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THE SASKATCHEWAN MEDICAL JOURNAL

VOL. I. APRIL, 1909 No. 2

Original Memoirs

MEDICAL PROTOZOOLOGY*

BY JOHN L. TODD, B.A., M.D. (McGill); D. Sc. M.R.C.S., ENG.
Associate Professor of Parasitology, McGill University, Montreal

Mr. President and Gentlemen:—

Physicians are now-a-days quite accustomed to think of disease as the expression of the infection of a living being by a parasite. The more common pathogenic parasites belong to the vegetable kingdom; they may be bacteria or, more rarely, fungi of various sorts. We are less accustomed to regard animal parasites as causes of disease, although they do cause destructive ones. All animal beings may be divided into two classes; unicellular organisms called Protozoa and multicellular ones or Metazoa. Of these two groups the Protozoa are much the more important and the object of this paper is to discuss them and their importance to us as medical practitioners.

Protozoology as applied to medicine, is comparatively speaking, a new subject and I do not doubt that you are asking yourselves why it has been chosen for the subject of this address.

*This address was delivered at Regina on July 22nd, 1908, before the Saskatchewan Medical Association.

About thirteen years ago, a Professor of Bacteriology was appointed at McGill University; the importance of bacteriology to medicine was just commencing to make itself felt in earnest. For the first year or two the course was voluntary. At the present moment, the most casual of us would consider it quite impossible for us to practice medicine without at least a nodding acquaintance with the bacteria; yet the objections of the students when bacteriology was made compulsory at McGill were most energetic! Their protests were subscribed to by many practitioners and they formed a large part of the valedictory address of a certain year! Protozoology at the present day stands in much the same position as did bacteriology then.

As is only natural in a field where important advances are being made almost daily, the subject is at present in a very unformed state. In this address, we shall confine ourselves to definitely proved facts and we shall consider almost wholly that knowledge which has suggested practical methods of prophylaxis or treatment of diseases caused by protozoa.

Protozoology in medicine so far has met its greatest application in the study of those diseases which occur especially in warm climates. Through successes there, interest is being turned more and more towards the study of its connection with diseases of countries situated in temperate zones; protozoa have already been found in some of these and probably will be found in others.

In order to fix your interest at once, let us enumerate those diseases which are definitely known to be caused by protozoa. Besides the parasites causing the diseases which we shall mention, there are many other protozoa, parasitic in men and animals, which ordinarily do no harm to their hosts. The diseases produced in man by parasitic protozoa are: Malaria, Trypanosomasis—that is, "Sleeping Sickness"—, Relapsing Fever, Kala-azar, Amoebic dysentery, and Abscess of the Liver, Syphilis, and, in Panama, a disease simulating Tuberculosis, caused by the Histoplasma capsulata. The following are human diseases in which objects believed to be protozoa have been seen, or which we believe from other evidence to be

probably caused by protoazoa: Yellow Fever, Small Pox, Chicken Pox, Measles, Scarlet Fever, Yaws, Dengue, Hydrophobia, the very fatal Spotted Fever of Montana, and—perhaps, Ulcerating Granuloma of the Pudenda.

Some persons, in addition, have described objects which they wish to call protozoa in various tumors; for example, in *Carcinoma, Sarcoma, and Molloscum Contagiosum;* the interpretation which they attach to their observations is extremely questionable. Medical protozoology has, then, as an object of study, the parasites causing an extremely important group of human diseases. Parasites similar to these and protozoa of still other species cause fatal and devastating diseases amongst animals and plants.

It was Pasteur who made the modern generations of physicians appreciate this fact. To cure disease one should know as much as possible concerning the disease-producing agent in order that its vulnerable point may be detected and a successful method of treatment, or prevention, devised. One of the earliest and most important of his studies led to his victory over a disease of enormous economic importance which is caused by a protozoon (*Nosema bombycis,* a *Myxosporidium*). An enormous proportion of those living in the south of France were dependent upon the silk industry. The silkworms had become infected with a very fatal disease which was transmitted from parents to offspring through the ova. Silk production became impossible; famine, misery and ruin held the country. Pasteur came, found the cause, advised a ridiculously simple means of prevention—see with a microscope which eggs are infected and destroy them—and thus he made the south of France once more prosperous.

It is the protozoon-caused diseases of animals and man, such as trypanosomiasis and malaria, which have prevented the colonization of Africa and other tropical countries by Europeans. They also made it impossible for the French to pierce the Panama Canal. With increased knowledge, malaria and yellow fever have become absolutely controllable diseases, and trypanosomiasis is no longer an invariably fatal affection! Through the application of appropriate measures, the death rate among those working

on the Panama Canal in tropical America is actually less than is that of New York City!

Previous to the last ten years the pathogenic protozoa had been little studied in the Tropics. So the first workers in that field obtained enormously important results with relatively little work. Although their efforts met with great rewards our knowledge of the pathogenic protozoa has been increased by workers in our own climate through advances just as important as those made in the Tropics. No more spectacular discovery was ever made in the investigation of disease and none was ever more pregnant with promise of benefit to mankind than was Schaudinn's when he found that syphilis was due to a protozoon.

The intention of this address is not so much to give a list of things which have been done and which are known, but rather to indicate the way in which recent advances in protozoology have been made. Its study at present requires but little apparatus. With his brain, his hands, a third-rate microscope, two needles and a matchbox, Ronald Ross worked out his discovery that malaria was transmitted from man to man by the bites of mosquitoes! Although many have traversed the field of pathology, there remain many rewards for those content to observe patiently and learn from watching. Who, for example, five years ago would have believed that syphilis could be caused by a parasite so striking as the *Spirochaeta pallida*, or hydrophobia by parasites as large as *Negri's bodies*? Countless observers had studied both diseases and failed to see these things. Much more remains to be found out about these two diseases alone.

Again, the causation of many of the exanthemata is far from understood. Their elucidation awaits patient, dogged, persevering observation by any one of us.

Let us speak for a moment concerning the protozoa in general. Then, since more is known of the cause and course of malaria than of almost any other disease, we shall speak of it at some length. The knowledge of what actually does occur in malaria often proves of value when considering the nature of obscure processes in less studied protozoan diseases. Since comparatively little of immediately applicable value is known con-

cerning the protozoan diseases of our own climate, little will be said concerning them.

