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THE HABIT OF GROWTH.

AN INTRODUCTION TO A DISCUSSION UPON CARCINOMA AT THE MONTREAL MEDICO-CHIRURGICAL SOCIETY, DECEMBER 13TH, 1895.

By J. GEORGE ADAMI, M.A., M.D.

Professor of Pathology, McGill University; Pathologist to the Royal Victoria Hospital.

Frankly, gentlemen, it is impossible to do anything approaching to a discussion of the cause, progress and histological characters of cancerous growths in the time allotted to each of this evening's speakers, and I am bound, therefore, to select one single aspect of the subject for treatment, and even then can at the most touch rather than treat it.

Perhaps that which is of most general and present interest in connection with cancer, both from the point of the pure pathologist and from the standpoint also of the practical man, is the question of the causation of cancer. I say from the point of view of the man in practice, because once the cause of cancer is surely established it is generally held that prevention will be possible. This is the general hope, but for myself I am a little doubtful as to whether this really follows. I am not quite sure that when we establish satisfactorily the ætiology we shall find matters so simple that we can readily abolish or prevent the cause. Even if the condition be of a parasitic development, even if we are able to cultivate the parasite outside the body, and thus gain an intimate knowledge of its life history, I am not wholly hopeful that we can assume upon the analogy of modern bacteriological achievements and feel assured that eventually we can find means of arresting the growth of the parasite, and so of arresting the cancerous process, for, as I shall proceed to show, the *modus*

operandi of the parasite must differ essentially from that of the micro-organisms of ordinary zymotic disease. At the present time the most that can honestly be said with regard to the results of the investigations into the parasitology of cancer is that those investigations have revealed the occasional presence in the cancer cells of a series of very curious bodies. These bodies may be of the nature of sporozoa, they may with perhaps equal plausibility be regarded as the results of endogenous cell degeneration. So long ago as 1889-90 I gave out and demonstrated to my morbid histology class at Cambridge sections of a cancer of the scrotum showing these bodies. I am as much in doubt as to the nature of these bodies to-day as I was then. I leave it to Dr. Martin to bring before the Society the main results of the observations that have been made in this subject so far.

But it seems to me that even if we grant that cancer is caused by this parasite, we have not arrived very much further. In the first place, in all other parasitic and microbic diseases with which we are acquainted, general infection is brought about by the conveyance of the *microbe* from the primary seat of growth to other regions of the body by the lymph or the blood stream. In cancer general infection (a term which in consequence I am inclined to dislike seeing used in this connection, I prefer "metastasis") is essentially associated with a totally different process, namely, the conveyance of *tissue cells*. It is the cells carried to other regions by the lymph or the blood stream that there proliferate, and the secondary growths are in the oldest and strictest sense colonial. Just as the old Greek colonies were established by members of a community who migrated to a distance and there founded a new community of like constitution to the old, but wholly separate and owing no allegiance, so is it with the metastatic cancer growths. Even if in these migrating cells parasites be present, it must be admitted that we are dealing with a new type of infection wholly distinct from that induced by the tubercle bacillus, for example, and as a consequence we cannot predicate that the laws determining the prevention of one will determine the prevention of the other.

In the second place, granting that parasites bear an ætiological relation to cancer, we are still left in the dark as to why parasites induce certain cells of the body to take on a functionless and heterotopic growth. At most we acknowledge that an obscure organism originates aberrant vital processes on the part of sundry cells; and inasmuch as similar aberrant vital processes are known to take place in other cells without there being any suggestion of similar parasites being present, we are led, I think harmfully, to separate off sharply

conditions which are related, we are led to neglect the attempt to find some common cause for all these conditions, we are led to separate sharply the malignant epithelial growths (I use this term in its broadest sense) from the malignant connective tissue growths; or if this be denied, and the sarcomata be accepted also as of parasitic causation, we are, at least, led to separate all malignant growths from all benign growths; we are conducted, that is, to an *impasse*. For this may be definitely accepted that certain benign growths are wholly unassociated with the presence of any parasite. Take, for example, the little lamellar fibromata to be seen upon the capsule of the spleen, or take the papillomatous overgrowth of the mucosa at the edge of a chronic intestinal ulcer, take the long finger-like down growths of epithelium at the boundary of a chronic ulcer, or the bony overgrowth upon the inner side of the femurs of cavalry soldiers. In all these cases chronic irritation is absolutely sufficient to explain the developments, yet no distinction can well be drawn between these chronic inflammatory hypertrophies and other forms of benign tumours. We must, then, logically admit that functionless and heterotopic cell hyperplasia can be induced without parasitic association; and inasmuch as the benign may pass imperceptibly into malignant growths, and inasmuch as we can, for example, come across lipomata showing transition into sarcomata, or fibromyomata doing exactly the same, as again we can, in thyroid, encounter what are certainly benign growths—adenomata (the so-called foetal adenoma)—possessing all the histological characters of carcinomata, the only conclusion to be reached is that a study of the presumed parasite is calculated to lead us only a very little distance.

We must seek deeper than these suppositious parasites if we wish to discover what lies at the bottom of all malignant tumour growth, aye, of all functionless cell proliferation.

Now, that I may prepare you for the train of reasoning upon which I am about to embark, and that you may throughout the ensuing argument see whither it is tending, let me here state the conclusion at which I have thus far arrived from a study of neoplasms and not a little consideration concerning their characters and relationships. Briefly, I cannot but hold that the one fundamental phenomenon underlying the development of cancerous and other neoplasms is the assumption of a habit of growth, a habit of rapid cell division independent of external stimulus on the part of certain cells in one or other region of the body.

The power of growth and multiplication is not, it must be borne in mind, something new to the cell. Every cell in the body, we may

safely say, either possesses or has possessed it. In every tissue, to the end of the life of that tissue, there is a constant, even if slow death of certain cells and replacement by cells of the same order, derived by proliferation of cells of that order. There is latent, that is to say, in all the living cells of the body a capacity for multiplication requiring only the necessary stimulus to call it into play. The habit of growth to which I have referred above is an exaggeration, or more exactly, a calling into full activity of this latent capacity.

This latent capacity for growth is much more intense in the vegetable kingdom, and numerous examples might be given in illustration. I need only remind you that if you nip off a piece of a begonia leaf, and place it under favourable conditions, that piece will develop into a complete plant. The cells of this leaf, highly differentiated as it is, have the latent power of orderly proliferation to such an extent that they can reproduce the whole plant.

Among the lower animals the same property is equally well marked. Cut a hydra into, I believe it may be said, almost as many parts as there are cells, and, provided that healthy and intact cells are left in the sections, each portion will develop into a complete hydra. The latent capacity for growth is such that each cell appears to have the potentiality not simply to produce cells of like order, but to reproduce the whole animal.

Ascend higher in the scale, and the latent capacity becomes more limited. In the crustacea for example, the potentiality is restrained to the reproduction of lost parts. Here the cells of various tissues proliferate harmoniously, and every tissue of the lost part is reproduced in proper proportion. Ascend yet higher, and the latent capacity is yet further restricted; so that in man we observe the following, namely, that only the cells of certain relatively simple tissues possess to any marked degree the power of complete reproduction.

It may be said that all this is trite and commonplace, and it may be asked what it has to do with the pathology of carcinoma. Well, the recapitulation is valuable to this extent that it helps to impress upon us the proliferative capacity of the cells of the body, and the limitations to that capacity in the higher animals. As a matter of fact, it is only in the higher animals in which these limitations have been impressed upon the cells that malignant growth is possible and is found. In lower animals any stimulus to cell proliferation leads to reproduction either of the whole individual or of a complex of tissues.

Recognising, then, the existence of this latent power of proliferation on the part of cells with the limitations that I have mentioned,

let me pass on forthwith to its bearing upon cancer formation, leaving aside, from lack of time, any consideration of the development of histoid tumours, even though I do this at the risk of being accused of passing by what is difficult to explain.

While in man we observe, as I have above stated, that only certain of the simpler tissues exhibit any marked power of proliferation leading to complete reproduction, the latent capacity for growth is present all the same, and we notice the appearance of a further and allied phenomenon. We see that under suitable irritation the cells of these higher tissues have not lost entirely their capacity for growth, only that capacity results in a development along somewhat different lines. What I mean can best be studied by observing the conduct of individual units of these higher tissues, either in the attempt at restoration of a muscle or nerve after section, or again, by a study of the processes occurring in glandular structures during the course of an inflammation that is not too intense. Severe inflammation leading, as it does, to active cell destruction is outside our purpose. Now, the most prominent characteristic of a nerve or muscle fibre present in the attempt at recovery after injury is the multiplication of the nuclei of each unit, a multiplication often regarded and spoken of as a degeneration, and indeed not unfrequently such multiplication precedes the actual disintegration of the unit. This multiplication, which I have elsewhere spoken of as "reversionary degeneration," is, I hold, an indication of a reversion to a more primitive type of cell, and indeed in the case of muscle Metchnikoff and others have shown that the individual nuclei resulting from this nuclear division may surround themselves with protoplasm and may pass away as simple embryonic cells, so that the whole muscle fibre becomes completely disintegrated. The process here is one of what may be also termed vital disintegration. The same principle that is shown here is to be seen at work in glandular structures. Take, for example, a case of parenchymatous nephritis. If this be acute the cells of the tubules swell up, show vacuolation and other signs of acute degeneration of the cell substance, with failure of the nuclei to stain properly (or to put it in other words, diminution of the chromatin of their nuclei), and the cells are cast off. With a lesser degree of inflammation the process is very different; we find here that the cells proliferate, but at the same time these new cells do not show the full adult character, their nuclei it is true stain intensely, but their bodies are small and cubical, their characters become more nearly allied to those of the cells in the developing kidney.

Or take the liver. Here in chronic inflammation we find the same

rule to obtain. If we study the comparative anatomy and the development of this organ we discover that it has arisen from a collection of separate acini or finger-like gland follicles. In the adult liver it is impossible to convince oneself of this fact; the cells seem to be arranged essentially in lobules around the branches of the hepatic vein; nevertheless the bile capillaries represent the lumina of the original or primitive gland follicles, and with chronic inflammation, as we see in case after case of cirrhosis, at the periphery of the lobules, the liver cells show the tendency to proliferation, with associated diminution in size; their nuclei stain as intensely as do those of neoplasms, so full are they of chromatin, and these small embryonic cells arrange themselves in a tubular manner, so that we have the appearance of numerous irregular winding ducts running through the new connective tissue formation at the periphery of the lobules—a reversion towards the primitive structure.

Still more instructive is the condition seen in the lung in chronic inflammation. In any case of chronic interstitial pneumonia [this term interstitial pneumonia is unsatisfactory, and a better one is chronic productive pneumonia, for the inflammation affects the parenchyma equally with the interstitial substance]—in any such case, I say, we observe that the result of continued inflammation is to lead to a modification of the epithelium lining the alveoli, so that instead of this being flattened and indistinguishable it is represented by a layer of small cubical cells in all respects resembling the cells lining future air sacs in the lung of the embryo.

In all these cases, therefore, we see this law holding good, that with chronic irritation of moderate intensity the cells of highly organized tissues tend to proliferate and to assume a more embryonic type. So true is this that time and again we pathologists are completely at a loss to give a full diagnosis. We receive from the gynæcologists, for example, scrapings from a womb with a history that there has been long-continued endometritis, and cancer is suspected. We receive from the surgeons portions of tissue taken from the edges of chronic ulcers, and are asked to decide if they be epitheliomatous, and in these and similar cases of so embryonic a type is the cell overgrowth, that it is impossible for us time after time to declare whether we are dealing with inflammation pure and simple or with actual cancerous tissue. I must confess that when I send in the reports upon such cases I still feel apologetic, I feel that the surgeons and gynæcologists have the idea that a pathologist ought to know these matters and ought to be able to give an assured diagnosis. I feel that the said surgeons and gynæcologists will when they read such reports complain that after

all I, the pathologist, am a very weak reed to have to lean upon. And I am glad that now, when I have no doubtful specimen before me to report upon, I can point out to the surgeons and the gynæcologists the state of affairs as it actually is, namely, that it is at times impossible to distinguish between chronic inflammatory and malignant tissue. And the reason, gentlemen, why it is impossible thus to distinguish between the two is that the difference between them is purely one of degree.

There can be no doubt that at times this inflammatory hyperplasia of gland cells—this development of embryonal or sub-adult gland tissue—passes on imperceptibly into cancer. Although it may be urged that in all cases of cancer the history of previous chronic inflammation cannot be obtained, this fact that antecedent chronic inflammation at times either escapes detection or is not present, in nowise weakens what is here stated, namely, that many cases of chronic irritation and long continued inflammation of moderate intensity, affecting epithelial and glandular tissues merge into carcinomatous manifestations. And so far as I can see, the line separating the one condition from the other, is that which separates continent from incontinent cell growth. In chronic inflammation as seen, for example, at the edge of an ulcer, we have a condition of increased blood supply and increased nutrition, and as a result we obtain that cell proliferation already described, associated with reversion to embryonic character, or almost I might state it otherwise and say, that we have reversion to embryonic character with associated embryonic powers of rapid cell multiplication, for the two conditions are inseparable. The only distinction between the inflammatory and the cancerous growth is this, that in chronic inflammation remove the cause of the irritation and the process of abnormal cell growth comes to an end. In cancer, the cells from frequent and rapid multiplication in a more or less embryonic state have gained the habit of growth, of unrestrained growth. It may be also that the vessels going to the region, from long dilation remain distended or have acquired persistent distension; so that even when the primary irritant is removed the part continues to receive nourishment in excess of physiological needs. This, together with paralysed nerve control, may well be factors leading to the first mentioned condition, but before all, it seems to me, that there is to be recognized this assumption of the habit of growth, so that once fully started upon the road of proliferation the cells continue to multiply utterly irrespective of the needs of the organism.

It may be said that this is an assumption on my part, and not

necessarily on the part of the cells, but I would ask you to consider a little before arriving at such a conclusion. The cells of the body, we know, are capable of acquiring other habits; we know for example that they can acquire a tolerance for sundry drugs; we believe also now-a-days that acquired immunity for disease is essentially due to the acquirement of another habit, to the accustomance on the part of these cells to the presence of small or weak doses of the products of pathogenic micro-organisms, resulting in the descendants of these cells at a later date being able to withstand, if not actually to be attracted to the products of these same bacteria when present in a more concentrated form. But apart from this support from analogy which, it may be said, is at the most doubtful, we have in the cancer cells clear indications of the assumption of this habit. There is in the first place the undoubtedly embryonic appearance in the cells. Now it is during embryonic life where, under physiological conditions, the cells possess this appearance, that they possess also most characteristically the power of frequent multiplication, that they possess very clearly a physiological habit of growth. Again there is to be noticed the excessive amount of nuclear chromatin. This increase in the amount of chromatin in the nuclei is under ordinary physiological conditions an indication that the cells are undergoing, or are about to undergo, multiplication. In an ordinary cancer, what immediately strikes us, is that all the cells in an alveolus, more especially towards the growing edge of the cancer mass, show a peculiarly intense nuclear staining. Thirdly, the irregular character of the mitosis or indirect cell division observable in cancer cells may in itself be accepted as an indication that the impulse towards division is so strong that the nuclear masses often break into three stars instead of two, or throw off redundant masses. And lastly, what may be termed the intense vitality of the cancer cells is again a character of young growing cells.

It is common to speak of the cells of malignant tumours as being endowed with low vitality. Nothing can be more incorrect. It is indeed true that the more internally situated cells of a new growth exhibit frequent evidence of either necrosis or various forms of degeneration. But those changes are surely to be ascribed not to the lack of vitality of the cells, but to the serious disturbance to the blood supply of the central region of a tumour which almost inevitably follows its eccentric growth. That growth and extension in spite of the pressure of the surrounding organs must also be associated with pressure effects upon the nutrient vessels of the more central area. Compare the cancer cells with those of the surrounding tissues. The latter certainly undergo necrosis and absorption, while the invading

cancer cells show every sign of active growth. The power that these cancer cells have for multiplying in new environment is in itself an evidence of heightened vitality.

It is true that there are certain layers of cells in the normal body which possess a somewhat closely allied intense vitality. The botanists have for long recognized the existence of similar layers in the higher plants and have spoken of them as the "cambium" or cambium layer. I do not know whether with the advance of the gentle science any other name has been given to the strata of the permanently embryonal cells. It would be well if in physiology we had some term denoting the collections of cells of this nature. It is owing to the existence of these cell layers that we are able to transplant skin and periosteum. In the former the layer in question is the lowest layer of the stratum Malpighi, which throughout life exists in a permanent embryonal condition and which is constantly presenting cell division, and developing new individuals to help to form the epidermis and to replace the scales of dead cells that are constantly being thrown off. In the latter also we have present an analogous layer of permanently embryonal cells. These layers may be said to present throughout life the habit of growth, and it is interesting to notice how peculiarly liable these very cell layers are to become the seat of unrestrainable or unrestricted growth, to manifest malignancy. But under physiological stimuli this excessive growth does not show itself, and under physiological conditions when transplanted, while the vitality of these cells is sufficient to permit of their proliferation when placed in similar environment, when placed in abnormal environment they die, just as any other healthy tissue dies and is absorbed when it is transplanted either subcutaneously or intraperitoneally into another individual. The cancer cells accompanying this power of unrestricted growth have a vitality so intense that when transplanted into widely different regions of the host from the original primary seat of growth they still are able to proliferate, and indeed this intense vitality renders it not impossible that occasionally cancer cells transplanted from one individual may grow in another; but it must be remembered that it is wise not to regard this as a phenomenon of true infection, any more than it is wise to consider the grafting of skin from one individual to another a true infection.

Finally, let me say that that theory is most worthy of acceptance which while being the simplest embraces and explains the largest number of phenomena. As I have shown, the parasitic theory is too limited to be satisfactory. Parasites may possibly be one cause of

chronic irritation and of originating the habit of incontinent cell growth. At most they are one cause; and till their life history has been mastered, till they are found in every cancerous specimen examined with sufficient care, they cannot be regarded as explaining every case of carcinoma.

The theory held by not a few that a weakening of the basement membrane lining the stratum Malpighi and gland alveoli is to be considered as explaining why the epithelial and gland cells invade the surrounding structures, is unsatisfactory in that it is only applicable to carcinomata, and has no bearing upon the development of malignant connective tissue growths. It is unsatisfactory, again, because we cannot recognize the actual point of weakening of the membrane. We can and must recognize on the other hand the condition of intense and active growth of the cancer cells and of the pre-cancerous cells, if I may so describe them. And it is not difficult to assume that the very intensity of this growth, coupled with the vitality of the new cells which does not permit them to undergo easy atrophy, so long as there is abundant nutrition, is capable of causing so much pressure within the gland alveoli that the weakening of the basement membrane is purely secondary to the vigorous cell growth, so that this habit of growth can explain alone the bursting of the cancer cells through the membrane and their invasion of the adjacent lymphatics.

The theory of a seminium as started by Virchow and elaborated by Creighton and others, while very taking, requires if pushed to its logical conclusion a seminium or seminal invasion for every proliferating cell in the body. True, each of us as a result of the habit of growth of one cell may be regarded as a motile tumour, and certainly in our case there was a primary seminium starting the growth, nevertheless comparative studies show that such is not necessary for the development of every organism or even for the development of sundry organisms high up in the scale of animal life. Add to this that the specific seminium in cancer has never been discovered.

