30.6. The highest monthly average was 33 in January and April, and the lowest 27 in December. The number of ambulance calls for year was 138.

The total number of consultations in the out door department 7,560 as compared with 6,570 for year ending 31st December 1902, being an increase of 990, of which 2,569 were medical, 1,170 surgical, 1,312 gynæcological, 648 eye and ear, 1,107 nose and throat, 251 skin, 503 genito urinary.

There had been 96 applications for admission to the training school during the year, and seventeen probationers had been admitted and thirteen accepted as pupil nurses. The income derived from all sources came within \$250 of the expenditure. The board of management and the medical staff were re-elected.

## HOTEL DIEU.

Report for year ending December 31st, 1903: Male patients admitted, 1,326; 688 cured; 504 relieved; 17 incurable; died 117. The treatment of these patients demanded 34,882 hospital days. Of those, 1,286 were Roman Catholics and 40 belonged to other religious denominations. Female patients, 1,234; cured, 626; relieved, 493; incurable, 20; died, 95. Total number of hospital days given to these patients, 34,007. Roman Catholics 1,213; other religious denominations 21. Major operations were performed on 480 men and 640 women, forming a total of 1,020. The acute diseases numbered 486 cases, chronic 640.

During December, there were admitted 371 patients; male patients, 198; female 173, with 10 deaths. Two hundred and thirteen consulta-

tions were given in the eye, ear, and nose outdoor department, and 35 operations were performed.

---

Diphtheria continues to spread in Ontario. In August, twenty-seven municipalities reported 122 cases with 24 deaths; in September, twenty-eight municipalities reported 240 cases with 30 deaths; in October, fifty-two municipalities had 464 cases with 54 deaths, and the returns for November and December, show that the prevalence of the disease is unabated. An increasing number of patients is taking advantage of the isolation hospitals, and Dr. Bryce, secretary of the Board of Health believes that will be an important factor in checking the progress of the disease.

---

The Superintendent of the Brockville Hospital for the Insane, Dr. Murphy, died of heart disease on the 17th January. He graduated from Queen's College, Kingston, in 1876, and immediately entered upon practice at Belleville. He was medical superintendent of the Memico Asylum from 1890 to 1894, and received a similar appointment on the opening of the Brockville Asylum in 1894. He married Miss Bousler, of Toronto, and left a family of six children. Dr. Murphy was 54 years of age.

---

Dr. Ellice McDonald, McGill, '01, has secured an appointment as Resident Intern in the New York Lying-in-Hospital. He had previously spent some months in the Kensington Hospital for Women, Philadelphia.

---

Dr. John McCrae, Dr. F. Morley Fry and Dr. H. B. Cushing have been appointed Associates in Medicine in the Royal Victoria Hospital; Dr. Edward Archibald and Dr. C. B. Keenan were appointed assistant surgeons, and Dr. W. H. Jamieson assistant laryngologist.

---

The thirty-seventh annual meeting of the Canadian Medical Association will be held at Vancouver, B.C., on the 23rd, 24th, 25th and 26th August, 1904, under the presidency of Dr. Simon J. Tunstall of that city. Mr. Mayo Robson will be a guest of the Association.

---

Dr. W. W. Ford, formerly fellow in Pathology at McGill, has been appointed first assistant in bacteriology at Johns Hopkins.

---

Dr. Hamilton Wright, formerly director of the Institute for Medical Research in the Malay States has taken service with Johns Hopkins Hospital.

Dr. Robert Fowler Beattie, McGill, '98, who has been studying for the past two years in Vienna, is at present engaged at the Liverpool School of Tropical Medicine.

Dr. P. H. Bryce, secretary of the Ontario Board of Health, will probably be appointed Canadian Medical Inspector to the Departments of Immigration and Interior.

Dr. Fred. H. Amcs, of Toronto, died in Denver where he had practised medicine for the past ten years.

Dr. Thos. Norton, a graduate of McGill, died on the 15th of January at Shelbourne, Ont., in the 52nd year of his age.

Dr. Duncan Fraser, of Lakefield, Ont., died in the 21st of January in the 57th year of his age. He was a graduate of Trinity Medical College in 1874.

## Retrospect of Current Literature.

### SURGERY.

UNDER THE CHARGE OF GEORGE E. ARMSTRONG.

THEO. KOCHER. "Nothnagel's Specielle Pathologie und Therapie, IX., 3.27. Brain Compression and Concussion; Surgical Treatment of Cerebral Diseases. 1901.

HARVEY CUSHING. 1. "Mittheilungen aus den Grenzgebieten der Medizin und Chirurgie. Bd. IX.—Heft 4 und 5. 1902.

2. Amer. Jour. of Med. Sci., Sept., 1902.

3. Amer. Jour. of Med. Sci., June, 1903.

The monograph of Kocher is the work of a past master of the science of surgery. All the related facts of anatomy, physiology, animal experiment, and clinical experience are brought together in a panoramic way to build up a complete picture of the phenomena of brain compression. It would take too long to give any detailed resumé of this work of 450 pages, and, apart from that I prefer at this time to review more particularly the work of Harvey Cushing upon brain compression, done at Kocher's suggestion; the more so inasmuch as, in itself, it contains the kernel of the whole question. The field, it is true, had been already well ploughed, yet there remained several important furrows to be turned by Cushing.

After exhaustive preliminary chapters upon the anatomy, hydrostatics, hydrodynamics, and physiology of the cerebral circulation, Kocher proceeds to review critically the experimental work, detailing first the re-

sults of Leyden and of Naunyn, and then passing to that of Harvey Cushing. He introduces his remarks with a reference to Cushing's work so complimentary to our neighbour across the line that it deserves repeating: "The Arbeit on brain compression which, thanks to the unusual ability and untiring zeal of the author, has led to especially valuable results, is that of Cushing, of Baltimore, undertaken in the winter of 1900-01 at my instigation, and carried out in the laboratory of Professor Kronecker in Berne. I am glad to have had the opportunity of suggesting this Arbeit and of having been able to be present at many of the experiments, inasmuch as I believe the results to be decisive in settling certain essential points in the question of brain compression."