The substance of which protozoa, and all living things, are made is called protoplasm. It is a complicated mixture of albuminous substances of more or less liquidity. It may be conceived as a somewhat viscid fluid and it obeys the same physical laws as do all fluids. By appropriate methods the protoplasm of a cell may be shown to have an alveolar or foam-like structure. It is, in fact, an intricate mixture of two fluids, one viscid and one more labile. In such a mixture, the more viscid fluid forms tiny droplets, each of which is surrounded by a layer of the less coherent one.

As in every other cell, the protoplasm of a protozoon may be divided into two great divisions, the cytoplasm and the nucleus. The cytoplasm, as a whole, may be divided more or less easily into a clearer, denser and more resistant outer layer—the ectoplasm, and a fluid, granular, alveolar internal portion—the endoplasm.

The nucleus in its simple form is a tiny sphere which is distinguished in fresh preparations from the remainder of the cell by being more refractile, and in stained specimens by taking the dye more deeply; it does this because of the presence of a deeply staining substance called chromatin.

Various differentiated structures concerned with the metabolism or locomotion of the parasite may or may not be present.

Movement may be effected through the formation of pseudopodia, through a flowing of the amoeboid protoplasm in one direction, and by the movement of cilia or flagella.

Nutrition may be effected through the ingestion of particles of matter by pseudopodia, as in the amoebae, or, as some of the ciliata, through definite mouth parts. Many protozoa live by absorbing nutrient material directly, through any part of their bodies, from the blood and body fluids of the host in which they live. In those forms which ingest solids, the food particles can often be seen within the parasite, each in a tiny gastric vacuole, where they are digested with the aid of a mineral acid.

Effete materials are ejected in the amoebae by a simple flowing away of the protoplasm; the ciliata void them through a definite anal area.

Other parasites have a contractile vacuole. This is a clear area in the ectoplasm which appears, grows slowing through the draining of water to it, empties itself by rapid contraction and forms again. The water which it ejects contains the soluble waste products formed by the metabolism of the protoplasm. One function of the vacuole is therefore excretion. In some forms it is probably also concerned with respiration. Contractile vacuoles are usually absent from protozoa living as parasites within the tisues of other animals. These protozoa accomplish excretion, like ingestion, through osmosis.

If unfavourable circumstances, such as drying, supervene, many protozoa have the property of surrounding themselves with a resistant cyst wall and of entering upon a resting stage of indefinite length, by means of which they survive the unfavourable conditions. Such "resting stages" play an important part in the life history of many parasitic forms, especially of those which have become so specialized that individual existence outside ot their proper host has become impossible. It is often through these cysts that the parasites are disseminated and such a stage is an absolute essential in the life-history of many protozoa (*e.g. Amoebae, Coccidia*).

Multiplication of the protozoa occurs in many different ways. In only some of them is an antecedent union of male and female forms necessary. The least complex method of reproduction is by simple binary division. A development of this process is "budding," by which a smaller parasite buds off from a large one. Such buds may be formed extremely rapidly one after another and destructive division ensues, in which the original parasite disappears to give life to a swarm of new small ones. When all the divisions take place simultaneously this process is called *"Schizogony"* and the young parasites so produced are *"Merozoites"*; if such destructive division occurs in a parasite after its fertilization, the process is called *"Sporogony"* and the young parasites *"Sporozoites."*

The developmental cycle of a protozoon is the series of processes through which it may pass in the time intervening between each fertilizing act. In many cases it includes an alternation of generations. That is, of states of being of the parasite in which sexual methods of reproduction alternate with a-sexual ones. The developmental cycle is often complicated by binary divisions, which may occur at any point, by cyst formation and by the intervention of a second host, as a necessary factor for the reproduction of a part of the cycle. There is indeed an alternation of generations in many of the parasites which interest us since they possess a sexual cycle which occurs in an insect host and an a-sexual one which is passed in a vertebrate host. As we shall see later, perhaps the best example of such an alternation of generations is the malarial parasite.

As might be expected, the morphology of parasites undergoing so complicated a development varies considerably. Not infrequently has it happened that different stages of development of a single organism have been described as separate parasites. Hence no parasite can be definitely classified until the whole of its life cycle is known.

So far we have spoken of protozoa in general. Let us now consider the diseases produced by individual species; we commence with the malarial parasites.

Since 500 B.C., before Hippocrates' time, malaria has been recognized as a clinical entity. Its close connection with swampy places has long been known and many theories have been proposed to account for this association, but it was not until 1898 that Ross proved that Malaria is an infectious disease and that it is transmitted from man to man by mosquitoes. Since then this fact has been confirmed by workers in many different parts of the world and nothing in medicine is more certain than that a genus of mosquito, the *Anophelinae,* transmits malaria; that, in nature, the disease can only be acquired through this insect; and that the mosquito can only become infected through biting an individual who harbours the parasite.

Some time before these discoveries were made, it was shown that the Filaria which causes Elephantiasis was transmitted by a

mosquito of another sort, a *Culex*. More recently it has been shown that yellow fever is transmitted from an infected to a healthy person by the bites of a third sort of mosquito, a *Stegomyia*. It is by no means improbable that still other diseases may be transmitted by the bites of such insects.

So soon as these facts were known, it became evident that malaria, yellow fever and elephantiasis would cease to exist were all the mosquitoes transmitting them to be destroyed. The idea has been acted upon in many places with magnificent success. The results of the mosquito-killing operations at Ismailia on the Suez Canal, in the Malay States, and at Havana are particularly good. As a representative example of the efficacy of these measures, let us quote the mortalities from yellow fever and malaria at Havana for the six years before and after the enforcement of the mosquito-killing measures.

	Year.	1895	1896	1897	1898	1899	1900
Before	Deaths from Yellow Fever	552	1,385	745	128	122	302
	Deaths from Malaria	206	450	811	1,907	909	325
	Year.	1901	1902	1903	1904	1905	1906
After.....	Deaths from Yellow Fever	5	0	0	0	22	0
	Deaths from Malaria	151	77	51	44	32	26

Although mosquitoes are not known to transmit disease in this country, they are nevertheless often a serious pest. For that reason alone, many Canadian communities might well introduce mosquito-killing civic ordinances.

In order that the development of the malarial parasite may be understood, it is necessary to know something of the structure of the mosquito. The mosquito's body may be roughly divided into three portions, the head, the thorax, and the abdomen. The most conspicuous parts of the head are its two large, lateral groups of multiple eyes, its antennae, the palps and the proboscis. The port of the proboscis which enters the host forms a tube armed at its extremity with piercing instruments. About five-sixths of the circumference of this tube is formed by the omega-shaped upper lip; the hiatus is filled by the hypopharynx. The saliva passes

down through a channel in the hypopharynx. The thorax contains the salivary glands and part of the alimentary canal. Within the abdomen is situated the remainder of the alimentary canal, the malphigian tubules and sexual organs.