Cohnein's celebrated theory has been so twisted about by various writers upon carcinoma, and has been made to do such yeoman service that it is necessary that I should here refer to it. But the embryonal cell vestiges upon which it is based are only useful in their restricted sense as explaining the rarer forms of cancer in which the condition of glandular or epithelial malignant growth apparently originates in tissues containing normally no glandular or epithelial substances. In its wider application it harmonises with the theory that I have placed before you, inasmuch as it demands as the initial stage of cancer growth the existence of embryonic cells.

It will be seen that the theory that I have laid before you by granting to the cancer cells the habit of tenacious and incontinent growth explains the assumption by the cancer cells of embryonal characters, explains also the overgrowth of these cells, the bursting through the basement membrane, the growth along surrounding lymph spaces, and even in the course of the blood vessels, and, with this, growth similar in character to the primary development at a distance from the primary seat, and so explains the formation of metastases, in fact the theory includes and explains all the essential characters of malignancy.

So far in laying before you these suggestions upon the nature of malignant growth, I have dwelt more especially upon the influence of chronic inflammation of moderate intensity in leading up to neoplastic tissue formation. But it may well be asked if it is necessary to assume that chronic inflammation of moderate intensity is the sole factor to be recognized as originating the habit of incontinent growth. A theory starting from the ground that malignant growth is always preceded by a stage of long continued slight inflammation is indeed untenable, clinical evidence does not warrant a premise of this nature. The most that can be said is that, comparing the histories we obtain in connection with the development of malignant neoplasms which are visible and more or less superficial, with those obtainable in connection with cancer and sarcomata of deep seated organs, we find a very much greater proportion of statements of previous injury and of chronic irritation in the former than in the latter class. I need but call your attention to the almost constant history of irritation obtainable in cases of cancer of the lips or of the tongue, and recent studies would indicate that—in the case of cancer of the breast for example—the more fully the previous history of the patient is studied the more frequently do we obtain evidences of injury inflicted upon the region which has become the primary focus of cancer. (Here, however, it is to be noted that the injury may have been inflicted long years previously.) But granting all this there remain cases in which it is not possible to demonstrate the previous action of chronic irritation, and these cases are sufficiently numerous to render it, I hold, unsafe to attempt to employ the argument by analogy and to assume that though unnoticed there did exist a pre-cancerous irritative stage.

If we examine the conditions associated with slight chronic irritation we cannot fail to notice that with the overgrowth of the tissues there is an accompanying condition of increased nutrition. Take for instance the edge of a chronic ulcer. The zone of the increased epithelial and connective tissue growths is at the same time a zone of

dilated vessels. That dilatation and the increased blood flow in the region may safely be said to have been brought about not so much by the demands of the peripheral tissue as by the central irritation, or in other words it would seem that, as a consequence of focal irritation, there is induced a dilatation of the vessels and increased blood flow extending beyond the area directly affected by the irritant. If this be so (and there is much to be said in favour of the view) then not a little of what are regarded as the effects of chronic irritation of a mild type may rather be assigned more immediately to over-nutrition—to a blood supply beyond the physiological needs of the region. And other cases in which there is such nutrition in excess of physiological needs unassociated with inflammation may likewise tend to the development of neoplastic growths.

We here approach a department of pathology that has been little worked at, and I must needs speak with caution. Indeed I would only hint that very possibly after the climacteric when retrogression of certain issues becomes increasingly manifest, with the absorption of certain of the components of sundry tissues other components of these same tissues gain a relatively greater amount of nourishment, and more especially where by injury (it may have been years previously) a certain amount of deformity or altered relationship of parts, a certain amount of instability, has already been introduced, there we have an association of factors peculiarly favourable to the acquirement of a tendency towards irregular and sub-adult cell growth—of a tendency towards the assumption by sundry cells of the afore-said habit of incontinent growth. While upon this subject, upon the liability of cancerous growth to occur at or about the climacteric, I may point out that the cell changes accompanying the involution of the tissues at the change of life are reversionary in character, they resemble to a certain extent the changes which I have described as accompanying chronic inflammation.

Before closing this paper, I must needs impress upon you that there is one factor which I have not touched upon, namely, modified nerve control over the tissue. This may be a factor in the development of neoplasms, but beyond the fact that recent observations seem to be proving more and more conclusively the intimate relationship between the nervous system and the fixed cells of the body, there is nothing that can safely be said with regard to the matter; there are no experiments or direct observations at all bearing upon it. It is safer, therefore, not to do anything beyond referring to its very possible existence, and pointing out that it is wise not to leave it wholly out of account.

To return now to the substance of my opening remarks. If the suggestions (and I hardly like to venture to call them more than suggestions) which I have thrown out have any solid basis, then it would appear probable that the advance in interference with cancer must proceed directly along the lines that it is at present taking in the hands of the surgeons, namely, the duty of the surgeon must be to recognise the existence of new cell growths at the very earliest moment, and more, now that operation is so robbed of its previous terrors, and that parts can be removed with so little disfigurement and so little danger of sequelæ, it becomes the duty of the wise surgeon to remove every neoplasm, benign as well as malignant, at the first opportunity. There is no valid reason for retention, there is the possibility, even if it be but distant, that the benign growth may assume malignant properties. Destruction of the cancerous tissue at the earliest moment, whether by the knife or by the administration of substances which excite a specific action upon the cells,—this alone, I cannot but hold, is what we have to recognize as the procedure at which to aim.

DISCUSSION ON CARCINOMA.

NOTES ON THE PARASITIC THEORY OF CANCER

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So much has been written within recent years on the parasitic nature of cancerous tumours, and the results of investigations have in some respects been so plausible that I thought I could best contribute to the evening's discussion by briefly considering the possibilities of this theory and observe on what grounds we may be induced to place malignant tumours in the category of parasitic affections. While not presuming to champion the advocates of this theory, inasmuch as my experience is so limited, I will nevertheless endeavour to lay stress on its most favourable features, many of which render the parasitic nature of cancer something even more than a probability. We cannot at all events repudiate the theory without a careful consideration, for among its adherents are numbered two scientists whose names stand foremost in bacteriology and pathology. Metchnikoff after examining the specimens prepared by English and European investigators emphatically pronounced in favour of the presence of parasites in cancerous tumours, while Virchow is so strongly imbued with the same idea that he is withholding his final volume on tumours, trusting that the near future may bring increased light on the etiology of malignant growths. It must, however, be confessed that while perhaps many observers are willing to acknowledge the presence of parasites in cancer masses, they are less readily satisfied that their presence is directly associated with the cause of the malady.

Though it be true that the parasitic theory of cancer formations is at present incapable of scientific proof, yet it should not be forgotten that in many, indeed in the majority of our infectious diseases, we are unable to carry out the postulates laid down by Koch to prove their parasitic nature. The epidemic nature of some of course renders this character probable, but in others even this feature is wanting. The amoeba of dysentery is generally accepted as being the causative factor of the tropical malady, yet the absolute proof is entirely wanting. Few scientists to-day will deny the relation between typhoid fever and Eberth's bacillus, or of the plasmodium malarie to the disease with which it is associated, yet in neither instance are we positively enabled to fulfil the requirements necessary to establish

satisfactorily the etiological relationship. As in these diseases, so too in carcinoma, where our knowledge is likewise very limited so far as the true cause is concerned, we are scarcely justified in discarding the theory of a parasitic origin till definite proofs to the contrary are established.

The customary classification of tumours, in so far as it does not consider their etiology, has been formed entirely on a basis of convenience in their nomenclature. The histological structures alone are taken as a means of differentiation between all the different types of neoplasms quite regardless of the cause inducing their growth. The distinction likewise between benign and malignant tumours is as much a clinical as a pathological differentiation and conveys no idea of their respective etiology, and one of the reasons is apparent. At the time when Virchow's classical work on cellular pathology appeared, parasites played absolutely no role in the study of pathological processes, and as the nature of tumours was then even more in doubt than now his desire was to formulate merely some convenient plan of nomenclature.

It is here that the first difficulty arises, for the merest superficial study of benign and malignant tumours suggests at once a difference so great as to render it more than likely that their respective causes are equally distinct. There are few pathologists to-day who ascribe the formation of malignant tumours to an overgrowth of embryonic cell remains, as suggested by Cohnheim for the origin of benign tumours, and the reason is obvious. When a tissue in its overgrowth ceases to remain local, ceases to retain its simple structure and regularity of outline, but tends to be distributed throughout distant portions of the body, there is at once suggested some special kind of stimulus, some unusual cause for such an irregular mode of procedure and extension of cells. The cause can hardly be identical with that for other more benign tumours, else one would surely get at some time or other an extension by metastases of lipomata, fibromata, etc. This, however, never does occur with the same invasive propensities, and there is at no time a paramount tendency to extension even locally. Some would explain this by the greater regenerative and proliferative power of epithelial cells over any other kind of tissue. While, however, such is the case, it is but a poor explanation of the atypical character of the growths in malignant tumours. Rapidity of growth alone can certainly not explain it, for whenever the epithelial growths extend rapidly it is because they find paths of small resistance, *i. e.*, the looser tissues and the surfaces, forming thus cauliflower excrescences, and so forth. It is rather where their growth is slow

that they invade denser tissues and infiltrate. Fibromata and other benign tumours may remain untreated for years and their tendency to invasion of other tissues is never manifest. They remain nearly always localized, encapsulated, and cause injury only by mechanical pressure.

The question is reasonably asked as to why in the one case we get metastases and not in the other, if a mere overgrowth of cells from irritation or other non-parasitic causes will account for the origin of both forms of tumours. The explanation cannot be offered that the nature of the individual cells of benign growths unfits them for transmission by vessels, for when the varied nature and sizes of cancer and sarcoma cells be considered it is not to be supposed that cells of other tumours find greater difficulty in passing through the vessels. Again, the mere fact that emboli of fat globules can be distributed over the body after fractures, etc., and be found in the smallest capillaries of the lungs would show that in one kind of tumour at least there is no mechanical obstruction to the passage of its elements by vessels.

There is further in malignant tumours not only a great activity, but this activity is directed in a special way. It is a true invasion of tissues—and invasion of vessel walls of all forms of tissues and by all possible channels. Wherever a distant part is infected with cells from the original growth the process begins anew.

So far as I am aware there is no other pathological process apart from parasitic affections possessing this same tendency of invasion and extension.

A further point of interest as illustrating the insufficiency of Cohnheim's theory as applied to malignant growths is obtained from a comparative study of tumours. Metchnikoff has pointed out that in the invertebrates cancer does not exist, while on the other hand it is very probable that cell remnants of epiblastic origin frequently occur in this order of life, so that reasoning by analogy we are scarcely justified in attributing to such remnants the cause of cell proliferation in malignant growths so far as vertebrates are concerned.

To examine into the nature of malignant neoplasms it is in the first degree necessary that we should see if in other parasitic diseases we have any evidence of new growths—if, in other words, parasites can induce cell proliferations in any way analogous to cancers. Of this I think we have abundant proof, and it will be of interest to institute a few comparisons between cancerous disease and those maladies where multiple new growths occur from the invasion of the parasite. Prof. Coats and others have asserted that an essential difference exists between the lesions found in parasitic diseases and those occurring in cancer,

that in the former the results are always irritative, inflammatory and destructive, in the latter purely proliferative. To these views, however, can be opposed the authority of equally capable pathologists, who insist on the neoplastic nature of such maladies even as tuberculosis. The bacilli once having found a resting place manifest their presence at once by a new growth of cells, the tubercle, and only subsequently do we get degenerative changes. It is practically the same in many other diseases, such as leprosy, where the earliest evidence of the presence of bacilli in the vessels is manifested not by an inflammation, but by a hyperplasia of the neighbouring tissues. As a result of the hyperplasia true tumours form chiefly in connection with nerve endings, while degenerative processes may be quite absent. But a yet more striking analogy between cancer and infective processes is seen in actinomycosis. It is true that here an irritation is set up by the advent of the fungus, but on the other hand so great is the proliferation of cells and bone formation in the jaw that before its parasitic nature was understood, its structure was looked on as being that of an osteo-sarcoma. From the primary seat metastases can spread to any part of the body, the first evidence of their presence in the newly-infected region being a multiplication of cells in the vicinity. But whereas it may be argued that in these instances the inflammatory conditions are primary, there are tumours formed by parasites where no sign of irritation exists. Such is the case in typhoid fever. The lymphomata sometimes found on the serous coats of the intestines, in the liver and elsewhere, are essentially neoplasms induced by the action of the typhoid germ.

In passing I would refer also to Hodgkin's disease, now classed by most pathologists among the infective maladies, for there, too, non-inflammatory neoplasms likewise occur.

But there are examples approaching still nearer to our subject, inasmuch as it is evident that in some instances an animal parasite (*i. e.*, one more nearly allied to the supposed parasite of cancer) can induce a hyperplasia of cells, a true tumour not running the ordinary course of inflammation. In chronic malaria the almost constant result of the parasitic infection is to produce in the spleen an enormous overgrowth in its essential cells and the fibrous stroma surrounding them.

It would seem, then, from what has been said, that parasites are quite capable of inducing overgrowths of tissue purely hyperplastic in character.

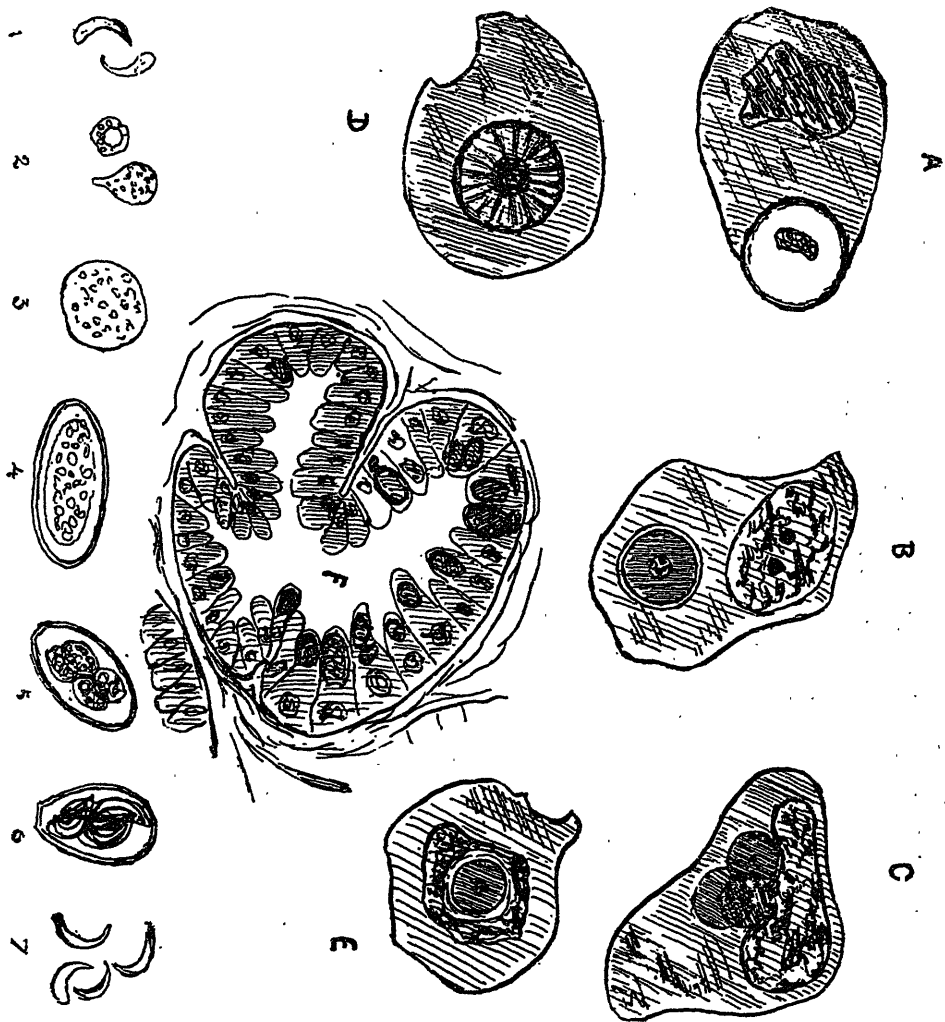
And further, it is known, that in some at least of the infectious diseases the parasites select chiefly certain cells for their habitat during a part at least of their life history. In malaria the blood cells

are selected, in leprosy the large multinuclear leprosy cells, in tuberculosis the bacilli are nearly always found in giant cells, in the last instances an active growth being apparent from the multiple nuclei. It may, then, be asked with reason, if cancer be parasitic why the epithelium cannot equally well be selected as a cellular habitat by parasites just as the blood cells, etc., in other diseases. Advocates of the parasitic theory of cancer find their organism constantly within the epithelial cells and it is here that the proliferation occurs.

Hitherto the instances given of hyperplasia have concerned cells other than those of epithelial structure, but we do not by any means lack an example where true epithelial overgrowths are induced by parasitic invasions; this is found in a disease of rabbits known as coccidiosis. Since the researches of Malassez, Delepine and others it has been recognized that certain parasites (whose form and general character bear a striking resemblance to the supposed organism of cancer) often infest the alimentary tract of rabbits and make their way thence to the liver, where they invade the epithelial cells in the bile ducts. As a direct result, an extensive proliferation of the epithelial cells takes place and also of the fibrous stroma about them, so much so that a luxuriant overgrowth occurs resembling very much a malignant adenoma of the rectum. (v. fig. F and Nos. 1 to 7.)

From what has been said, then, it seems clear that, firstly, parasites are quite capable of producing cell proliferation independent of inflammatory conditions, *i. e.*, a proliferation analogous in general features to cancer; that, secondly, they produce metastases, as does cancer; that, in the third place, it is not uncommon to find parasites selecting special cell structures for their habitat; and that, finally, we can find in the lower animals an epithelial overgrowth and the formation of a fibrous stroma, all being induced by the invasion of a parasite.

Before considering further the general reasons upon which the parasitic theory of cancer may be based, I will briefly describe the main characters of the organism supposed to be concerned in the formation of cancer tumours, though the diagram kindly prepared by Dr. Adami will perhaps better give an idea of their nature. In attempting such a description one is beset with difficulties, owing to the various opinions among investigators as to what is and what is not to be regarded as the true parasite. This confusion arises from the supposed resemblance which certain other structures have to these parasites; among these may be mentioned forms of cell degeneration, morbid karyokinesis of cancer cell nuclei, invaginated cancer cells, enclosed leucocytes, and endogenous cell formations.



Figures A to E. Supposed parasites within cancer cells (after Ruffer).

Figure F. Proliferated epithelium of bile duct, containing coccidia (after Delepine and others).

Figures 1 to 7. Coccidia in various stages.

The main opinions, however seem to be that the parasite is usually spherical or oval, with a more or less rounded nucleus, this latter occupying a relatively small area of the parasites' protoplasm. The cell body is homogeneous or mottled, sometimes radially striated. These striæ were supposed by some to be evidences of reproduction, such as is observed in malarial parasites. A capsule of double contour surrounds the organism and seems to be intimately associated with the protoplasm of the cancer cell, as though secreted by the latter. Sometimes the organism seems to lie in a kind of cyst or vacuole, in this way resembling the bacilli of leprosy, where the same condition often occurs. The parasite may be single or multiple within the cell, and invades sometimes the nucleus, sometimes the protoplasm. It is largely from the staining reactions that these are differentiated from the various other structures above mentioned. Where, however, so much strife is at present going on among the various English investigators I will not attempt further details in this matter, inasmuch as there seems but little possibility of rendering it more lucid from our present knowledge.