I would like to describe with a little detail this work of Cushing's on account both of the inherent beauty of the experiments and of the importance of the results. To begin with his methods of investigation:

1. *Modes of exerting compression.* First of all he makes a sharp distinction between local and general pressure. Local pressure was obtained by the introduction of a foreign body, usually a rubber sac filled with mercury, introduced through a trephine opening. General compression was obtained by the introduction of salt solution under pressure into the cerebro-spinal space. The latter gives a much more exact and constant pressure upon the whole brain and especially upon the vital centres of the medulla.

2. *Injections.* Cushing made a number of experiments in the way of injecting brains during compression with solidifying fluid, driving it under pressure, usually in the agonal stage of the animal, into the brain by way either of the vessels or of the cerebro-spinal space. He found, in brief, that the injection fluid did not fill capillaries in the area of compression when he used local compression, nor anywhere in the brain under conditions of general compression. If the injection were made through the artery before the compressing force was exerted, the veins were found filled with injection material, the capillaries empty; if it were made during compression the veins were found filled with blood and the capillaries empty. In the case of local pressure its effects were found to be transmitted very irregularly; if general compression was exerted the effects were evenly distributed over the whole brain.

3. *The Skull Window.* In the third place—and this is a very important part of the experiments—he observed the brain directly by means of a glass window screwed into the trephine opening. Underneath this window, which was frequently placed in the middle line over the longitudinal sinus, a portion of the dura was removed sufficient to show one convolution, one sulcus and the vessels lying upon it. The typical experiment was carried out somewhat as follows:—Blood pressure

being measured in the femoral by means of the mercury manometer, the salt solution was injected usually through a trephine opening in the atlas, likewise under a known pressure in mm. of mercury, into the cerebro-spinal space; and simultaneously the local effects in the cortex were directly observed through the window.

It must be remembered that the major symptoms of brain compression are medullary and are due to effects upon the vagus, the respiratory and the vaso-motor centres. The results which Cushing obtained may be best described in his own language taken from his article in the *Mittheilungen*.

*Local Compression.* When local compression is exerted upon one hemisphere, the window being in position upon a corresponding area of the other hemisphere, the following changes in the circulation may be observed during the gradual increase in the compressing force:—One of the first phenomena consists in a color difference between arteries and veins. There accompanies this a slight but distinct widening of the veins, which extends even to the smaller radicles. When the local pressure is increased to above 80-100 Hg.mm., the capillaries grow pale and the brain loses its reddish ground-tone. But the large veins, lying in the sulci, remain filled with blood and become quite dark. The smaller venous radicles, especially where they cross the convolution, may at this time be in parts collapsed, in parts full.

If compression is now increased, so as to exceed blood pressure, the arteries themselves collapse, the veins meanwhile remaining filled with asphyxial blood. Occasionally this anæmic condition may last a long while, although usually the arteries soon fill up again, for a reason to be given. If compression has been exerted so as not to irritate the sensitive dura, this stage of anæmia may be reached with very little change in pulse, respiration or blood pressure. The foreign body (Hg.) may sometimes attain 1/6th of the whole brain volume without causing such medullary phenomena (this explains some cases of tumour). That this is possible can be due only to one or both of two factors,—either the compression is transmitted unequally, or the medulla has escaped pressure by a dislocation downwards through the foramen magnum. No doubt both play a rôle. Horsley and Spencer have shown that a small foreign body and a less degree of pressure over the cerebellum, and still more so over the medulla, can cause symptoms which remain absent when the hemispheres are compressed. This observation confirms the results of Cushing's findings.

The falx and tentorium certainly play a great part in transmitting pressure unequally. The falx is often found dislocated to the opposite side after pressure, showing that transmission occurs mainly transverse-

ly, and less in the vertical direction. The dislocation of the cerebellum and medulla downwards must be especially easy in animals which possess a more or less conical cerebellar fossa. In the apes and man the same condition is probably not so pronounced, although its occurrence is certainly sometimes observed. A pretty demonstration of this dislocation downwards was afforded by an experiment of Cushing's. After exerting great compression upon the hemispheres and failing to produce symptoms of pressure on the medullary centres, he opened the lumbar meninges and injected his salt solution from below. Immediately the fourth ventricle symptoms were called forth.

It is thus evident that the effect of local compression on the circulation may vary greatly in different portions of the brain, and that the symptom-complex may be either very slight or very severe according to the degree to which the higher medullary centres are affected. The greater part of the brain may be made entirely anæmic, without the so-called major symptoms occurring. This is also seen clinically.

*During General Compression.* For the purposes of drawing deductions from experiments this method is of far greater value than the local. As Cushing remarks, the great differences of opinion which have obtained among physiologists are probably due to the fact that the importance of an especially accurate measurement of the compression upon the medulla itself and of a comparison of this with that of the blood, has not been realized. It is only by such comparison that we can get a proper idea of the circulatory conditions in that most important part of the brain.

Now it has been shown that local compression gives results too vary—intracranial tension is an evenly distributed one; and this can be accomplished in no other way than by exerting the pressure through the cerebro-spinal space. Only thus can we obtain with any regularity the major and essential signs of brain compression and discover the efforts of nature to withstand its effects.

*What are now the circulatory changes observed?* As in the case of local compression the first change is that of a slight dilatation of the veins, the coming into view of the smaller radicles, previously invisible, and the development of a distinct difference in color between veins and arteries. At the same time the longitudinal sinus (window in mid line) shows signs of narrowing, beginning usually at the posterior end. These changes are observed long before pressure is great enough to give signs of disturbance of the medullary circulation. Occasionally slight irritative phenomena on the part of the respiration and pulse rate occur during this early stage, but there is no effect on blood pressure, and if the



compression is exerted slowly and carefully even these may be avoided.