When the mosquito commences to suck blood, it first of all makes a strong expiration—probably as the result of inhaling the carbonic acid gas which is exuded from the bodies of animals. The contents of the œsophageal diverticula are thus driven down the tube formed by the mouth parts into the host upon which the mosquito is feeding; at the same time the saliva is probably injected. These two fluids together prevent the blood from coagulating and, in addition, create a local hyperaemia. It is the contents of the diverticula, and not the saliva, which are responsible for the irritation produced by the mosquito's bite. The active cause of the irritation are yeasts of various sorts.

When a mosquito ingests infected blood, all the immature malarial parasites taken up with it perish and are digested; only those survive which are prepared to enter on the sexual cycle occurring normally in the mosquito.

For convenience sake, we shall take as an example the *Aestivo autumnal,* or malignant tertian parasite. As you know the malarial uarasites are intracellular haematozoa; they live within the red cells and feed upon haemoglobin. A fully developed parasite has devoured all the haemoglobin in its host cell, so that only a mere shadow of it remains. Such parasites have assumed an elongated shape which Laveran originally likened to a crescent. In specimens stained by Romanowsky's method, a crescent has a blue cytoplasmic body containing a variable amount of red chromatin and a certain amount of pigment—the pigment is melanin and is the result of the digestion of hamoglobin by the parasite. As they are seen in the circulating blood, the sexes of the crescents can be easily distinguished. The male crescent is the reproductive, the fertilizing cell. It therefore contains a large amount of chromatin loosely distributed in granules, each of which will eventually form a microgamete or spermatozoon. It has comparatively little cytoplasm. Its pigment is scattered and it is somewhat shorter and broader than the female crescent. The

female crescent, or macrogametocyte, will be especially concerned with the nutritive functions of the new individual it is destined to produce; it therefore has more cytoplasm. Its chromatin is compactly placed about the centre of the cell and its amount is small since only one macrogamete or embryo will be formed from the female crescent. Its pigment is also compactly collected towards the centre, and the whole parasite is longer and narrower than is the male. Soon after the crescents are ingested by a mosquito they become, first oval ,then rounded. At about this stage, a careful examination will detect, still attached to each crescent, two small bodies which have been extruded; these are the polar bodies. A little later, the pigment of the male cell is seen to become violently agitated and it dances with most extraordinary energy within the cell. This is due to the movement of the imprisoned microgametes. If a male cell is watched at this stage, a long slender flagellum, a microgamete, is soon seen to erupt. Others follow at quick intervals, until from four to eight fine, rapidly-moving, flagellum-like microgametes have appeared. It is worth recording here as an awful example, that not more than ten years ago text books were published on malaria, in which this all-important stage of the parasite was solemnly labelled a degenerating form! After a short time, the microgametes break loose and swim rapidly through the surrounding blood. One of them reaches a macrogamete and enters it, to form a zygote or copula. The zygote becomes elongated and forms a travelling vermiculus or ookinet. The ookinet makes it way through the epithelial layer of the mid-gut, popularly called stomach, to gain the muscular layer where it rests. Here it may be detected in its earliest stages through the presence of the characteristic malarial pigment, which it retains for some time. It was through the constant presence of this pigment that the nature of these developmental forms was first recognised. Here the parasite grows as an oocyst and reaches a considerable size. After a short period, its cytoplasm is seen to divide into several divisions or sporoblasts. Each of these, a little later, itself divides into numerous tiny hairlike bodies; these are the sporozoites. When the sporozoites are matured, the oocysts burst and the sporozoites

pass to the salivary glands of the mosquito. They are then extruded with the saliva as the mosquito bites. The further development of the parasites goes on in the blood of patients suffering from malaria.

Many of the sporozoites, so soon as they reach the blood, make their way into the red cells; those remaining free in the plasma are engulfed by the leucocytes. Within the red cell the parasite becomes spherical and, in fresh preparations, may be seen as a clear refractile body which possesses amoeboid movement. If it is watched carefully, it may sometimes be seen to divide into two. As might be expected, pigment, resulting from the digestion of haemoglobin, appears within the parasite in a few hours. In stained preparations the parasite, at all its stages, is seen to consist of cystoplasmic and nuclear material. Very early the parasites become divided into two classes, those intended for a-sexual and those for sexual development. As they become larger the chromatin of the parasites destined to multiply a-sexually becomes collected into a varying number of clumps. These masses or clumps are placed about the periphery of the parasite, and from its appearance this stage is sometimes called a "rosette." When it is mature, the rosette bursts and sets free a swarm of young parasites each containing one of the chromatin masses; toxins are probably liberated at the same time since the ague fit immediately follows the bursting of the rosettes. Each small parasite now enters into a red cell, once more to commence the cycle of development. The cells which develop sexually gradually produce the adult "crescents" already described. If these adult sexual forms are not ingested by a mosquito they usually die and are taken up by leucocytes. Some of the female forms, however, retire to the deeper organs. They may remain latent there for many years and it is to their existence that the recrudescences of malarial fever must be ascribed which sometimes occur in an individual many years after he has left a malarial district.

It may seem to you that needless time has been spent in discussing the properties of the protozoa in general and in describing the comparatively well-known cycle of the development of the

malarial parasite. It is not so. Each of the facts mentioned is important both for its own sake, because of its connection with malaria, and because of the light it throws, by analogy, upon obscure appearances in less well studied diseases. For example, let us consider trypanosomiasis.

The fact that trypanosomes may appear after long intervals in the blood of persons supposed to have recovered, either with or without treatment, from a trypanosome infection, suggested that there must be two forms of the parasite—the first, the well-known flagellate organism and the second, a more resistant resting form. A remedy is possessed in atoxyl, which has the property, when an infected animal is first treated by it, of invariably driving all the trypanosomes from its blood. If the treatment is persisted in, the animal is sometimes cured, but more frequently the parasites reappear after some time and they then are no longer susceptible to even the largest doses of atoxyl. They have acquired an immunity to the drug. It was thought that probably some of the trypanosomes, when driven from the blood by the first dose of atoxyl, turned into the resistant forms and it was suggested that success might follow attempts at treatment in which medication was directed particularly against this resistant stage. To test this idea, a series of experiments was initiated in which trypanosome-infected animals were treated first by atoxyl and then by some other drug. Considerable success resulted from these experiments and combined treatment by atoxyl and mercury, or by atoxyl and some other trypanocidal subetance, was learned to be much more efficacious than is treatment by atoxyl alone. Further research has demonstrated that a spherical, resistant form of the trypanosome does exist. Its existence was suspected, for the reasons given above and from the analogy of the reistant female crescents which are responsible for the recrudescences in patients with chronic malaria.