A point of interest, however, in regard to these bodies lies in the fact that they are invariably found in greater numbers at the growing edge of the tumour, and inasmuch as the cells in these areas are the youngest they are also least likely to be degenerated. Where, too, the greatest degeneration is seen in the tumours one finds a distinct paucity of parasites. An examination of the individual cells invaded by the parasite shows, further, that while little or no mitosis is seen in them, there is active proliferation in adjacent cells, the parasite thus acting as a stimulator of cell growth.

These facts in themselves though suggestive of the possibility that these organisms produce the cell proliferation, are of course far from proving it. In attempting to establish the proof serious difficulties arise, inasmuch as hitherto no one has succeeded in isolating the parasite and obtaining it in cultures. But the same is practically true of other diseases—hydrophobia, scarlatina and many others. Furthermore, however, we cannot be satisfied that transmission by inoculation from man to man is possible. A few isolated cases have been recorded where some of the lower animals have successfully been inoculated and the transmitted portions have given rise to new growths with metastases. This, it may be argued, is a mere grafting from one animal to another, but inasmuch as the same organisms will be found in the metastases of the inoculated animals, it remains yet to be proven that there is not something else besides the simple transplantation of cells. It is quite as possible that the experimenters,

without being aware of it, overcame in some way the obstacles that ordinarily prevent successful inoculations. Within the last few months a melanotic sarcoma was readily transmitted to a rabbit and in a few weeks had given rise to metastases throughout the body.

At all events we are too little familiar as yet with all the conditions necessary to produce successful inoculations. How many people have already ingested myriads of cholera vibrios by way of experiment and have subsequently felt no ill effects? Our methods at the present day are in many respects imperfect, and failures do not necessarily render the general underlying principles fallible.

On much that has been written on the contagiousness of cancer and its frequent occurrence in people who live much together I cannot touch, nor of the plausibility of the so-called "cancer-houses," which are marked as being contaminated. I would merely conclude by suggesting that until some other reasonable explanation is afforded we are not in a position to despise the parasitic theory of cancer formations.

It has been so often urged, and with apparently great emphasis, that in the majority of cancerous growths there is associated some chronic irritation, it may be a slight and persistent one, that I cannot close without referring for one moment to this theory. Whereas it is true that in a great number of cases some irritant is associated with the development of carcinomata, yet in the vast majority of instances the self-same irritant may be at work in just the same mild chronic and intermittent way and yet never induce a cancer. Of the number of men who use clay pipes there is surely but a small minority in whom cancer develops on the lip, while in the cases of cholelithiasis how rarely do we find cancerous conditions of the gall-bladder. It is true that with almost every case of cancer of that organ gall-stones are associated, but the mere presence of the cancer, implying as it does some destruction of the epithelium, etc., will supply a most ready nucleus around which concretions can form. Considering, then, how common are gall-stones and how rare is malignant disease of the gall-bladder, the latter would seem to be the primary condition and the cholelithiasis a secondary result. The same holds true to a more marked extent perhaps in calculi of the urinary bladder, which, in themselves so frequent, yet only under the rarest conditions are associated with epithelioma of that organ.

If it be true that chronic mild irritation can stimulate epithelial cells to overgrowths of a malignant type, we have yet to explain why this condition does not more often result from such a pressure. The persistent irritation which produces a clavus never, or scarcely ever,

results in an epithelioma; there occurs merely a superficial growth of epithelium, layer upon layer, never tending to become malignant, never forming metastases.

Where chronic inflammation exists there ensues frequently an extensive downward growth of the epithelial structures, but always more or less regular in its distribution. There are, however, occasions where scar tissue can develop into an atypical growth of epithelium, and this, it must be admitted, is difficult to explain. Here again, however, chronic irritation alone will fail to give an explanation, else the condition should be far more frequent than actually occurs.

It would seem that irritation alone, then, cannot explain the formation of cancerous tumours, that to the mere activity of epithelial cells alone cannot be accredited the formation of cancers, and it would seem that our only resource is to examine for some deeper cause, to search for the original stimulus which brings to the cells the power to proliferate. It has been shown how characteristic are new growths as the result of parasitic invasion and how scarce are evidences of similar growths in diseases that are proven to be non-parasitic. So that placing together all our facts we feel that, for the present at least, there still remains a hope that in the near future something more may be discovered to account for the similarity of malignant processes to those in the infective diseases.

DISCUSSION ON CARCINOMA.

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As Drs. Adami and Martin have so eloquently sustained their parts of the discussion and carried us into the fairy realms of pathology, where we have floated on the clouds of theory, it will perhaps not be so pleasant to many of you to come down to terra firma and hear the hard, dry facts of clinical surgery in its relation to cancer. Before entering upon any special description of the symptoms and treatment of cancer of the lip, tongue, throat and œsophagus, I should like to say that I firmly believe that all cancers are local in their origin, that by early and wide removal recurrence may be prevented, and that removal should be undertaken as early as possible in the pre-cancerous or inflammatory stage, if that stage can be made out. I also wish to say that I believe that certain individuals are more liable to cancer because they are more vulnerable, and that this vulnerability is a matter of heredity—also that a person may be vulnerable yet never knew it, because he has never been exposed to the exciting causes of the disease. The exciting causes are probably many, the most potent being local irritation, as witness the frequency of cancer of the lip and tongue in the male and the smoker ; the fact that in India the natives frequently suffer from epithelioma of the abdomen at the place where, in cold weather, charcoal braziers are applied ; also the marvellous fact that chimney-sweep's cancer of the scrotum, once so common in England, has been abolished by Act of Parliament, that is, it has entirely disappeared since chimney-sweeps have been prevented climbing up the insides of chimneys and thus have avoided irritation of the scrotum by soot. I remember well a few years ago removing an epithelioma from the roof of the mouth in an old man, who had no teeth, and who, when smoking, in order to prevent the pipe falling out of his mouth, tilted it up against the hard palate ; at that point an epithelioma appeared. Cancers of the breast frequently follow injury, and cancer of rectum may be caused by irritation of hardened fæces and foreign bodies. In fact I could, were it worth while, multiply *ad infinitum* the various ways in which cancers are induced. As to the parasitic theory of the origin of cancer and the treatment of cancer by toxines I have not much to

say; probably those that follow me will take up this part of the subject. I feel, however, that here a wide field of investigation is being opened up, and in the future there is promise of an abundant harvest.

Cancer of the lip.—The form of cancer most seen in the lip is epithelioma. Males are most commonly affected, because in them the lips are more subject to irritation from pipes, tobacco, etc. This form of cancer usually appears after 45, its growth is slow and the glands in the submaxillary region are fortunately not early involved. The disease first appears as a fissure, a warty growth, an excavation, or an ulcer, which will not heal. It may first appear as a little tubercle covered with a scab, which when picked off soon forms again. In whatever way the growth commences sooner or later ulceration sets in. This ulceration is deep with hard edges and a hard infiltrated base, and although not painful, causes discomfort, especially when eating. After a time the glands in the submaxillary region become enlarged and infiltrated, and later the other glands in the neck become involved and the case becomes hopeless. Chancre of the lip is the only affection which might be mistaken for epithelioma. In chancre the glands are early involved. As I said before, involvement of the glands in cancer of the lip is a late symptom. Early incision is the only form of treatment which is of any use. Every sore on the lip which is difficult or slow to heal in an individual past middle life should be regarded with suspicion and should be freely removed. Caustics should be avoided. Early removal before the glands become involved will, in most cases, result in a permanent cure. No cleaning out of the submaxillary space will be needed, but if the sore has lasted for any length of time, then even if no distinct enlargement of the glands can be felt through the mouth, the lymphatic tissue in the submaxillary region should be cleaned out as the axilla is in cancer of the breast. It is my custom when there is enlargement of the submaxillary glands first to operate on the lip and a week or two later in the submaxillary region, waiting till the inflammatory conditions about here subside and one can tell how much tissue to remove. In most cases it will be found necessary to remove the submaxillary salivary glands, for in them are imbedded lymphatic glands which lie concealed and may contain cancerous elements, although this condition is not demonstrable to the naked eye. I need not describe the method of operating in cancer of the lip for it is familiar to all of you. When a considerable portion of the lip is involved a plastic operation would have to be done. I might mention that modern surgeons have discarded harelip pins and now only use sutures of silk-worm gut, silk or catgut.

Cancer of the Jaw.—In this form of cancer the conditions are more unfavourable than in that of the lip. It often occurs in the comparatively young and is more common in the upper jaw. It commences in the gums and spreads to the jaw. Early and complete removal is the only treatment. My experience has been unfavourable as to recurrence in these cases. I do not recollect a single case of permanent cure. In one I thought I had effected a cure, but alas, after four years of freedom recurrence has taken place. The history of this case is interesting and instructive. Eight years ago he had a sore on the lip which was treated by a cancer quack with caustics. A year later I saw him and removed some cancerous glands in the submaxillary region; next year he returned with cancer of the right side of the jaw. This half of the jaw was removed; the following year he again returned with cancer of the remaining half of his jaw. This was removed, and when he was well on the way to recovery he had a severe attack of erysipelas, of which, however, after a long convalescence, he got better and for four years, until the present summer, remained well. The disease has now returned and the involvement of the parts about the jaw and neck is so extensive that operation is out of the question.

Cancer of the tongue is always epithelioma and commences as a fissure, nodule or ulcer, usually on the side and the anterior portions, more common in men than women—247-46 (Barker). Exciting cause, smoking, which often leads to leucoma or psoriasis of the tongue, a condition which may be produced by syphilis and dram drinking. Sixteen out of eighty cases are preceded by leucoma, according to Butlin. All scars, syphilitic fissures, etc., predispose; irritation of a sharp tooth or badly fitting tooth-plate. However, no exciting cause can be found in some cases. Any case of ulcer of the tongue occurring in a person over 40 should be looked upon with suspicion, and if it does not heal readily should be excised. If one waits until the signs of cancer are unmistakable, such as deep ulcerations with infiltrated base, enlargement of glands, etc., then operation is of only temporary benefit. To be successful the operation must be early, and if possible before the glands are affected. If the case be left until the floor of the mouth or the tonsils are involved, operation is not very promising as to cure.

Diagnosis.—(1) Tubercular ulceration; (2) syphilitic disease, primary or tertiary; (3) simple ulcer.

Tubercular.—More at tip; age not diagnostic; lymphatic glands involved in both; history and microscopic examination only tests of value.

On one occasion I excised the tongue of a man of 60 for supposed cancer of the tongue; he died three weeks after from acute general tuberculosis; the supposed cancerous ulcer was tubercular. In this case there was no microscopic examination previous to operation.

Syphilitic Ulcer.—If primary, the glands are very early involved. The history helps one in tertiary syphilis. The ulceration is usually preceded by induration; in cancer this follows the ulcer. Ulcers may be multiple in syphilis.

Simple ulcers have rarely much induration about them. Any ulcer in a man past 40 which does not heal readily should be excised. In any doubtful case always excise a portion of ulcer for microscopic examination.

Treatment of cancer of the tongue should always be by excision—partial or complete excision. There are many very extensive operations advised, such for instance, as Kocher's, where a preliminary tracheotomy is performed and the throat plugged with antiseptic material. Vomiting, however, is not provided against in this operation. I much prefer Whitehead's operation to any other. Formerly I always performed preliminary ligature of the lingual arteries, but now with a good assistant these arteries are easily secured in the mouth as cut. In Whitehead's operation of excision scissors are the only cutting instruments needed, and the tongue can be entirely removed in a very few minutes. After operation some form of antiseptic paint of iodoform and Tinct. Benz. Co. should be applied to the cut surface and the mouth should be washed out with a weak solution of permanganate of potash. Formerly it was my custom to feed by the rectum for some three or four days, but now I commence feeding by the mouth with a tube the day after operation, and also allow the patient to get up and, if the weather be fine, to walk out in the sun. By these means recovery is much more rapid, the discharges are much less likely to get into the lungs, and the patient can more easily get rid of the thick stringy mucus which is so often seen after these operations. The great dangers of excision of the tongue are hæmorrhage and septicæmia. Hæmorrhage is now rarely dreaded and septicæmia may be prevented by careful antiseptis and attention to the proper methods of feeding.

In operating for cancer of the tongue the following points are important:

1. Remove all the disease. And here I might say that I do not believe in partial extirpation of the tongue, but prefer always to remove the whole tongue.

2. Prevent hæmorrhage.

3. Avoid entrance of blood into the air passages. This may easily be done in Whitehead's operation by never allowing the patient to be too completely narcotized. In these cases I always keep the patient in a semi-recumbent position, and as soon as the tongue is excised allow him to recover and sit up, and the arteries which have been secured by forceps are now tied at one's leisure.

4. The presence of an aseptic condition of mouth should be preserved until healing is complete. This may be accomplished by the use of antiseptic paints and the frequent irrigation with an antiseptic solution.

I had intended saying something about cancer of the larynx and œsophagus, but I see my time is up, and I shall close by reiterating what I said in the beginning, viz., that cancer primarily is local in its origin and may be cured if removed early and widely enough.

DISCUSSION ON CARCINOMA.

By GEORGE E. ARMSTRONG, M.D.

Assistant Professor of Clinical Surgery in McGill University; Surgeon to the Montreal General Hospital; Attending Surgeon to the Western Hospital

Perhaps in no department of surgery has greater advance toward a higher ideal been made during the past five years than in the surgical treatment of surgical diseases of the stomach and rectum.

In 1890, at the International Congress in Berlin, Billroth reported 69 stomach resections and gastro-enterostomies, with a mortality of 47 $\frac{1}{2}$ per cent.

In 1895 Dr. J. Mikulicz, of Breslau, reported before the Association of Surgeons in Berlin 103 operations upon the stomach, with a mortality of 23 $\frac{1}{2}$ per cent., or less than half the rate of mortality reported by Billroth just five years before; and this advance is still further emphasized by the report that 68 of these 103 operations performed during the last two and a half years gave a mortality rate of only 16 per cent. The fatal issues were generally due to collapse, inanition or pneumonia.

Of these 103 operations 33 were gastrostomies for carcinoma of the œsophagus and cardiac end of the stomach, with 6 deaths directly due to the operation; 23 were gastro-enterostomies for carcinoma of the pylorus, with 6 deaths, and 18 were pylorus resections for carcinoma, with 5 deaths.

The shortest period of survival after gastrostomy was three and a half weeks and the longest twelve months, an average of four and a half to five months. But this operation should not be judged alone by the chances of recovery after operation, but by the future history of the patient operated upon. And to the question which might be reasonably asked, "Is it worth while undergoing such a serious operation, with its attendant danger, for the sake of such a short respite from an inevitable result?" I think we may truly answer that gastrostomy will relieve from that most agonising form of death, death from slow starvation, and that if life were not prolonged even by one day, yet would the operation be advisable from a purely humanitarian point of view. With the aid of anæsthesia and the modern surgical technique, with the relief from frequent painful dressings which it ensures, the pain from the operation is very slight.

The successful removal of carcinoma from the lower end of the

oesophagus and cardia will probably never be feasible, more especially as the region cannot be palpated or diagnosed with certainty until the disease is somewhat advanced.

The average duration of life after gastro-enterostomy for carcinoma of the pylorus was nine and a half months. This again is essentially only a palliative procedure, but the relief from the distress incident to pyloric obstruction and stomach dilatation makes it, in my opinion, well worth the doing. The easier death from metastasis, anæmia and asthenia is not to be lightly thought of. But gastro-enterostomy should give way to pylorotomy, which gives a longer respite and the only chance of permanent cure.

The average duration of life after pylorus resection for carcinoma was sixteen and a quarter months. Pylorotomy excels by far in its results gastrostomy and gastro-enteostomy, and it is to this procedure that we must look for our most brilliant results in the future. It aims at taking advantage of the doctrine of cancer being primarily a local disease, and removing it radically before it has infiltrated adjacent tissues or infected the neighbouring lymphatics. Four patients who had been submitted to pylorotomy were free from recurrence respectively twenty-four, eighteen, five, and five months after the operation. One of Mikulicz's cases lived three years after operation, one of Billroth's cases five years, and one of Kocher's cases was free from recurrence seven years after operation. Czerney reports 12 pylorus resections, with 5 deaths; 2 were living and in complete health fifteen and twenty-six months after the operation. The other 5 died two, seven, ten, fifteen and eighteen months respectively after the operation, with symptoms of a return of the disease. As the usual duration of life in gastric cancer is little over a year this is a distinct gain. My own case died eight months after operation, with symptoms of recurrence. The stomach is more frequently the seat of primary cancer than any other viscus except the uterus. Now, fortunately, when the stomach becomes the seat of the cancerous process the pylorus is affected oftener than any other part. Welch analyzed 1,300 cases of stomach cancer and found the pyloric region the seat of the disease in 791 of these cases, or 60·8 per cent. It attacks men a little oftener than women. Herbert Snow has collected statistics of 3,819 cases of primary cancer of the stomach, and 2,116 occurred in men and 1,698 in women.

With these established facts, taken together with our improved methods of diagnosis and the statement of Welch that a tumour is present in three-fourths of the cases of gastric cancer, is it too much to hope for that in the near future we may be able to obtain much better

results in pylorus carcinoma than have been obtained in the past? To accomplish this we must operate early, if possible while the cancer is limited to the gastric follicles, before the muscular layer is perforated, and certainly before metastasis has occurred in adjacent tissues or lymphatics.

I would urge the association of an operating surgeon with the physician, for it is always the physician who is first consulted in these cases of suspected gastric cancer, and I think the time has come when we can, when in doubt, advise an exploratory incision with confidence.

In regard to extensive resection of the stomach, the so-called extirpation, the success so far attained has not been encouraging, and it is doubtful if such operations have any future.

The time limit will not permit me to deal with the whole of the alimentary canal, and I think I can probably discuss the treatment of cancer of the rectum, with more interest than any other part of the intestine, more especially as the modern operations are not described by many English text-books. Neither Treves or Jacobson mention Kraske's operation at all. These operations have been worked out by Continental surgeons and are practised in the United States and in Canada.

Volkman drew attention to the lesser tendency to metastasis in cancer of the rectum than in the same condition occurring in the female breast. The functions of the large gut are not essential to life except in so far as its action as a tube is concerned. Carcinoma of the rectum runs a particularly chronic course. Herbert Snow states that it may exist for ten or fifteen years without causing death. It often remains for a long time a localized disease. Iversen reports 47 autopsies, with no metastasis in 21. Bardenheuer was the first to draw the line of distinction between amputation of the rectum and resection.

According to Warren the statistics compiled up to 1881 show a high rate of mortality varying from 31 to 58 per cent. in the hands of different surgeons. Thorndike estimates the mortality during the next ten years at 16.1 per cent. Kraske published in 1885 a paper which gave a new impetus to this operation.

The difficulties found to obtain in dealing with cancer of the rectum have been access, hæmorrhage and sepsis.

The different methods lately devised to secure better access to the rectum have at the same time enabled the operator to lessen the loss of blood.

In 1883 Volkman in removing a sacral sarcoma accidentally opened the sacral canal and, somewhat to his surprise, no harm resulted.

Kraske, at that time Volkman's assistant, took advantage of this experience and proposed and carried into practice the chiselling away of the left border of the sacrum, thus gaining free access to the upper part of the rectum. The incision is made over the sacrum and coccyx, the latter is removed and the greater and lesser sacro-sciatic ligaments separated and the lateral portion of the sacrum chiselled away. This operation remains one of the safest and simplest, as it leaves the lateral blood and nerve supply on the right side uninjured. It has been followed, however, by prolapse of the rectum, which proved in some instances very intractable. I adopted this method in one case and the patient died two years later from local recurrence and asthenia. There was no metastasis.

