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THE

MONTREAL MEDICAL JOURNAL.

VOL. XXXII. JULY, 1903. No. 7.

AN EXPERIMENTAL STUDY ON THE EFFECT OF THE BLOOD-SERUM OF NORMAL AND IMMUNIZED GOATS IN MODIFYING THE PROGRESS OF TUBERCULOUS INFECTION.

BY

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[*From the J. H. R. Molson Laboratories for Pathology.*]

One of the most important subjects, if not indeed the most important, occupying the attention of the experimental investigator in the domain of Medicine at the present time, is the discovery of some curative agent to be employed in that most dread and widespread disease to which human beings are subject—tuberculosis. For the past fifteen years some of the brightest intellects have been at work on this problem with as much zeal and hope,—albeit let us confess with more knowledge —as was ever expended by the investigators of old in the search for the philosopher's stone or the elixir of life. We have, however, reluctantly to admit, that the collective result of these most searching and extensive investigations, while beyond doubt it has increased our knowledge of the nature of the tubercle bacillus and the morbid processes induced by it, has led as yet to but little practical result. The final solution of the problem has hitherto eluded our grasp, and investigator after investigator has, like his prototype the more dramatic alchymist of the dark ages, seen the golden vision fade from his eyes when the prize was thought to be won.

The brilliant success that has crowned the efforts of experimenters to produce an antitoxic serum for diphtheria and hydrophobia, and the somewhat less valuable results that have been attained in tetanus, septicæmia, and typhoid fever, have excited the justifiable hope that a similar remedy might be devised in tuberculosis. Here, however, the

This paper is abstracted in part from a communication read at the meeting of the Royal Society of Canada on May 19th, 1903. The full study will appear in the Transactions in due course.

problem has turned out to be by no means as simple as in the case of the diseases just mentioned. Practical experience has shown that the efficacy of the antitoxic sera hitherto prepared is in direct ratio to the virulence of the diseases in which they are employed. Unlike diphtheria, tuberculosis is not a self-limited disease, nor does it kill by septicæmia. It belongs to that group of diseases to which leprosy, syphilis, and actinomycosis also belong, that have a characteristically slow progression, presenting it is true effects referable to a mild intoxication, but also causing gross organic lesions in various parts. Here it is obvious that a purely antitoxic serum, that is to say, one that merely neutralizes the poisons elaborated by the tubercle bacillus in the course of its growth, is hardly likely to prove effective. Should it be possible to prepare such a serum, and as we shall see it undoubtedly is, the disease would still progress. To be of real value a serum would need to possess germicidal as well as antitoxic properties. Even in the days of the discovery of the diphtheria antitoxin and before (1884), attempts were made to solve the problem and the names of Héricourt and Richet stand out as pioneers in this line of research. Since then the number of workers has increased marvellously, and the work of Koch, Maragliano, Babès, Maffucci and Di Vestea, Behring, Niemann, and on this continent, Trudeau, and DeSchweinitz, is a monument of painstaking research, scientific accuracy, and devotion to truth. No one who has not investigated the subject would credit the enormous amount of labour expended on this one problem.

The subject has been attacked in various ways. One class of investigators has attempted the cure of tuberculosis by means of drugs, a mode which seems of late again to be coming into prominence. A second school, of which Koch has for some years been the leading spirit, has sought to produce immunity and cure the disease by the injections of various toxins derived from the tubercle bacillus or chemical modifications thereof. In this category of remedies belong the various tuberculins, oxytuberculin, tuberculocidin, and antiphthisin. By the injection of these substances it is sought to stimulate the cells of the body to the elaboration of an antitoxic substance in such amount as to neutralize the poisons eliminated by the bacilli. The third series of experimenters has endeavoured by the injection of various extracts of tubercle bacilli, or in some cases the living attenuated germs, to produce immunity in certain of the lower animals, and use the blood serum of animals thus fortified to combat the disease in other individuals. It is with work of this last class alone that this paper will deal.

The first observation, and one that has lead to all the rest, was that of Héricourt and Richet. In 1888 they noted that if a rabbit, which

is very susceptible to this germ, be inoculated with the staphylococcus pyosepticus it may be rendered refractory to its action by intraperitoneal injection of dog's blood, an animal that possesses a natural immunity to the infection. This suggested to their minds that the same thing might hold good in tuberculosis. Without entering into details, the chief conclusions at which they arrived were:—

(1) That in animals the subjects of experimental tuberculosis the injection of dog's blood will arrest the disease provided the germ is not too virulent, or will retard it if it is very virulent.

(2) The serum of a dog injected into a healthy rabbit will prevent the development of experimental tuberculosis subsequently.

(3) The serum of a dog previously inoculated with tuberculosis when injected into rabbits already tuberculized will aggravate the disease.

These observers did not believe that dog's serum possessed a specific curative action in tuberculosis, although it seemed to have a powerful action against some of the effects of the germ and exerted a tonic action on nutrition. The special credit due to Héricourt and Richet lies in the fact that they were the first to see the possibility of producing by the injection of tuberculous virus a specific means of combatting the disease. It was Maragliano who first demonstrated by scientific proofs that a tuberculous antitoxin did exist and applied it to the treatment of human tuberculosis. His results were given to the French Congress of Medicine at Bordeaux in 1895, and his subsequent investigations have proved to be so brilliant and painstaking that a brief reference here will not be out of place. Koch's original tuberculin was prepared by heat so that it did not represent the full toxic properties of the bacillus, for as Auclaire has shown certain volatile poisons are given off in the course of preparation. These substances have been shown by Maragliano to cause convulsions when injected into rabbits. The glycerine also used in the preparation is toxic. Maragliano therefore uses a watery extract of the bacilli. He makes use of two toxins: (*a*) prepared by concentrating a culture of the bacilli over a water bath at 100° C. for three or four days; and (*b*) a culture filtered through a Chamberland filter at the room temperature and concentrated in a vacuum at a temperature less than 30° C. For inoculation purposes he uses three parts of *a* and one of *b*. This mixture is injected into horses beginning with a dose of two milligrammes per kilo. of the body weight and is increased gradually one milligramme a day up to forty or fifty. The injections are stopped if the animals show signs of fever or emaciation until recovery has taken place. The whole process is spread over about six months. Before using the horse serum thus prepared Maragliano waits three or four weeks until the urine is free from toxic

bodies. One c.cm. will counteract the smallest dose of tuberculin that will produce a reaction in a tuberculous man. The serum is said also to possess appreciable germicidal properties. Maragliano has knowledge of 1362 tuberculous patients treated by his serum. Eighty per cent. were benefited by it. The most favourable results were obtained in afebrile cases with localized lesions. In cases of mixed infection the serum was less useful. Maragliano has also shown that the serum of tuberculous patients treated with his serum was two or three times as antitoxic as it was before the injections.

Maffucci and Di Vestea have attempted to attain results by using sheep, which are supposed to be refractory to tuberculosis, employing the methods of Héricourt and Richet and the "mithridatization" method with Behring's antitoxin. They injected both dead and living bacilli into the sheep but found that the serum resulting was neither curative nor prophylactic, but at most caused some retardation in the disease. They found moreover that while the serum was innocuous for guinea-pigs in doses of 2 c.cm. per hundred grammes, one-fifth of a c.cm. in rabbits produced a fatal hæmoglobinuria. When added to a culture of tubercle bacilli in the proportion of four to one some attenuation of the germs was produced.

Niemann has used goats. He injected for some weeks a tuberculin derived from a very virulent stock of bacilli until he was giving fifteen c.cm. Then he injected an alcoholic precipitate from the tuberculin that had been proved to be extremely toxic, beginning at first with twelve to eighteen milligrammes and increasing after a month to half to one gramme. He found that by the use of the antitoxic serum thus prepared he could prolong the disease and claimed to have observed good results in human beings.

The results of DeSchweinitz and Dorset are somewhat similar. They inoculated cows and horses with tuberculin and bacilli and found that this conferred on their sera some powers of retarding the disease in guinea-pigs. The serum of cows inoculated with attenuated bacilli proved to be more potent.

Trudeau and Baldwin were able to produce a marked degree of immunity in rabbits by the injection of attenuated cultures but the serum of such animals did not appear to have gained antitoxic properties. In a large number of experiments with sheep, asses, rabbits and chickens, inoculated with living germs, they thought that the sera thus fortified possessed slight antitoxic properties. Their results were however not very convincing.

From the above mentioned observations it will be gathered that the

results of experiment are by no means uniform and not entirely satisfactory. The best results have been obtained where in addition to the toxins the substance of the germs has been employed as well, but even in this case there is some discrepancy between the different observers. In fact Maragliano is the only one who seems to be at all sanguine as to the value of his serum.

The few observations I have made have been carried out on slightly different lines from those hitherto published in the hope that they would throw some light on a somewhat doubtful question and possibly elicit some new facts. I have employed goats for the purpose, finding them on the whole the most suitable. It used to be thought that goats were absolutely refractory to tuberculosis, but this is certainly not the case. (Colin. Compt. rend. Acad. de Sc., Paris, 1891, CXIII, 219). It is true, however, that in a natural state they rarely suffer from the disease. It is possible to give them the disease by injecting living virulent bacilli in considerable quantities into the circulation, although subcutaneous injection will not suffice. They are therefore relatively immune. They are also hardy animals and stand the various manipulations well. A considerable quantity of serum can be obtained from them which is of good quality and keeps well. Goat serum has the further advantage, as Lépine has shown (Sém. Méd. 1891, XI, 21), that it produces much less hæmolysis when added to human blood than does dog's serum.

It is a well recognized fact that the sera of several normal animals possess what may be called natural antitoxic bodies. Thus horse serum possesses about two or three hundred antitoxic units against the diphtheria germ, and Maragliano states that human serum possesses three to four hundred antitoxic units against the bacillus tuberculosis. It was thought wise therefore to determine first whether normal goat serum could be in any sense considered protective against tuberculosis. Should this prove to be the case then one might try to increase this up to a valuable point.

For the purposes of the experiment it was obviously necessary to obtain the serum without contamination from bacteria and as nearly normal as possible. To attain this the following method was adopted. A large healthy male goat was taken, the hair was removed over the course of the external jugular vein in the neck and the skin washed and sterilized by means of a solution of sublimate (1-1000)). A large sterilized trocar attached by a rubber tube to a sterilized bottle was then inserted into the vein and the blood allowed to flow into the vessel. The serum was allowed to separate in a cold chamber, the clear

portion carefully decanted off, and one-quarter per cent. of chloroform added as a preservative. It was found that the serum thus prepared kept perfectly well for some weeks.

EXPERIMENT I.

The first experiment was conducted under the following conditions: Eight guinea-pigs and ten rabbits, presumably in good health, were taken, and their weight and temperature before inoculating were obtained. They were then numbered and kept in separate hutches. On March 13th, 1902, they were inoculated, one half intraperitoneally and the other under the skin of the left leg, with a culture of the bacillus tuberculosis of extremely mild virulence, standardized as follows:

A culture of the bacillus typhi abdominalis taken from the old laboratory stock was inseminated in 1.5 per cent. acid broth and grown in the incubator at the usual temperature for twenty-four hours. The culture obtained was then killed with formalin vapour and used as a standard. A glycerine agar culture of the tubercle bacillus referred to was ground up in a sterile mortar with sterile normal saline solution. This was allowed to stand until the heavier portions had sunk to the bottom. The opalescent supernatant portion was carefully decanted off and diluted with sterile normal salt solution until it reached the same degree of opacity as the standard culture of the B. typhi. Hanging-drops were then examined under the microscope to see that there were no gross masses of bacilli floating about. One cubic centimetre of this material was then used for inoculating. Care was of course taken as far as possible to avoid contamination in the course of the various manipulations, sterilized vessels and instruments being invariably employed.

The animals were shaved at the desired points and the skin sterilized with bichloride, 1-1000. The inoculations were made with an all-metal syringe of five c.c. capacity, previously boiled.