Again, the knowledge that the trypanosome causing the tsetse-fly disease of cattle was transmitted by a fly of that name and that malaria was transmitted by a mosquito, irresistibly suggested that the trypanosome known to cause sleeping sickness might also be transmitted by some biting insect. Research, along

the lines indicated, soon showed that sleeping sickness was indeed transmitted by a species of tsetse-fly and also, though rarely, by mosquitoes.

The analogy of the various diseases produced by parasites and transferred by the bites of insects suggested that a parasite should be looked for in the blood of patients suffering from a disease produced by the bites of an African tick; although its cause has so long remained unknown, a week's work sufficed to show that this disease was due to a spirochaete morphologically indistinguishable from the spirochaete which produces relapsing fever in Europe. Conversely the fact that so many protozoan diseases are transmitted by biting insects suggested that the parasite causing the invariably fatal Kala-azar of India might be transmitted in the same way. Research has shown that it is possibly carried by the bed-bug.

The fact that the regularly recurrent attacks of fever in malaria are due to a definite occurrence in the life history of the parasite producing that disease suggested that a similar process might cause the more or less regularly recurrent attacks of fever in the disease produced by the African Spirochaete. Although the matter is not yet settled it seems possible that this may be so, since a very interesting cycle of development of the spirochaete has been partially worked out. The spirochaete wraps itself into a tangled skein and gradually becomes encysted. Its chromatin fragments into numerous granules and it seems probable that each of these granules, when set free by the rupture of the cyst containing them, develops into a spirochaete.

Let me give one more example of the frequent biological analogies among the pathogenic protozoa. The malarial "crescents" were described as possessing certain characteristics which identified them as male and female. It has been shown that these same qualities characterise the male and female parasites in certain leucocytozoa and, probably, in some trypanosomes. They certainly do characterise the males and females of a giant variety of spirochaete which occurs in oysters.

This huge spirochaete of the oyster has forms which very closely resemble certain types of spirochaetes seen in tick fever,

in syphilis, and in certain foul ulcers. It seems possible that further research may show that sexual processes occur in the parasites causing these diseases similar to those described already in the spirochaete of the oyster.

One of the reasons for making so careful a study of the biology of each of these animal parasites is, the hope that some weak point in its life-history may be discovered, through which it may be successfully attacked and, consequently, by which the disease caused by it may be successfully treated.

We have already related how such a study has led to an advance in the method of treating trypanosomiasis; again, it is well-known that the malarial parasites are most susceptible to the effect of quinine when they are free in the plasma immediately after the rosettes have broken up; consequently, when there is a choice, quinine is to be always given just before the ague fit in order that it may be present in the blood at the most appropriate moment.

Up to the present, protozoology has its greatest application among the diseases with which we are most intimately concerned in Canada, in the diagnosis of syphilis and of hydrophobia. If the *Spirochaeta pallida* can be demonstrated in a suspicious sore, or Negri's bodies in the ganglion cells of the central nervous system of an animal suspected of hydrophobia, the diagnosis is certain and the appropriate treatment may be commenced without hesitation.

When it is realised that practically all of the important facts mentioned in this address have been discovered within the past ten years, it becomes evident that the study of the pathogenic protozoa is of enormous importance, that it is a subject which is undergoing rapid extension, and that its further development must be carefully watched by every medical practitioner who wishes to be abreast of his times.

If prophecy is permissable, it seems possible that the next great advances in protozoology will come through a study of the nature of protozoan immunity. From the little work which has already been done on this subject, it seems possible that the immunity sometimes acquired by animals against protozoa is not

of the same nature as that which exists in some of the bacterial diseases and it seems probable that work in this field will meet with a great reward.

ADVANCES IN THE SURGICAL TREATMENT OF SYPHILIS*

BY ARNOLD SIMMERS, M.D.

SALTCOATS, SASK.

A good many syphilologists discussing the treatment of the primary sore raise grave objections to removal of it, chiefly on the grounds that thereby the patient's satisfaction of diagnosis as to his or her condition will be imperilled. Now as a rule this objection is groundless because, alas! the patient must as a rule have a pretty shrewd idea as to what is what in view of prior conduct. Syphilis, like other infective diseases, as we all know, commences with a primary local lesion, which local lesion is nothing more nor less than a factory for the production of a specific or definite poisons which being absorbed into the general system produces symptoms commensurate with the amount of poison and causes damage to tissue elements sometimes varying with the individual's vital powers of resistance. Therefore it does seem perfectly sensible to assume that if the working of the factory be stopped at an early period the amount of damage done must be to a large extent diminished. To say that the non-appearance of secondary and constitutional signs and symptoms after excision causes a non-conclusive state of affairs as to whether or not the patient ever had syphilis can in no wise be accepted.

J. M., a law student, consulted me in October, 1888, six days after connection, for a urethritis; he was put on the usual routine and appeared to be doing well; four weeks afterwards he again looked me up and informed me that he had a crack on the foreskin and a thing like a string running up the dorsum of the penis. I examined him and found on the superior margin of the prepuce the usual horse collar sore with lymphagitis and hard, shotty buboes in both groins; there were no other symptoms as

* Read before the Saskatchewan Medical Association, July, 1908.

yet and the evening temperature never exceeded the normal. Being only then a student myself I took him along to our family doctor who helped me to circumcise him, thereby removing the whole sore. Next day I handed the prepuce over to our hospital pathologist who kindly examined it and found it to be a typical hard chancre: the circumcision wound healed under the first dressing. This operation was followed up by a strict dietary regime and in addition mercury (HgCl) gr. 1-32 *ter in die* was prescribed and from that day until the present he has never presented another single symptom. There was no secondary rash, no evening headache or malaise and no mucous patches. I had a letter from him only last week in which he said that from that date until date of writing he has never had a single hour's sickness.

At that time in the Edinburgh lock wards all chancres unless on the glans proper were treated by removal with the knife and as a rule were followed by secondary eruption or other symptoms.