In 1889 Billroth made a V-shaped incision, one leg of the V crossing the sacrum below the level of the third sacral foramen and the other passing down along the left border of the sacrum and coccyx. The sacrum was then divided on a level with the third sacral vertebra and the osteo-integumental flap turned to the right. This operation was afterwards claimed by Rehn, of Frankfort, and by Rydygier. This method gives a very ready access and is not so likely to be followed by prolapse. The right lateral blood supply is not interfered with and the bone is found to unite well, even in those cases where primary union of the external wound is not obtained. Borelius of Karlsbroma, modified this method with a view of still further avoiding injury to the nerve supply of the levator ani and sphincter. He made a median incision from the middle of the sacrum down over the coccyx and then along the border of the right gluteus maximus muscle, and cut through its fibrous insertion. The margins of the wound were then dissected back and the sacrum chiselled through obliquely from the lower margin of the left to the lower margin of the right sacral foramen, and the lower end of sacrum was then turned down to the left.

Heinecke made a T-shaped incision, the transverse incision corresponding to the level of the third sacral vertebra. The bone incision corresponded to the superficial one, and the two osteo-plastic flaps were turned out and at the end of the operation replaced and sutured. This is practically the method employed by Gussenbauer, and its results are said to be very satisfactory.

Rehn has approached the rectum in woman by the vagina, making longitudinal median incisions through the raphe of the perineum to the sphincter ani. The rectum is then separated from the posterior vaginal wall and from the sacrum and brought down, the portion diseased resected, the ends of the gut sutured and the wound closed.

The patient upon whom he operated, however, died of avoidable peritonitis.

One of the great advantages of these latter operations over Kraske's is that they do not divide the tubero sacral and spino-sacral ligaments and thus weaken the pelvic floor.

There are a number of considerations that may be discussed as applicable to all these methods of operating.

In the old operation of Dieffenbach, Velpeau and Lisfranc the neoplasm was approached from the anus and in many instances the sphincter was sacrificed.

One of the first advances was in the direction of saving the sphincter and the substitution of resection for amputation.

Willems, Rydygier and Witzel proposed to utilize a portion of the gluteus maximus muscle for a sphincter and brought the upper end of the rectum out between the lower fibres of this muscle. Witzel reports six cases operated upon successfully by this method. Gersuny proposed torsion of the upper end of the gut on its own axis and fixation of it to the skin by suture. The resistance to the escape of fæces offered by this procedure was overcome by the contraction of the abdominal muscles. Several cases have been reported in which this method proved successful.

The next step in advance was the deliberate opening of the peritoneum. This was found to be necessary in cases where the disease was situated high up. To accomplish this successfully it was a *sine qua non* that the field of operation should be rendered aseptic, and this was not easy of accomplishment. In many cases there was found narrowing of the gut at the seat of disease and a condition of coprostasia. This could only be overcome by a long course of preparatory treatment, extending over a period of from one to three weeks. During this time the bowel was gradually emptied of hardened fæces by repeated daily enemata, so that at the time of the operation it could be washed with cleansing antiseptic solutions and the field secured free from fæcal matter. To still further secure a field of operation as aseptic as possible Quénu suggested that the growth be curetted and thoroughly cauterized. As a result of these precautions we can now open the peritoneum with comparative safety and close it again by suturing it to the wall of the rectum.

The next difficulty was found to be sloughing of the upper end of the rectum from interference with its blood supply, and to obviate this the mesentery must be carefully avoided. Incisions can be freely made laterally, but from behind the rectum must be separated very carefully with the end of the finger and without dividing any of the

mesenteric vessels. If the middle hæmorrhoidal is avoided the nutrition of the proximal end will not be impaired.

The union of the upper and lower segments of the rectum by any method of suture yet devised has been disappointing in its results. Leakage and fistula have resulted in nearly every instance. When successful it is the ideal result in cases where the nerve supply to the levator and sphincter ani has not been divided. This unfortunate separation has apparently been due to septic infection from descending fæces before the union was accomplished; and although ample drainage was secured the fistula did not tend to close and the neighbouring tissues became infected with the discharges. To overcome this difficulty Schede proposed to do a preliminary colotomy and thus secure for the parts below rest and asepsis. This suggestion, so far as I am aware, has not been carried out in any large series of cases, but it seems to me to be a valuable one. After the union of the segments is accomplished the opening in the colon can be closed and the fæces allowed to pass the natural way. There are two other reasons why this procedure might be adopted, one is that it would afford an opportunity of removing hard scybalous masses from the rectum and thus securing a clear field below for operation, and the other that it would afford an opportunity of defining the upper limits of the cancerous growth.

Another unfortunate *sequela* of proctorrhaphy is the tendency to contraction and formation of stricture. In the small bowel this is not so serious a consideration, because the fæces are softer and oftener liquid in character than in the colon. In the large bowel the fæces tend to become dry and hard and to collect in masses that could pass a narrowed point only with difficulty. There is a tendency for them to collect above the stricture, and by causing dilatation and a local catarrh of the bowel at that point to favour recurrence.

I have thought that in view of the tendency to local recurrence in rectal cancer, and of the difficulty of preventing troublesome and often persistent fistulæ, and of narrowing of the bowel at the point at which the two ends were sutured, and of the danger of sloughing of the proximal end when a very high division of the rectum was found necessary in order to remove the whole growth, that it would be better in such cases to extirpate the rectum completely and to establish a permanent artificial anus. If this procedure would ensure a considerably greater chance of permanent cure, its dangers are not great and it is a perfectly feasible operation.

I have not yet put this idea into practice, but I think that I should be tempted to do so under the circumstances mentioned. A patient

with a well made artificial anus in the groin is able to go out and mingle with people, and can keep himself clean and can attend to himself. He is probably better off in this respect than the man with leakage of faeces in his perineal or sacral regions. Complete extirpation of the rectum could be made a much more radical operation, and the chances that the disease would be all removed would be greatly increased. I think it would give greater prospect of freedom from recurrence, and that should be the great consideration in the removal of malignant disease in the future.

Mikulicz, with a view of lessening the shock of the operation due to the unavoidable loss of blood, has sometimes given an intravenous injection of Koch's saline solution before operation. He has sometimes given as much as two litres before and repeated it after the operation was concluded if it seemed be required.

Lastly, I should mention that an Australian surgeon, Dr. Maunsell, has proposed to invaginate the rectum, together with the neoplasm, and then to remove it. Rehn suggests that this might be done very well in women, by first making an incision in the posterior vaginal wall and after separating the rectum all around invaginating it through the sphincter.

I am sorry that I cannot give any new signs by which carcinoma of the alimentary tract can be recognized at an earlier stage. In the meantime we can only bear in mind its existence and use the greater diligence in applying the tests that we already have, knowing that early recognition of the cancerous process in any part of the body is more than half the battle.

DISCUSSION ON CARCINOMA.

JAMES BELL, M.D.

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The part allotted to me in this discussion includes cancer of the breast, the external genital organs and the skin, as seen from the standpoint of the surgeon.

There is probably no organ of the body which is subject to cancer in which the disease produces greater distress and suffering, both mental and physical, and ultimately a higher rate of mortality than the female breast. Moreover, it is frequently attacked at a comparatively early age and valuable lives are lost while yet in their prime. In this connection I wish to point out that although the rudimentary mammary gland of the male is sometimes the seat of cancer, it is nearly always the mammary gland of the female which we are called upon to treat. This is the converse of the statement just made by Dr. Shepherd in speaking of cancer of the lip, in which he pointed out that the disease was practically always found in the male.

There is a point which cannot be too strongly emphasized, and it is this, that in the early stages of cancer of the breast, when it is most important that a diagnosis should be made, and there is still an opportunity to effect a radical cure, it is most difficult to recognize, and as a matter of fact is rarely recognized. There are, moreover, benign tumours of the breast which it is practically impossible to diagnose from carcinomata, except by the microscope. I think the surgeon's rule should be that except in the case of those distinctly innocent growths, which are comparatively common in young women, it is safer to act upon the assumption that they are malignant. I mean that unless he can be practically certain that the growth is a benign one he should treat it as if he were certain that it was a carcinoma. There can be no middle ground. I have recently had a case which illustrates this point and which impressed me greatly. It was that of an unmarried woman 50 years of age. She had a history of growths in both breasts, one of eight years' duration and the other of six. They both had all the clinical characters of cancer of the breast and had been so diagnosed by several physicians. They were both accompanied by enlarged lymphatic glands leading towards and into the axilla. The strong point against their being malignant was their long

duration without producing any deterioration of the general health or any evidence of metastasis. I suggested to this patient that one breast should be removed, viz., the one which had been affected the longest and which most resembled cancer (clinically) and subjected to histological examination, on the result of which the fate of the other should depend. She accepted my advice and the breast was removed, very widely and with thorough dissection of the axilla, just as if it were clearly a cancer. The gross appearance on section was distinctly that of cancer, but the microscopical examination discovered only a fibro-adenoma. However, I determined to remove the other breast, as I felt that the certainty in the case of the one could not be assumed to remove the uncertainty in the case of the other. On examination the second breast proved to be a typical carcinoma. Here it was practically impossible to make a diagnosis; and yet it was most important that the growth should be removed.

The surgical treatment of cancer is based upon a recognition of the following facts, which may be said to be generally accepted by both pathologists and surgeons:

1. That cancer is primarily always, and generally for a considerable period of time, a local disease.

2. That it extends (*a*) by infiltration of adjacent tissues, and (*b*) by being carried along the lymphatic vessels to the nearest group of lymphatic glands.

3. That metastasis to remote organs occurs only, as a rule, much later.

The obvious inference is that removal should be early and should include not only the tissues for a considerable distance around and beneath the mass, but also the nearest group of lymphatic glands, and all the tissues intervening between them and the mass. When I speak of removal I mean by a cutting operation, and I wish here to express my opinion in the most emphatic manner that the use of caustic applications for the cure of cancer is in the highest degree unscientific, and that in most cases it can do nothing but harm. I speak thus plainly because even in comparatively recent text-books and monographs upon malignant disease we find the statement that there are cases in which escharotics are curative and are to be recommended. With this teaching I have no sympathy whatever. I admit that as a palliative measure in incurable or inoperable cases the use of caustics or partial operations, such as curetting, etc., may be indicated, but I contend that their ultimate effect is always to stimulate the growth of the original disease. In my opinion clinical experience all goes to show that local irritation is a very prominent factor in the production

of cancer and in increasing the rapidity of its development when it is already established. Now, with regard to operations for the removal of cancer of the breast, the methods of operating have within the last few years been so greatly extended and modified that they are now quite different from what they were ten or fifteen years ago. We recognize that, quite apart from the necessity or the possibility of closing the wound, the whole breast gland must always be sacrificed and the tissues for a considerable distance beyond what seems to be the limit of the disease, because there can be no doubt but that infiltration always extends much further than we can recognize it by either the sense of sight or the sense of touch. The tissues should also be removed deeply, down to the wall of the chest in the lower part and always including the pectoral fascia and, when necessary, a part or the whole of one or both pectoral muscles, quite apart from the consideration of the subsequent usefulness of the arm. (And it is surprising to observe how little these extensive dissections interfere with the functions of the arm.) In all cases the whole of the axillary lymphatic and areolar tissue must be removed. It must be removed whether we can recognize any glandular infiltration before operating or not. Speaking now, from memory only, I do not think that I have ever removed a carcinomatous breast and dissected the axilla in which I have not found cancerous glands, although it was in many cases impossible to detect them before operation. The minimum operation for cancer of the breast should be, therefore, removal in one mass of the mamma surrounded by a wide area of healthy tissue, including the pectoral fascia and all the tissues down the chest wall at a lower level than the muscle, all the lymphatic and cellular tissue of the axilla and all the tissues between the original mass and the lowermost part of the axilla. In a large number of cases this is sufficient, but there are a great many other cases in which it is necessary to go still further in order to remove the whole of the disease, on account of its having invaded the glands beneath the pectoral muscles and up, even into the supra-clavicular space. In these advanced cases we frequently find that after a most extensive dissection we are obliged to complete the operation, or rather desist from further operation, with the certain knowledge that cancerous tissue has been dissected from an area perhaps of an inch or more of the axillary artery and vein, with which it has been in the closest relation anatomically, and with the strongest suspicion, often amounting to certainty that the walls of one or both are invaded by the cancerous growth. It has frequently occurred to me on arriving at this condition of affairs to ask myself whether having done so much one ought to stop here? Whether under

such circumstances, other things being favourable, the whole upper extremity should not be removed after the method which is employed in the treatment of sarcoma of the neck of the humerus or scapula? This operation when performed by the method known as that of Paus Berger is nearly bloodless, is not followed by shock and is easily performed. Above all it makes a clean sweep of all the tissues which are liable to be invaded by extension from the axillary glands, and is in many cases the only way in which this can be done. Of course when the glands of the mediastinum are involved, or when there are metastatic foci in remote parts no operation can be curative. But as I have already pointed out these conditions obtain only, as a rule, long after the disease has reached such development that diagnosis cannot be mistaken. I am sure I have seen several cases where this operation was indicated, and in fact I have advised it in a couple of cases, but the patients would not submit to it. If this is not done in those cases the result is, that within a few weeks there is œdema and often neuralgia of the arm, which we are powerless to remedy, and which makes life a miserable burden, until it is terminated by gradual exhaustion, or by a metastatic growth in some vital organ. I was not aware until quite recently that this procedure had actually been successfully carried out, but in one of the latest numbers of the *Lancet* is a report of a case by Mr. W. Arbuthnot Lane, in which he had removed the upper extremity for extensive cancer of the breast and axilla by a modification of Berger's operation. This procedure has the appearance of being a very formidable operation (although it is not), and of being a great sacrifice, but we cannot weigh the value of a life against the loss of an arm, and as I have already pointed out the arm soon becomes not only useless, but a painful encumbrance. If I might venture a prediction, it would be that in the near future this operation will be frequently performed and many valuable lives will be saved by it. It is frequently stated that recurrence after removal of the breast for cancer is generally in the cicatrix. Now I think when this occurs the only logical inference is, that in the original operation the removal was not wide enough or deep enough. I think the experience of all surgeons is that when the incisions have been in all directions sufficiently wide of the disease, recurrence is generally in the axilla and is correspondingly rare in the cicatrix.

With regard to the statistics of the operative treatment of cancer of the breast, I do not think that there are any that can be relied upon, for the reason that it is only within the last few years that anything like radical measures for the removal of all the disease have been adopted, and the statistics of the older methods show uni-

formly bad results. If I am not mistaken the statistics available,—say ten or fifteen years hence, will show very good results,—at least everything seems to point that way at the present time. I have not attempted to trace the subsequent histories of my own cases for this discussion, and I can only at the moment speak positively of one very satisfactory case in which perfect health has been maintained for any length of time. The case is that of an elderly lady, 65 years of age, operated upon in 1889, now six and a half years ago. The disease was extensive, distinctly involving the glands of the axilla. The operation effected a very wide removal of tissue and a very thorough dissection of the axilla, and according to my information received quite recently, this patient is still quite well and free from any sign of recurrence.

In cancer of the male genital organs, the same general principles must be applied, and in removal of the penis, whether the disease be extensive or not, and whether the superficial inguinal glands show any sign of infiltration or not, the contents of these spaces should be thoroughly removed by dissection.

In dealing with malignant growths of the testicles, it is practically impossible except, sometimes, at a very late period to distinguish between cancer and sarcoma, or those mixed growths which are so commonly found in the testicle. In any case it is to be borne in mind that the lymphatic extension here is to the retroperitoneal glands which, of course, are quite inaccessible to operation. It is only in the later stages of cancer of the testicle, when the tunica vaginalis and superficial parts have become involved, that extension to the superficial inguinal glands occurs.

Time will not permit me to speak at length on cancer of the skin. I will merely call the attention of the Society to the case of a man aged 65, who had an epithelioma of the leg developing upon an old ulcer, and upon whom I operated in November, 1892, removing the whole area (9½ by 6 inches) and transplanted skin from the thigh by Thiersch's method. This patient (who was presented at one of the meetings of this Society, about six weeks after operation), is, I am credibly informed, still quite well and free from recurrence of the cancer or even any return of the ulceration (now a little more than three years after operation). This and similar experiences with the so-called "rodent ulcer" lead me to believe that cancer of the skin has much less tendency to extend itself by any of the known methods than has cancer of most other tissues.

A TRIP AMONGST THE GYNÆCOLOGISTS OF NEW YORK.¹

By C. L. PREVOST, M.D., Ottawa.

As you know, I lately spent a few weeks in New York, where I visited the hospitals and eagerly listened to the lessons taught by the eminent gynæcologists whom the commercial metropolis of the United States is so proud of. I came back delighted with my trip, and I long to render my happiness complete by trying to make you share the intellectual enjoyments I have experienced, the recollection of which is still fresh in my memory.

This introduction indicates to you to what a degree my enthusiasm has been aroused by that marvellous city. For us, who in this capital of our Dominion are leading such a calm quiet life, the restless activity which reigns in New York is simply a revelation. The noise, the rush of business, the glitter of wealth, the progress manifested in every direction, all this is actually astounding! With gaze rivetted upon everything that surrounds us, our captivated senses seem to whirl about; we instinctively feel ourselves carried away, as if powerless, by the universal animation. But, once this momentary stupour over, we recover possession of our intellectual faculties and catching the contagion, we start forth following the others and saying to ourselves, "That is the way to understand life! Let us go ahead."

It is not my intention, gentlemen, to lead you through the magnificence of social life in New York. I merely want to beg the pleasure of your company to an excursion through the intellectual world, and especially that part of it which is particularly interesting to us, being in relation with our daily studies, I mean the medico-surgical department.

One word only of the hospitals in general. It is totally useless to endeavour to describe the luxury and the perfection of a certain number of them, especially those which have been recently erected. One must see them with his own eyes to see what hygiene and scientific modern investigations have accomplished for the relief and welfare of those who suffer.

The advantages offered to the physicians and students who follow those hospitals are innumerable, owing to the clinical material they contain, and the eminence of the talented men who manage them. I want to mention above all, the Post Graduate Medical School, the

¹ Read before the Ottawa Medical Society, November, 1895.

German Hospital, the New York Cancer Hospital, the Presbyterian, Lebanon, and Roosevelt. The operating room of the latter is a model one; it is nothing short of a marble palace, erected in honour of modern asepsis. W. Y. Sims, the generous founder, spent more than half a million in making it the most perfect and complete surgical operating room in the world. Inaugurated in November, 1892, the Sim's operating building has its principal entrance on 8th street, opposite the College of Physicians and Surgeons. In the centre there is a vast amphitheatre supplied with gas and electric lights, the doors, the walls and the floor of which are of white marble. All around the amphitheatre runs a circular corridor from which a dozen rooms open, to wit, a waiting room, a room for examination of patients, two rooms for etherization, a room for photography, a bacteriological laboratory a room for dressings and bandages, a room for sterilizing apparatus, another for cleansing the instruments, a larger room for surgical instruments with eight large glass cases, and lastly, a dressing room for the operator and his assistants.

The Sim's operating room is exclusively devoted to observations in general surgery. There is another one, less sumptuous and still absolutely admirable, situated between the Sim's building and the Roosevelt Hospital proper; it is the McLane pavillion for gynæcological observations. Here again, the marble floor and walls are of the most resplendent whiteness, ventilation and lighting perfect. I have no hesitation in saying, more hospitals will certainly be erected in the future; gold distributed by intelligence may reach results perhaps equal, but never superior, to what exists at Roosevelt Hospital.