When the pressure has been brought up to near the blood pressure, we find the longitudinal sinus collapsed, the brain clearly in a condition of stagnation, and the veins filled and of a deep blue color. According to the views of some, such a degree of circulatory stagnation should be sufficient to cause marked symptoms; yet, as the curves show, there need be no change in pulse, respiration, or blood pressure. According to the usual opinion, if the compression is increased above this point, and above blood pressure, a complete anæmia of the medulla results, calling out the major symptoms of compression and causing death. This is erroneous. What occurs is this. As soon as the blood pressure is exceeded by the compression-pressure and indeed exactly at that moment, the observer sees through the window that the brain grows pale; that is, the capillaries are emptied, and even the visible arterioles also, while the veins remain full of stagnant blood. This anæmia, however, lasts but a short time (unlike the condition in local compression). Why? Because now the blood pressure rises, and rises so as to reach a level above that of the compressing force. Thus the blood is driven through again, the arteries become visible and the reddish color returns to the brain.

Now if we again increase the compression the same results are obtained. In this way Cushing was able to drive blood pressure up to comparatively enormous heights. In one case he pushed intracranial pressure up to 276 mm. Hg. and the blood pressure to 290, before this regulating mechanism failed. Moreover it was found that a high compression pressure, if kept below blood pressure, could be borne by the brain for a long time—an hour or more. And clinically it is certain that a similar condition of moderate interference with medullary circulation can be borne for days (as in hemiplegia).

Now we have here evidence of a sort of regulating or protective mechanism designed to overcome the effects of cerebral anæmia. To what factors is this due?

The physiological proof afforded by Cushing is very pretty. If he cut both vagi the blood pressure response appeared more regularly than before inasmuch as the cardio-inhibitory action was excluded. If he cut the cord above the level of departure of the sympathetic nerves to the splanchnic area, thus excluding vaso motor control of that great region, he obtained only a vagus effect, a slow pulse but no rise in blood pressure. When he cut both the vagi and the cord and induced compression, there occurred neither slowing of pulse nor rise in blood pressure. Again,—and this was very ingenious,—if he cocainized the medullary centres in the 4th ventricle, thus paralyzing them, and, of course, carrying out arti-

facial respiration, he obtained the same results as when he cut both the vagi and the cord. When the cocaine effect wore off there returned gradually the response of the vaso motor centre with its rise in blood pressure upon compression. Lastly, exposing a loop of intestine, he saw that during brain compression the mesenteric vessels contracted, and that they dilated when compression was removed, evidencing the enormous importance of the great splanchnic area.

From these experiments Cushing felt justified in formulating a law,—  
“An increase of intracranial pressure above blood pressure causes a rise of the latter to a point somewhat above intracranial pressure. Moreover this regulatory mechanism is due to an action of the vaso motor centre and is brought about only by the condition of anæmia.”

“An acquaintance with this regulatory mechanism” continues Cushing, “would appear to throw light upon many points concerning the effect of compression which have hitherto been discussed indecisively. We see that venous stagnation has no relation to compression symptoms; that these symptoms may remain quite absent until we get an anæmia of the medulla; that the vaso motor centre in the medulla possesses the power of working successfully against this anæmia for an undetermined time and of postponing the stage of paralysis; that in local compression an anæmia may exist in the neighbourhood for a long time without prejudice to life so long as the medulla is not involved.”

It is here not the place to discuss questions of priority. The influence of brain anæmia upon blood pressure has long been known; and whether Schultën completely demonstrated the intimate relation between brain compression and blood pressure, or whether Leonard Hill, who speaks of the “protective mechanism” of the vaso motor centre (what Cushing calls the “regulationsmechanismus”), proved and formulated a proposition containing the essentials of Cushing’s law must remain undecided in so far as the present article is concerned. In any case it is indisputable that Cushing by his injection experiments and by the use of the window with accurate simultaneous measurements of the blood pressure and of intracranial pressure, has settled once and for all the “Wirkungsweise” of brain compression.

So much for the central point of the question. In addition his experiments confirmed or disproved many other details; such as the extremely free connection between the cerebro-spinal fluid and the sinuses and veins, and its practical lack of communication with the lymphatics; such as the descent of the medulla and the cerebellum into the spinal canal upon compression, and the consequent partial escape of the medullary centres from the compressing force; such as, again, the proper meaning:

of Traube-Hering waves, with many other minor points too numerous to mention.

Reviewing this work of Cushing's, together with that of many others Kocher summarizes the "Theory of Brain Compression" somewhat as follows:—

"As soon as the available room in the skull is taken up by compression there occurs a driving-out of the fluid contents. The brain itself, incompressible, has to give way towards the foramen magnum. The liquor goes off by the veins and sinuses and into the diploë, and eventually along the nerve sheaths. At the same time the venous blood is expressed from the sinuses and large veins, into the jugular, or the veins of diploë. This is the stage of compensation.

When no more room is available there begins the early stage of manifest compression through progressive narrowing of veins towards the arteries. This causes stagnation in the side exits and we get insufficient circulation through the capillaries resulting in headache, dizziness, pains in the limbs, restlessness, ringing in the ears, disturbed consciousness, delirium, dreams, etc.

With increased pressure we get capillary anæmia, and this stage represents the acme of manifest compression. An anæmia from local pressure may be a lasting one and in such cases may cause local signs according to situation,—paralysis, hemianopsia, etc. This can last a long time without danger to life; but if the anæmia extend to the bulb, death is inevitable through paralysis of the vaso motor centre. That this result is or may be long postponed is due to the excitation of the vaso motor centre according to Cushing's law. This excitation, however, lasts only so long as the anæmia is present; blood being driven through, the blood pressure falls again, and the anæmia becomes an intermittent one. The respiratory centre is affected in the opposite way— anæmia tends to paralyze it, while good blood stimulates it. The vagus centre is affected earlier, even by comparatively small obstruction to circulation: the venous blood of difficult circulation seems to arouse the cardio-inhibitory action and this persists without change until the paralytic stage. Ultimately the medulla is given blood only during systole, not diastole, and this not only intermittent but insufficient blood supply leads to the fourth stage, that of paralysis. The paralytic symptoms affect the whole brain. Introduced by tremors, nystagmus, variations in the pupil; irregularity of pulse and respiration, it progresses to complete unconsciousness, with loss of all cortical function; fixed dilated pupils; stertorous intermittent breathing; rapid and small pulse; sinking blood pressure and finally death.