Query.—What of Grover's contention that in cases where secondary symptoms are not allowed to develop the patient is sooner or later doomed to tertiary manifestations in central nervous system? So much for the primary stage of syphilis from a purely surgical point of view. The buboes occurring along with it whether in groin, epitrochlear or neck, as we all know, seldom require excision unless the primary sore has developed on the site of a previous soft sore, becomes phagadaenic or otherwise infected with dirt or other suppurative germs. As for the secondary stage cutaneous syphilides seldom require surgical interence unless in broken down debilitated patients who are liable to ecthymatous and rupial forms. But when we come to the bones and joints we sometimes have a different tale to tell here as well as in the tertiary.

Mrs. X.Y.Z. Came as a healthy young lady of 25 years of age to this country to be married in November, 1902. Her husband had come from England where he had haemoptysis in 1887. She became pregnant and was delivered in the eighth month of a putrid foetus. A macular roseola with headache and sore throat had preceded this by six months (so I learned with much difficulty eighteen months after). Anaemia followed a normal puer-

perium and ferruginous tonics combined with arsenic did not benefit this at all. Synovitis of both knees also appeared from no discoverable cause and both knees had to be put into plaster of Paris. Struck by the pasty, muddy appearance of her countenance I put her on $HgCl^2 + KI$ combined with sarsaparilla with the result that the general condition rapidly improved and the synovitis disappeared. She again became pregnant and fourteen months after the first confinement gave birth at term to a live child to all appearances healthy. Three weeks afterwards the child developed snuffles, became very peevish, a copper rash appeared upon the nates and a pemphygineous condition spread over its body. Hydrarg c Creta c Lactopeptine was administered internally and the mother put again on to $HgCl^2 + KI$ (her anaemia having again shown up) when both rapidly improved. This spring synovitis has again occurred with periostitis of both tibia combined with phlebitis of the tibial veins.

Now on the first blush of it this case might be explainable on quite different grounds apart from syphilis, but looking to

(1) Anaemia only benefited by Hg.

(2) The condition of her child.

(3) The synovitis with no septicaemia or arthritic signs.

(4) This solitary haemoptysis of husband. He has in left suprascapular area of left lung a vomica size of walnut perfectly dry and beyond the solitary haemoptysis has shown no other signs of tubercle.

This case I think illustrates secondary syphilis from a surgical standpoint and also introduces us to the inherited or congenital form appearing soon after birth. Now to refer to a case of congenital in an adult.

Mrs. T., aetat 36, was seen by me in January of this year. She had been married for 17 years and was the mother of six children. There was no history of miscarriages or other signs pointing to acquired syphilis and so far as the husband—a very healthy looking specimen—was concerned the past history was absolutely negative. When I saw her she was in bed comatose, a left crossed hemiplegia having occurred. For several weeks previously she had been complaining of severe headaches. The

hemiplegia was typical but the left knee joint was swollen, contained fluid and to the finger tips gave a soft, elastic velvety impression. On examining the skull the left temporo-occipital regions were found studded over with hard eburnated excrescences about the size of a well-formed garden pea. Under mercury and KI with galvanism and massage she gradually regained complete power in her arm and leg but the knee joint remained rather obdurate until for some time retained in plaster of Paris. This I think is a case of undoubted congenital syphilis, as on recovery I was able to obtain a family history of one sister suffering from keratitis with complete blindness of one eye and a younger brother suffering from otorrhoea and Bell's paralysis. Mr. D'Arcy Power in his able paper which appeared in the B.M.J. of 23rd May ,1908, points out the value of X-ray examination in such cases as I have indicated above and I would here remark how regrettable it is that we in the outlying parts of the Province are so cut off from the privileges of such a valuable adjunct to our means of arriving at a clear and satisfactory diagnosis. Perhaps ere long a generous government will be in a position to at least assist each and all of our local hospitals in getting a complete radiographic set of apparatus. He goes on to say that by means of the radiograph we shall be able to understand those cases of leukoplakia occurring in people who have no reason to suspect themselves the subjects of specific infection. In this I do not quite follow him, as witness the following case:

Miss M., aetat 41, consulted me about nine years ago complaining of some painfull cracks on the tongue with scattered patches of glistening and thickened epithelium on the tongue and cheeks. There was a history of palmar and plantar psoriasis and on the cranium were scattered a few nodes. As mastication had become a perfect nightmare for her I applied the cautery pretty freely to the cracks, prescribed her alkaline antiseptic mouth washes and internally put her on to large doses of Donovan's solution of Hg. As. & I. She improved rapidly and for nearly a year I did not see her. At the end of that time she again called upon me. The cracks and glistening patches were more numerous than ever; the tongue was bound down to the floor of the

mouth and the cervical glands were much enlarged, as was likewise the liver. She died in the course of a few days and on post-mortem a large ulcerated mass was found in the anterior wall of the stomach; the liver was studded with hard nodules, as likewise the lungs. On microscopic examination of sections of tongue and cervical glands proliferation of fibrous tissue with typical cell nests of carcinoma were found.

Here one had evidently to deal with a mixed case, but query: What is the connection between the syphilitic and malignant poisons?

Coming now to glance at tertiary syphilis we find a manifestation of this fell disease which lends itself in almost every organ and tissue of the body to the surgeon's attention. In the skin, fibrous tissue, muscle, nerve, bones and internal organs. Take the wretched serpiginous ulcers on the surface with their hard undermined edges and covered with a dirty unhealthy slough, dragging their course along day after day with no pretence at healing until the surgeon steps in. Take the swellings of joints and long bones attended with disorganization and necrosis. In all of them we see a state of affairs in which the vital forces have been reduced to a low ebb and unless something tangible in addition to constitutional support is undertaken dire results are bound to accrue.

THE SASKATCHEWAN MEDICAL JOURNAL

HARRY MORELL, M.D., C.M.
Chairman of Publication Committee

G. A. CHARLTON, M.D., C.M.
Secretary-Treasurer

Editorial and Business Offices:
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Box 1106.

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Editorial Notes

Saskatchewan Medical Association

The success of a society depends not only upon the number and loyalty of the individual members, but upon the officers as well. When one accepts an office in an organization, medical or otherwise, it is his duty to do his utmost to upbuild that society and guard its welfare. The individual member is the unit, and a single unit acting as such possesses very little power ,but becoming attached to others it grows and by its growth develops strength, power and influence.

All this applies to the officers and individual members of the profession in Saskatchewan.