The reason for using a culture of weak virulence to begin with was that guinea-pigs are very susceptible to tuberculosis and it was suspected, from observations already published, that should goat serum possess any antitoxic powers these would be extremely slight.

One half of the animals were inoculated subcutaneously over the abdomen with two c.cm. of normal goat serum every second day. Subsequently the temperatures were taken every day and the weights once a week.

Instead of estimating as others have done the effect of the injections by keeping the animals until they died spontaneously and taking into consideration merely the loss of weight, it was thought advisable as we were dealing with germs of such mild virulence and there was a possi-

bility of the animals recovering, to kill them at stated intervals and determine the amount of tuberculosis by the naked eye and the microscope. By this method an exact appreciation of the state of things could be obtained. By arranging them in pairs according to weight it was moreover possible to compare animals of approximately the same degree of resisting power.

Two guinea-pigs and two rabbits died spontaneously before the conclusion of the experiment, apparently from some gastro-intestinal disturbance. The rest of the pigs were killed after thirty days, and one-half of the remaining rabbits about the same time. The first animals killed presented so little pathological change that it was thought advisable to keep the remaining six for two weeks longer in the hope that the lesions would be more marked. Autopsies were performed at various times with the special object of determining the extent of the dissemination of the tuberculous virus, the effect of the serum injections, if any, and the character of the bacilli of tuberculosis found in the various parts. Portions of the organs were examined microscopically, both by the hæmotoxylin method and the modified Ziehl-Neelsen method for tubercle bacilli. Smears were made from the organs and stained for bacteria. Cultures were also taken from the organs.

Without going into the full details it may be stated that of the guinea-pigs only one (No. 2) gave evidence of any dissemination of the tubercle bacilli to any distance from the site of the original inoculation. It had not received serum. In Nos. 1 and 4 the inguinal glands were affected; the bacilli were discovered in No 1 which had not received serum, but not found in No. 4 which had. In No. 6 which had received serum, the infection was strictly localized to the site of inoculation. In those inoculated in the leg, Nos. 3, 5, 7, and 8, all except one showed enlargement of the inguinal glands. In only one that had not received serum were the bacilli discovered (No. 3). One that had received serum did not develop a local lesion (No. 8).

In the case of the rabbits, only one developed gross tuberculosis (No. 8), and this one had not received serum. This result was in general what one would have expected as rabbits are much more refractory to tuberculosis than are guinea pigs. None of the culture tubes developed the specific bacillus, and when found in smears, they were in a state of extreme fragmentation and degeneration, showing that the infection was an extremely mild one. So far as I could see the inoculations of serum had no effect whatever upon the temperature of the animals receiving it, but the rabbits so treated lost weight rather rapidly, although the pigs were unaffected. This was probably due to interference with the feeding for the injections produced extensive areas of co-

agulation-necrosis in the abdominal wall and in one or two instances there was slight superficial suppuration. Apparently the injections of serum had some slight deterrent effect on the development of the tuberculous lesions, but it was felt that it was unwise to draw any positive conclusions from such a small series of animals, particularly with so mild a germ, so a second experiment was undertaken on similar lines but with several modifications suggested by the experience with the former series.

Experiment II.

Six guinea-pigs and twelve rabbits were placed under exactly the same conditions as to food, exercise, etc., and weighed at intervals of a week until the average normal weight was established. They were then grouped in pairs according to weight. Rectal temperatures were taken daily for ten days to establish a mean normal temperature. Both the weights and the temperatures were found to vary in health between rather wide limits. The average temperature of the pigs was from 102° and 3-10ths to 102° and 8-10ths; that of the rabbits from 102° to 103° and 2-10ths.

All with the exception of two rabbits, which were retained as controls, were inoculated with one c.cm. of an emulsion of a more virulent, though still mild, culture of the tubercle bacillus in normal saline, standardized as before. One half of the animals were given the inoculation in the left leg subcutaneously; the other half intraperitoneally. Three days after inoculation one member of each pair was given a subcutaneous injection of one c.cm. of a fresh supply of normal serum from the same goat, collected with the same precautions as before. This was repeated every third day until the close of the experiment. The reason for reducing the dose was the marked local disturbance caused by the injections in the first series of animals. Two rabbits were also given serum but without tuberculosis. During the course of the investigation daily temperatures were taken and the animals were weighed weekly. A few of the animals died spontaneously before the six weeks allotted to the experiment had elapsed, but the remainder were killed in pairs on the same days. A post-mortem examination was made immediately. In estimating the amount of disease resulting I took into consideration, the dissemination of the disease in the various organs, the amount of tissue destruction, the amount of repair if any, the histological appearance of the lesions, and the morphology of the bacilli found.

It was found in the course of this experiment that after the injection of the bacilli the average temperature of the animals was raised one degree. The average temperature of pigs and rabbits before inoculation

was 102.52°; after, it was 103.41°, in the case of the animals not receiving serum and 103.62°, in those given it. In the control animals that were given serum alone, the temperature in one was only slightly elevated, in the other normal. We may thus conclude that the injection of the serum had no effect on the temperature curve. With regard to the weights it was different. The animals given serum lost 22.27 per cent. of their body weight; those not receiving it lost only 10.45 per cent. As a rule rabbits inoculated with tuberculosis preserve their nutrition surprisingly until towards the last when they go down hill rather rapidly. The injection of the serum, although given in less than half the quantity employed in the first instance, caused considerable local disturbance, and this was aggravated by the animals scratching themselves so that the loss of weight is no doubt to be attributed to the interference with their feeding thus produced.

In comparing the results I found, as before, that guinea-pigs are much more susceptible to tuberculosis than are rabbits, losing weight rapidly from the first and presenting marked lesions when killed. These facts led me to keep the rabbits under observation some three weeks longer, in the hope that thus the resulting disease would be more pronounced. This, however, did not prove to be the case.

After a careful consideration of the extent and nature of the lesions produced in the pigs it could not be said that the injection of the goat serum had the slightest effect in inhibiting the action of the bacilli. The results in the case of the rabbits were rather more promising. The most marked difference was found in rabbits III and XII. Number three which had been given serum presented no positive appearance of tuberculosis, whilst its mate, number twelve, presented caseation at the site of inoculation and tubercles on the peritoneum. On the whole the lesions were slightly more marked in the case of the rabbits not receiving the serum. In corroboration of this finding may be cited the results of the first experiment where the two animals that did develop tuberculosis were those that had not been given serum. It is of course hazardous to draw too positive conclusions from such a small number of animals but it would appear so far as we have gone that normal goat serum does have a slight retarding effect on the progress of tuberculous infection. Whether this action is specific or not is another question. Recent work has shown that the sera of other animals, such as the dog and the horse, as well as normal saline solution, possess similar properties.

Having drawn this conclusion it was thought advisable to attempt to confer upon the serum more definite antitoxic properties. The method adopted was based upon that employed in the production of diphtheria

antitoxin, namely, the introduction of the toxins of the bacillus into the system of an animal until it was immune to the effects, and then using its serum as a curative agent. As has been pointed out most of the work on these lines has proved to be a failure, or at most has had a very limited meed of success. This is possibly due, at least in part, to the fact that the toxins and extracts of the tubercle bacillus used for immunizing purposes have been obtained by heat or by various chemical processes, so that they do not represent the full toxic properties of the bacillus. To obviate this objection Koch's new tuberculin (Bacillen-emulsion) was employed. Perhaps a word or two of explanation as to the nature of this substance may not be out of place at this juncture.

Koch takes a definite weight of tubercle bacilli, filters them from all culture fluid, grinds them up with two hundred parts of 1/50 normal soda solution, and then centrifugates. He then pours off the supernatant fluid, adds weak acid to the residue until only slightly alkaline, and finally dilutes with a standard weak solution of carbolic acid and saline to the extent of one to three thousand. Glycerine is also added, and the final emulsion represents five milligrammes of pulverized bacilli in every cubic centimetre. (Deutsche med. Woch. Nov. 28, 1901.) The injection of this into tuberculous persons brings about a rise of temperature of one and a half to two degrees centigrade. The dose at the first injection is 0.0025 milligramme, rapidly increased two or five-fold until the reaction appears.

To obtain convenient amounts for injection the bacillus emulsion was diluted according to Koch's directions with a standard diluting solution containing 0.8 per cent. sodium chloride and 0.5 per cent. carbolic acid. Three strong healthy goats were subjected to the injection of the bacillus emulsion in gradually increasing amounts, the whole procedure extending over seven months. The reason for spreading the injections over so long a period was that it had been found by Maragliano and others that the animals stand the treatment better and the results are more satisfactory. The injections were given subcutaneously in the neck under strictly aseptic conditions once a week until towards the end of the allotted period. Previously, however, the normal temperature for the goat was ascertained. The amount of the emulsion injected was at first .0025 milligrammes repeated for three weeks and cautiously increased until at the end of three months the goats were receiving 0.015 milligrammes. Subsequently the amount injected was doubled each week, until at the end of the seven months 15 milligrammes was reached. After the first three months also the temperature before inoculation was taken as well as afterwards twice in the twenty-four hours. The normal

temperature of the goat varies between 101 and 103 degrees Fahrenheit. In only one case did the injection of 10 mmg. cause a rise of temperature from 102 to 103 degrees and 3-5ths, but this was only 3-5ths of a degree above the maximum normal variation. The subsequent injection was lessened to 7.5 mmgs. and then again increased. During the last few weeks while such large amounts were being employed the injections were only given once in from ten to fourteen days. After the animals were considered immune to the emulsion a period of three weeks was allowed to elapse, until all excess of the toxin should have been eliminated from the system. One of the goats was then bled from the jugular vein with the same precautions as before adopted, and the serum used for the purposes of the experiment. Tested by the Arloing-Courmont method as to its powers of agglutinating a homogeneous culture of the tubercle bacillus, kindly furnished by Prof. Courmont, it gave a positive reaction in a dilution of one to fifty.

Experiment III.

In carrying out the third experiment I laboured under considerable difficulties. Owing to the great disturbance caused by the injection of the serum in guinea-pigs it was thought better to use rabbits exclusively. Ten rabbits were taken, their temperature was noted daily for a week to establish a normal average, and their weight was recorded. They were then grouped in pairs according to their weight. Four were injected intravenously through the auricular vein; four intraperitoneally; and two in the left leg, with one-half c.cm. of an emulsion of a mild tubercle bacillus in saline solution standardized as before. One member of each pair then received one c.cm. of the fortified goat serum. Unfortunately, after the experiment was well started, rabbit septicæmia broke out in the hutches and about half the animals had to be replaced. At the end of month several of the animals were killed but it was found that the germ was not virulent enough to produce characteristic lesions. The animals were therefore reinoculated with the same quantity of an emulsion made from a mild germ received from Dr. De-Schweinitz of the Bureau of Animal Industry, Washington. In addition two other rabbits were inoculated in the anterior chamber of the eye, affording a convenient means of watching the progress of the tuberculous infection. At the end of another month four rabbits were killed and again no lesions were found. The results of more than two months' work was almost nil, although they served to indicate the effect produced by the antitoxic serum on the healthy organism. The average temperature before inoculation of the rabbits which did not receive serum

was 102.9 degrees and the average weight 1865 grms. After the injection of the tubercle germs the average temperature was 102.7 degrees and the weight 1878 grms. The average temperature before inoculation with tuberculosis of the rabbits that did receive serum was 103.2 degrees and the average weight was 1360 grms; after inoculation with tuberculosis and after receiving antitoxic serum the average temperature was 103.2 degrees and the weight 1675. Thus, as the culture inoculated was inocuous the conclusion is that the antitoxic serum had no effect on the temperature while it apparently stimulated nutrition as the animals receiving it had markedly increased in weight, and in truth appeared in fine condition. Finally as the experiment had to be concluded rather hastily, six guinea-pigs were taken, their normal temperature ascertained, and they were grouped in pairs as before according to weight. Two were inoculated in the left leg with a standardized emulsion of relatively mild bacilli, (1c.cm.) and the remaining four intraperitoneally with the same amount. One member of each pair was given one c.cm. of antitoxic serum subcutaneously every second day. Numbers III and VI, inoculated in the leg, died on the second day of the experiment, and presented no evidences of tuberculosis. Number IV died on the ninth day and its mate was killed on the eleventh. Numbers I and V were killed on the fourteenth day.