Correlating these theoretical views with clinical phenomena, Kocher

proceeds to lay down his now well-known clinical classification, dividing a typically progressive case of brain compression into four stages:—

1. *Stage of compensation*, in which slight circulatory embarrassment is overcome by escape of the liquor and by narrowing of venous channels, symptoms being insignificant.

2. *The beginning stage of manifest compression*, with venous stasis, characterized by headache, vertigo, restlessness, roaring in ears, disturbed sensorium with excitement; above all with development of distension and tortuosity of the veins of the optic papilla, a recognizable and very valuable clinical sign.

3. *The acme-stage of manifest compression*, characterized by alternations between anæmia and a good circulation. Here we have the step-ladder rise in blood pressure with the development of rhythmic blood-pressure waves, marked respiratory distress, rhythmic alterations in the size of the pupil, and usually a vagus pulse.

4. *Stage of paralysis* with alternations between complete anæmia and an insufficient circulation, characterized by a falling blood pressure, irregular cardiac and respiratory efforts, deep coma, wide fixed pupils and broken snoring respiration—an irrecoverable condition of cerebral anæmia.

The clinical application of these experimental principles, as can be seen, turns upon the use of a simple and convenient apparatus for recording blood pressure in man; and such, Cushing found in the Riva-Rocci instrument, modified by Cook. In a very important clinical article in the *American Journal of Medical Sciences*, June, 1903, Cushing gives us the clinical applications of the foregoing experimental work. He reports five cases representing the four stages of Kocher's classification. It would take us too long to abstract the details of these cases; suffice it to say that with the help of this modified Riva-Rocci blood pressure apparatus he has been able to follow in a comparatively accurate way the conditions of blood pressure proven to exist in experiments. Too much praise cannot be given to the extremely accurate observation of blood-pressure in the cases reported,—observations which led *logically* in each case to the formulating of clear indications for or against operation. It represents the prettiest example of the logical and successful application of physiological experiment to clinical work that we have observed for a long time. We must refer the interested reader to the article itself. Yet we would like to call attention to one case in particular, Case iv., which represents a new departure in brain surgery; one which depends directly upon the experimental work described. It was that of an apoplexy with right hemiplegia in which blood pressure registered 300 mm. of mercury with

all the major bulbar symptoms present and threatening paralysis of the vital centres. These were relieved by craniotomy and the aspiration of an intracerebral clot. Although death resulted on the third day from pneumonia, the relief to the dangerous brain symptoms was unmistakable. Cushing expresses the opinion that such cases of intracerebral hæmorrhage may, at least in some instances, be regarded in the same light as those of extra-cerebral hæmorrhage and justify in the same sense surgical interference. The propriety of such a radical procedure must remain undecided until we have further clinical data to go upon. Possibly the dangerous compression symptoms might have been sufficiently relieved by trephining alone, or by the raising of a large osteo-plastic flap.

Space forbids our referring in detail to Kocher's work on Concussion, which he prefers to call acute compression. Its consideration in his monograph occupies as much space as that of compression. The book concludes with a valuable section upon trephining and its indications, craino-cerebral topography, extensive craniotomies, exploratory craniotomy, and brain operations in general.

It is a work which can hardly be too much praised and if possible enhances the brilliant and world-wide reputation of its author.

*E. W. A.*

---

## MEDICINE.

UNDER THE CHARGE OF JAMES STEWART, F. G. FINLEY, H. A. LAFLEUR AND  
W. F. HAMILTON.

---

FORTESCUE-BRICKDALE. "Collargol; a Review of Some of its Clinical Applications with Experiments on its Antiseptic Action."

Since Credé introduced silver as an antiseptic in 1897, many salts of this metal have been used for both external and internal conditions. Collargol, an allotropié modification of silver—has been used internally in both human and veterinary medicine—administered as an ointment containing 15% of the drug and intravenously, 5 or 10 c.c. of 1 per cent. solution being injected once a day.

When absorbed it induces a leucocytosis—within the first six hours lasting for twenty-four or forty-eight hours. It is excreted by the intestines and by the kidneys—no poisonous symptoms ever occur.

From experimental and clinical evidence concerning its usefulness the following conclusions are drawn up:—

1. That collargol has never been introduced into the body in sufficiently large quantities to produce an antiseptic solution in the mass of the blood.

2. That the evidence is strongly against its having any effect on artificial septicæmia in rabbits.

3. That as far as the above case show it has not had any effect on proved cases of general pyæmia or septicæmia in man.

4. That a fall of temperature and improvement in the general condition comparable to that sometimes produced by antipyretics and hydrotherapy has been observed in some cases of general toxæmia but that in half the recorded cases admissible as evidence it proved inert.

---

RIESMAN. "Desquamation of the Skin in Typhoid Fever." *The Amer. Journal of the Med. Sciences.* January, 1904.

Dr. Riesman's interesting resumé of observations on this subject and the recital of two illustrative case reports well deserve a place in the retrospect of medicine.

The following varieties of desquamation in typhoid may be distinguished:—

1. That confined to the rosecolor spots. In some instances each spot has a tiny vesicle upon its summit which quickly passes into a thin scale-like crust.

2. That appearing as a sequel of sudamina. This is confined to the areas that have been the seat of the sudaminal eruption. \* \* \* \* The desquamation is usually furfuraceous but it is sometimes scaly. It occurs upon the trunk and the proximal parts of the limbs and is never seen upon the distal parts of the extremities or upon the face. It appears in the bathed and in the unbathed.

3. In some instances, \* \* \* \* there is in typhoid fever, an extensive almost universal desquamation either furfuraceous or lamellar which seems to be independent of sudamina and in all probability is a trophic change analogous to the shedding of the hair. It affects the trunk and the roots of the limbs, and, in rare instances also the face and the distal parts of the extremities. Usually but not always the extent and the intensity of the desquamation bears a relation to the severity of the fever.