Every practitioner in the Province of Saskatchewan is eligible to membership, and it is sincerely to be hoped that those who are not members of the Provincial Medical Association will become so. The object in the uniting of each individual member of the profession is to gain harmony, influence and strength and therefore present a united front to back up legitimate demands affecting the profession as a whole. Properly organized a Provincial Association should contain at least 85 per cent. of the members. Is it too much to expect that our hopes may be realized?

Again we have the mooted question of reciprocity before us. This time it emanates from the West. A few years ago the "Roddick" Bill was the favorite, but on account of objections from the Boards representing the Provinces of Ontario and Quebec no advance was made past a certain stage. This Bill of Dr. Roddick's contained a reciprocity feature covering a Dominion examination and license. Now we have a proposition of a Board of Examiners representing the four Western Provinces.

Confederation

Before a gathering of the profession in Winnipeg a short time ago Dr. R. G. Brett presented an address: "Some Aspects of the Medical Profession in the West." The most important subject treated and discussed was reciprocity. In a personal communication from Dr. Brett we quote:

"I may say that the College of Physicians and Surgeons of Manitoba has appointed two delegates to join with delegates from Alberta and we hope also from Saskatchewan and British Columbia to discuss the question of confederation of the four Provinces for examination and licensing purposes. The scheme as you will see is not merely a question of reciprocity, it is to have the four Western Provinces surrender their examining functions and merge it into one examination. This in my opinion will give a standing to the profession in these four Western Provinces both at home and abroad much greater than could be obtained by individual examining restrictions."

* * *

Before proceeding further, it will be wise to ponder: What change is really required or wanted and for what purpose? For instance, if we proceed on the line indicated in Dr. Brett's communication, the question of reciprocity should be eliminated, because in the scheme submited, this subject is not touched upon. The plan laid before us is to all intents and purposes a merger or an agreement, and has to do only with the examination and the licensing of candidates by a Board of Examiners composed of members representing each of the Provinces ,who will conduct

Merger or Inter-Provincial Registration

examinations and license those successful. These examinations are to take place simultaneously in Winnipeg, Regina, Edmonton and Victoria, or any place designated by the board.

In the meantime each of the Provinces involved in this merger will surrender their licensing powers.

All this means inter-Provincial examination and license and not reciprocity and should have a smooth and steady progress for its completion.

* * *

Reciprocity, as we take it, contemplates that "we give and return mutually." It is realized that we are on dangerous ground, but it is better that we face it at this time. If the two measures, Inter-Provincial Registration and Reciprocity, could be made two distinct measures for discussion some advance might be made, but many confound these questions as one. Many practitioners in Saskatchewan ask the question, "If new legislation is made for Inter-Provincial Registration, what will our status be, and would our licenses be recognized by other Provincial Boards other than our own? Or what provision will be made to make registration retroactve?" We have good reason to believe that when the Provincial delegates meet, the subject of reciprocity will prove a lively issue and not so easy of solution. At the same time, however, Saskatchewan interests will be represented by one or more Delegates entrusted to look after any legislation which may be wise to adopt.

Reciprocity

* * *

Before dismissing this matter it should be known that during the Second Annual Meeting of the Saskatchewan Medical Association, held at Indian Head, the following telegram was received:

Banff, Alta., Nov. 6th, '07.

G. A. Charlton, M.D.
Regina.

If Association favorable, and wish for reciprocity of three Western Provinces, on conjoint examination Manitoba, also if it agrees to same conditions. Pass resolution accordingly. Our Provincial Medical Association did so.

(Signed) J. D. Lafferty.

Accordingly the following resolution was framed and passed:

Proposed by Dr. H. G. Nyblett, seconded by Dr. H. E. Munroe, that "The Saskatchewan Medical Association do hereby endorse the movement for a conjoint Board of Examiners for Saskatchewan, Alberta and British Columbia, provided that complete reciprocity be arranged for those practitioners already enrolled on the Medical Registers of the above Provinces, and that all graduates from whatever teaching body be admitted only upon examination before the Conjoint Board of Examiners."

* * *

Why not take advantage of the meeting of the Manitoba Medical Assocation at Brandon in June, when there will be a large number of representatives from all parts of the West. A conference of delegates from their respective Provinces could be easily arranged to bring to issue this question of reciprocity. Even if all the Provinces cannot come to an agreement—those Provinces who come to some mutual understanding, probably could make an alliance. The personnel of representatives should consist of three—one appointed by the College of Physicians and Surgeons, another by their Provincial Medical Association, and the other at large.

* * *

It is with pleasure that we are able to publish in this issue the article contributed by Dr. Todd on "Medical Protozoology." To really do justice to it micrographs should accompany the text, but we were unable to arrange it.

Apropos of this subject Dr. Osler has written lately covering some of the important matters relating to this, and we take advantage of his remarks which we quote *in toto*.

Professor Osler, of Oxford, writing to *The Times* from Rome, says he has been visiting the Laboratories of Pathology and of Hygiene directed by Marchiafava and Celli. The deaths in Italy from Malaria have been reduced from 21,033 in 1887 to 4,160 in 1907, largely owing to the sanitary measures of the

Italian Society for the Study of Malaria. Professor Osler continues:

Professor Osler on Malaria

It has long been known that malaria disappears "spontaneously." The Fen country is now healthy; parts of Canada, about Lakes Ontario and Erie, which were formerly hotbeds of the disease, are now free. This cannot be attributed altogether to cultivation and drainage. I know places on the shores of the lakes just mentioned in which the conditions today are identical with those which I remember as a boy. The Desjardin Canal Marsh on the extreme western end of Lake Ontario was a well-known focus of the disease. The marsh remains, the mosquitoes are there; but a case of malaria is almost as rare as in England. The disappearance is largely due to the free use of quinine. The settlers early recognized the important fact that malaria was a disease liable to recur, and it became a common practice to take Peruvian bark every spring and autumn for a year or two after an attack. This is a point in prophylaxis which the work of the Italian Society has brought into prominence. . . .

The anti-malarial crusades initiated by Ross have had an extraordinary success, and nowhere more than in Italy, in the hands of the National Society, to whose good work it is a pleasure to call attention. It would be hard to name any single event of the nineteenth century of greater practical importance to the race than the discovery of Laveran. In the words of Colonel Gorgas, it has made the tropics habitable by white men. The Panama Canal zone is an astounding witness to the success of modern sanitary measures against malaria. The monthly reports of Colonel Gorga give a death-rate (among nearly 50,000 work-people) lower than that of any large city—it has been as low as 12 per 1,000! And let us not forget that humanity owes this triumph to the men who introduced experiment into medicine, to the Harveys, the Hunters, the Majendies, and the Claude Bernards—the arch-vivisectors whom it has become fashionable to abuse! and who have thus enabled us to wring from nature what Harvey calls "her closet-secrets."