The general conclusion based on this experiment was that the antitoxic serum had a distinct effect on the development of the tuberculous process, inasmuch as in those animals that had received the serum the lesions were noticeably less than in the others. This was well exemplified in pigs I and V. In No. I the spleen contained a few minute tubercles as did also the omentum, while in No. V the spleen was much enlarged and apparently filled with tubercles, the liver contained a few definite tubercles, and the great omentum was greatly thickened and converted into a gelatinous firm mass.

With regard to the two rabbits inoculated into the anterior chamber of the eye, in one the disease progressed so rapidly, apparently from secondary infection, that accurate conclusion could not be drawn. The other proved quite satisfactory, however, and the progress of the disease could easily be watched. For about two weeks the disease advanced so that the small caseous mass at first resulting had become enlarged to twice its size. With this there was considerable swelling and injection of the iris with exudation and marked conjunctivitis. Then one c.cm. of serum was given every third day. After this the signs of the acute iritis and conjunctivitis subsided, and during the three weeks following the animal was kept under observation, while the disease un-

doubtedly progressed, and subsidiary tubercles formed, the process appeared to be quite slow and somewhat indolent.

In the case of the guinea-pigs it was found that the injection of the antitoxic serum had no modifying influence on the temperature. From the autopsy findings it would look as if the use of the antitoxic serum had a notable amount of restraining influence upon the dissemination and development of the tuberculous process. It is equally certain that it was not powerful enough to neutralize the infection and prevent its extension. I would hesitate to draw these conclusions from such a small series of animals were it not for the fact that the results are in perfect accord with those of work previously done on analogous lines.

As a result of these experiments as well as those detailed at the beginning of this paper, I think we are justified in concluding that it is possible to prepare a serum that possesses in a notable degree antitoxic properties against tuberculosis. Whether the various sera prepared are of much clinical value is to my mind questionable. Of course after the announcement of any new curative agent, there is always an outcry in its favour, but two or three years later most of these remedies have died a natural death. The only serum that is still being used is that of Maragliano, and he is so enthusiastic in its praise that an institute has been recently established in Italy for the treatment of tuberculosis by his method, to which he supplies serum gratis. Still his reported results, namely sixty per cent. of improvements, are not so much in advance of the figures furnished by any first class sanatorium, which are from forty to sixty per cent. of cures in the early stages. The results are not so good that we ought to pause in our efforts to obtain a yet more powerful serum. It may indeed well be that we have almost reached the limit of potency in the sera prepared by the methods here referred to and Koch is quite possibly right when he says that immunity to the action of the toxic products of the tubercle bacillus does not necessarily mean immunity to tuberculosis. In this case we probably need some serum powerful enough to destroy the tubercle bacillus in the tissues, or one which will stimulate the body cells to elaborate a germicidal substance. It is certain that further advances in this direction will have to be made on the lines of Behring's recent work, who has succeeded in producing immunity in calves by injecting them previously with attenuated germs of human origin. Possibly by a modification of his methods we may be able to elaborate a serum of the potency required. If not, the problem will have to be attacked on quite different lines.

In conclusion I wish to express my thanks to the Hon. E. H. Bronson

of Ottawa, whose public spirit and generosity have made this research possible; to Dr. H. M. Kinghorn of Montreal, now of Saranac Lake, and to Dr. H. Wolferstan Thomas, for cultures supplied, and to Professor Adami for valuable hints.

A complete bibliography and full details of the experiments are appended to the full paper.

A CASE OF GASTRIC SYPHILIS.

BY

H. A. LAFLEUR, M.D.

The following case seems to be worth recording for two reasons:—First, the lesion was observed *intra vitam* in the course of an exploratory laparotomy; and second, the patient made a perfect and lasting recovery, up to the moment of writing, more than a year after the operation.

J. F. L. C., 39 years old, single, first came under observation in June, 1897. In the summer of 1896 he had suffered occasionally from severe pains in the hips and lower extremities, which would last a day and a night and then subside. During the following winter the pains had increased in frequency and severity. He described the pains as aching with occasional twitches, and worse at night, sometimes preventing him from sleeping. The pains were not increased by walking or other exercise, and would sometimes be absent for a week at a time. He had no difficulty in walking, and did not stagger or stumble.

In 1892 he had a sore on the penis, lasting from March 24th to June 1st, and was treated for syphilis by a physician. Very slight, if any, secondary symptoms developed. From that time until the onset of the pains in his limbs he had enjoyed good health. Physical examination, when I first saw him in June, 1897, showed no organic disease of the various organs. Owing to illness I saw him only at long intervals until the end of January, 1898, when he again consulted me for the same pains. These had been very severe, occurring every month, sometimes every two weeks, and had not been relieved by full doses of iodide of potassium. Eventually, however, the pains subsided gradually, and I did not see him again until November 23rd, 1901, when he consulted me for indigestion and diarrhœa. The latter he attributed to a chill he had got while swimming, at the beginning of September, but he had been failing in health during the summer.

The stomach symptoms were flatulency, fulness, and a gnawing

Paper presented at the 18th Annual Meeting of the Association of American Physicians, Washington, May 12th to 14th, 1903.

feeling in the stomach at all times, but worse after taking food. There was no definite pain and his appetite had remained good, though he dreaded eating on account of the uneasy sensations that followed the ingestion of food. He was also nauseated rather often after food and occasionally vomited his meal unchanged, immediately or soon after eating. The diarrhœa was soon controlled, but the other symptoms were not alleviated by restriction of diet, lavage or drugs, and throughout November, December and January he became, if anything, worse. The vomiting particularly became more frequent; nothing seemed to agree with his stomach, but meat seemed to be borne better than any other food. During this time, repeated examinations of the stomach contents were made after a test-meal, and invariably with the same result—an inert gastric juice, containing no hydrochloric acid, no organic acids, and devoid of any digestive action on coagulated albumen. Inflation through the stomach-tube showed a prolapsed and dilated stomach, the greater curvature extending below the level of the navel. The stomach washings contained, besides undigested food, small flakes of muco-pus occasionally flecked with minute bloody points.

As the patient was steadily failing in weight and strength, it was decided, after consultation with Dr. Armstrong, to recommend gastro-enterostomy. While not declining an eventual operation, Mr. C. suggested taking a trip to the West Indies, in the hope that the sea voyage and rest would benefit him. He left in February for Jamaica, and was absent two months, during which time his symptoms remained the same and he continued to lose in weight. On his way back he consulted one of the most prominent clinicians in America, who concurred in the advisability of a gastro-enterostomy. I saw him soon after his return and was shocked at his appearance. He had lost 30 lbs. since the beginning of his illness, and was so weak that the slightest exertion was an effort. There was, however, no distinct cachexia, and the color of the mucous membranes was fairly good. Before finally deciding on operation, the stomach was examined, and to my surprise it was found that on full inflation the greater curvature did not extend beyond a point half-way between the xiphoid cartilage and the navel. This seemed to make a gastro-enterostomy unnecessary, but it was thought advisable nevertheless to make an exploration, find the cause of the trouble, and if possible remedy it. The operation was performed on May 14th by Dr. Armstrong, and the following account is transcribed almost verbatim from the hospital case-record, omitting only minor details of surgical technique:—

Primary incision in mid-line, midway between ensiform and navel. Stomach presented; anterior wall held firmly to anterior abdominal wall by thick band of adhesions, half an inch wide and one and a half inch long. This was divided, clamped and tied. Other denser adhesions were felt below, behind and above, and prevented extrusion of the organ. The pylorus was found quite free. There was no tumour apparent to the touch, but extending from a point about 2½ inches from the pylorus over towards the cardia the stomach-wall felt thicker than natural, and the surface of the organ in this area was characterized by a pinker shade and by scattered shallow puckerings. No glands could be felt in the gastro-hepatic omentum nor in the hilus of the liver, nor again could they be seen in the great omentum. The free edge of the liver presented a few nodules which were scraped and found to contain gritty calcified matter. There being no condition requiring a gastro-enterostomy, it was decided, in view of the abnormal appearance of the anterior wall, to open the stomach and expose the interior. The stomach was opened midway between the lesser and greater curvatures on its anterior aspect, the incision commencing about 2½ inches from the pylorus. This opened the stomach in the thickened area, and the following condition was found: stomach wall thick, about 1 cm., in places 1½ cm.; little bleeding; muscular tissue harder than normal. The everted surface showed complete denudation of the mucosa over an area extending completely around the stomach at the pyloric end of the incision. The same condition extended along the interior and anterior aspect of the stomach toward the cardiac end of the organ fully four inches. Here and there especially toward the margins of the bared surface there were small islets of mucous membrane having a rough cockscomb appearance and a purplish tint. The edges of the ulcerated area were well defined, serpiginious in outline and abrupt. The edge was very slightly heaped up and undermined, and just in the undermining angle was a whitish line. The surface of the ulcerated and denuded area was rather smooth, neither caseous nor necrosing, of a pinkish red color and almost bloodless. In the thickened area some cicatrisation and contraction had occurred producing a certain degree of hour-glass contracture two or three inches from the pylorus. A slice of mucous membrane, a section through the muscular wall and mucosa, and a snipping from the edge of the ulcer were taken for microscopic examination. After extending the wound to give sufficient space, the exuberant edges of the ulcer were pared, the base was curetted, and the thermo-cautery lightly applied to as much of the ulcerated surface as could be reached, the very slight bleeding following curettage being easily checked by the same means. The gastric and

abdominal wounds were then closed by suture. The subsequent course of the patient's illness was quite uneventful. There was no recurrence of vomiting or gastric distress, and when he left the hospital on July 3rd, he was taking a full and varied diet without the slightest discomfort, and gaining weight rapidly. Antisyphilitic treatment was commenced after leaving the hospital and was continued with intermissions through the summer.

The examinations of the tissues removed at the time of the operation were made by Dr. P. G. Woolley, who reported as follows:—The tissue from the base suggested malignancy, for there were small masses of epithelial cells surrounded by a fibrous stroma. But the edges of the ulcer were simply fibrous tissue and muscle, the former in excess, and there was no marked infiltration. The base was markedly inflammatory, not malignant.

The diagnosis of syphilitic ulceration of the stomach is not one that should be made without careful consideration or without excluding beyond a doubt the possibility of the more common forms of solution of continuity, for gastric syphilis is admittedly a rare lesion, and I am quite prepared to admit that the burden of proof still lies with me. Carcinoma, which was at one time suspected, may be at once dismissed. It is not so easy, however, to say unhesitatingly that it was not an *ulcus simplex* of large dimensions, such as have been recorded in the literature from time to time. I would attach some weight to the facts that the patient had not been a chronic dyspeptic, and that anacidity and not hyperacidity existed from the onset of the illness. But the chief argument is drawn from the anatomical character of the lesion. Both Dr. Armstrong, who has had a very considerable experience in the surgical treatment of gastric ulcer, and myself remarked at the time of the operation on the unusual character of the lesion—the soft, redundant, somewhat overhanging borders, the dry and almost bloodless base, and the long tag-like adhesions on the external surface of the stomach—forming a picture quite unlike that seen in simple ulcer.

Microscopically, the lesion was the exact counterpart, save in dimensions, of that described and figured by Dr. Flexner in Vol. XIII of the Transactions of the Association of American Physicians as one of syphilitic ulceration. The histological examination in the present case was necessarily incomplete, only small fragments of tissue being available for microscopic study. It is suggestive, however, that the same masses of epithelial cells surrounded by a fibrous stroma described by Flexner in his case were found by Dr. Woolley in the tissue from the base of the ulcer. As regards evidence of syphilis in the other organs, it is

probably not unfair to assume that the nodules in the liver containing gritty calcified material were the remains of a former gummatous infiltration of that organ. The clinical evidence of an antecedent luetic infection is certainly indisputable.