The Post-Graduate Medical School cannot boast of such luxurious appointments, but it is there that the physician must go and register if he wants to acquaint himself perfectly with the daily surgical movement going on throughout the city. In fact, besides daily lectures given every hour upon all the branches of medical science, operations are every day performed in the building by the leading surgeons of New York, namely, Phelps, Edebohls, Nilsen, Emmet, Foerster, Abbe, Kelsey, Boldt, Dudley, Willy-Meyer, Waldo, etc. Every morning we are notified, on a blackboard nailed on the wall, of the surgical operations which are to take place that day in all the hospitals; their nature is mentioned as well as the hour at which they will be performed and the name of the operator. We only have to choose, there are some for every taste.

The physicians may also, during their leisure, peruse the various periodicals placed at their disposal in the reading room. The Post-Graduate Medical School is the mother house, as it were, of the

medical men, strangers as well as residents in the city, and I am happy to pay publicly here this tribute of gratitude to Mr. Farrell, the Superintendent, for the urbanity and affability with which he receives all those who call on him, and for the services of every kind which he is always ready to render them.

What shall I say next of surgery, as it is understood in New York, and especially of abdominal surgery ?

Well, the whole of it is contained in those two words : Asepsis and Antisepsis. In other terms, the germ theory is universally adopted, and this *consensus medicorum* is a resplendent confirmation of the exactions and truth of the doctrine of those who have inaugurated the marvellous era of progress which has revolutionized medical science within the last fifteen or twenty years. The men who are still refractory are getting less and less numerous ; they constitute but an insignificant portion and dare no more speak out their scepticism with regard to theories sanctioned by experience in every part of the world.

The germs which are the origin of all complications of wounds swarm everywhere around us, and amongst them, the most formidable are the streptococci and staphylococci which carry with them supuration, septicæmia and death. It is of an absolute necessity, before every operation, that they should be destroyed on all objects which will come in direct or indirect contact with the wounded tissues of the patient : this is asepsis. After the operation, we must erect a protective barrier against their possible invasion by means of substances deadly to them : this is antisepsis. Here is, in short, the principle upon which all surgeons keep their eyes fixed. The means of obtaining this end vary according to the surgeon and the materials at his disposal, but the central idea is the same for all : thorough sterilization. But no negligence in the details ! Here the chain is not stronger than its weakest link ; all routine is unmercifully banished everywhere. Everything is carefully reasoned, from the preparation of the patient to the sterilization of the hands of the operator, and this is the way, in my humble opinion, that we must understand antisepsis : it must be absolutely perfect or else it becomes totally illusive. Everything must be sterilized ; instruments, ligatures, dressings, the patient, the operator, his assistants and the nurses ; but from that very moment, none of the parts or objects which have been sterilized must come in contact, should it be but momentarily, with any part of the body or any object which is not sterilized. Thus, you will never see in surgical services in New York, in the course of an operation, an assistant with sterilized hands

remove the lid of a case, the stopper of a bottle, or put his hands on any part of his face. So much the worse if perspiration blinds the operator, or a pruritus whatever annoys his eyes, nose or ears, there is always near by a charitable nurse who will nicely relieve these temporary inconveniences.

These minutiae may seem ridiculous to some sceptics ; well, I shall give to them the same answer as Paschal did to the unbelievers who doubted the religion : " If you do what religion teaches you, supposing it is false, there is not much harm, but what an ill-luck not to believe in it and disobey, if it should prove to be true !"

Thus, ridicule, doubt and laugh at the teachings of the germ theory if you like, still obey all the same. Should the principle upon which it reposes be erroneous, you shall have, after all, the satisfaction of having been scrupulously clean, which is a virtue in surgery as well as in all the other actions of life.

With regard to the surgeons themselves whom I had the good fortune to see at work, I will not surprise you in saying that I found their dexterity simply marvellous. Nothing astonishing when we come to think of the way they are recruited in the hospitals. The younger ones continually have under their eyes their masters whom they watch operating every day. Later on, when they handle the knife on their own responsibility, they are already broken in to the work and they naturally try to surpass their elders, and are carried away by that legitimate emulation towards an incessantly progressive course. And what a beautiful organization in the surgical departments of their hospitals !

During an operation there is a place for every one, and every one is at his place. An abdominal section in these large establishments is something solemn, admirable ! Everything has been scrupulously prepared by the nurses and assistants. The boilers, sterilizers, are in full blast and contain the dressings and articles which will be wanted. The instruments purified, are disposed in order in receptacles covered with sterilized towels. The patient, anæsthetised in the other room, has been carried in and put on the operating table. In a twinkling of an eye she is prepared, and the field of operation is limited with sterilized towels. The operator, surrounded by his assistants, gets ready to begin ; complete silence everywhere. The orders are short, precise, given in a low voice and immediately obeyed. The operator whispers the name of an instrument, the assistant entrusted with this function nimbly presents it. Blood flows, quickly a forceps is applied by another assistant. A sterilized pad is wanted, a mere sign is at once understood by the trained nurse who hands over the desired

object. The water in a basin is tinged with blood, another nurse immediately changes it without being told. The first assistant, intelligent and not jealous, helps the operator and facilitates his work. Everybody is at his post and thinks of it alone and never, during the course of an operation, is a fault against asepsis committed.

There are two classes of operators : the slow and quick ones. The latter operate in a brilliant manner and hasten their work to shorten the duration of anæsthesia. The others take their time, they feel, examine and are careful to do well what they are doing. Which do you prefer ? I have no hesitation in saying that I am in favour of those who operate slowly. Their work certainly lacks of the brilliancy which characterizes the doings of the others, the operation will likely last a few minutes longer, but given the conditions of security with which anæsthetics, and especially ether, are now-a-days administered, what is the use of hurrying ? It seems to me that the patient is far more exposed to the evil consequences of a fault committed through a too great precipitation than to the illusive dangers of a prolonged anæsthesia. Will I cite an example ? I was present, one day, at an abdominal hysterectomy, performed in one hospital that I will not mention, by one of those brilliant and dashing operators. Indeed, the scalpel was flashing, handled in a dazzling manner by the skilful gynæcologist. The abdomen had been opened by a single stroke, the broad ligament, on the right side, had been ligatured and severed at its superior part. A hemostatic forceps had grasped the uterine artery, and the knife was resuming its nimble action. Suddenly a gush of arterial blood spouted out of the wound, the uterine artery had been divided between the proximal end and the clamp.

I had never in my life seen a uterine artery bleeding, and I can tell you, gentlemen, I do not wish to ever find myself face to face with such a hæmorrhage and placed in similar conditions. The artery being deeply situated in the pelvis and submerged under a stream of blood which sponges and pads were unsuccessful in staunching, it was useless to think of applying a ligature on the bleeding vessel. A long hemostatic forceps had to be sunk at random down to the bottom of the wound, endeavouring to seize the artery buried in the deep tissues. The operator at last succeeded in doing so, but after minutes which seemed so many hours to the anxious persons around. The patient was beginning to show signs of collapse, they had to resort to hypodermic injections of strychnine ; a stimulating enema was administered, and five to six pitcherfuls of saline solution were poured into the abdominal cavity.

Well, do you not think that this hæmorrhage, evidently due to the excessive precipitancy of the brilliant operator, will jeopardize the good results of the operation a great deal more than would have done an additional half hour to the duration of anæsthesia.

With regard to anæsthesia, in all the hospitals of New York ether is used, administered in a cone covered with a towel. I saw Clover's inhaler used at the German Hospital only, and a modified apparatus at that, provided with a tap at the superior part through which fresh air was allowed to penetrate without removing the mask from the face. Dr. Boldt, at St. Mark's Hospital, is the only one who sticks to chloroform, at least such was his practice when I first met him in 1893.

"You are using chloroform, I said to him one day, have you never had any accidents with it?" "Yes," said he, "I had one case of death with chloroform, but I had two with ether."

The process in use for the sterilization of the patient's abdomen and the hands of the operator and his assistants is very much the same everywhere. Vigorous frictions with soap and warm water during at least five or ten minutes and then one minute immersion in 1-1000 solution of sublimate. I have had no opportunity of seeing them use permanganate of potash and oxalic acid, according to the method so much thought of in Johns Hopkins Hospital of Baltimore. Almost every operator does the abdominal section with the woman in the Trendelenburg position, some standing on the right of the patient, others on the left, the latter tracing their incision from the pubes towards the umbilicus. This mode of proceeding seems to me to be the easiest and most rational. It is needless to say that no antiseptics whatever are allowed to penetrate into the abdominal cavity, sterilized water only is used. This I believe to be the practice of all abdominal surgeons without exception. Iodoform itself, in several hospitals, seems to be discarded, and surely I would not be the one to call back that disagreeable drug. There seems to be a tendency to employ sterilized gauze altogether. However, a certain number of gynæcologists have remained faithful to the old odoriferous drug.

The sutures in vogue are of catgut, silk and silkworm gut. Silver wire is rarely employed; I saw it used but once by Dr. Craigin at Roosevelt's. Catgut, as ever, is accused of a great deal of evil doing, and they are still in search of an ideal method of sterilizing it. Thus, at the German Hospital, they are looking for a safer process than Kocher's, and are trying at present catgut sterilized by boiling for an hour in alcohol at 95°. According to Waldo, this method is as defective as others, he has tried it and has had bad results with it. The surest means, he says, of obtaining perfectly aseptic cutgut, consists

in its immersion in a solution of 1-1000 of sublimate in ether, in which solution it is kept until wanted. I may say that I have tried personally the process of sterilization of catgut by boiling in alcohol. But we must not forget that alcohol boils at 117°, and catgut submitted to that temperature only once cannot theoretically be considered as perfectly disinfected. Therefore I thought it safe to submit it to fractional sterilization, that is, boil it the first day for one hour and half an hour the two following days. The first day, all vegetative forms of bacteria will be destroyed, but a certain number of spores will escape destruction. They will grow out into vegetative form though during the twenty-four hours of interval between the heatings and be killed by the second and third boilings. Then only we may be reasonably sure of having secured a perfectly sterile catgut. But unfortunately, this process rots the catgut which, although in some parts quite resistant, becomes as a whole totally unreliable.

Now, gentlemen, if you will follow me I will take you to some of the principal hospitals I visited, and will let you know the facts worthy of interest that I have observed.

We shall begin by Brooklyn, and let us enter St. Mary's Hospital. This hospital is under the direction of nuns, and the medico-surgical department is attended by nurses trained in a school attached to the hospital. The day I went there, I expected to witness an abdominal hysterectomy which I was told was to take place that day. Before we were shown to the operating room, the head nurse invited us to put over our clothes a sterilized jacket, a rule to which must submit all those coming from outside to assist at an operation. In fact, every one in the operating room, wore the same accoutrement, the visitors, nurses, assistants, etc. Only one made exception, it was the operator himself who, at the time of my visit, was then examining the patient already anæsthetised. I wonder still what was the reason of that singular anomaly.

The chief surgeon of St. Mary's Hospital is Dr. J. Byrne, a charming old man, who tendered us the most gracious welcome. He is the author and enthusiastic admirer of a special method of vaginal hysterectomy in malignant diseases of the uterus. He performs the whole operation with the galvano-cautery method without knife or scissors. To him, it is the ideal method of removing the uterus per vaginam, the only one which assures perfect hemostasis and, above all, an absolute asepsis. He contends that utero-vaginal structures which have been severed by the galvano-cautery are left in a state more favourable for restoration to a healthy and normal condition than when either scalpel or scissors have been employed. There is total

absence of pain and fever following the operation, and the return of the disease is exceptional, or at any rate a great deal more tardy than after operations performed according to other methods.

Let us now go back to New York, please. It is 10 a.m., and Dr. Nilsen is giving his gynæcological clinic at the Post-Graduate School. A woman lying in the dorsal position, and covered with a sheet to save her modesty, is brought, on a rolling table, into the amphitheatre. The professor examines her. It is one of those common cases of daily occurrence in the practice of every physician, multipara, history of several miscarriages, lumbar and abdominal pains, metrorrhagia, leucorrhœa, frequent micturation, bad digestion, etc., etc. Cause: endometritis, laceration of the cervix, relaxation of the vaginal walls. Treatment—Curetting, trachelorrhaphy, perineorrhaphy and then hot douches.

Dr. Nilsen operates with his patients in Sim's lateral position. He never does curetting with a dull curette, but always uses a sharp one. In operating for trachelorrhaphy, he uses and praises very highly Skene's hawk-bill scissors, insisting upon the necessity of holding well out the lips of the cervix by the means of curved vulcellum. He sutures the cervix with straight needles and uses carbolated waxed silk prepared according to Skene's method. With regard to douches, he dwells strongly upon the necessity of prolonging them for at least half an hour, and repudiates the rubber fountain syringe, recommending a simple pail supplied at the bottom with a tap, to which a long rubber tube is attached.

Let us hurry now and take the elevated railway on Third Avenue. I want to take you to the other end of the city to the Lebanon Hospital, situated on 150th street. This hospital is only five or six years in existence, and was formerly occupied by an Ursuline convent. It contains 350 beds. The programme of operations is very attractive at the time of our visit. Dr. Waldo intends doing two curettings, one trachelorrhaphy, one amputation of the cervix and two perineorrhaphies. Dr. Waldo is one of the most brilliant and most sympathetic amongst the younger gynæcologists of New York. I had the honour of being acquainted with him in 1893, when he was assistant to the late lamented Carroll Lee at the Post-Graduate. Certainly he has lost nothing of his exquisite politeness and the amiable manner with which he receives the numerous physicians who crowd around him to admire his surgical skill, and profit by his experience. Waldo, like Nilsen, and I may say almost every gynæcologist in New York, operates with his patients on the side. He curettes with the sharp curette until he hears the tissues grating, and then dilates with a double-bladed metallic dilator. The Hanks dilator, a modifi-

cation of Hegar's, seem to be used by the gynæcologists of the Women's Hospital only. He does trachelorrhaphy with ordinary scissors. He slits the angles in the median line and then removes, on each side, a triangular strip; and, always with the scissors, he cuts down through the cicatricial tissue until he sees a freely bleeding surface which shows that he has reached the sound parts of the cervix. With half-curved needles, he sutures the pared surfaces with silkworm-gut, taking care to thrust the needle at a good distance from the edge. If the cervix is thickened and indurated, he makes a circular amputation, and in entering he causes the needle to penetrate from right to left on the vaginal mucosa, the point of the needle coming out through the cervical mucous membrane to enter the other side and come through again on the left vaginal mucosa. Two similar sutures are made and then he unites the upper and lower parts of the cervix by imbedded sutures to avoid pockets which would prevent accurate union.

Schröder's operation seems to be rarely done in New York. In France, on the contrary, it is more frequently performed than Emmet's trachelorrhaphy.

Waldo repairs the relaxed perineum in the twinkling of the eye. He grips the top of the rectocele with a tenaculum and two other tenacula are fixed, one on each side, on a level with the caruncles. He stretches the tissues, spreading out a triangular surface on the posterior wall of the vagina, which he causes to bulge forward by means of the left index finger introduced into the rectum. He then makes, at the posterior commissure, a small incision at the union of the skin with the vaginal mucous membrane, cutting with the point of the scissors. Sliding up the scissors through the submucous layer he opens the blades and separates the mucosa in every direction. This he excises afterwards following the sides of the triangle. He then unites the pared surfaces by means of the Cleveland suture. Very ingenious that suture and of the most rapid application. I will undertake the difficult task of describing it, the words right and left being used with regard to the operator, not the patient.

He uses a long slightly curved needle threaded with a long piece of catgut. The needle is made to enter on the right side near the tenaculum fixed on the caruncle. He creeps under the tissues along the border of the denuded triangle up to the top of the rectocele. The needle then comes out and goes in again downwards, always imbedded in the tissues, and follows a line situated midway between the median line and the left side of the triangle. Out comes the needle to the left of the median line at the base of the pared surface, in it goes again on the right side of the median line at a point symmetrical to

the point of exit on the left side ; up it goes under the tissues between the median line and the right side of the triangle to the top of the rectocele again, where it comes out. Lastly, it is entered in the tissues and pushed downwards from the right to the left, following the left border of the triangle to make its final exit on a level with the right caruncle (left of the operator) exactly opposite its point of entrance on the other side. In pulling upon the ends of the thread, the tissues are approximated, puckered up not unlike Stoltz's suture in anterior colporrhapy, and the suture is tied.

This very brilliant process is done in a very short time and restores the perineum in an irreproachable manner. The patient is kept in bed for ten days and is allowed to pass her own urine, as they say over there, that is without the use of the catheter.

I saw also Dr. Waldo perform laparotomy for an ovarian cyst. In opening the cyst an enormous quantity of purulent serosity spurted out. The suppuration of the cyst was the result of tapping previously done by the attending physician. Waldo rightly censures the detestable practice of puncturing ovarian cysts, which is the most common cause of their purulent transformation. He tries to explain the result by the supposition that the deep layers of the epiderma containing germs, e.g. staphylococcus albus ; the latter are not destroyed by the most vigorous scrubbing of the skin, and are carried in by the trocar and contaminate the parts contained in the abdomen. The hypothesis may be correct, but, in my humble opinion, I believe that generally these cysts suppurate because the tapping has not been done according to all the rules of strict antisepsis. We either neglect to completely sterilize the skin of the abdomen by sufficient scrubbing, or the trocar, or the hands of the operator have not been properly prepared. At any rate, with this patient, the cystic cavity contained pus, the walls of the cyst were everywhere adherent to the abdominal parietes ; to attempt the separation of the adhesions and the ablation of the sac would have been imprudent. After having carefully emptied the cavity and united the edges of the cyst to the lips of the abdominal incision, abundant irrigation was made with sterilized water. Then long parallel bands of iodoformed gauze were packed down to the bottom of the cavity and the ends left loose and folded over the incision and covered with absorbent cotton. The whole was firmly held in place by adhesive plaster and a many-tailed bandage, cut out somewhat similar to Soulellé's apparatus for fracture. At the end of two or three days the iodoformed gauze will be changed, and then the dressing done every day until cicatrization of the cavity is complete.

(To be continued.)

Clinical Reports.

A HAIR-PIN IN A GIRL'S BLADDER.

By STANLEY S. CORNELL, M.D., C.M., Athens, Ont.

Miss G., a tall, plump, anæmic girl, aged 19 years, came to my office January 26th, 1893, and informed me that during the previous six days she had experienced pelvic pains while urinating or vigorously exercising; that the pain had developed suddenly, but was associated with no abnormal discharges from the genital or urinary organs; and that her symptoms were caused by the presence of a *hair-pin* that had been lost in her *vagina* upon the sixth day before her consultation.

The distress accompanying urination was so great that the patient avoided drinking water or tea for the whole period of her pains.

The patient was reticent concerning the origin of her suffering, but admitted the following history: Believing, from some obscure vaginal sensation, that her monthly flow was about to be established, the patient introduced the rounded base of a hair-pin within the vagina (?) in order to confirm or refute her impression, involuntarily "drew a long breath, and lost the pin."