Regina Clinical Society

One of the largest gatherings of medical men, held in Regina, met on Saturday night, April 3rd, for the purpose of organizing a society for discussing the questions of scientific medicine.

The direct outcome of the meeting was the formation of the "Regina Clinical Society." The following officers were elected: President, Dr. John M. Shaw; Vice-President, Dr. H. M. Stephens; Secretary, Dr. Harry Morell; Treasurer, Dr. O. E. Rothwell.

The feature in the formation of this organization was that it was decided to limit the work of this society to questions of scientific interest pertaining to Medicine, Surgery and allied subjects.

A committee was named consisting of the officers, with the addition of Drs. McLeod and Ellis, to prepare and draft a constitution, to be submitted at the next meeting of the Society, April 10th.

Stated Meeting Held April 10, 1909.

The President, Dr. John M. Shaw, in the Chair.

The minutes of the meeting of April 3rd were read and approved. Report of the Committee for the preparation of a constitution and bylaws received, amended and adopted. The Executive was empowered to provide for the Society permanent quarters for the holding of meetings and which would be available to the members at all times, and also to make preparations to have the nucleus of a medical library gone ahead with.

It was decided that at present the Society hold their regular meetings on the first Saturday in each month at 8.30 p.m.

Manitoba Medical Association

No effort is being spared to make the second annual meeting of the Manitoba Medical Association a huge success. This year's meeting is to be held at Brandon on June 22 and 23, under the presidency of Dr. J. R. Jones, Winnipeg. The Hon. Secretary, Dr. Jasper Halpenny, Winnipeg, has kindly forwarded us a copy of the provisional programme, which we publish. We are informed that in addition to the official invitations sent to the Secretaries of the Medical Associations of the nearby Provinces which will send official representatives, a very welcome invitation is extended to individual members of the British Columbia, Alberta and Saskatchewan Medical Associations to be present and enjoy all the advantages and take part in the discussions. The secretary also wishes us to say that all our readers are included in the above and that he hopes they will accept this invitation. All will be cordially welcomed. We do hope that many of our readers will be present to enjoy and profit by many of the scientific papers which will be presented and which we append.

PROVISIONAL PROGRAMME.

C. Eugene Riggs, St. Paul, Minn.—Subject to be chosen.

H. H. Chown, Winnipeg.—"When to Operate in Appendicitis."

B. J. Branson, Winnipeg.—"Hydatids."

D. S. McKay, Winnipeg.—"Some Observations on Pain in Appendicitis."

J. O. Todd, Winnipeg.—"Goitre."

W. Chestnut, Winnipeg.—"The Physician's Duty in Tuberculosis."

J. E. Lehmann, Winnipeg.—"More Recent Methods in Diagnosing Surgical Kidney."

D. H. McCallum, Winnipeg.—

J. A. McArthur, Winnipeg.—"Tuberculosis in Children."

R. D. Fletcher, Winnipeg.—"The present Status in the Treatment of Urethral Discharges."

W. Harvey Smith, Winnipeg.—"The Tonsils and their Treatment."

Raymond Brown, Winnipeg.—"Headache."

E. S. Popham, Winnipeg.—"Some Phases of Life Insurance Examination."

D. A. Stewart, Ninette.—"The Sanitarium."

J. D. Lafferty, Calgary.—"The Necessity for more Advanced Legislation Providing for the Protection of Public Health."

H. M. Speechley, Pilot Mound.—"The Artificial Feeding of Infants and its Relation to Summer Diarrhoeas."

J. A. Gunn, Winnipeg.—"The Treatment of Typhoid Fever."

John A. Macdonald, Winnipeg.—

Chas Hunter, Winnipeg.—"The Differential Diagnosis in Functional and Organic Diseases of the Gastro-Intestinal Diseases."

Robert F. Rarke, Winnipeg.—"Religion as a Psycho-Therapeutic Agent."

M. S. Inglis, Winnipeg.—"Exhibition of X-Ray Work."

John H. R. Bond, Winnipeg.—"Exhibition of X-Ray Work."

F. S. Keele, Portage la Prairie.—"The Present Status in the Treatment of Acute and Chronic Otitis Media."

W. Bigelow, Brandon.—"Syphilis of Small Intestine." Case report.

T. R. Ponton, Macgregor.—"Obstetrical Complications in Farm Houses."

Neil J. McLean, Winnipeg.—Subject to be chosen

Geo. O. Hughes, Winnipeg.—

F. D. McKenty, Gretna.—"An unusual Hernial Accident." Case report.

H. P. H. Galloway, Winnipeg.—The Surgical Treatment of Oalio-Myelitis."

News Items

The Saskatoon City Hospital was opened Monday afternoon, April 5th, under most favorable circumstances. The Ladies' Hospital Aid entertained the guests who were very interested in the building and its up-to-date equipment. After a few short speeches the Mayor formally opened the building. The city feel that they have one of the most up-to-date hospitals in the West. It has a very elaborate and most recent heating and ventilating system, is beautifully furnished and in the operating room the equipment cannot be excelled.

The Prince Albert medical men have formed an association with the following officers: President, Dr. A. David; vice-president, Dr. P. Shelley; secretary, Dr. F. W. Fourney; treasurer, Dr. A. B. Hopkins.

Wilfred Tessier, M.D., of Goose Lake, Sask., who occasioned a lot of trouble during the sitting of the Provincial Legislature in June last, when he applied and was permitted to present himself for a special examination, which was opposed by the Medical Profession and the Opposition in the House—came again into prominence lately while in Saskatoon, where he made a desperate attempt at suicide by cutting his throat—during a "brain storm." His recovery is assured.

The City Council of Prince Albert has granted $2,400 to the Victoria Hospital. This is an increase of $400 over last year.

A highly enjoyable concert which increased a substantial addition to the funds of the Regina Grey Nuns' Hospital took place at the City Hall Feb. 17th.

We clip the following from "Standard of Empire," London, Eng., March 5, 1909:

"The issue of the first number of the 'Saskatchewan Medical Journal' marks another stage of advance by the Saskatchewan

Medical Association, the medical organization of the Province, the third annual meeting of which was held last July. The journal, which is issued by the Publication Committee of the Association, of which Dr. Harry Morell is chairman, has for its primary object the permanent recording of the transactions of the Association's annual meetings."