GIANT-CELLED SARCOMA OF LOWER JAW. RESECTION WITH PROSTHETIC USE OF SILVER WIRE.

BY

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E. F., aet 12. Admitted May 7th, 1903; complaining of a lump under the tongue.

History.—Five years ago the child fell on her chin against a chair, cutting the skin, but without sustaining any further injury so far as could be ascertained. Three years ago a small purple-colored lump made its appearance at the junction of the lower lip with the alveolar border of the jaw and exactly in the middle line. It was not accompanied by pain; nor was there any toothache. Two years ago the growth had attained the size of a walnut, and protruded above the lip. At this time her doctor operated, removing the growth under ether. He told her relatives that it was connected with the bone, which he scraped. The wound was packed with gauze, and was dressed daily for three months, when it finally healed. At the dressings no pus or dead bone was ever seen.

She remained well up to three weeks ago, when it was observed that a lump was forming a little to the left of the former swelling. Since then this lump has grown rapidly to about twice the size of that first noticed. The growth has never caused any pain; nor has it ever been tender on pressure. The child has never had a serious illness. The family history is negative.

Present Condition.—A well nourished girl, with good color; all her organs healthy; the only lesion found is the jaw tumor.

Condition of Jaw and Mouth.—There is visible externally a slight bulging of the chin just to the left of the middle line, extending along the bone for about an inch. The skin over it is normal. Inside the lip, the swelling is seen to occupy the alveolar border, and extends from the space between the first bicuspid and the canine tooth on the right side to the first molar on the left. it is not so prominent as to protrude the lip. The four lower incisors are absent, having been removed at the first operation. The mucosa covering the growth seems normal. The swelling feels soft, yet elastic. It has a bluish look, but is not

compressible; nowhere does it feel bony, and palpation causes no pain The root of the left canine is slightly exposed; but probing discovers no dead bone.

It is impossible by palpation to assure oneself as to whether the growth involves the centre of the bone, or only the periosteum. Although on the left side of the chin, the bulging seems to involve both alveolar border and body of the jaw, the inner surface, towards the mouth cavity of the bone, is plainly not abnormal. No egg-shell crackling can be made out. One minute nodule is felt in the left submaxillary region, suggestive of an enlarged gland; but it is so small as to be uncertain.

A clipping removed from the growth and examined microscopically confirmed the diagnosis of sarcoma, and afforded the further information that it was of the myeloid variety.

In the consideration of this case, two points appealed to me as being of especial interest; first, the question of the degree of malignancy of the giant-celled sarcoma, with the corollary of the extent of the operation to be undertaken; second, the question of the deformity and the loss of function entailed by resection of the lower jaw, and the prosthetic work necessary to obviate these.

While, in the minds of most surgeons, to name the name of sarcoma—whether, spindle, round, or giant-celled,—has been sufficient to indicate the most radical operation, there has been growing up lately a tendency towards more conservative treatment. I speak here, in the case of jaw tumors, not of the sarcoma epulis, which has never been considered materially malignant, but of the endosteal growths. Endosteal sarcomata are in the great majority of cases giant-celled in type, with a greater or less admixture of spindle or round cells. It seems certain that, clinically, these are the most benign of all sarcomata. Nélaton used to deny even that they were real tumors, and called them hypertrophies of the bone-marrow, but doubtless this was going much too far.

Nevertheless, metastases from myeloid sarcomata are certainly rare, and recurrences after wide removal very infrequent. While we still know practically nothing as to the essential nature and significance of giant-cells, the belief is probably widespread that the more purely giant-celled a sarcoma is, the less is its malignancy.

In 1889, Fedor Krause,[1] reported from v. Volkmann's clinic, 4 cases of endosteal jaw sarcoma treated only by local curetting and chiselling. In all cure resulted, although in one there were 6 recurrences. In another case affecting the tibia cure was permanent 2¾ years after operation. In a late number of the Johns Hopkins Bulletin, Bloodgood[2]

takes up the question, and reports upon 7 giant-celled sarcomata from Halstead's clinic treated by more or less conservative operations, all with good results. He reviews the literature of the question in Progressive Medicine, Dec. 1902, page 150[3], and concludes that it is justifiable to attempt to remove myeloid sarcomata first by curetting and chiselling alone; if recurrence appears, by resection; and by amputation only when a very great amount of bone is involved, or when the surrounding soft parts are infiltrated.

In view of this evident tendency towards conservatism, and because of the considerable mutilation involved in a wide resection of the lower jaw, one might have entertained, in the case here reported, the idea of a purely local scraping and chiselling operation, with conservation of a posterior bridge of apparently healthy bone. Nevertheless the contraindications seemed sufficiently definite. The present growth was a recurrence; it had increased rapidly in size; it already involved a considerable portion of the jaw; if originally endosteal, it had by now certainly broken through the bone and invaded the gum and soft parts of the chin; and, in the microscopical section of the clipping the sarcoma was far from being of the pure giant-cell type. For these reasons a wide resection was planned. There came, in the second place, the question of how to obviate the deformity and loss of function necessarily resulting.

Operation, May 15th, under ether.—Resection in the usual way through an incision running along under surface of jaw below the chin, the first molar on each side being extracted and the bone sawn through at those points. The right molar would have been saved, had it not been completely carious; soft parts dissected wide of the bone both in front of and behind the chin. A hole was then drilled through either stump; and a length of strong silver wire, heavy enough to retain firmly any shape given to it, yet light enough to be easily moulded with the hands, was passed through the hole in the left stump forming a loop. The two free ends were brought over to the right side, and the wire was worked into an anterior curve approximating the contour of the chin, the two strands being fixed at a distance of about ¾ of an inch from each other in the vertical direction. I may say here, however, that this distance became later, whether by pressure of the stumps, or by manipulations in the later part of the operation, somewhat reduced.

One free end of the wire was then passed through the hole in the right stump from inside to outside, cut off short, and the end clinched with hammer into the compact bone. The other free end, cut to the proper length, was shoved about half an inch into the spongiosa. It was now found that the loop in the right stump allowed some sliding

in the transverse direction; it was therefore clamped down close to the raw edge of the stump, forming a sort of O. The mucous membrane of the lip was then united by interrupted catgut sutures to that of the floor of the mouth without undue tension, thus covering in the silver wire from the oral cavity. The bunch of chin muscles, mylo-hyoid, genio-hyoid, and genio-hyo-glossus, was sutured in one mass with two or three chromicized catgut sutures to the base of the tongue. Finally, the skin wound was sutured, leaving gauze drainage at either angle.

The after-course may be summarized in a few words. The patient was allowed to swallow a little water 6 hours after operation, which she did without difficulty. The control of the tongue, it may be said in passing, was very satisfactory from the first. Ordinarily in extensive chin resections, it must be carefully held forward with a silk ligature through the tip for several days. In this case the silk ligature was removed on the morning following as being evidently unneeded; and no doubt the explanation lies in the fact that, by the insertion of the wire and by the suture of the mucous membrane, the normal relations of tongue fixation were largely restored. Three or four days after operation, it was found that all the catgut sutures uniting the mucous membrane on the left side of the mouth had given way; whether from infection or from a too early use of the tongue it is hard to say. This left a large cavity towards the skin wound, which has since granulated in satisfactorily. The retention of the stumps is almost perfect. On the left side the one remaining molar articulates exactly with the upper one; on the right side, it is drawn inwards so as to articulate in only half its surface with the corresponding upper one. The movements of the stumps are good; but the patient is still unable, or perhaps unwilling, to bite anything with the two teeth left.

The chin is well preserved; but the lip shows a slight tendency to be drawn inwards, though not enough to be deforming. The wire seemed, until several days ago, to have healed in perfectly; but at that time (about June 11th), there developed at the right angle of the skin incision, previously well healed, a sinus, which does not communciate with the mouth. On probing this sinus, the bare silver wire can be felt; and the suspicion is natural, that the end of the wire shoved into the spongiosa of the bone may have loosened and be now inducing local suppuration. Even if such be the case, one need hardly doubt but that a small secondary operation to secure this wire-end more firmly in the bone will succeed in closing the sinus.

Description of Tumor:—The jaw being sawn through from before backwards about the middle of the body, it is seen that the bulk of the tumor occupies the medulla of the bone; and there can be no doubt

but that it was of endosteal origin. The anterior shell of the body is perforated very extensively by the neoplasm, which, invading the soft parts, produced the swelling seen clinically. Posteriorly the layer of compact bone is not materially destroyed. The growth is reddish and friable; and contains one cyst, about the size of a small marble, which contained slightly hæmorrhagic fluid. The soft tissues are apparently dissected wide of the growth. No glands are to be found.

The full microscopic examination by Dr. Keenan was as follows:—

Sections of tumor show tissue to be that of a typical myeloid sarcoma. The cells are of two classes; one, large irregular multinucleated cells; one, small mono-nucleated round or fusiform cells. The multinucleated cells contain from 3 to 10 round vesicular nuclei, and occasionally nucleoli; nuclei are scattered irregularly through cell protoplasm; there is a very small amount of interstital substance. Blood vessels are fairly numerous with thin but definite walls.

In planning the prosthetic work in this case, two main points had to be considered. First, the age of the patient. Being 12 years old, she has as yet only two molars. In her 18th year, or probably a little before, she will get her 3rd molar; and still later her wisdom tooth. Second, the extent of the resection planned, which was to leave her with, at present, only one molar in either stump. Probably the best prosthetic method is that which holds the stumps in position by a temporary splint, whether wire or interdental, during healing, and inserts thereupon a permanent dental appartus with teeth. In the present case, this was rendered impossible, or at least very difficult, by the fact that not enough teeth were left to which to attach a permanent apparatus. Anything permanent would be better applied later, when the patient had acquired the rest of her second teeth. For the intervening years, some kind of support was needed, which would keep the stumps from being pulled inwards and preserve the chin contour. The idea of silver wire, to be used as above described, occurred to me; and on looking through the literature, I found some analogues and two precedents.

C. Hofmann[5] reports in 1900, his use of silver wire, which healed in permanently, in a large defect of the lower jaw following osteomyelitis. The result was excellent.

Pearce Gould[6] in 1897, reported a case of the use of silver wire. The wire later "became shifted, and appeared through the cheek, and the man removed it himself." The advantages of silver wire are evident; owing probably to its antiseptic action, it is able, as has been demonstrated, to heal in even in septic wounds. It is easily handled; it is adaptable to large defects, and is easily inserted. In all that concerns the dentistry of this case, I must acknowledge here my great indebted-

ness to Dr. E. B. Ibbotson, dentist of the hospital, who has freely aided me with his advice.

Our plans for the patient are to provide her later with a light removable apparatus to hold out the chin and to prevent undue scar contraction; and still later, when she has attained full growth with three solid teeth in either jaw to insert a permanent plate with teeth.

So far, apart from the development of the small sinus, which I expect to heal ultimately without trouble, the result has been excellent.

The X-ray picture taken with the plate under the chin, and the tube a little in front of the forehead showed the extent of bone destruction.

Inasmuch as the chief *raison-d'être* of this article is to give a preliminary report of an attempt at immediate lower-jaw prosthesis, it may not be uninteresting at this point to review briefly the literature of the subject in so far as it has been found accessible. Unfortunately much of it is contained in foreign dental journals not available here for reference. This kind of work seems upon the whole to have been decidedly neglected until just lately in England and America as compared with France and Germany.

Martin,[4] of Lyons, seems to have been the first (1889) to write at any length upon the subject. I have not been able to obtain his work, but his method is briefly described in an extensive article by Hahl[5] in Langenbeck's Archiv, in which the French and German methods are contrasted.

The Lyons school, represented by the work of Ollier and Martin, fasten in during the operation an apparatus of hard rubber corresponding exactly to the size of the portion of jaw removed. After weeks or months this is replaced by a smaller permanent appliance.