Physical Signs and Treatment.—On digital examination of the vagina, the examining finger detected a limited and ill-defined point of resistance in the anterior vaginal wall. The patient was then anæsthetized, and Thompson's searcher introduced into the bladder. This procedure resulted in the contact of the point of the instrument with an apparently small object from which emanated a clicking sound. An attempt to remove the foreign body by means of a pair of uterine dressing forceps having failed, I introduced Goodell's powerful dilator along the whole length of the urethra, and performed rapid dilatation. Although the result of this manœuvre rendered an extreme dilatation of the upper third of the urethra unavoidable, yet it enabled me to pass my index-finger through the canal to a point just within the neck of the bladder. I now perceived that one arm of the hair-pin was superficially imbedded in the mucous membrane at the base of the bladder, and, tracing it upward, concluded that the base of the hair-pin lay behind the symphysis pubis. The examining finger was carried up to the symphysis and against the rounded base of the pin; the palmer surface of the finger was then turned toward

the sacral pronontary, and the finger-nail introduced between the symphysis and the base of the pin; a backward movement of the finger caused retroversion of the pin, while gentle forward traction caused it to sweep the posterior wall of the bladder and follow the urethral curve till its expulsion was completed.

The extraction of the hair-pin was to me a difficult procedure, and consumed fully a quarter of an hour.

The hair-pin was made of brass, and was $3\frac{1}{8}$ inches in length, its greatest breadth between the arms being $\frac{5}{8}$ inch, and its least breadth $\frac{1}{2}$ inch. The arms of the pin were powerful bars $\frac{1}{4}$ inch in circumference. The pin was coated in its entirety with a layer of gray alkaline mucus.

Traction with the uterine dressing forceps had resulted in the bending of one arm of the pin at an obtuse angle, and this, no doubt, caused a somewhat deeper implantation of the other arm in the vesical mucous membrane. Had such implantation occurred to a much greater extent than it did, perforation of the bladder at the base would have been the result.

Not more than a drachm of blood escaped from the urethra during and after the extraction of the pin.

The patient was put to bed for five days upon a limited diet. Water was given in quantities to satisfy thirst. No untoward conditions developed, and the temperature rose to 100°F . on only two days. The unfortunate condition of dilatation of the upper third of the urethra followed the spreading of the dilator, and was associated with inability to resist the urinary pressure within the bladder beyond a variable degree; but this gradually subsided during seven months treatment with *nux vomica*, *belladonna* and iodide of iron.

Ephemerides, 1895.

By WILLIAM OSLER, M.D.

III. GEOGRAPHICAL TONGUE.

Rayer's lingual pityriasis—eczema of the tongue, exfoliative glossitis, of other writers—is not a very uncommon affection, and rarely of much moment, lasting from a few weeks to a month or two. Occasionally, as in the following cases, it is very protracted and intractable, and a source of great worry.

Mrs. W., aged 65, wife of a physician, seen on several occasions throughout the year. She first came under my observation on March 3rd, 1894, complaining of a peculiar disease of the tongue, associated with a burning sensation. The condition had persisted at intervals since April, 1893. I dictated the following note at her first visit: "The tongue is not enlarged. The dorsum presents a number of irregular, somewhat serpiginous abrasions, the edges, for a couple of millimetres, look whitish and infiltrated. The papillæ, however, are not destroyed, and it is only the superficial layer of epithelium which is removed. About a third of the dorsum is occupied by these patches. She says that sometimes they are entirely covered by the greyish white material. Towards the left side of the tip there are three or four rounded patches with small, red, central depressions which look like the beginning of the trouble. There is no induration. Far back on the left side there is a patch in which there are one or two small hæmorrhagic papillæ, but here, too, there is no induration."

She says that when first noticed the disease was at the tip and was not painful. She had been of late greatly distressed about it, particularly as she has dreaded that it might be the beginning of a cancer. Her husband had taken her to a number of physicians without getting any satisfactory account of its nature, and a surgeon had suggested that it might be the commencement of malignant disease.

As there was evidently a strong nervous element in the case, I assured her that it was not likely to lead to anything more serious. The application of a twenty grain solution of nitrate of silver twice a day gave her great relief, and for several months she thought she was cured. In September of 1895 the burning feeling in the tongue returned, and the patches were again very well marked.

On January 24th, 1895, the tongue was covered with irregular

serpiginous patches with depressed, smooth, denuded centres and greyish white margins. The use of the nitrate of silver was resumed, and she was ordered iodide of potassium. She improved very much, and throughout the summer remained well. In October the trouble began again. The burning feeling was very distressing, and hot things and many articles of food caused very unpleasant sensations.

I saw this patient a few weeks ago, and she was still troubled with occasional patches.

The condition has now recurred at intervals for nearly three years.

A few weeks ago I received a letter from a naval surgeon of the Pacific Squadron, asking information about the case of a brother officer. His description is so accurate and careful that I quote part of it, inasmuch as the diagnosis is to be readily made from his account. "The papillæ of the tongue are very prominent; three longitudinal fissures traverse the organ; one in the centre; one on either side, each with lateral fissures. Opaque, whitish patches, linear and semi-circular in shape, begin in the fissures and soon spread over the dorsum, always with semicircular outlines. The patches grow larger, widening as they pass, until they reach the under surface of the tongue, when they disappear. The mucous membrane over which the patches have passed and are about to pass appears perfectly normal. Fresh patches are sure to form again. From four to six days is the natural existence of any one of them. Curiously enough, the patches are limited to the right half of the tongue. There is no pain, but the patient complains of a dry, chipped feeling, especially in the morning, when the white patches are more marked. The suffering is more mental than physical, inasmuch as the patient fears the development of an epithelioma."

The irregular patchy appearance of the surface of the organ gives a certain resemblance to a map—hence the name "geographical" tongue. I have never known an instance in which it was so persistent and the cause of so much suffering as in Mrs. W.

IV. BUCCAL LEUCOPLACIA.

Buccal psoriasis, or keratosis mucosæ oris, offers many perplexing problems to the physician. The two cases I here report illustrate very different types of the disease, the one characterized by much irritation, sometimes swelling, and an extensive patchy leucoplacia; the other represented by a small, opaque white, corn-like thickening.

Lieut. A., U.S.N., aged 45, was referred to me May 10th, 1895, by Dr. Beyer, complaining of a sore tongue of six years duration. The patient first noticed a little 'canker sore' on the right side of the

tongue. It soon disappeared, but shortly afterwards the tongue became so painful and swollen that he could scarcely eat.

The patient has always been a vigorous, healthy man. In 1881 he had a primary, syphilitic sore, with very slight eruption after it. He was thoroughly treated; married in 1889; has no children. He has been a smoker for years, but on account of his tongue has had to give it up except at intervals. In the summer of 1892, a moist, patchy eruption came upon the head, and appeared at intervals for nearly two years. With this exception he has had no signs of syphilis since 1881. He has been a temperate man; he has never had the gout. The trouble with the tongue has occurred at intervals since 1889. The condition on examination was as follows:

He is a healthy-looking man of good colour. There are three little nodules on the margin of one ear, not chalky. There are longitudinal ridges on the nails. The mucous membrane of the lips and of the gums is normal. On each side, just within the fræna of the lips the mucous membrane for 1 cm. from the edge is thickened and greyish white in colour. This condition, the patient says, comes and goes with the soreness of the tongue; and these patches may appear at the angle of the mouth before the tongue gets sore. They have extended so as to be visible at the outside. The mucosa covering the cheeks and palate is perfectly normal.

The dorsum of the tongue presents one long central fissure with numerous lateral ravines. On the left half there are three parallel fissures, on the right two longitudinal furrows. Towards the root of the tongue the fissuring is very irregular. The general surface is reddened and the papillæ are well seen, nearly all of the simple form. In the central portion and along the median fissure the mucosa is smooth, glossy, and in places thickened, here and there quite white. Far back, on the right side there are several well marked patches of leucoplacia, and a small, firm, projecting body, like a wart. The margin of the tongue and the lips are smooth. The mucosa looks a little denuded, but not specially red or raw. At the left margin of the tip there is an opaque, white plaque. On the under surface of the tongue on the left side near the frænum there is a small, slightly projecting, opaque portion of the mucosa.

He says that at present the tongue is nearly well. He gives, however, an account of the remarkable influence of certain substances. Smoking in the present state of the tongue does not appear to irritate it in the slightest. Milk, coffee, whiskey, or any alcoholic drink excites superficial inflammation with a good deal of swelling. In some of these acute attacks the tongue becomes so much swollen that he can

scarcely masticate. He has to be particularly careful about his food, taking a very plain diet. The influence of milk is, he says, most extraordinary. He has tried it a dozen times within the past four years, and on each occasion it has excited a good deal of swelling and soreness of the tongue. If after an indiscretion the tongue becomes swollen, he takes calomel, from two to four grains for three nights in succession, and the condition of the tongue begins immediately to improve. The present state causes him no anxiety whatever; his only worry is lest any food should accidentally light up the superficial glossitis, as during the acute attacks the tongue is swollen, red and very painful. He does not think that the white patches have increased much within the past two years.

The following case represents a very different form of leucoplacia, one to which the term lingual corn is more appropriate.

Captain X., of the British Army, aged 41, consulted me March 12th, 1895, about a patch on the dorsum of the tongue, which had been worrying him for six months.

He is a large framed, healthy looking man. He has always been very well and strong. He has been a moderate smoker (pipe); lately he has been smoking cigars, one or two a day.

About twenty years ago he had a soft chancre which was followed by buboes, but there was no secondary rash. About two years ago he had a little raised sore on the under surface of the left side of the tongue, which caused him a good deal of worry. There was some doubt about its nature, but he was given iodide of potasium and it disappeared gradually.

The present trouble began about six months ago, when he noticed the spot about to be described. He does not think it has increased much in extent.

On the right side of the tongue, about 4 cm. from the tip, and 2 cm. from the median line, there is an opaque white spot, exactly 5 mm. in length by 4 mm. in width. It is not raised above the surface and is not ulcerated. Behind and at the sides it passes uniformly into the mucosa; in front it is separated by a small, narrow groove. It is everywhere opaque white on the surface, perfectly smooth, feels horny, not rough, and on pressing it between the thumb and finger laterally it apparently has no great depth, and it does not feel indurated. It resembles a small, localized spot of leucoplacia. Just behind it there is one little accessory spot about half the size of a pin's head. The other parts of the tongue are perfectly smooth and clean. The glands beneath the jaw of the right side are not enlarged.

A thin shaving, taken from the spot, showed nothing but flattened

scales of epithelium. The patient has had, at intervals, for four or five months, pains in his bones, particularly at night. He has been taking iodide of potasium for between two and three months, but without special benefit, and without any change in the local condition.

The patient was given a favourable prognosis, and urged to continue the iodide for three months, and then, if not better, to have the spot excised.

The association of leucoplacia with persistent smoking has long been recognized. (Smoker's tongue.) As in the cases I here report syphilis is a common antecedent, though the relation between the affections is very obscure. One of the most obstinate and extensive instances I have ever seen was in a man who had not used tobacco, and had not had syphilis. The mucous membrane of the cheek on the left side, almost from one alveolar fold to the other, was represented by an opaque white patch of about the appearance and consistence of a 'milky patch' on the pericardium. The condition caused a great deal of mental worry and distress, and the patient consulted several physicians both in this country and London without getting any satisfaction as to the nature of the trouble. After lasting for more than a year it gradually disappeared and he has never had a recurrence.

A very much more serious matter is the relation of these patches to epithelioma. About one in five of Butlin's cases of epithelioma were preceded by leucoplacia. With such a percentage, when the patches are localized, as in the second case I mention, excision should be advised.

RETROSPECT OF CURRENT LITERATURE.

Medicine.

Arthritis and Endocarditis.

ALEXANDER HAIG. "Arthritis and endocarditis due to drugs which diminish the solvent powers of the blood for uric acid."—*British Medical Journal*, December 28, 1895.

In this article Dr. Haig asserts, with an unusual degree of positiveness, that arthritis and endocarditis of so-called rheumatic origin are solely due to the quantity and solubility of uric acid in the blood, and that this quantity and solubility are absolutely and completely within our control. So soon as this is recognized, what is now crippling and decimating our children will be prevented, chiefly by the regulation of diet.

So long as uric acid is held in solution in the blood, *i.e.* so long as it is not found in excess of normal, nor the alkalinity of the blood diminished, so long do rheumatic signs and symptoms fail to appear. The disturbance of this balance precipitates the attack.

The conditions which favour rheumatic attacks, as exposure to cold after heat and fatigue, wetting through and getting hot, he regards as so many causes increasing the acidity of the blood, or in other words, diminishing the alkalinity of the blood, thus precipitating the uric acid.

In a case of pulmonary tuberculosis in which he gave nitro-hydrochloric acid with strychnine, in a case of chorea treated by arsenic, and in a case of broncho-pneumonia with a systolic murmur at the apex, eventually treated with dilute sulphuric acid and digitalis, he claims to have seen changes occur definitely referable to these drugs—in the first case arthritic pains, with rise of temperature and development of a systolic murmur; in the second case a post-systolic murmur; in the third case a rise of temperature, which fell with the setting aside of the acid. These are all regarded as cases in which the drug mentioned diminished the alkalinity of the blood or diminished the

excretion of the uric acid in the urine, and thus favoured its precipitation—the cause of the arthritis and endocarditis.

Salicylates and alkalies do not work well together, since salicyluric acid is soluble in more or less acid fluids, while the other compounds of uric acid are not so. For this reason the salicylates are most effectual in the acute cases of arthritis, since here the alkalinity of the blood is low.

The author's words may be quoted, showing how strongly he believes in the causative action of uric acid. He says, "I make bold to say that every drug that has been used with benefit in acute rheumatism in the past, and every drug still to be discovered that may be used with benefit in the future, will be found to do good in direct proportion to its power of dissolving and eliminating uric acid. The straightforward and easily verified chemistry of uric acid will replace the hypothetical microbe, and gout and rheumatism will be regarded as mere modifications of one and the same disease—arthritis due to uric acid."

Chlorosis.

RALPH STOCKMAN. "Observations on the causes and treatment of chlorosis."—*British Medical Journal*, December 14, 1895.

According to Dr. Stockman's view there are but two great and direct causative factors in chlorosis, viz., blood loss and insufficient supply of iron in the food. Other ascribed causes may contribute to produce either one of these two causative factors, and as such cannot be considered as direct agents.

The author holds that Virchow's view of congenital hypoplasia of the arterial system as a cause of chlorosis is contradictory, for since the condition of chlorosis is transient, so also must the cause be transient.

The theory supported by Sir Andrew Clark and others concerning constipation and resulting ptomaine absorption lacks support in facts.

Now, since hæmoglobin deficiency is the chief characteristic in the blood of chlorotic patients, special interest attaches to the observation of this constituent of the blood. Sex influences it normally. In women it is 8 to 10 per cent. less than in men, therefore the blood of women is less able to stand any drain upon it than that of men.

Age also acts as a factor, since from 15 to 25 not only is the hæmoglobin less, but the number of red corpuscles is also less than at other ages. This is the period of rapid physical development, and during this time also the menstrual function is established. Growing girls and chlorotic individuals very frequently present signs of ill-performed

digestive process, with constipation. This implies the consumption of an inadequate amount of food and therefore an inadequate amount of iron.

Condition of Digestive Organs—Healthy persons consume about $\frac{1}{11}$ to $\frac{1}{8}$ grain of iron daily, while the analysis of the dietary of four chlorotic girls showed only $\frac{1}{30}$ to $\frac{1}{20}$ of a grain daily. The amount of iron excreted is estimated at less than 6 mg. daily, or about $\frac{1}{11}$ grain.

By experiment Dr. Stockman establishes the relation between the amount of hæmoglobin in the blood and the amount of iron in the food taken. Many others corroborate this observation.

The loss of blood by depleting the system of iron, and thus preventing a reserve deposit of iron in the liver and spleen, interferes with a speedy recovery,—a restoration to its normal richness in hæmoglobin.

Women in a healthy condition are quite able to withstand the menstrual hæmorrhage, the reserves of iron favouring recovery, but the condition is quite different in young and growing girls.

The explanation of those cases of chronic relapsing chlorosis is not made with any reference whatever to Virchow's theory of arterial hypoplasia, but the author refers them to insufficient food supply, or excess of blood loss, or to these two causes combined. There may be deficiency in blood forming activity.

The obstinate anæmia of gastric ulcer affords an example of the combined working of these two great and direct causative factors,—blood loss and insufficient dietary. The chlorosis of boys, of non-menstruating girls, as well as the anæmia of the menopause, are referred to dyspepsia, insufficient food and excessive blood loss.

Having thus discussed the causes, the treatment of chlorosis forms the next division of this paper, which may be reviewed under two headings,—prophylaxis of chlorosis and treatment of the condition itself.

In considering the prophylaxis he says any undue menstrual losses are to be checked by ergot, or sometimes hot douching. And of more importance still is the cultivation of an habitually good appetite and vigorous health.

In the treatment of chlorosis itself he recommends iron, in some form, the choice of preparation as well as the mode of administration to be made according to the conditions present. Manganese and arsenic Dr. Stockman regards as unnecessary. A diet containing much flesh is indicated, as such food is richer in iron than farinaceous food. Fat, in the belief that it hastens blood formation, is recommended by Nasse, Bradford and Ebstein. In order to secure results in cases of

severe anæmia rest in bed must be enjoined, thereby enabling the food and iron supply to be used for purposes of nutrition.

If the appetite and digestion are at fault, treatment must be directed toward this system in cases of chlorosis, since recovery depends so much upon food assimilation.

The Use of Antiseptics in Infantile Diarrhœa.

W. SOLTAU FENWICK. "The use of antiseptics in infantile diarrhœa."
—*British Medical Journal*, December 21, 1895.

In this paper, read before the British Medical Association at its last session, the subject of etiology in intestinal sepsis is considered and a brief review of the more important antiseptic drugs adapted for medicinal use is offered. These the author divides into two classes according as they are soluble or insoluble in water. These two classes are separated by yet other characteristics than that of solubility or insolubility in water. Those drugs which belong to the former group possess germicidal and toxic properties in direct proportion to the dose in which they are administered, while those of the latter group remain almost unaltered in the stomach, where they exert but little influence on the fermentation processes in that organ. The decomposition which they undergo in the intestines often results in products highly poisonous.

The drug of Dr. Fenwick's choice is resorcin, and for the following reasons:

1. It is extremely palatable to children.
2. It is devoid of toxic properties, differing in this respect with carbolic acid.
3. It is very inexpensive.
4. He has found it highly satisfactory in a large number of cases of intestinal dyspepsia in infants and young children, concerning 120 of which he gives interesting and convincing statistics.

He adds that in those chronic cases where follicular ulceration of the large intestine exists the drug may be supplemented by such remedies as benzol-naphthol.

W. F. Hamilton.

Surgery.

Post Typhoid Bone Lesions.

PARSONS. "Past typhoid bone lesions."—*Annals of Surgery*, November, 1895.

Among the sequelæ of the continued fevers, the lesions of bone have long occupied a place of prominence. In the Toner lecture in 1876, W. W. Keen quoted forty-one cases, thirty-seven of which had followed typhoid fever. In the same year Sir James Paget described most fully, from the clinical standpoint, an inflammatory condition of bone occurring at various periods after typhoid, pursuing a more or less chronic course, with but little tendency to spontaneous recovery, except after long periods of time. He had observed some seventy cases, all after typhoid fever.

In 1873, Murchison reported necrosis of femur, tibia, and temporal bone following the same disease and, later, Affleck described periostitis of the humerus in two cases and of the tibia in another.

Other observers have also reported similar cases.

With the identification of the Eberth-Gaffky bacillus as the specific cause of typhoid fever, the nature of these bone lesions has been investigated more thoroughly, with results which have established a relation between them and the primary typhoid attack.