---

RUCKER. "The Differential Diagnosis of Typhoid Fever in its Earliest Stages." *The Amer. Journal of Med. Sciences.* January, '04.

After a review of the various methods of differential diagnosis chiefly from the bacteriologic standpoint, Rucker draws up the following conclusions:—

1. There is no single symptom on which alone an early diagnosis of typhoid fever can be made. It is only by careful consideration of the symptom complex that a clinical diagnosis can be arrived at.

2. The most trustworthy as well as the earliest sign of typhoid fever is the presence in the circulating blood of the bacillus of Eberth.

3. The demonstration of the bacillus of Eberth in the blood is not beyond any fairly well equipped laboratory.

4. The bacillus of Eberth is found in the fæces later than in the blood but with comparative ease. The presence of the bacillus typhosus in the fæces is of great value as a corroborative sign.

5. The presence of the bacillus typhosus in the rose spots is a trustworthy sign, but has no advantages over the examination of the blood from other localities.

6. The serum reaction of Widal is seldom demonstrable during the earliest stages of typhoid fever. It is of value only in the higher dilutions.

---

MAX EINHORN, M.D. "The Serum Treatment of Typhoid Fever." *Medical Record*, Jan. 16th, 1904.

An historical summary of the efforts to obtain a serum for the treatment of typhoid fever opens the article, and then Dr. Einhorn gives his own experience in the employment of the serum prepared by the Berne Board of Health, after the method of Jez. Ten cases were treated and full notes with charts are given. Dr. Einhorn arrives at the following conclusion:

"The serum treatment of typhoid fever temporarily reduces the fever and improves the general condition, so that patients go through a more rapid and safer convalescence; the injections do not seem to be connected with any dangers; with the many injections given we never had any serious trouble. I therefore believe that the serum treatment of typhoid fever is now already of decided value, and there is no doubt that we shall soon have more potent sera, with which we may obtain more favourable results."

---

DUPUY. "The Laryngeal Complications of Typhoid Fever." *The N. Y. M. and Phila. M. Journal*. December 26, '03.

Notwithstanding the careful and painstaking study bestowed upon typhoid fever, Dr. Dupuy finds an hiatus, so to speak, in the list and descriptions of the complications of this disease especially with reference to the larynx. The article under review is an attempt to fill up the omission by bringing together the references to laryngeal complications—discussing the etiology, frequency and pathology and reporting a case. The general conclusions with which the article closes are as follows:—

The 25 collated cases reported in the last 58 years, which for evident

reasons are only approximately correct, afford eloquent proof that the subject of typhoid affections in the larynx calls for general recognition. Evidence bacteriological and clinical strongly support the view adopted by the majority of observers, that the laryngeal involvement in most instances is a direct typhoid infection.

A high death rate, as shown by statistics, when this complication exists, teaches the salutary lesson of always examining the larynx when the danger signals of hoarseness, dyspnoea or dysphagia set in.

The favourable results which follow operative interference offer such a contrast to the high mortality without operation that there can be but unanimity of opinion as to its propriety.

Trachæotomy is the most approved method.

Lesions in Larynx.

Laryngeal perichondritis .....	Cases	5
“ Ulceration .....	“	5
“ Necrosis .....	“	3
“ Abductor paralysis .....	“	2
“ Oedema .....	“	3
“ Diphtheria presumably .....	“	3
Ludwig’s angina .....	“	2
Abscess in larynx .....	“	2
		—
		25

FRANCIS HARE, M.D. “Mechanism of the Paroxysmal Neuroses.” *Australasian Medical Gazette*, July, August, September, October, 1903.

The disorders, known as paroxysmal neuroses, namely, migraine, asthma, epilepsy, gastralgia, and functional angina pectoris, are covered very fully and their interchangeability referred to. The mechanism of the production of each is described. The papers are full of clinical references and many illustrations are drawn from the literature. They may be obtained under one cover from W. E. Bridge, Sydney.

STEPHEN J. MAHER, M.D. “Investigations of a Bacterial Treatment of Tuberculosis.” *New York and Philadelphia Medical Journal*, Jan. 16th, 1904.

Dr. Maher continues his recital of cases treated by what he calls the X-bacillus. He has already treated sixty-three cases, and the final results will be read with interest.



F. L. WACHENHEIM, M.D. "The Hæmorrhagic Diseases and their Allies in the Light of Modern Pathology." *Medical News*, Jan. 16th, 1904.

The author begins his study with a consideration of the nature and causation of spontaneous hæmorrhage, and deals with chemical poisons and toxins as causative agents.

Summing up, the author finds that hæmophilia, congenital or acquired, is a toxinæmia with secondary auto-immunization to a quasi-normal function; that the scorbutic affections are chemical auto-intoxications, hæmorrhagic only because the blood is especially involved; and that the purpura rheumatica group is only a manifestation of ordinary rheumatism or sepsis. After an exposition of their very diverse nature, it seems clear to the author that the old class of the hæmorrhagic diseases has become obsolete, should be relegated to the domain of historic medicine, and cease to appear in monographs and text-books.

---

*The American Journal of the Medical Sciences*, December, 1903.

It is worth reproducing the contents of the December number:—

The Anatomical Basis of the Argyll-Robertson Pupil, by Henry M. Thomas; A Contribution to the Surgery of Cerebral Tumours, by George Woolsey; Multiple Sclerosis with Dementia, by J. Ramsay Hunt; Tumours of the Sigmoid Flexure, by Prof. C. A. Ewald; Concerning the Nature of Certain Cases of Chronic Polyarthritis, by David L. Edsall, and Ralph S. Lavenson; Clinical Lecture on the Symptomatology and Treatment of Trifacial Neuralgia, by Charles H. Frazier; A Death during General Anæsthesia with Ethyl Chloride, by Francis Olcott Allen, Jr.; A Case of Infection of the Epididymis and Tunica Vaginalis by the Friedländer Bacillus, by Eugene P. Bernstein; A Case of the Epiphenomena of Diphtheria Antitoxin, by James P. Marsh; A Case of Probable Primary Carcinoma of the Lung; by Arthur Bremken; The Movements of Superior Intercostal Muscles in Hemiplegics, by L. Pierce Clark; A Note on the Foot of the American Negro, by Albert H. Freiberg, and J. Henry Schroeder; Studies on the Antagonistic Action of Drugs, by H. D. Haskins; Blood Changes in Dementia Paralytica, by A. R. Diefendorf.