The Berlin method, worked out by Von Bergmann and Sauer, fills in the defect only after healing, but before scar contraction sets in; and endeavours, especially in lower-jaw resections, only to keep the stumps in normal condition during healing.

Finally, Gluck and Warnekros modify the Ollier-Martin method by putting in a permanent prosthetic appliance at operation; implanting it, as it were, and expecting it to heal in.

Martin's "appareil primitif" was made of hard rubber, and was secured by pegs or screws to the stumps, or by clasps to the teeth where any teeth were left. It was built in two parts, one corresponding to the body of the jaw, the other to the alveolar process; and the lower portion was again made in two halves to facilitate removal. It was supplied with a system of canals and with a tube for purposes of cleansing.

Of the cases reported by Martin, half healed *per primam*; while in the rest the apparatus seemed to cause considerable inflammatory trouble, with a good deal of pain.

Gluck and Warnekros believed they obviated these dangers by using metal instead of rubber; by a more perfect fixation and a more perfect asepsis.

Hahl, from whom I quote the above details, proceeds, without discussion, to describe the Von Bergmann-Sauer method, as practised in Berlin for the previous decade (1887-1897). From an experience of 45 lower and 81 upper jaw resections, all treated prosthetically after operation, his conclusions may well be said to command attention.

In the case of the lower-jaw Hahl sets up 3 groups, according to the location and extent of the resection.

I. The chin is removed. Here a wire splint is intercalated during healing. If two or three good teeth remain, the wire is wound round them on either side. If no teeth remain on one side, the wire, fork-shaped, is shoved into the spongiosa on that side. The wire is shaped before operation; and the material used is either gold, aluminium-bronze, or nickeled steel.

Where all the teeth were lacking, Hahl used either Bönnecken's wire-bridge, fork-shaped at either end in such a way as to embrace the stumps, or else a solid metal spindle-shaped body large enough to support the lip, and provided with two sharp points at each end which were shoved into the bone and fastened by wire ligatures. In all these cases, as soon as healing was complete, the wire splint was removed, and a broad hard-rubber splint, with wing-like processes towards the jaw stumps, covered with black gutta-percha and attached to an upper plate by a spiral spring, was immediately inserted for permanent use.

II. Cases where a portion of one lateral half of the jaw was removed, the chin remaining intact: Here a sort of stick, made of gold or of aluminium-bronze, of the size of a lead pencil, was inserted in the usual way by means of sharp forked ends into the spongiosa, and made fast by wire ligatures. This was left to heal in permanently.

III. This group comprised cases in which the whole of one-half of the jaw was removed. In these Sauer's device of the "shiefe ebene" or slant splint was used. This is a splint attached at an incline to the outside of the teeth of the sound side, in such a way that, when the mouth closed, the upper teeth, impinging on the splint, forced the lower jaw outwards. It was inserted at operation and fulfilled the great indication in these cases, that of preventing the in-falling of the sound half of the jaw. This was worn by the patient until the permanent plate was inserted, or longer, if there remained any tendency towards in-falling of the sound side. The details as to just how the permanent plates in these cases are fastened in, which is after all, a question of pure dentistry, are very incompletely given.

Various other surgeons have devised modifications of the above-de-

scribed principles, mainly in the direction of temporary supports during healing. McBurney[7] used in 3 cases of excision of one-half of the jaw, first, an interdental splint; then, when complete cicatrization had occurred, a spiral spring, which, fastened to the cuspid of the lower jaw, and taking its support from an upper molar on the other side, held the lower jaw in position until the muscles of that side were sufficiently educated; finally, replacing this, a permanent rubber plate with "plumper." The result was excellent in all.

Sir Wm. Stokes[8] devised a splint of wire, so twisted as to present two arms at either end, which embraced the jaw-stumps and held them apart. This had the advantage over the rubber interdental splint, that it allowed of easy irrigation, and that it did not have to be removed for feeding.

Pearce Gould,[6] after failing in one case to get silver wire to heal in, tried in two other cases a steel bar with reverse screws. In one, the bar healed in well; in the other it worked loose and had to be removed.

Stanley Boyd had used a knitting-needle, which became displaced and had also to be removed.

Cryer,[9] of Philadelphia, reports his prosthetic work in a case of J. Wm. White's. His technique seems to have been practically the same as that of Martin above described:—a temporary vulcanite splint, followed in 6 weeks by a permanent one, carrying 8 teeth, and attached by wire to the capped teeth (two last molars) remaining on either side.

Berndt[10] reports 4 cases of resection of one half of the jaw, in which he inserted at, or soon after operation, a celluloid pessary-ring, moulded so as to approximate the shape of the portion removed. Although sinuses gave trouble for some time, the celluloid ultimatly healed in permanently in all four cases. Deformity was obviated, and the function of the remaining side was preserved.

Bardenheuer[11] and others, disbelieving in foreign bodies in the mouth for prosthesis, have devised, where the defect was not too great, various plastic operations to bridge the gap with bone. Some of these have been successful, but their usefulness is evidently limited to small defects.

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VALEDICTORY ADDRESS.

FACULTY OF MEDICINE, McGILL UNIVERSITY, 12TH JUNE, 1903.

BY

FRANK BULLER, M.D.

Perhaps it never occurs to an audience such as here assembled, the extraordinary difficulties encountered by the annual victim of a time-worn custom such as I am here to represent. It is of course expected of every Valedictorian that his utterances shall be crisp, sparkling, and original; that he shall promulgate ideas and pour out a deluge of wisdom and good counsel the like of which never before emanated from the neurons of a cerebral cortex. If he does not accomplish this, and more also, he feels somewhere deep down in the innermost recesses of his mental organism, that his lofty mission has proved a failure, that he has blighted the expectation of his colleagues, and cast a shadow over the glowing enthusiasm of the bright young minds, now for the first time emancipated from the leading strings of an elaborate curriculum, and the dignified restraint of a venerable collegiate institution. Where, may I ask, shall you find crispness at a season when all are experiencing the depression of protracted toil, to which is superadded the enervating qualities of approaching summer? Whence shall there come aught that is sparkling, through the clouds and mists of labor in the confined atmosphere of a city, surcharged with the grimy elements of soft coal, bush fires, and dessicated street sweepings? Where shall you seek for originality in a field of thought which has been ransacked for a century or more by thousands in pursuit of the same objects, —the production of an instructive and entertaining address, about nothing in particular?

Fortunately conditions change with the evolution of knowledge, else there would be nothing to relieve the dull monotony of tales a hundred times thrice told. Fortunately too, there is an ever-changing kaliedoscope of thoughts and ideas which comes to yield something of its own to each revolving scene in the panorama of life.

Thirty-three years ago when I was a post-graduate student in Berlin I remember well the remark of a somewhat cynical elderly Scotchman, engaged like myself in the diligent search for the knowledge which grows from more to more, discussing one day the things we thought we had learned, and the things we might still have to learn. He said to me, "you seem to think you know a good deal about medicine and surgery in general and ophthalmic surgery in particular, but you may take my word for it, your ideas of things ten or twenty years from now will have entirely changed. The things you know, or think you know now,

will be supplanted by other ideas, and other knowledge, and you will look back to this present time as a period of darkness and ignorance." Our brief acquaintance was of the " ships that pass in the night " sort, and I know not whence he came or whither he went, but his words were prophetic; his predictions I have found to be true. In these thirty odd years everything seems to have changed, with the exception of a few general principles, such as we all learn during the period of student life.

Thoughts, ideas, methods,—all have undergone transformation. Good old-fashioned, vile tasting rhubarb and jalap have been replaced by sugar-coated confections equally efficient, and whole regiments of chemical formulae I once had on the tip of my tongue,—all these things and many more have passed into oblivion. And believe me, I am well within the truth in telling you that, so far as I can compare my working knowledge of to-day with that of the past, in the days of this transient friendship, there is very little not so utterly transformed that I might be a different person altogether having but a dim consciousness of my former self. In all this, the change has been so gradual that one recognises no difference from year to year and only comes to understand it all by a retrospect extending away back to an almost forgotten shadow-land.

I do not imagine there is anything peculiar or unusual in this, but rather that it is the common experience of all who have similar opportunity to observe the progressive alterations in all things which go to make up the sum total of an active, or, to use the cant phrase in vogue just now, a strenuous life. What food for thought there is in that small word! Some one has said it is one half an if, and three-fourths a lie. A sad dog he must have been, to speak thus of the word which represents all that we know of happiness in the present, of hope for the future. More than this it represents the culmination of Divine Power, the sole purpose of the universe. It is the medium through which all knowledge is acquired and transmitted, the connecting link between the material and the spiritual, for those who believe the present is but a preperation for another existence. To the pure materialist it is the beginning and the end of all things.

Apart from all metaphysical considerations, are we not justified in assuming that the highest destiny of matter is the evolution of life? So far as we know the materials which are used to make up a world in any part of the universe, are always the same. We know enough of our own solar system to justify the belief that our planet, the Earth, is the only portion of this stupendous machine thoroughly well adapted for the support of life in the infinite variety known to have existed

here for countless ages; though only comparatively a recent development in its higher forms. No one can deny, and indeed there is no reasonable doubt, that the same or very similar conditions prevail in other systems, perhaps millions of systems greater than ours. We recognise here something which it is easy to believe displays the very essence of, and reveals the matchless work of a Divine Power in preparing an otherwise useless material for this its highest known function—to wit, the development and perpetuation of life.

Science has evolved wonderful results in utilising the various forces of nature for the benefit of the race, but we seem no nearer a solution of the mystery of life itself than our forefathers have been. No one as yet can explain the transformation of inert material into a living, sentient organism, nor have we anywhere indisputable evidence that this is not the very highest expression of the will and purpose of an over-ruling power; whoever then contributes most to the perfection of this purpose may reasonably claim to stand in closest relation to the Giver of Life. It is in accordance with the known laws of life that all lower organisms are more or less subservient and contributory to the higher. This is a cogent reason for assuming that the higher forms of life represent the most perfect and complete result of Nature's efforts.

If this be true, those who are specially qualified by natural gifts, and careful training, to foster and care for the higher forms of life, are surely nearer to the heart of Nature than any others. I am confident on one here will deny that this is the special function of the Medical Profession. A consciousness of this should be a never-ending source of satisfaction to every worthy member of the profession. This is the high office to which you, Gentlemen of the Graduating Class have now attained. This is the great distinction that you Gentlemen of the Junior Classes are seeking to acquire. For the sake of your Alma Mater, of the friends you love best, of all that makes life worth living, see that you bear the honors with all the dignity and pride of real merit, bold in the consciousness of unalterable integrity. Then, and then only, can you be sure of having friends and companions among the best in the land.

If you show me a few minutes indulgence, I shall venture now to exercise one of the privileges belonging to the part I have the honor of acting in this afternoon's programme. Briefly then, I purpose giving the usual few words of advice, directed chiefly to those of you who are about to leave us carrying with you tangible evidence of our appreciation as well as the intangible bond of sympathy, which forever

unites those who have long worked in harmony together, and still continue to cherish the same pursuits.

In the first place let no one imagine he has completed his studies when he has become possessed of a college diploma. The first thing to do, if you have not already anticipated the suggestion, is to obtain the code of medical ethics and make yourselves thoroughly familiar with its contents. You will find nothing more helpful than this from start to finish. Amongst other things in this little booklet, you will note the statement that, "a regular medical education furnishes the only presumptive evidence of professional abilities and requirements, and ought to be the only acknowledged right of an individual to the exercise and honours of his profession." Note the phrase, "only presumptive evidence of professional abilities and requirements." After all then, having spent several years in arduous study,—though pleasant and profitable I hope they have been—after having successfully run the gauntlet of half a hundred examiners, the most you can claim is presumptive evidence that you are qualified to practice your profession. Supposing you have done all this and also fulfilled all the requirements to legalize your pretentions, can you all conscientiously affirm, that this is sufficient? It is not a fact that some, if not all of you, would be the better of further study in the practical school of junior hospital appointments? Speaking with the authority of long experience I may say I would have a poor opinion of any recent graduate who would answer this question in the negative. Granted you will say, but how are we all to obtain hospital appointments? My answer is, there are many hospitals throughout the country that would be glad to obtain the services of young men who really desire to do good work, and are willing to serve another year or two without pecuniary reward, just for the sake of the inestimable advantage this sort of training affords. It is true that such appointments in large cities for the most part only go to those who have shown more than average ability as students. In some respects this is an unfortunate state of things, but I do not see just how it can be remedied. Certainly the less successful students are the ones most in need of further opportunities for practical study.