Ebermaier, in 1887, obtained from two cases of suppurative post-typhoid periostitis the bacillus of Eberth in pure culture. Orloff, in 1889, in a similar case of periosteal abscess, six months post-typhoid, found this bacillus alone. Achelme, Melchair, Galgi, Eberth and others have had a similar experience.

There are many cases on record in which the infection has not been with the typhoid bacillus, but with the pyogenic cocci, or the less frequent pus producers. Nettles describes eleven cases of osteitis, five of which showed the pneumococcus, one the pneumococcus and staphylococcus, and five the streptococcus.

While it is certain that mixed infections do occur in the post-typhoid bone lesions, it must be admitted that the evidence of careful bacteriological investigation, based upon a considerable number of cases, is to the effect that these lesions may be caused by the typhoid bacillus alone.

Orloff produced suppuration in dogs and rabbits by subcutaneous inoculation of pure culture, the pus showing this organism alone.

Of great interest are the experiments of Galgi, who fractured a long bone in one of the lower animals, and at some distance from that point injected subcutaneously a suspension of pure typhoid bacilli, with the production of suppuration at the point of fracture; the pus showing in culture only the typhoid bacilli.

The presence of the typhoid bacillus in the spleen and bone marrow, particularly of the ribs, has been demonstrated by Quinke as late as the seventh week of the disease. In nine cases examined, eight showed the organism in the marrow of the ribs. In two cases the sternum was examined with positive results, and in seven out of eight cases large numbers were found in the spleen pulp. By analogy they should be as frequent in the bone-marrow as in the spleen.

Dr. Welch observed the persistence of the typhoid bacillus in the bile of a rabbit which had been inoculated four months previously and had recovered; they were not found in the organs.

Observations upon the suppurative processes in human beings developed during or subsequent to an attack of typhoid fever, indicate that at one time the ordinary pyogenic organisms are alone present, at another, associated with the typhoid bacillus, and in still others the typhoid bacilli alone are met with, and even more rarely the typhoid bacilli are found together with other bacteria, *e.g.*, bacterium coli commune. It is not necessary that there shall be a common etiology in these processes any more than we look for a common cause of the suppurative process occurring under other conditions in the body; on the other hand, there seems to be no good reason for excluding the typhoid bacillus from the group of possible pyogenic organisms. It may be looked upon as capable of causing various pathological conditions,—a specific typhoid fever attack, a local suppuration, and, finally, a general septicæmia.

Dr. Parsons reports six cases in detail. Four occurred in men and two in women. The ages ranged from twenty-one to forty-three years.

The character of the attack of typhoid fever does not appear to bear any relation to the occurrence of these lesions.

The period after recovery from typhoid fever at which the lesions appeared varied from one to sixteen months.

As to the bone involved, hardly any region of the body is exempt. The tibia seems to be the bone of choice. The humerus, radius, ulna, femur and fibula have at one time or another been involved, whereas the feet and hands were remarkably free. In the head the parietal and temporal bones have been affected, and in the thorax the ribs or their costal cartilages are a very common seat, probably next in frequency to the tibia.

It may be that some of the cases of "typhoid spine" described by Gibney should be in this class.

The effect of trauma, overstrain and muscular exertion, occurring soon after typhoid may be a determining influence in these bone lesions.

The *prognosis* is good as a rule, although Klemm reports a fatal case of lesion of the femur showing typhoid and colon bacilli associated. Complete excision of all diseased and suspected tissues appears to be the most satisfactory treatment. Mere incision is often followed by a persistent fistula. The persistence of the organism in the wound for such long periods of time, as some cases show, and the satisfactory results obtained after thorough and complete removal of the focus, suggest very strongly the line along which to work.

Linear Craniectomy.

DANA. "Craniotomy for idiocy."—*The American Journal of Medical Sciences*, January, 1896.

So much has been said against this method of attempting to relieve some of the symptoms of idiocy that an article favouring linear craniectomy is worth noting. Keen, of Philadelphia, has spoken favourably of the operation, so also has Horsley, Starr and Roswell Park.

That some amelioration of some of the worst features of these cases follows craniotomy, in some instances seems to be pretty well established, and, *vice versa*, that very great improvement ever takes place, that is, that a change from the imbecile to the normal state ever occurs is about as well established.

Dr. Dana does not believe that the premature ossification of the cranial bones compresses the brain and prevents its development, yet in his opinion the microcephalic infants without fits or palsies furnish the best field for the operation.

Dr. Dana thinks that it is through its pedagogic influence that an improvement in these cases takes place and that the operation is allied in its effects to a severe piece of castigation.

In addition to this educational or pedagogic effect on idiots it is not impossible to suppose that by removing certain parts of the skull-cap we do allow for a freer expansion of the brain, that its circulatory supply may be improved and the tendency to growth and development of nerve centres receive something of a stimulus.

Little can be expected after a child has reached the age of four or five years, and the best chances for improvement will be obtained if the operation is done under the age of four.

Dr. Mies (*Ueber das Hirngewicht des Leranwachsenden Menschen*)

has shown that the development of the brain is divided into three equal periods. The brain increases in weight by one-third during the first three months of life. It increases in weight another third during the period from the tenth month to about the middle of the third year. The last increment takes place during the period between two and a half years and adult life, and most of this last increment takes place before the child has reached the age of seven years. It is in the second third of the brain development, or the early part of the last third, that most improvement is recorded from craniotomy. At the same time there have been some striking successes, so far as symptoms are concerned, in children as old as nine or eleven years, but these are cases in which there has been epilepsy or paralysis or some other motor disturbance.

The mortality after linear craniotomy is now about 5 per cent. In Dr. Dana's personal experience one-half of the recovered cases have improved.

Pathology.

The Gonococcus and the Complications of Gonorrhœa.

DAUBER UND BORST. "Maligne Endocarditis im Anschluss an gonorrhœa."—*Deutsche Archiv. für Klinische Medicin*, 13th December, 1895, Band 56.

W. S. THAYER ET G. BLUMER. "Endocardite Ulcéreuse blennorrhagique. Septicæmie d'origine blennorrhagique."—*Archives de Médecine Expérimentale et D'Anat. Path.*, November 1st, 1895.

Where so very much clinical and medico-legal value attaches to the certainty with which we can diagnose a gonorrhœal infection, the importance of comprehending fully the typical characteristics of the gonococcus cannot be over-estimated. Time and again one is called upon to decide not only the nature of a purulent urethritis, but likewise to determine the causative factors in numerous complications which clinically are either classed as gonorrhœal, or else have so intimate a relation to the course of that malady that it seems more than probable that similar causes have induced both the primary lesion and the apparently secondary manifestations. In this category the various joint lesions, known clinically under the name of gonorrhœal arthritis, are facile princeps; the others, too numerous to give in detail, have in many cases quite as intimate a relationship to the gonorrhœal attack; such, for example, are many forms of cystitis, salpingitis, peritonitis, myo-, endo- and pericarditis, conjunctivitis, renal affections, some cerebral and spinal lesions, eruptions on the skin, etc. While, however, clinicians habitually denominate many of these as post-gonorrhœal, such a term is scarcely justifiable save in those cases where the gonococcus has been discovered in the affected regions or tissues, and until this is accomplished we cannot scientifically establish the etiological relationship between the germ of gonorrhœa and the so-called complications.

As a matter of fact, it is only within a very few years that investigators have satisfactorily proved the directly infectious nature of the gonococcus in these secondary results of a purulent urethritis, though such a statement applies unfortunately to but a very limited number of cases. Scientists have hitherto failed to discover the gonococcus in any of the nervous or cutaneous affections which have followed upon a gonorrhœa, and in many of the other more common complications a

germ has been found resembling the gonococcus in form and staining peculiarities, but no cultures were obtained, thus rendering the diagnosis unsatisfactory. The more complete proof of the presence of gonococci in joint affections and secondary abscesses was reserved for very recent times, such, for example, as the detection of the germ in an abscess of the finger by Lang and Paltauf, in an empyema by Mazza, in or near the joints by Neisser, Finger, Bloodgood and Flexner, Bardone-Uffreduzzi and others. By experimental inoculation on the human healthy urethra the last named investigator produced a purulent urethritis by means of a pure culture of the germ removed from the joints.

The relation of the gonococcus to cardiac complications is, however, of even greater interest both to the clinician and the bacteriologist. Ever since the middle of the present century the sequence of heart lesions upon attacks of gonorrhœa has been duly recognized; these lesions may appear either directly upon the urethral infection within a very few days, or else some arthritic complication may intervene. This latter course is the more usual.

Sometimes, however, the gonorrhœa appears to be ushered in or rapidly followed by signs of a general infection, and sepsis with malignant endocarditis may ensue, as recorded in a fatal case observed by Martin, of Vevey.

Occasionally, too, cases are placed on record where an intimate relation appeared to exist between chorea and specific urethritis, with or without cardiac complications—hence the terms employed by Litten, viz., chorea postgonorrhœica; endocarditis et chorea gonorrhœica—terms which, however suggestive, are utterly unaccompanied by a scientific basis for the nomenclature. While then abundant clinical records are not wanting to show that the most varied tissues and organs may become secondarily diseased as a result of gonorrhœa, the pathological investigations have been far from satisfying the necessary requirements to prove so intimate a connection between the gonococcus and other complications. Improved methods in bacteriology, however, have recently come to our aid in regard to this subject as well as to many others, and the association of some forms of arthritis and endocarditis, etc., with the germ of gonorrhœa has been established beyond a doubt. Only a few months ago Thayer and Blumer definitely proved that a malignant endocarditis and general septicæmia could be induced solely by gonococci—and the germs were found not only at the autopsy, but were likewise cultivated from the blood during life. Their case concerned a young married woman who died after an illness of three or four weeks with symptoms of

some general infection, viz., high fever and chills, rapid pulse and respirations, cyanosis, etc. There were splenic enlargement, pre-systolic and systolic mitral murmurs at the heart, and some albuminuria. Among the post-mortem conditions found were recent vegetations on the mitral and aortic valves, with loss of substance, infarcts in the spleen and lungs—some nephritis and general vascular engorgement. The gonococci were present in the blood and amid the valvular vegetations as demonstrated on cultures and cover glass preparations.

Much confusion over the diagnosis of gonorrhoeal infection has necessarily arisen from several factors. Firstly, the supposed occasional presence of the gonococci normally in the genital tract. Secondly, the difficulty in obtaining some absolute and authoritative standard for the differentiation of the germ. Until very recently most observers following the lines laid down by Leyden, Deutschman and others regarded the following features as sufficient for a diagnosis of the gonococci :

1st. The presence of a biscuit (semmel) shaped diplococcus with its apposed surfaces flattened ; absence of any grape-like clusters.

2nd. The frequent presence of the cocci within the pus cells.

3rd. The staining reaction, viz., decolorization by Gram's method.

4th. Rapid decolorization by alcohol.

5th. Negative results when grown on ordinary media, such as agar, broth, gelatine and potato.

In view of recent work, however, these alone cannot be regarded as sufficient to establish an absolute diagnosis of the gonococcus, and a 6th postulate must be added, viz., the presence of a positive growth of minute white colonies surrounded by smaller daughter colonies when grown upon human blood serum added to ordinary agar, and this end may be accomplished in various ways. Thayer and Blumer in making their cultures from the circulating blood, sucked up by means of sterilized pipettes a large amount of fluid, adding to the agar about one-third of its quantity of blood, and the successful results amply justified the procedure. In obtaining the fluid from inflamed joints of gonorrhoeal origin, the method employed by H. S. Shaw, working under the direction of Dr. Adami, is commendable and satisfactory. In a case recorded by him, the synovial fluid was drawn off in sterilized glass pipettes and added to glycerine agar, and the colonies of gonococci, though remaining almost invisible as a growth, were readily seen in cover glass preparations made from the surface of the tube after several days had expired.

But this is not the only medium upon which the germs will grow.

Some bacteriologists recognize the fickleness of bacteria, and in endeavouring to provide a suitable medium of growth, seek for anything that savours of the curious and outlandish—and so in the case of gonococci, one authority, evidently an epicure, recommends filtered extract of foetal pigs—upon which the germs are said to grow luxuriously. It is certainly difficult at times to account for predilections.

Whether or not we can ascribe any special characteristic features to the appearance of the growths on these various media does not seem to have been satisfactorily answered. There are some, however, who insist emphatically on the importance of cultural peculiarities, and among such are to be reckoned Dauber and Borst who had occasion to observe thoroughly a malignant endocarditis and general septicæmia following upon gonorrhœa. On making a bacteriological examination of the blood and the spleen pulp, they discovered a diplococcus which was morphologically identical with the gonococcus, and which had the same staining reactions. Their germ further did not grow on ordinary culture media, though it afforded abundant colonies on human blood serum agar. These colonies, however, presented an appearance so entirely at variance with that of ordinary gonococci that the authors concluded they were dealing with an entirely different micro-organism. Regarding these observations as satisfactory, we would conclude that a malignant endocarditis may arise during the attack of gonorrhœa, and be induced by a germ so similar to the gonococcus that only certain very indefinite cultural peculiarities would differentiate them. Such a conclusion, too, would practically render valueless all previous observations of a similar kind where no bacteriological investigations had been made. On the other hand, it is to be regretted that the authors did not obtain gonococci from the local discharge in the same case, grow them on identical media, and by thus instituting tangible comparisons, prove that the gonococci and the germs found in the blood were two different species of micro-organisms. Where so little has been done on this subject, and where consequently our knowledge is as yet not so exact as with many other bacteria one should hesitate before positively asserting that gonococci, under slightly altered conditions, could not offer varied appearances, even on identically prepared media. It should, however, be added that not a few cases have been recorded where although pure growths of gonococci have been obtained in metastatic abscesses, that in other tissues and organs of the same case, ordinary pyogenic bacteria, etc., may be found,—manifesting the presence of either a mixed or secondary infection—similar to those observed in diphtheria, typhoid fever, tuberculosis, etc.

From the work then that has hitherto been accomplished regarding the nature of complications of gonorrhœa, it has been established beyond doubt that gonococci may enter the blood stream and set up suppurative processes in different parts of the body, a malignant endocarditis, general sepsis and death. Further, that many complications are to be regarded either as secondary infection or as the result of the action of gonococci mixed with other bacteria. The proof that a toxine is developed and is capable of lighting up similar conditions, though not to be excluded, lacks at present a substantial foundation.

C. F. Martin.

Canadian Medical Literature.

[The editors will be glad to receive any reprints, monographs, etc., by Canadian writers, on medical or allied subjects (including Canadian work published in other countries) for notice in this department of the JOURNAL.]

PERIODICALS.

DECEMBER, 1895.

CANADIAN MEDICAL REVIEW.

A few points in the treatment of severe railroad injuries—R. W. Garrett, Kingston, p. 197.

THE CANADIAN MEDICAL RECORD.

Artificial lighting of public buildings and private houses, and its effects upon the human eye—Casey A. Wood, Chicago, p. 107.

Tumours of the orbit—J. W. Stirling, Montreal, p. 117.

THE MARITIME MEDICAL NEWS.

Report of a case of osteomalacia—Foster McFarlane, St. John, N. B., p. 249.

Cases in practice—G. E. Coulthard, p. 252.

Some proposed changes in the militia medical service—Wm. Tobin, Halifax, p. 255.

POPULAR SCIENCE MONTHLY.

The anatomy of speed skating—R. Tait McKenzie, Montreal, p. 180.

JANUARY, 1896.

THE CANADA LANCET.

Some limitations to curative work in state hospitals for the insane. A criticism of present methods, and a plea for a better system of treatment of the acute curable insane—Chas. B. Mayberry, Danville, Pa., p. 141.

Traumatic Septicæmia—J. C. Mitchell, Enniskillen, Ont., p. 148.

JOURNAL OF CUTANEOUS AND GENITO-URINARY DISEASES.

A remarkable case of purpuric eruption ending in gangrene, apparently caused by sodium salicylate—F. J. Shepherd, Montreal, p. 16.

L'UNION MÉDICALE DU CANADA.

Des causes et de la curabilité du cancer—Charles Verge, Quebec, p. 1.

Conseils pratiques donnés aux élèves en octobre dernier—A. T. Brosseau, Montreal, p. 12.

Anomalie de l'artère pharyngienne ascendante—A. A. Foucher, Montreal, p. 17.

A propos de quelques observations de cures radicales de hernies—O. F. Mercier, Montreal, p. 20.

REPORTS, ETC.

Report of the Board of Health of the Province of Quebec, 1895.

Medical Register of the College of Physicians and Surgeons of the Province of Quebec.

The Anatomy of Speed Skating—R. Tait McKenzie.

This very interesting article deals with that special form of athletics known as speed skating. Anthropometric charts and photographs of the most noted skaters are given, which show the special muscular development produced by this form of exercise. We find that these

men have strong backs and broad necks, due to their attitude while at work. The arms, which are kept idly folded on the back, are small and weak, as well as are the chest muscles. The abdominal muscles get some work from the constant swaying, but the characteristic features are the powerful, vigorous gluteal and extensor muscles, with sinewy hamstrings, but undersized calves. Thus speed skating is not a good exercise to develop a well-built, symmetrical man, but when indulged in, should be in conjunction with other forms of athletics which bring into action the muscles of the arm, calf, shoulders and chest.

A Remarkable Case of Purpuric Eruption Ending in Gangrene, Apparently Caused by Sodium Salicylate--F. J. Shepherd.

This case was exhibited before the American Dermatological Association and the Montreal Medico-Chirurgical Society, a report of which has appeared in the proceedings of the latter Society, published in the September number of this JOURNAL, p. 226.

Report of the Board of Health of the Province of Quebec, 1895.

This Report, which has just been issued, shows that a great and good work has been done by the Board of Health towards teaching and enforcing the principles of Preventive Medicine in this Province. The Secretary's report is not only a report of the progress of the work done, but is a valuable *resumé* of the requirements of hygiene, which should be in the hands, not only of every physician, but of every householder. It embraces discussions on legislation and regulations, including the Public Health Act, amended to date; local boards of health; contagious diseases; Ste. Foye vaccine institution; St. Lawrence quarantine; water supply to towns, municipalities and dwellings; sewers, drainage of dwelling houses and in rural municipalities; ventilation; teaching of hygiene in educational establishments; cemeteries and vital statistics. The first step of the Central Board, when formed, was to establish local boards of health. The progress was at first very slow, but the small-pox epidemic of 1891 was an excellent opportunity for completing organizations in each locality, and to-day out of 876 municipalities in the Province, 839 have their local boards as required by law.

The manner in which the Board has prepared for, and combatted infectious diseases, reflects the highest credit upon the management. The epidemic of smallpox, which broke out in 1891, in various localities scattered throughout the province, was so completely and so effectually checked, that there were but 151 cases, of which only 32 were fatal. Again, in 1892, when the Province was threatened with an invasion of cholera, the Grosse Isle Quarantine Station was found

to be in such an unsatisfactory condition that it could not afford proper protection. The Central Board obtained from the Provincial Government most extensive powers, by which they forbade the landing of emigrants in the Province, and the communication with the shore of ships coming from infected ports. The position taken by the board was declared *ultra vires* by the Federal authorities. Nevertheless the Board held firm and faced all objections raised by the large transport companies and enforced the regulations, in some instances by the aid of the police. The result of this action was that the Quarantine Station was re-modelled and transformed into a modern one.

That the people may learn the nature and cause of tuberculosis, a circular entitled "Consumption; what is at present known of it and the means of preventing its contagion," has been published and distributed throughout the Province. Such advice is, indeed, timely, for we read that 4,960 deaths occurred from tuberculosis in the eighteen months ending January 1st, 1895.