Last week the Board of Governors, sitting in Regina, decided to place University College at Saskatoon. The faculties of Arts and Agriculture are to be formed at once, so that in a short time the University of Saskatchewan will be "in being."

Answers to Correspondents

Grayson, Sask.—Anonymous communications are never recognized. Any complaints against a medical student practicing without qualifications should be made to Dr. Chartlon, Acting Registrar, Regina.

R.S.M.—Nova Scotia has some arrangement with the General Council of Medical Education of the United Kingdom whereby a licentiate may become registered in Great Britain, but he must have been admitted to practice and registered only after being examined by the College of P. & S. of Nova Scotia. A licentiate of Nova Scotia, though being registered by some previous qualification, is not entitled to registration in Great Britain.

Member—McGill University Faculty of Medicine was founded in 1823 and was known then as the "Montreal Medical Institution."

E.M.—The Saskatchewan Medical Society is to be held in Saskatoon during the first week of July. The Manitoba Medical Association meet at Brandon in June. See provisional programme in this number.

Personals

Dr. G. A. Wright, '04 McGill, who has been practicing in North Dakota and has just finished a post-graduate course in Chicago, has located in Riverdale. Riverdale is a part of the City of Saskatoon.

* * *

Dr. J. R. Matheson, of Prince Albert, one of the Executive Committee of the Saskatchewan Medical Assn., paid this office a pleasant visit on April 7.

* * *

At a recent meeting of the Board of Governors, of the Regina Hospital, Mr. Frank Haultain was appointed Commisioner to the institution. This appointment is a very popular one.

* * *

Dr. R. G. Stevenson, who has been in general practice in Moosomin, has been succeeded by Dr. McLaren. Dr. Stevenson is member of the Publication Committee of the Saskatchewan Medical Association.

* * *

Dr. Hugh Cochrane of Maryfield, Sask., has gone East on a vacation.

* * *

Dr. Frederick William Hart of Indian Head, is paying a visit East. Rumor has it that when he returns he will not be alone.

* * *

Dr. Devine, medical officer for military district No. 10 (Winnipeg), has resigned. He will be succeeded May 1 by Dr. Vaux, Halifax Military District.

* * *

The Saskatchewan Gazette contains the following appointments as coroners: S. J. Johnson, M.D., Leslie; E. M. Hickson, M.D., Waterous; H. McLean, M.D., Lang; F. R. W. Warren, M.D., Lanigan.

Book Reviews

Human Anatomy. Including Structure, Development and Practical Considerations.

By George A. Piersol, M.D., Prof. of Anatomy at the Univ. of Penn. J. Playfair McMurrich, Ph.D., Prof. of Anatomy at Univ. of Toronto. Thomas Dwight, M.D., Prof. of Anatomy at Harvard Medical School. Carl A. Hamm, M.D., Prof. of Anatomy at Western Reserve Univ. John C. Heiser, M.D., Prof. of Anatomy at Medico-Chirurgical College, and J. William White, M. D., Prof. of Surgery at the Univ. of Pennsylvania. With 1734 illustrations, 541 of which are in colors. Edited by George A. Piersol, M.D. J. B. Lippincott, Company. Philadelphia, London and Montreal.

This classic possesses several important features which must not be passed over lightly. First on looking over the names of those whose work is included, bespeak for it an extraordinary amount of strength, which is not ordinarily given to many of our modern text books. Five of the leading anatomists, in association with one of the most experienced of surgeons, have combined and incorporated in this work the end results of their long years of labor in the anatomical laboratories and hospitals in the foremost colleges on this continent. We are proud to see one of our own teachers included in the list of authors, Dr. J. Playfair McMurrich, Professor of Anatomy in the University of Toronto, who has supplied the description of the muscular, and of the blood and lymph-vascular system. Most interesting is the unique part in which Dr. J. William White has contributed on "Practical Considerations." In this the reviewer cannot say any more than quote from a description given as follows:

"Dr. J. William White, widely known both as a surgeon and a teacher of surgery, has, under the head of Practical Considerations, pointed out with unusual force the relations of anatomy to

the requirements of the practitioner, and associated anatomical facts with those conditions, resulting from injury or disease, that these facts elucidate, presenting, in connection with each organ or system, enough facts illustrative of the dependence of the diagnostician and practitioner upon anatomical knowledge to awaken interest and to combat the tendency to regard anatomy as something to be memorized during student days and forgotten when examinations are over. Even when such facts do not seem at a first glance to come within the scope of a text-book of anatomy, it will be found that a careful comparison of this text with the descriptive portion of the book will show a real and practical relation between them—a relation which, once established in the minds of the student and the physician, will make it easier for the former to learn his anatomy and for the latter to remember and apply it."

A review of this would not be complete without some special mention be made of the illustrations in which evidently no expense has been spared and it should be noted that " in almost every case special dissections or preparations were made, and the drawings taken direct from nature, giving faithful, honest, conscientious reproductions, resulting in the most remarkable, accurate, and artistic anatomical illustrations.

We have no hesitation in strongly recommending this work to the student, general practitioner or sepcialist.

HARRY MORELL.

BOOKS RECEIVED

The following have been received and will receive consideration later:

Gynaecological Diagnosis. Edited by JOHN G. CLARK, Univ. of Penn. Six hundred and seventy pages of text, with three hundred and forty-six illustrations and four full page plates in black and colors. J. B. Lippincott Co. Philadelphia, London and Montreal.

Diseases of the Digestive Canal. By DR. PAUL COHNHEIM. Edited by DUDLEY FULTON, M.D., Univ. of California. Nearly

four hundred pages. Illustrated. Messrs. J. B. Lippincott Co. Philadelphia, London and Montreal.

Diseases of the Nose, Throat and Ear. By FRANCIS R. PACKARD, M.D., Philadelphia Polyclinic. Profusely illustrated J. B. Lippincott Co., Philadelphia, London and Montreal.

Appendicitis and Diseases of the Vermiform Appendix. By HOWARD A. KELLY. A new work entirely, and a splendid one. Over five hundred pages, with two hundred and fifteen illustrations, some in colors, and three plates. J. B. Lippincott Co., Philadelphia, London and Montreal.

Obituary

LONDON, Ont., March 31.—Dr. J. Knox Niven, son of Dr. Jas. S. Niven, is dead, after three years' illness. He was thirty years of age, and practiced for some years in Manitoba and British Columbia. He served in the Boer War.