How shall we find a remedy? For the present I have only one to suggest. The world is wide and hospitals are many. Let every recent graduate make up his mind he must obtain some sort of appointment that will give him the privilege of doing hospital service. Of course there are not enough vacancies in the resident staffs of our own hospitals to give all the graduates of each year such positions, but I believe many could readily obtain similar positions in other cities in

Canada, in the United States, and elsewhere. Would it not be wise then to make applications immediately wherever there seems a chance of obtaining an appointment ? Some of us who have been your teachers might be of service in securing such appointments and I speak now for the Faculty, when I say that every one of our graduates can depend upon our cordial support in matters of this kind. How could it be otherwise since our strongest desire is to secure for all our graduates the highest honors and the foremost places in the ranks of the profession ?

Though all may not be in a position to undertake this additional course of training, there is no doubt that many more would do so could they be brought to realise the enormous advantages to be gained thereby. Of this I am certain, the young practitioner who has placed the coping stone of hospital experience on the mental edifice of four years study, finally goes out into the world in every way better equipped than those whose foundations may be all right, but whose superstructures have never been properly and thoroughly completed. Remember that where there is a will there is a way. Some of you will obtain these positions immediately and without difficulty, and with these as with many of their predecessors there may be a stumbling block in the well known and recognised fact in all the affairs of men, that things easily obtained are often not valued as they should be, and for this very reason the best opportunities may be wasted if not entirely thrown away. Let me tell you I have seen many young men possessing the very best appointments, with ample opportunity of learning in every department of medicine and surgery, simply settle down to a life of ease and enjoyment, actually thinking more of trumpery amusement than they do of filling in every precious hour, every golden minute, with the glorious work of storing the experience of a lifetime into a mind and body still young and vigorous enough to make the very best of every capacity, of every attainment.

If the contrary course be pursued, if there be an earnest desire to gather up, not only the whole loaves, but every crumb of experience that life within the walls of the hospital affords, is it not equivalent to putting an old head on young shoulders; and is it not true that those of you who have achieved this may go forth ready to conquer the world, or at least so much of it as comes legitimately within the sphere of your action ?

This is the very growing time of the young physician's life, the season is short; let him have a care that no time be lost, that the seeds be sown early in a well cultured soil, lest the growth be stunted and the harvest immature. Consider how it is with us here in the

north, and how it would be with June and July taken out of the calendar; one such year would mean incalculable loss; two or three in succession, starvation, ruin, and utter desolation. With only one season, which never returns, would it not be an act of madness on the part of him who should waste the June and July of his life in idleness and frivolity? Yet this very thing has happened time and again to my certain knowledge, and may still recur, should this my friendly admonition go unheeded. I do not say there should be no relaxation from duty, no time given to healthy recreation; on the contrary, within certain limits the business of pleasure may be a necessity; but I do claim that the months or years of extra training I am advocating should be as carefully regulated as they would be by one who undertakes a course of physical training for the purpose of winning a prize only attainable by the highest development of skill and endurance. And *such* a paltry prize compared with the one you are striving for!

In order that the fullest advantage may be derived from hospital work, it does seem to me things might be arranged differently. I have always and everywhere observed a tendency in young men to unduly exalt the department, or particular work in hospital, they happened to have. There are sometimes even petty jealousies between those doing work in the different departments. No more deplorable mistake can be made than this. In such work there is no room for jealousy or the sort of competition which so often tends to make life mean and sordid. Here the only competition should be to see who can do the most in advancing his own knowledge and that of all who are associated with him. Here at least is a case in which the benefits to be derived from co-operation are mutual and reciprocal.

Some of you will seek for further training abroad. Those who have this in view may be divided into three classes: first, those who intend spending one or more years in purely scientific work. These are few in number, but the country has need of them and they should be encouraged in every possible way. The second are more numerous and will go across the Atlantic with the intention of seeing something of the hospital work and general teaching on the other side. This too shows a laudable and enterprising spirit. I cannot urge too strongly upon these the paramount importance of obtaining some sort of hospital appointment. In this way they will learn much more than as mere onlookers, who are never brought into the inner circle, and never in a position to follow all the details of any case, however, interesting or instructive. The itinerant may get a smatterng of many things, but he comes home without a substantial working knowledge of anything. In order to obtain hospital appointments it may be necessary to pass one or more of the old country examinations. This of

course involves some loss of time, but it may be well worth the extra time and trouble. I can speak from experience in this too, for I held various hospital appointments for six years in Europe, and was only able to obtain them by having an English qualification.

Those who elect to follow the clinical teaching on the Continent will of course find the usual facilities for this kind of work in any of the large centres such as Vienna, Paris or Berlin, but for certain special work some of the smaller clinics may be found more suitable.

Those who elect to follow the clinical teaching on the Continent will who intend to become specialists. Let me tell you first of all, the student who leaves his college and immediately goes abroad to study some specialty for six months or a year, during which time he merely attends the clinics, and then returns home and starts as a specialist, is nothing short of an imposter, a superficial, narrow-minded, ill-trained egoist, too ignorant to understand his own incapacity. Alas! There are many much scattered all over the world. They do infinite harm to themselves, to their victims, and to the profession, before they are properly found out. Whoever would become a specialist should first have several years general training in hospital and if possible add to this two or three years general practice, then, having found his special aptitude and having taken counsel from some one high up in that particular work as to probable fitness, spend at least two years in some great hospital centre, if possible as a resident in some large special hospital, and then by hard and unremitting toil he will have done all that is necessary, and the reward will be a knowledge of the work so complete that the respect and good will of the community in which his lot is cast, becomes an assured and permanent thing. The specialist worthy of the name has no secret knowledge, no occult formulæ. for the cure of disease; he has only learned his work so thoroughly that the whole subject is as an open book to him, and he sees at a glance things which to the novice are hidden or hopelessly obscure.

In conclusion I would say, let your first and last endeavor be thoroughness in all that you find to do; make no haste to acquire wealth of the sort that men can buy and sell, for the only wealth really worth possessing is ability, and the consciousness of ability, to do good, honost, intelligent work. This is a wealth which can never be taken away. It is not subject to the fluctuations in value of things commercial. It does not tarnish or become soiled by vulgar usage, but goes on increasing in value and in brightness in a way that far outshines even the grasping miser's lurid dreams of avarice. Let this be your goal and you shall win a crown to wear within the heart, "a crown that's called content."

ON THE COAGUATION OF BLOOD IN ITS RELATION TO THROMBOSIS AND THE FORMATION OF FIBRINOUS EXUDATE.

BY

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I intend to report briefly upon some experiments, which were undertaken with the intention of analysing the different factors, which might come into play, if blood vessels are occluded during life by thrombosis, and in the formation of fibrinous exudate. In a preliminary way we may divide the causes leading to coagulation, into three classes: first, the causes determined by the constitution of the blood itself; second, the influence exercised by the surrounding tissue upon coagulable fluids, and third, the influence of elements foreign to the body, such as bacteria and ligatures.

In the experiments reported by former investigators the blood was collected in tubes containing suspensions of solutions of different substances, and in that way the influence of such substances on the coagulation of the blood was determined. Under these experimental conditions the difference between the action of the various substances found was slight, coagulation usually taking place inside of the next ten minutes, therefore the investigators who studied this question came to the conclusion that all extracts of organs accelerate the coagulation of the blood, though Delezenne notes in a brief way, that he found extracts of birds' tissue more effective than others in causing the coagulation of the blood of birds. It is evident that this method does not imitate the conditions usually prevailing in the animal body where the coagulable liquids are usually not mixed with the extracts of organs, but are only in contact with the tissues.

Under these conditions Conradi found that the blood collected in tubes was not influenced in its coagulation by mere contact with tissues. In my own experiments I used a method, which I first employed in previous investigations on coagulation of the blood of arthropods.[1] I freed the blood from its cellular contents, distributed measured quantities of the plasma into small dishes and in the centre of each dish I placed the substance whose influence upon the coagulation of the blood I desired to investigate. This method does imitate the conditions prevailing in the body. The blood of birds is the most convenient for such purposes, because, if it be collected, as Delezenne has shown, through canulas introduced into a vessel, and if contact of the

These investigations were carried out under a grant from the Research Fellowship Fund of McGill University.

1 Biol. Bull., May, 1903; and fully in Virchow's Archives, July, 1903.

blood with the wound be avoided, plasma can be obtained which does not coagulate for many days.

Among the factors to which was frequently attributed great significance in the formation of thrombosis, blood plates are to be mentioned. If we centrifuge the blood of a goose, collected in the way above stated, we can easily separate a large number of the blood plates or cells analogous to the blood plates of mammals, and white blood corpuscles, from the majority of the red blood corpuscles. If we now add these blood plates to the blood plasma, they do not have any marked effect in causing coagulation, neither do washed red blood corpuscles, even after they have been crushed to set free their cellular contents.

It has further been maintained, that during coagulation of the blood, the plates agglutinate and become to a great extent dissolved, and that these two processes stand in direct causal connection in the coagulation of the blood. It is, however, easy to observe, that the blood plates in birds' blood not only have no strong coagulating influence upon the surrounding plasma, but even that the agglutination takes place long before coagulation sets in, and that these two processes are perfectly independent of each other.

I mention here that it is possible to collect mammalian blood plates in a way analogous to the method employed in collecting birds' blood plates. Ordinary mammalian blood cannot be prevented from early clotting, as is the case with birds' blood; if, however, a few cc. of mammalian blood, from the guinea-pig for example be collected in about 30 cc. of a .8% sodium chloride solution, previously heated up to 56 C., this blood can in most cases be centrifuged without any coagulation taking place. Under these circumstances we see between the liquid and the red blood corpuscles a thin white zone, which consists of agglutinated blood plates and leucocytes. The former are little bodies sending out processes all of similar size, staining more with basic than with acid stains, agglutinating, containing no hæmoglobin, and therefore corresponding perfectly with those elements of the blood which are called blood plates. We have thus an easy method of separating blood plates from the other elements of the blood, and of collecting them in large masses.

If we add to measured quantities of plasma, distributed into flat dishes, pieces of various tissues, we see that certain laws prevail with regard to the power of those tissues to produce coagulation. If we use goose blood, the strongest reactions occur with the tissues of the bird: in our experiments the muscle of the pigeon, goose and hen was used, the pigeon muscle most frequently. Birds' liver also was used, and though it was not always as active as birds' muscle, the difference was

not very great. With guinea-pig muscle we noticed an unexpected falling off in the strength of the coagulating power. In many cases pigeon muscle may cause coagulation of goose plasma in one or two hours, with guinea-pig muscle it may require one or two days or it may not take place at all. Rabbit muscle acts in a way similar to that of the guinea-pig. The muscle of the cat is very active, although not so strong as that of the pigeon. Dog muscle is less active than that of the cat, and frog muscle may sometimes be more active than guinea-pig muscle, but is decidedly less so than birds' muscle. Lobster muscle has a weak activity, fish (flounder) and crab muscle are much more active.