The chapter on vital statistics is very full, but is by no means complete, owing to the great difficulty of obtaining the required data, the only source of the information being the church registers and cemetery reports. For the year 1894 the birth rate was 37.42 per 1,000 and the death rate 22.74. A fact of great importance established by these statistics, is the high death rate among children under five years, especially due to diarrhœal diseases. A table given of 35 counties, in which the population is almost exclusively French, shows that the death rate is very high, which is explained to a certain extent by the fact that the birth rate is much higher than among the other races. But in spite of this high death rate, the natural increase of the population of these counties was during the year 2.03 per cent., an increase which is greater than that of England, which is only 1.5 per cent.

The report is interesting and valuable reading, and should stir up physicians, clergymen and others to render every assistance in their power to the men who have done and are doing so much to improve the health of our people.

Medical Register of the College of Physicians and Surgeons of the Province of Quebec.

This is the first register that has appeared, and is regarded only as a first proof. The Registrar, Dr. Beausoleil, requests all those interested to make and send to him the necessary corrections without delay. It is altogether in French.

Kenneth Cameron.

Reviews and Notices of Books.

The Principles and Practice of Medicine. By WILLIAM OSLER, M.D. New York: D. Appleton & Co. Second edition. 1895.

The appearance of the second edition of this now classical text-book has called forth renewed expressions of the approval which followed its first publication. There is probably no medical work in the English language more widely and constantly consulted, and certainly none to which the physician and student may refer to with more confidence. It must indeed be gratifying to the author to know that his work has been adopted as the standard text-book in the principal medical schools of America and Great Britain, and it is no exaggeration to assume that its translation would meet with an equal appreciation in the medical centres of Europe.

The general plan and arrangement remain unchanged, and the volume still bears the personal *cachet* which characterizes all Dr. Osler's work—wide reading, judicious criticism and very large personal experience; the whole cemented together with a conciseness and directness that leave nothing to be desired.

The principal additions include the recent advances in our knowledge of the parasitology of malaria, of the treatment of diphtheria and tetanus, of the ætiology and treatment of the thyroid group of diseases and of Addison's disease, and of the fundamental structure of the nervous system. The last mentioned section has been enriched by the addition of numerous coloured diagrams. Among other important additions may be mentioned a chapter on affections of the mesentery, particularly cysts, the importance of which in the diagnosis of obscure abdominal tumours should not be overlooked. The same may be said of anomalies in form and position of the liver, which are briefly but clearly described. The chapters on septicæmia, pyæmia and appendicitis have been rewritten and extended. The latter is most satisfactory and voices the opinion of the most advanced physicians on the question of operation in this disease. The use of salines is unhesitatingly condemned, and moderation in the use of opiates advised. While adhering to the opinion that appendicitis is in the majority of cases a surgical affection requiring operative interference, the author rightly remarks in the section on diagnosis that "there is a well-marked appendicular hypochondriasis," and that "the question really had its ludicrous side," in view of the hasty and needless operations not infrequently performed under a mistaken diagnosis.

Minor additions and corrections have been made throughout the work, and here and there matter has been omitted.

The article on typhoid fever has been considerably extended. The author does not approve of the so-called eliminative and antiseptic treatment, and gives excellent reasons for his opinion—the bacilli do not multiply in the intestinal contents; checking bacterial activity interferes with the normal processes in the bowel; and, he adds as a rider, “no one has been foolish enough yet to claim that so-called intestinal antiseptics can kill the pathogenic and spare the useful organisms.”

The more recent theories on the aetiology of gout are stated, often in the words of their respective advocates, but no preference is expressed for any one of them.

To the morbid anatomy of broncho-pneumonia has been added a list of the micro-organisms most commonly found in association with the lesions.

There are few important changes in the section on diseases of the circulatory system. The “intermittent claudication” theory of angina pectoris is mentioned, and (as noted in the preface) associated with the name of Allan Burns, its original expounder. In the section on mitral stenosis the plausible explanation of Fenwick and Overend for the alteration of the first sound of the heart is noted.

The group of blood diseases has been rearranged and new investigations recorded.

In the section on diseases of the nervous system, besides the changes above mentioned, the chapters on the topical diagnosis of diseases of the spinal cord and of the brain have been with manifest advantage placed first in their respective sub-sections.

The revision of the work has been so thorough that there is little room for criticism.

The omission of the methods of clinical examination of the stomach is justified by the statement that “they more correctly belong to, and are more fully given in, manuals of diagnosis.” The same reason, however, might be urged for the omission of the tests for sugar and albumen in the urine, and of the technique of the examination for tubercle bacilli in sputum, all of which are retained in the new edition. The method described for detecting tubercle bacilli is that of Weigert-Ehrlich, which has now been almost entirely superseded in clinical work, and even in pathological laboratories, by the Ziehl-Neelsen carbol-fuchsin solution, followed by decolourization and counterstaining with Gabbet's blue. The necessity of fixation of the material on the cover-glass by passing it through the flame is not mentioned. Recurrence in typhoid fever is not alluded to.

While writing on the treatment of small-pox, mention might have been made of Finsen's method of “red light,” which appears to have some effect in preventing pitting, and has moreover an historical interest.

In view of the recent work of Kruse and Pasquale, the statement that Kartulis succeeded in cultivating amœbæ from dysenteric stools should be omitted.

The author retains Murchison's classification of jaundice; a short

notice of the recent work of Vaughan Harley, Stadelmann and Hunter would not have been out of place.

There are very few typographical errors; a few proper names are misspelled, *e. g.* Telamon for Talamon, Berkeley for Berkley, and Grissolle for Grisolle.

A special feature of Dr. Osler's book is the large number of valuable references to medical literature. In most instances the name only of the author or investigator is given. It would be a great boon to the reader, and would certainly enhance the value of these references, were a complete bibliographical index appended to a future edition. H. A. L.

A Manual of Syphilis and the Venereal Diseases. By JAMES NEVINS HYDE, A.M., M.D., Professor of Skin and Venereal Diseases, Rush Medical College, Chicago, etc., and FRANK H. MONTGOMERY, M.D., Lecturer on Dermatology and Genito-Urinary Diseases, Rush Medical College, etc. With forty-four illustrations in the text and eight full-page plates in colours and tints. Philadelphia: W. B. Saunders, 425 Walnut street. 1895.

The aim of this manual is to present to the student and practitioner, in a compendious form, all the practical facts connected with the etiology, diagnosis and treatment of these diseases. The work will be of value because of its convenient form and as being thoroughly up to date in all the subjects treated. Here and there, however, sentences may be observed which are rather obscure in meaning and show signs of hasty construction. The illustrations are well selected and the letter-press is good.

K. C.

Society Proceedings.

MONTREAL MEDICO-CHIRURGICAL SOCIETY.

Stated Meeting, December 13th, 1895.

A. D. BLACKADER, M.D., PRESIDENT, IN THE CHAIR.

Dr. R. de L. Harwood, of St. Lambert, was elected an ordinary member.

Discussion on Cancer.

Dr. J. G. ADAMI introduced the general pathology of the subject.
(See page 581.)

Dr. C. F. MARTIN spoke on the present state of the parasitic theory.
(See page 594.)

Dr. F. J. SHEPHERD took up cancer of the face, mouth and throat.
(See page 602.)

Dr. G. E. ARMSTRONG, of the remainder of the digestive tract
(See page 607.)

Dr. JAS. BELL, of the breast and genito-urinary organs. (See
page 614.)

THE

Montreal Medical Journal.

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No. 8.

MCGILL UNIVERSITY DINNER.

The University dinner of the session of 1895-96 will be long remembered by those who were fortunate enough to take part in it as one of the most successful university functions of recent years. Upwards of 500 ladies and gentlemen were present in the great dining-room of the Windsor, and all apparently keenly enjoyed themselves. The Chancellor, the Hon Sir Donald A. Smith, presided. There were present their Excellencies the Earl and Countess of Aberdeen; Principal Peterson, of McGill University, and Mrs. Peterson; President Eliot, of Harvard University, and Mrs. Eliot; President Loudon, of the University of Toronto; Hon. Mr. Ross, the Minister of Education of Ontario; Principal Adams, of Bishop's College; many of the governors and members of corporation of McGill; the professors and lecturers of the various faculties, as well as a goodly array of students.

The speeches were numerous, able and appropriate to the occasion. His Excellency, the Chancellor, and Principal Peterson, as University officials, were all very happy in their remarks. The toast of "Our Queen," proposed by the Chancellor, was received with unbounded applause, as was also that of "The Governor-General." His Excellency in his response was as usual happy in his remarks. "Sister Universities," proposed by Principal Peterson, of McGill University, was responded to by President Eliot, of Harvard University, and President Loudon, of Toronto. Dr. Eliot was listened to with rapt attention by the great assembly. He dwelt on the opportunities afforded to rich and beneficent people by universities in enabling them for all time to perpetuate their names for good work. His remarks on the savagery of going to war to settle trifling disputes were loudly cheered.

The Hon. Mr. Ross, of Toronto, who is well known as a clear and forcible speaker, proposed the toast of "McGill University, her Prin-

cipal and Graduates." This was responded to by Principal Peterson and Dr. Craik, the Dean of the Medical Faculty. "The Undergraduates of McGill," proposed by D. MacMaster, D.C.L., was responded to by representatives of each of the five faculties, all of whom acquitted themselves with credit. Many of the grave seniors present were astonished at the great display of oratorical ability shown by the coming men.

The proceedings of the evening were enlivened by the University Glee Club singing a number of college songs.

THE NEW PHOTOGRAPHY.

The reports in the daily press concerning a wonderful advance in photography are certainly startling. Prof. Roentgen, of Würzburg, is the discoverer. Prof. Schuster gives in the *British Medical Journal* for January 18th the fullest explanation yet received. He has received some photographs from Prof. Roentgen which fully bear out all that is claimed by the discoverer, and there can be no doubt that a most wonderful and important discovery has been made.

It has long been known that highly-electrified particles which are projected from the negative pole of a vacuum tube produce a strong luminosity (phosphorescence) when they strike against the glass walls of a tube. Prof. Roentgen's discovery is that, in addition to this phosphorescence, another radiation is produced which is capable of penetrating through all bodies, though not to the same extent—aluminum is more transparent to this radiation than Iceland spar. The radiation passes in straight lines easily through paper, cardboard or wood, and produces photographic effects after having passed through two complete packs of cards. This new radiation passes in straight lines and cannot be refracted or reflected. Lenses will not focus the rays. The photographs are therefore said to be of the nature of shadows. Scientists are at work in many English and European centres testing this discovery, and observations of the greatest practical value are said to have been made. In medicine and surgery it opens the way to an exactness of diagnosis that may prove of the greatest usefulness.

Prof. Cox, of McGill University, has already photographed a hand in a manner that brings out clearly the outlines of the bones of which it is formed, and we hope in our next issue to be able to give our readers some photographs of medical and surgical conditions that will illustrate the scope and utility of this new discovery.

MCGILL MEDICAL LIBRARY.

PERIODICALS REQUIRED TO COMPLETE SETS.

The Library Committee will be grateful for any of the following periodicals, which should be addressed to the Library, Medical Faculty, McGill University :

- American Journal of Obstetrics, The—Vol. I., 7.
- American Practitioner and News—Vols, XVII., Nos. Dec. to June; XVIII., Jan. to July.
- Anatomie und Physiologie, Hyman und Schwalbe—All before Bd. 13, 1886.
- Annals of Surgery—Vols. V., Nos. 1, 2, 3, 4, 6; VI., 4, 5; VII., 1, 2; VIII., 1, 2, 3, 5, 6; IX., 1, 2, 4, 5, 6; X., 1, 3, 4, 5, 6; XII., 1, 2, 3, 4, 5; XIII., 1, 6; XIV., 1-6; XV., 1-6; XVI., 1-6.
- Archiv für experimentelle Pathologie und Pharmakologie—All before 1881; Bds. XIII., Heft. 2; XVII., 5; XVIII., 1-6; XIX., 1, 6; XX., 1-6.
- Archiv für Klinische Chirurgie—All before 1876 and after 1877 to 1884; Band XXXIII., Heft 3; XLV., 2, 3, 4.
- Archiv für Mikroskopische Anatomie—All before 1886.
- Archiv für Pathologische Anatomie und Physiologie und für Klinische Medicin, von R. Virchow—All before 1881; Bd. LXXXVII., Heft 2; LXXXIX., 2, 3; CII., 3; CVIII., 1.
- Archives of Surgery—All before 1890.
- Berliner Klinische Wochenschrift—All before 1880; Vol. LXXXVIII., Nos. 1-40.
- Brain—Vol. IX. and from Vol. XI.
- British Journal of Dermatology—All before 1891: Vol. VI., No. 5.
- Canada Lancet, The—Vols. I., II.; XXIII., Jan., Feb., July; XXIV., Oct.; XXVI., Sept., Oct., Nov., Dec.; XXVII., Oct., Jan., March, June.
- Canada Medical Record—Vols. II., Nos. 4 and index; XIII. to XVIII., want index; XIX., 6, 7; XX., 1, 2; XXI., 2 to 12; XXII., 1, 2, 3, 4, 5, 7, 8, 9, 10, 11.
- Centralblatt für Bakteriologie und Parasitenkunde—Bd. XIV., No. 15: X., 9; XI., 25.
- Centralblatt für Chirurgie—All before 1886.
- Climatologist, The—Vols. I., Nos. 1 5; II., 5, and all after.
- College of Physicians, Transactions of the—All before 1879.
- Congress of American Physicians and Surgeons, Transactions of the—All before 1891.
- Deutsches Archiv für klinische Medicin—Vol. LIV.
- Deutsche medicinische Wochenschrift—All before 1886; Vols. 1891-93.
- Dominion Medical Monthly—1893, No. 6; 1894, No. 6.
- Edinburgh Medical Journal, The—Vol. XVI.; Dec., 1894; April, 1895; June, 1895.
- Gazette Medicale de Montréal, La—Vol. I.
- Gynaecological Journal—All after 1872.
- Gynaecological Transactions—Vols. III. and all after 1881.
- Hospitals—
 - Guy's Hospital Reports—Series III., Vols. 16, 25.
 - St. Bartholomew's Hospital Reports—Vols. 27, 28.
 - Royal London Ophthalmic Hospital Reports—Vols. V., Part III.; X., Part II.; XI., Part III.; XII., Part III.; XIII., Index.
- Jahresbericht über die Fortschritte der Anatomie und Physiologie—Bd. 12.
- Jahresbericht über die Leistungen und Fortschritte in der Gesamten Medicin—All before 1882; Band II., Abth. III.
- Journal de l'Anatomie et de la Physiologie—All before 1886.
- Journal of American Medical Association—Vols. II., Feb. 2-16, May 24; III., July 26, Sept. 20, Oct. 11-18-25, Nov. 1; IV., Jan. 10, 24, April 25; V., July 18, Sept. 12-19, Oct. 3, Nov. 28, Dec. 19; VIII., Jan. 1, March 19, April 9-16-23-30, May 7-21, June entire; IX., July 9-16-23, Aug. 6-13-20, Sept. 10, Oct. 8, Nov. entire, Dec. 3-

10, 17; XI., July 21, Sept. 8, Oct. 6, Nov. 24; XII., Jan. 12, Feb. 16-23, April 27, May 4, June 8; XIII., Aug. 10, 24, 31, Sept. 7, Oct. 26, Nov. 9, Dec. 7-14; XIV., Jan. entire, Feb. 1-22, March 8-15-22, April 19-26, May 24-31, June entire.

Journal of Cutaneous and Genito-Urinary Diseases—Vols. II., III.; IV., Nos. 1, 4 to 12; VI., 5, 8, 9; VII.

Journal of Cutaneous and Venereal Diseases—Vols. I., Nos. 3, 4, 8, 10, 11, 12; II., 1, 2; IV., 1, 2, 3, 10, 11.

Medical News, The—All before 1882.

Medical Record, The—All before 1875.

Montreal Medical Gazette—Vol. 1.

New York Medical Journal, The—All before 1883; 1885, Nos. 1, 2; 1886, 1, 2; 1887, 1, 2; 1888, 1, 2.

Ontario Medical Journal, The—Vols. I; II., Nos. 1, 6; III.

Ophthalmological Society of the United Kingdom, Transactions of the—Vols. I, II., III.

Pathological Society of London, Transactions of the—Vols. I, II., III., XX.

Pharmaceutical Journal and Transactions—Second series, Nos. 4, 5, and all after 1886.

Practitioner, The (London)—Vol. XXIX.

Revue de Chirurgie—All before 1886.

Revue de Médecine—Tomes III., No. 2; IV., 1; V., 2, 3.

Revue des Sciences Médicales—Tomes I., VI., X., XXVI.

Royal Academy of Medicine in Ireland, Transactions of the—Vols. I, II., and all after 1888.

Sanitarian, The—Vols. XXXI., Sept.; XXXII., March, June, July, Oct., Nov., Dec.

Schmidt's Jahrbücher—All before 1884.

Société de Biologie—Tomes 2, 3, 4, and all after Tome 5.

Therapeutic Gazette, The—All before 1881; Vols. XIV., Nos. 5, 11, 12; XVII., 1, 2, 3, 4, 8, 12; XVIII.

Union Médicale, L'—Vols. VII., Nos. 2, 8; VIII., 12.

Year-Book of Pharmacy—All before 1870 and after 1880.

Zietschrift für Klinische Medicin—Band IV., 3, 5, 6; VIII., 4; IX., 10, 11, 12; XIII., 1, 6; XIV., 4, 5, 6.

Dr. R. W. Garret has been appointed to the position of Professor of Midwifery and Diseases of Women, rendered vacant by the death of Dr. Fenwick.

Dr. W. G. Anglin, of Kingston, has been appointed Professor of Clinical Surgery in the Medical Faculty of Queen's University, and has also been given the position of Senior Surgeon to the Kingston General Hospital.

Obituary.

KENNETH N. FENWICK.

The sudden death of Dr. Kenneth N. Fenwick, of Kingston, removes from Kingston one of its most gifted and enterprising citizens and from our profession a man of great promise, a man who had already made a name for himself, not only in his native city, but throughout our Dominion. The circumstances leading to his death are such that should make physicians and surgeons think very seriously, and the lesson taught should be learned by all.

On the 23rd ult. Dr. Fenwick performed three abdominal operations, one of them being a complete hysterectomy. The following day he operated on a case of septic peritonitis, and in doing so became infected in the left thumb, through a fissure caused the day before by tightening a ligature. At 2 a.m. on the 26th ult., he had a severe chill, followed by a temperature of 102° F. However, he made light of this, as physicians are apt to do, and insisted upon going about his duties on the 26th and 27th. On the 28th his temperature was 104° F., pulse 140, and his left hand and arm swollen and painful. In spite of all that his *confrères* could do the arm became rapidly gangrenous and he died that evening. He died heroically and without a murmur.

Dr. Fenwick was born in 1852. He took his B.A. degree in Queen's in 1871 and graduated in medicine in 1875. After spending some time in England and on the Continent studying his profession he settled in Kingston. There he rapidly rose to a high position socially and professionally. He took a great interest in the Kingston General Hospital, was instrumental in pushing forward the Doran wing of that hospital, and gave the hospital an operating theatre, known as the Fenwick Operating Theatre, one of the most complete and best equipped operating theatres in Canada. His loss is deeply felt by the college, by the hospital and by the citizens of Kingston.