---

"Enteric or Typhoid Fever." *The Practitioner*, January, 1904.

*The Practitioner* devotes the January Number to a consideration of typhoid fever. The introduction is by Sir William Broadbent reviewing the papers which follow. There are articles on typhoid in Egypt,

India and China, and in South Africa during the war. *Ætiology* and prevention are discussed in two papers and *Protective Vaccination* in one by Professor Wright. The treatment of the disease is considered in four papers, one of which deals with the methods employed in Johns Hopkins Hospital. *Para-typhoid infection* has a paper to itself, by Dr. Hewlett. This collection of papers contains the most recent views on the whole subject.

---

### Society Proceedings.

---

#### SOCIETE MEDICALE DE MONTREAL.

*Meeting January 13th, 1904.*

DR. VALIN, PRESIDENT, IN THE CHAIR.

Dr. Alphonse Mercier presented a pathological specimen of a cancer of the œsophagus. The cancerous growth perforated the œsophagus and adhered to the lung and pericardium. He also related the clinical history of the patient who died in Dr. Demers' department, at the Notre Dame Hospital. Dr. Mercier also presented an enormous sarcoma of the right kidney, completely filling the right side of the abdominal cavity, but not extending to any other organ.

Dr. Monod congratulated Dr. Mercier upon the specimens presented, and drew attention to the necessity of a physician wishing to make a good diagnosis, not to dwell upon one symptom, but to group all the symptoms and thoroughly examine the subject.

Dr. Oscar Mercier, who had catheterized the patient for a stricture of the œsophagus—added a few words, and remarked upon the dangers attending such a practice so useful to confirm the diagnosis.

Dr. L. J. Lemieux read a paper in the name and at the request of Dr. Marmoreck, concerning his report made a few months ago, on a new serum for the treatment of tuberculosis.

Dr. Dubé thanked Dr. Lemieux for this paper, the contents of which were already known to several, through the French medical press. In his opinion, Dr. Marmoreck had only sought to have priority. He hoped before long, that the antitubercular serum would become effective, but at present he would not dare to make use of it.

Dr. Lecavalier strongly insisted upon the non-effectiveness of the serum and its disastrous effects upon the patients placed under Marmoreck's personal attendance in the hospitals of Paris.

Dr. Alphonse Mercier did not admit the effectiveness of Dr. Marmoreck's serum and believed that serious reasons had forced Dr. Marmoreck to sever his connection with the Pasteur Institute. Upon the discovery

of his antistreptococcic serum Dr. Marmoreck found a most staunch supporter, in Dr. Roux, the leading authority in serotherapy, but at present Dr. Roux was absolutely opposed to this new antitubercular serum. A vote of thanks was officially transmitted to Dr. Marmoreck for his courtesy in forwarding his report.

The reading of Dr. Dubé's paper on Syphilis and Tuberculosis was postponed to the next meeting, and he moved that lecturers outside of Montreal be invited to address the society on subjects of their choice, and that Dr. Coyteux Prévost, of Ottawa, and Dr. Archambault, of Nashua, be invited.

---

### OTTAWA MEDICO-CHIRURGICAL SOCIETY.

*Seventh Meeting, January 14th, 1904.*

H. B. SMALL, PRESIDENT, IN THE CHAIR.

Dr. Dewar showed the specimen of a dermoid cyst of the left ovary which was removed from a multipara. The interesting facts about the case were: the complete absence of severe pain, and, the slow growth of the tumour. It was first noticed some years ago before marriage, but beyond causing several miscarriages, it had given little trouble.

Dr. Minnes showed a specimen of Melanotic Sarcoma of the Choroid, and the patient from whom it had been removed. This case was in a young man of 20, first seen a year ago. He then complained of his vision being poor. An exudate could be seen in the choroid and the diagnosis rested between gumma of the choroid and sarcoma. There was a history of gonorrhœa and a possible history of syphilis. He was put on potassium iodide but he did not return until a month ago when the history of a recent blow was given. The eye was found filled with a black mass and vision was absent. There were two small ciliary staphylococci. Excision was advised; the condition was probably melanotic sarcoma, though it was possible to have resulted from a ruptured globe with hæmorrhage. He came back after two weeks—a considerable advance being apparent and immediate excision was done.

On making sections of the eye, it was found to be a melanotic sarcoma arising from the choroid in the neighbourhood of the optic nerve and corroding the sclerotic. On account of this latter fact, a complete removal of the contents of the orbit was done a week later. The wound healed well and the result looked promising.

The paper of the evening was read by Dr. R. W. Bruce Smith, assistant superintendent of the Hospital for the Insane at Brockville. The subject was "The Relation of Auto-Intoxication to Insanity, with Reports of Cases." The following is an abstract of the paper: Modern

methods of investigation and treatment are rapidly bringing asylums into closer resemblance to modern hospitals. It is being demonstrated conclusively that the study of insanity must be conducted along the same lines as are pursued in the investigation of other branches of medicine. We know little of the pathology or pathogenesis of the various insanities, yet in other diseases, advances in the study of Bacteriology and Physiological chemistry have gone far towards demonstrating that the great majority of the processes of disease in general are due to toxic elements in one form or another. May we not therefore look to the general organism to discover toxic elements which may originate directly or reflexly the conditions existing in the insane. The relation between changes in the nervous system and general somatic disease is often marked. The lapse of time between the two is so great that the relationship is overlooked.

To Bouchard and his associates must be ascribed the credit of co-relating auto-intoxication and various forms of insanity. All efforts to locate the lesion and demonstrate the exact nature of its pathology have failed to convince us that insanity is due to some definite morbid process or degeneration of nerve cells or neurons. On the contrary, if it be organic disease affecting the nervous system, then the causes we find for physical disturbances are many.