In former investigations I had observed that the blood plasma of the lobster coagulates rapidly under the influence of lobster muscle, that the muscle of the rat and guinea-pig is without effect. Since then I have tested a number of other substances for their coagulating influence on lobster plasma, and found absolute inactivity of all vertebrate tissues which have been so far tried. We therefore can speak of a specificity in the coagulating influence of tissues upon the blood of different animals, and probably one has to assume a different chemical structure for the fibrin ferments present in organs of different classes of animals, and a different structure for the fibrinogen present in the blood of different animals. This specificity, however, is not as absolute as the one observed during the last years in substances obtained by immunising animals, for example, the precipitins and agglutinins. Experiments carried on with turtle blood and the blood of rabbits lead to similar conclusions, and upon the latter experiments I shall report later. I may state in a preliminary way that in several series of experiments, in which the blood of rabbits was collected in tubes containing extracts of different organs, extracts of the muscle and liver of the rabbit had a rapid coagulating effect upon the blood of the rabbit, extracts of the muscle and liver of the pigeon and of the guinea-pig seemed to have rather an inhibiting influence as compared with the action of an 8% Nacl. solution. In a similar way extracts of the muscle and liver of the turtle have a specific coagulating effect upon the blood of the turtle, extracts of the organs of a rabbit or pigeon are considerably less active. These latter experiments, however, I intend to repeat before I can accept these results as definite. On the whole other organs of the different species act in a similar way to muscle; there, however, seem to be some slight differences, the lymph glands of guinea-pig were usually found to be more active in causing coagulation than the muscle of the guinea-pig.

If we add, however, instead of pieces of various organs, the clots from the blood of various animals, we do not find this specificity. If

we again use goose plasma as a test object we find that the clot of the blood of a guinea-pig is just as active, or sometimes even more so, than the clot of a pigeon or a goose in causing coagulation. Frog clot is also active. Clots of the blood of the dog and cat are extremely active, but their activity never surpasses and usually is less than the activity of pigeon muscle. In regard to the various clots, we do not observe specificity to the same degree as in the case of tissues. It would not be difficult to distinguish by this biological method between muscles of different classes of vertebrate animals, it would, however, be impossible to distinguish between the clots of different classes of animals.

This difference between these two sets of coagulating factors can also be demonstrated in another way. Pigeon muscle acts on goose plasma only when that plasma is not more diluted than 1-10, or at the most 1-20. Goose plasma diluted up to 1-30 is not influenced at all by pigeon muscle. If we add, however, to goose plasma diluted 1-30, a piece of clot of the blood of a guinea-pig, it usually causes coagulation, although such a clot is less active than pigeon muscle, if added to goose plasma diluted to 1-5, or 1-10. Of interest in this connection is the fact that a number of times pigeon muscle caused a more rapid coagulation in diluted than in undiluted goose plasma, although in other cases undiluted plasma coagulated more quickly. Coagulated pigeon blood acts also here in a way similar to coagulated guinea-pig clot.

Lymph collected from the thoracic duct of the dog is as active as blood clot; the pericardial fluid of the human body is also active in causing coagulation, although to a less degree.

If we add pieces of tissues or of a blood clot to guinea-pig plasma obtained by the method described above, we find the different clots very active, although the muscles of the various animals, pigeon muscle included, are quite inactive. In this case the guinea-pig blood is diluted very much, and it therefore resembles diluted goose plasma. There is, however, one marked difference between diluted goose plasma and diluted guinea-pig plasma; strongly diluted goose plasma has lost, or almost lost, the power of coagulating spontaneously; guinea-pig plasma, on the other hand, although not affected by pigeon muscle, easily coagulates spontaneously, sometimes after a few hours, sometimes after one day, and if such a spontaneous coagulation does not take place, we can usually induce it easily by the addition of a small quantity of an otherwise inert substance like powdered charcoal, which even in a much more concentrated solution of goose plasma is very slow or even unable to produce coagulation.

In the large majority of these experiments the coagulation of the

plasma begins immediately around the piece of tissue which was put into its centre, and gradually proceeds from there to the periphery; only occasionally, and especially in such cases, where the plasma seems near spontaneous coagulation, does the clotting start at the periphery of the dish. This fact is of great interest. It shows that the substances causing coagulation pass slowly from the tissue into the surrounding fluid, and that they have the power of penetrating through the gelatinous masses which form around the centrally situated piece of the organ. This ferment-like substance is able to pass through gelatinous material, although such colloidal substances, as solutions of soap, are, according to the experiments of Friedenthal, not able to pass through gelatin.

The specificity of the conditions causing the coagulation of the blood of different species are also shown by the following facts. Peptone (Albumoses) in a 10-15% solution, added in a certain proportion to goose plasma, has a marked accelerating influence upon its coagulation: the same substance added to the plasma of the lobster inhibits or prevents its coagulation. In this connection it is noteworthy, that in both cases Witte's peptone is usually much more active than Merck's peptone, which in this respect is frequently almost inert. In a similar way leech extract, which prevents in a certain strength the coagulation of goose plasma, has no inhibiting influence of any significance upon the blood plasma of the lobster. Calcium chloride, however, added to goose plasma or lobster plasma, has in both cases none or only a very slight accelerating effect upon coagulation.

I wish briefly to state the result of a number of experiments made on the influence of bacteria upon the coagulation of the blood *in vitro*. Such experiments to my knowledge have not before been recorded. It was found that the staphylococcus pyogenes aureus has a specific influence in causing coagulation of the blood, a much more marked influence than any other organism investigated so far. The bacillus of diphtheria, the bacillus xerosis, the streptococcus, and the bacillus of tuberculosis, the typhoid bacillus, have so far been found to be without any influence. It must, however, be stated that the growth of the streptococcus in the bouillion which was used was very weak, and that only suspensions of a glycerine agar culture of the tubercle bacillus in salt solution has been so far employed. The colon bacillus has a somewhat stronger effect than the typhoid in causing coagulation, although its power is not of much significance. The coagulating influence of the bacillus pyocyaneus and of the bacillus prodigiosus is more pronounced, but it is much weaker than that of the staphylococcus. The reaction of the bacterial cultures can be excluded by control experiments as the cause of this coagulating influence. The bouil-

lon cultures of the staphylococcus killed by heat had lost all or the greatest part of their coagulating power. The coagulation under the influence of the staphylococcus usually began three to five hours after its addition to the blood plasma, and it is therefore unlikely that substances produced by the staphylococcus in the blood plasma were the cause of this coagulating influence.

Goose plasma injected into the peritoneal cavity of a rabbit or into a pigeon was, after two to four hours still uncoagulated. In two experiments, however, in which simultaneously with the plasma a bouillon culture of the staphylococcus aureus was injected, coagulation had taken place after two hours in one case.

By continuing these experiments and employing the methods here described we shall be able to gain a clearer insight into the causes of coagulating processes in the body. An intimate knowledge of the causes of coagulation must be of great importance if we consider the practical bearing such coagulating processes have upon pathological conditions. The formation of adhesions after peritonitis is caused by the coagulation of the coagulable fluid in the peritoneal cavity; the formation of a scab during wound healing is a further instance of the practical importance of coagulating processes. The influence of microorganisms on the formation of fibrin in the lung in pneumonia has not yet been investigated. An understanding of such obscure conditions as that described by Curschmann as "Zuckergussleber" and by Nicholls as Hyaloserositis, might be hoped for by the further investigation of the influences of certain bacteria upon the coagulation of liquids containing fibrinogen. In this connection the results obtained with the staphylococcus in our experiments are noteworthy.

The pathological significance, however, of the solidification of liquids is mainly based on two facts. In the first place, the clotting of liquids interferes with the circulation of the substances necessary for the life of the cell, especially in the case of thrombosis; secondly, connective tissue cells and blood vessels, which do not usually grow into liquids, begin under certain conditions, to advance into solid coagula, a fact perhaps to be explained by the contact irritability which seems to be a property of the protoplasm of many cells. This organization of a coagulum by connective tissue is the cause of adhesions which may form. If, in the small dishes used for our experiments, the substances causing coagulation were in close contact with the bottom of the dish, the coagulum usually was fixed to the surface of the dish; if, however, the substances were suspended in the liquid, frequently the coagulum was movable. Under these conditions a connective tissue ingrowth would probably not take place in the living body.

THE

Montreal Medical Journal.

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

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

VOL. XXXII. JULY, 1903. NO. 7.

THE BACILLUS OF DYSENTERY.

At the meeting of the American Pediatric Society in May an interesting discussion took place as to the role taken by the Bacillus Dysenteriæ in the etiology of the summer diarrhœas of children. This bacillus, first studied by Shiga in the Imperial Hospital at Tokio, has been recently shown to be the active cause of epidemic dysentery in Japan, in the Philippines and in certain parts of Europe.

Last summer, under the superintendence of Dr. Simon Flexner, a careful investigation was made by Drs. Duval and Bassett at the Thomas Wilson Sanitarium near Baltimore, of the cases of diarrhœa which occurred in that institution. These investigators report, that this bacillus was found in all cases characterized by an acute onset, elevation of temperature and the presence in the fæces at some stage of the illness of mucus and blood. The specific organism was also found in scrapings of the intestinal mucosa at autopsy, and in one case from the mesenteric lymph nodes and liver. It was present in large numbers in the stools

of acute cases, but was secured with difficulty in cases of a mild character.

Dr. Flexner, who opened the discussion, described how Shiga had first fixed upon the bacillus as the important etiological factor in the attacks of epidemic dysentery, which occurred in Japan. As many organisms as possible were first separated from the dejecta of patients suffering from the affection, and then each form was individually tested with the blood serum obtained from the same patients, in the same way as the Widal test is made with the serum from typhoid fever patients. In the case of the bacillus dysenteriæ alone was an agglutination action observed, and this reaction was obtained from the blood serum of almost every patient suffering with this affection; with certainty in all those in which the bacillus was found in the dejections.

The conclusions arrived at therefore were that this bacillus is a stranger in the system, and that its etiological relation to this type of disease is shown by its presence, its constancy, and the peculiar blood reaction obtained from it. In the children examined at the Thomas Wilson Sanitarium, agglutination reactions were obtained, when the organisms were tested with the blood serum of the patients from whom they were secured; with the serum of other infants suffering from summer diarrhœa; and with the serum of adults with acute dysentery. This bacillus was not found in the stools of 25 healthy children, nor in those of infants suffering from simple diarrhœa, marasmus and malnutrition; nor did the blood serum from these agglutinate the dysenteric bacillus.

In the discussion which ensued the great value of these investigations was generally acknowledged. Holt described the results obtained as the first ray of light on the uncertain etiology of summer diarrhœas. Nevertheless, of those taking part in the discussion, the greater number considered that the diarrhœa of infancy included many types which would eventually be found to be due to different organisms. It was thought to be hardly probable that all cases of summer diarrhœa are occasioned by the presence of this bacillus. The subject is one which demands careful investigation and promises brilliant results.

As regards the prevention of the infection it may be said, that while we have no positive knowledge as to the exact method by which the organism gains access to the system, all evidence points to the fact that like the germs of typhoid and cholera, it is liable to contaminate drinking water; like these organisms, however, it is easily destroyed by a temperature much below boiling point. Hence arises the necessity of insisting, during the summer weather at least, that children and infants be allowed to drink no water except that which has been sterilized by boiling.

At the present it appears to be quite possible by an imunizing serum to protect guinea-pigs against a dose of infection, which, without such injection, would inevitably prove fatal. Attempts have been made to treat the disease in adults by the injection of an immunizing serum, and out of 500 cases at the hospital in Tokio 280 were treated by Shiga with a serum, while the remainder were treated in the ordinary way. In those treated with the serum the mortality was only 9 or 10 per cent., while in the others it amounted from 30 to 50 per cent., 39 per cent. being the average. Shiga also reported that under the serum treatment, there was a prompt amelioration of the symptoms, and a decided shortening of the course of the disease.

Thus far little has been attempted in the serum treatment of this affection in children. Dr. Herter in New York reports that he employed the serum in a very desperate case of dysentery in a child of five years with an immediate amelioration of all the symptoms. The number of movements was diminished, and the tenesmus relieved, the temperature and pulse were lowered, and the patient became distinctly more comfortable. Unfortunately, the amelioration was only temporary, a fact which was attributed by Herter to the presence of secondary infections. In reporting the case, Dr. Herter said, that he did not think we should infer, that because we had not succeeded with typhoid serum, therefore we should not succeed in dysentery. Much study and research as well as extended observation is still required however, before we can place this application of serum therapy on a satisfactory basis.