Recent observers have shown that the various fluids of the body undergo decided changes in the insane. The urine has been especially used to demonstrate this. The following conclusions have been drawn; first, that the toxicity of urine is markedly increased in melancholia and diminished in maniacal patients, as demonstrated by the fact that when injected into animals it produces symptoms similar to that form of mental disturbance in the patient from whom the urine was taken. This fact alone favors the idea that the toxæmia is the cause not the effect; second, that insanity is frequently produced by toxins is affirmed by recent investigations of acute infectious, visceral and diathetic diseases.

From this does it not seem a reasonable hypothesis to assume that the sympathetic relation existing between all acute forms of insanity and physical disturbances is capable in the majority of cases of actual demonstration? One of the best arguments in favour of the origin of insanity by auto-intoxication is deduced from the fact that antiseptic and anti-infectious treatment has often given good results.

Since the introduction of asepsis in midwifery the number of cases of puerperal insanity has been greatly lessened. Hansen, Idanoff, and others have laid great stress upon infection or toxic conditions as a cause of the lying-in psychoses. No distinctive organism has been demonstra-

ted in the blood or uterine cavity; yet Williams, of Johns Hopkins reports two cases of puerperal insanity in which pure cultures of streptococci pyogenes were obtained from the cavity of the uterus. Berkeley reports a case in which growths of streptococci were got from the blood and from the vaginal secretions during life. Clouston also reports a similar case.

Hansen estimates that 80% of the lying-in psychoses have an infectious or toxic origin. Cases of the latter class are due to the accumulation of certain chemical products of incomplete metabolism. These irritate during pregnancy, the nervous system and at the supreme moment of delivery lead to a pathological reaction in the form of an eclampsia, a psychosis or both.

Insanity in an acute or chronic form in the non-pregnant from a renal lesion is frequently met with, and the hallucinatory-confusional excitement closely resembles that so remarkable in puerperal cases. Eight years ago in a report of some observations gleaned from post-mortem examinations of the insane, the essayist called attention to the large proportion of cases in which a chronic kidney lesion was discovered without any previous history of alcoholism, syphlisis or gout. He pointed out then that there was more significance probably in the matter of kidney lesion than in the mere fact of its occurrence.

In the asylum, the mental disorders arising from auto-intoxication are most frequently due to intestinal putrefaction.

To look upon every recent case as having some physical cause by which we must endeavour to account for the mental phenomena is the only correct basis upon which to commence and continue the treatment of the acute insane.

The therapeutic advances achieved in the treatment of the insane have been few. The main object is to ascertain any pathological condition, local or general, and endeavour to correct the same. The use of intestinal disinfectants has been extolled by Bouchard and others, but the essayist has never been satisfied that his results could be attributed to such remedies. The preference is to rely more upon thorough and complete cleansing of the alimentary tract by the free use of salines and lavage of the stomach. The skin is to be kept free, and sedatives discarded as far as possible. Both ends are secured by the use of the spray bath. There is no sleep producing agent equal in its effects.

The following case reports are chosen to illustrate: Case I. M. H. C., act 22. Single, farmer's daughter, housework. Previously healthy. Heredity denied. First attack of insanity one month before admission, assigned cause—domestic worries.

Medical certificate asserts that she is greatly excited, laughing and

crying at intervals. Talks incoherently and incessantly. Had delusions of persecution. Very suspicious of every-one. Marked insomnia, restlessness and excitability. On admission—restless, eyes wild and staring. Breath foul, tongue coated, teeth covered with sordes T. 101, P. 106. Pelvic organs normal. Digestion much impaired. Bowels very constipated.

Diagnosis: Acute mania. The stomach was irrigated, and food administered. Large dose of magnesia sulphate gave free motions, but excitement continued. She was given a warm shower bath and placed in a wet pack at 112°F. The mental excitement gradually subsided in three hours. On removal, she was sponged with alcohol and water. She slept for four hours. This treatment was continued for five days. The improvement continued and at the end of two weeks she was free from the auditory and visual hallucination. Tonics were administered and recovery was practically uninterrupted. She was discharged in six months and has been perfectly well since.

Case II. M. C., aet 24. Delivered 10 weeks ago. Pregnancy normal, labor protracted. Severe mania developed two weeks ago—quite difficult to control. On examination when admitted, the uterus was found to contain some foul shreds of membrane, which were removed by curette. Vaginal douches of 1—1000 bichloride of mercury were used twice daily for a week. Nourishment was given by stomach tube also cascara sagrada to keep the bowels open. At end of week, the shower bath was used twice daily followed by friction with rough towel. This was continued for two months. Recovery was uninterrupted. Patient was discharged in four months and had no recurrence during three years since.

Case III. S. C., aet 48, male, married, father of seven children, painter, always temperate, had gradually been growing peculiar and for a month before admission was much mentally disturbed; had delusions of persecution, of suicidal intent; at times lethargic; at times excited. When admitted was much depressed. Temp. normal, pulse 76. Urine scanty, dark and of Sp. Gr. 10 25. Skin flabby and cold—stomach and bowels irrigated. Was given hydrargyrum cum creta followed by salines, kept in bed and fed regularly on liquids. He was given a spray bath every day for a month. Bowels were kept open and he was urged to drink water freely. After remaining dull for two months, he was encouraged to take up an occupation and from that time his recovery was rapid. He went home in the tenth week after admission and has been perfectly well since.

In the discussion which followed, several of the members present took part.

# MONTREAL MEDICO-CHIRURGICAL SOCIETY.

*Seventh Meeting, January 5th, 1904.*

H. S. BIRKETT, PRESIDENT, IN THE CHAIR.

The meeting was held in the lecture room of the Physics Building, McGill University, by permission of the university authorities, and the attendance was unusually large, 114 members being present.

The treasurer, Dr. A. T. Bazin, presented the annual financial statement, which was as follows:—

## TREASURER'S ANNUAL REPORT, SESSION 1903.

1902.		RECEIPTS.		
Dec. 30	Cash Balance on Hand . . . . .		\$ 241 95	
1903.	Subscriptions, Entrance and Annual . . . . .		1,442 00	
Apr. 17	Repayment of Loan to Milk Commission . . . . .		29 75	
1903.	Interest on Bank Deposit . . . . .		8 17	
				<u>\$1,721 87</u>
		EXPENDITURE.		
1903.	Rent, Heat and Light . . . . .	\$700 00		
	Caretaker . . . . .	120 00		
	Attendant . . . . .	123 00		
	Printing and Stationery . . . . .	95 65		
	Journals . . . . .	29 96		
	Insurance Guarantee . . . . .	7 50		
	Office furnishings:			
	Balance on Typewriter . . . . .	\$35 00		
	Die for Crest . . . . .	15 00		
	Seal and Press . . . . .	20 00		
	Plate for Membership Certificate . . . . .	35 00		
			105 00	
	Telephone . . . . .	30 00		
	Secretary's sundry expense, 1903 . . . . .	50 00		
	Secretary's honorarium, 1903 . . . . .	50 00		
	Smoking Concert, Dec. 19, 1902 . . . . .	44 90		
	Sundries . . . . .	1 50		
				<u>1,357 51</u>
1903.				
Dec. 31	Cash Balance in Bank . . . . .			364 36
	Gross Assets:—			
	Arrears in Subscriptions . . . . .	378 00		
	Furniture . . . . .	688 84		
	Cash Balance in Bank . . . . .	364 36		
				<u>1,431 20</u>
	Liabilities:—			
	Loan on Furniture . . . . .	335 00		
	Outstanding accounts,			
	Treasurer's Sundry Expenses, 1903 . . . . .	\$14 60		
	Caretaker, 2 months . . . . .	24 00	38 60	
				<u>373 60</u>
	NETT ASSETS . . . . .			<u>\$1,057 60</u>

PROFESSOR E. RUTHERFORD gave a lecture, with illustrations and experiments, upon Radium, and an abstract appears at page 112 of this number of the JOURNAL.

*Eighth Meeting, 22nd January, 1904.*

H. S. BIRKETT, M.D., PRESIDENT, IN THE CHAIR.

The correspondence which passed between the Secretary and the Canadian Nurses' Association was read. It showed that the Council had declined to take any part in the deliberations of that Association in connection with the issuing of a new tariff of charges and the action of the Council was endorsed by the Society.

DR. H. A. LAFLEUR presented a living case of myxœdema, and read a report upon the condition. He showed photographs taken before and after treatment with thyroid extract, to demonstrate the improvement.

DR. FINLEY was of opinion that myxœdema did not occur so frequently in this country as it did in London; he had seen not more than two or three cases in Montreal, whereas in London they were fairly common. He noted the resemblance of myxœdema to Bright's disease, in respect of the condition of the kidneys, which in both cases yielded casts and albumin; another condition he had noted was deafness which usually subsided after the administration of the extract.

DR. LAFLEUR in reply to a question, said that two different preparations had been used, but he was not aware of their relative strength. Dr. Birkett enquired as to the condition of the larynx and ears, and Dr. Lafleur stated that there were several lacunæ in the case report—the larynx, ears, fundus of the eye, and blood were not examined.

DR. SHEPHERD said that he had had two cases of surgical myxœdema, of which one had been operated on three times for carcinoma of the thyroid. The patient developed myxœdema after the second operation, but the symptoms subsided after treatment with thyroid extract, and the patient was quite well three years after the onset. The other case followed excision of the thyroid. Dr. Shepherd remembered, that after hearing a lecture upon anatomy, in which the subject had been referred to, a student diagnosed a case in his own family and brought the patient for examination. The symptoms disappeared after the use of the extract.

DR. GEORGE K. GRIMMER gave a demonstration of the utility of paraffin injections in correcting deformities of the nose. He exhibited lantern slides and two living cases.

In the discussion which followed Dr. Craig gave testimony to the value of the method, and referred to the subcutaneous operation by Roe, of Rochester. In reply to a question by Dr. H. D. Hamilton, Dr. Birkett said, that so far as the American Laryngological Association was concerned, and he thought also the London Association, the sub-



ject had never been discussed, though not a few members had done the work. For his own part the cases which came before his notice were not those which would be benefitted by that treatment, but were those which had received injuries to the structures and those structures still existed and could be rebuilt. He had not used paraffin because he had no occasion to employ it.

DR. BULLER stated that before paraffin was thought of he did an operation on a nose in which there was a congenital depression of the nasal bones and widening of the epicanthus. This operation was done in the General Hospital in 1893, and consisted of placing a piece of glass under the skin and making a fairly presentable nose. The surface was laid bare to the periosteum; the glass, which was made by a lapidary from a mould of wax, was inserted and the wound stitched with four or five sutures when immediate union took place.

In reply to Dr. Kerry, Dr. Grimmer stated that the occurrence of embolism was practically a thing of the past, though in the earlier days three cases had been reported.

DR. BELL read a case report upon Migration of Needles from the Intestine into the Surrounding Tissues. The case is reported on p.108 of this number of the JOURNAL. Duplicates of the needles and a piece of glass were exhibited and skiagraphs shown.

DR. LOCKHART recalled a case of a woman who had introduced a crochet needle into the uterus for purposes of emptying its contents. She came to the hospital and for a fortnight was under observation, but the needle could not be found; there was on admission pain and one degree of temperature. Two days after arriving home the uterus emptied itself, and she came back with pain in left half of abdomen which was sharp and shooting and aggravated when pressed upon. On careful examination a linear mass was made out, though the skiagraph gave a negative result. The abdomen was opened and the pelvic cavity explored thoroughly and nothing found until the hand passed up along the left side of the abdomen, when a hard structure immediately in front of the left kidney was felt. It proved to be the needle, and it was half imbedded in its whole length, with the point in the wall of the intestine, though not perforating it. On examining the uterus more carefully, one found just above the tip of the fundus a scar of a small perforation, evidently the point of perforation of the needle. The patient made an uninterrupted recovery.

The President announced that Dr. Harvey Cushing, of Baltimore, would address the next meeting of the Society.