THE MEDICO-CHIRURGICAL SOCIETY.

The meetings of the Medico-Chirurgical Society for the season of 1902-1903 came to an end with the last meeting. Looking at the number and quality of the communications to the Society, the variety and interest of the living cases, the rarity and significance of the pathological conditions and the fulness of the discussions, all are agreed that the meetings were a success. Yet from remarks made by the president incidentally, it would appear as if there were lacking a lively interest in the proceedings. Certainly during the later meetings there has been a diminished attendance, especially of the older members; that was due, not to a lack of interest, but to the absorption of professional cares and the fatigue that always comes towards the end of the winter's work.

The very excellence of the programmes has tended to keep tired and busy men away. The meetings as rule extend over two hours and a

half; the material presented makes such demands upon the attention, that there is some sense of relief when they are over. One example will serve. At the second last meeting there were four living cases shown; one the results of an operation for removal of the lower jaw by a new method, another to illustrate rupture of the spleen, one of dentigerous cyst and yet another case of transposition of the viscera. All four cases were elucidated by elaborate papers, followed by a discussion. In addition, there was a pathological demonstration of great interest, and a case report with specimens, skiagraphs and photographs. Besides all this the ordinary business of a society of two hundred members had to be transacted.

This wealth of material, clinical and pathological, speaks well for the profession, and it is no solution of the difficulty to reduce the amount produced before the society. On the contrary, it might easily be increased; the meetings would still retain their very high standard, and yet they might be made tolerable to busy and tired men.

The truth is the time has come for a subdivision of the work. All are not interested in everything, and most men are interested in very little. The living cases could be shown in one or two rooms. Short printed accounts of each would minister sufficiently to the curiosity of the members and those who desired to go deeper into the cases could seek out those who presented them and inform themselves upon what was obscure, without listening to a great deal they knew before and much they did not care to hear.

The pathological specimens could be shown, and the demonstrations given in another quarter, where those who have an interest in such things could observe at their leisure. It does the members very little good; it certainly does the specimens no good, to have a tray with its confused contents passed from hand to hand.

The case reports could be made much more entertaining by the omission of details having no bearing upon the matter in hand. Nothing is gained by making a report read like an account of a medico-legal inquiry, by introducing all the facts of the patient's daily life, his diet, occupation and amusements, his early diseases and his ancestry, save in so far as these facts elucidate some part of the case. A reporter is not bound to take up the systems, organs and tissues in order, and report them normal, and anything left unsaid can always be reported in the printed proceedings.

If the meetings were less formal, there would be less inducement for the making of speeches, a form of entertainment which is very tedious. The Council has already done much towards discouraging hasty utter-

ance, by taking all matters of business into its own hands for preliminary consideration; otherwise there is sure to be discussion without decision, and decision without discussion.

Under some such arrangement the actual meeting need not last more than an hour. Each member could see and hear what he desired to see and hear, and if anyone had a weighty thing in his mind, he would have opportunity to discharge it quickly and to good effect. The members would have occasion for speech and communion amongst themselves, and all would find an excuse for not enduring things in which they had no interest. The meetings in such case would still be profitable, and a source of pleasure as well. The new rooms lend themselves admirably to this plan and when the walls are adorned with portraits of all the past presidents they will have a new interest. The excellent portrait of the late Dr. Reddy, presented by his family, is only the forerunner of many others to come.

THE CONVOCATION.

The seventy-fourth convocation of McGill University for conferring degrees in the Faculty of Medicine was in every respect remarkable. The number of graduates was an even hundred, nearly double what it was ten years ago, and no preceding class has received so much instruction or passed through a severer ordeal of examination.

The disassociation of the medical students all through their course from the university, was emphasized by the place in which the ceremonial of graduation was performed. There are many rooms in the University amply capacious to accommodate all who had any legitimate business at the convocation, and the graduates should not be denied the privilege of meeting within their own walls.

A convocation is an assemblage of all the component parts of a university, in which all should be represented from the Visitor to the freshest undergraduate. The meeting under consideration scarcely fulfilled that condition. The Visitor was absent as a matter of course and also the Principal; of the fourteen Governors there was only one present; of the forty Fellows there were six, and of the one hundred and ninety-five officers of instruction there were but twenty-two. As a matter of fact, there was not even a majority of the members of the Faculty of Medicine present.

The convocation was presided over by Dr. Craik representing the Governors, and Dr. Johnson, who is still Vice-Principal, took Dr. Peterson's place. It was a pretty ruse of his the way he destroyed the traditional synchrony between the capping and the applause. The

Vice-Principal is not the man to be imposed upon by Medical students, nor would he cast his Latin pearls before the three belated "engineering students," upon whom he bestowed a degree. English was good enough for them.

The valedictory address on behalf of the students was excellent, and amongst its other excellencies was briefness. Humour does not come naturally to the young, and yet the speaker for the class always feels bound to employ that medium of expression. Some day some valedictorian will speak words of sobriety and earnestness and surprise himself by his success. The reply by Dr. Buller was full of matter, as all of Dr. Buller's utterances are, though there were one or two incursions into metaphysics which at one moment did not promise well.

The Dean was particularly happy in his closing address, and his words of advice were touched with emotion. The sincere tribute to Wyatt Johnston was very grateful, and all were glad to receive the assurance that the chair he occupied for so short a time had again been adequately filled. The appeal made last year for an increased endowment was again renewed, but from the nature of the audience it would appear as if greater success might be met with in other quarters. In the face of the great schools arising in the United States, and the joining of the forces of Trinity and Toronto, the Dean does well to be alive to the competition that must result and the necessity of providing against it.

THE CONTROL OF TUBERCULOSIS.

The league against tuberculosis is proceeding in an orderly way with its important work. They are getting to the root of the matter in dealing with the dissemination of the plague. If they can prevent the pollution of sidewalks, railway stations and public meeting places by sputum laden with tubercle bacilli, they will have cut off a fertile source of infection. Street cars and public conveyances are no longer a danger, for the menace to life has already been effectually removed from them by the stringent law against spitting. The plea offered by a prisoner in the Recorder's court, that he was suffering from consumption, and so compelled to spit, is no longer accepted as a justification. The important deputation which waited upon the Mayor pointed out to him the progress that is being made in other places. Toronto is applying to the Legislature for power to make a by-law upon the subject: Ottawa has such a law in force; Winnipeg has the matter up before their Council, and Hamilton has admonitory signs in the streets. The league is now calling for a regulation with a suitable penalty in Montreal, that no person shall spit upon any sidewalk or upon the floor

of any street car or other public conveyance, while upon or traversing any of the streets, lanes, or squares of the city of Montreal, or upon the floors of any theatre, opera house, music hall or hall used for public meetings, railway or steamboat station, or waiting room, or other public hall, building, room or place, or upon any platform surrounding, in front of, or in the immediate vicinity of, any such place. A by-law to the above effect has been submitted to the Council and was referred to the Health Committee for consideration.

The next move is in the direction of notification by physicians of cases of infection. At first it will be voluntary and in such cases the league will undertake to look after them in the way of their surroundings, seeing about proper ventilation, the taking of proper precautions against the spread of infection and the supplying of disinfectants. There is precisely the same reason for notifying cases of tuberculosis, as exists in the case of scarlatina or any other infectious disease.

The public has been approached through the churches; another section is to be reached through the out-door departments of the hospitals, and the physicians have promised their co-operation. The cogregating of infected persons in these places must be a grave danger, and much can be done by disseminating knowledge amongst them. It is by such systematic work the league in the end will attain to success.

Dr. Adolph Lorenz, who has been awarded by his admirers the ambiguous soubriquet of "bloodless surgeon," has finished his second American tour by a visit to Montreal. It is scarcely necessary to do more than make mere mention of the fact, for nothing can be added in the way of information to what has already been so generously supplied by the daily press in regard to the daily movements of this distinguished visitor. Those who had the privilege of meeting him confirm the advance reports of his fine physique and striking appearance, his geniality and dexterity in his work.

Dr. Lorenz, by his visit, has done good in calling the attention of surgeons to cases of congenital dislocation of the hip, and he has demonstrated that much can be done for their relief, whether the method he employs be adopted or not. Some cases are suitable for forcible reduction, and some are better served by a cutting operation, but no mechanical procedure will ever relieve the surgeon from the exercise of that judgment and anatomical knowledge which must ever decide the course he shall pursue. Long before Dr. Lorenz was discovered by the daily press, he was a successful surgeon, known to the profession for his scientific spirit, his industry, knowledge and skill;

the notoriety that has been thrust upon him by his advance agents and exploiters has not diminished these qualities in the least.

The career of Dr. Lorenz is a great encouragement to those surgeons who are prone to the vice of advertising, and in time it may be considered that an operating theatre is a theatre indeed, and its equipment not complete without a press gallery and a telegrapher's key. It must be confessed however, that those who like to go quietly, and believe in the virtue of reticence, have received very little consolation from the performances of this eminent surgeon.

The extremely attenuated entertainment, that was recently given in the grounds of McGill University, fascinating and innocent as it was, must have given rise to many observations more or less profound. The generations of workers, that wrought at the excavation of the little dingle below the Arts building, builded or excavated better or worse than they knew, for they could never have foreseen that they were creating a literal stage whereon the characters from Professor Moyse's lectures might make their entrance.

The whole effect was extremely curious; Rosalind fleeing up the steps of the mining building like a wild creature of the woods, and emerging like a Donalda attired for the altar; the motley, disclosing such wisdom as was never heard before in any university grounds or building either for the matter of that, and Jaques with his humourous sadness, his cheerfulness in adversity, and his perspicasity in finding a fool in the forest of the McGill campus. One would not have thought his cry of "Ducdame" should have received so free a response in any university grounds. It was a strange note to emanate from the purlieus of a university:—"Who doth ambition shun, and loves to lie in the sun, come hither, come hither, come hither."

And one whose imagination was touched with the spirit of the piece might also see upon the steps of the Natural History Museum looking down upon "the poor dappled fools" the aged and slightly bowed figure of the late Principal in cap and gown, with an expression of gentle remonstrance upon his kindly face.

The committee appointed at the general meeting held on the 4th March have, after four months' deliberation, issued a statement to all graduates dealing with the proposed scheme for the erection of a union building for the students and graduates of McGill, in commemoration of the university's 75th anniversary.

The committee seeks to explain the functions of a Union on the

ground that undergraduates may be brought together to share in the use of a building which makes provision for relaxation, amusement, and general intercourse. Such a building, at the modern university, the committee states, usually contains a large assembly hall or living room, a reading room, a small restaurant, a billiard room, a trophy room, a hall large enough to be used for meetings of the Literary society or of the Athletic associations, and several smaller rooms for chess, for the glee club, for the editors of the students' paper, and in general, for the smaller undergraduate organizations. Baths, a swimming tank, and an exercise room are other important adjuncts to be secured if funds permit, and architecturally, the building is made as beautiful as possible, and is so arranged that large spaces can be made available for special entertainments.

The experience of other universities is cited to show the value of such a centre for the development of a collective university life, and the graduates are called upon to provide the means towards obtaining the same boon for their Alma Mater.

The retirement of Alexander Johnson from the position of Dean of the Arts Faculty, Professor of Mathematics, and Vice-Principal of McGill University, and of J. Clark Murray from the chair of Mental and Moral Philosophy, is a source of regret to their friends, and that term includes every student who has passed through the University these thirty years. Professor Moyse, who succeeds Dr. Johnson as Dean and Vice-Principal, is respected by every member of the University for his attainments and qualities, and he will have a sympathetic audience in the students of medicine with whom he is closely allied by reason of his researches in physiology.

The New York Medical Journal and the Philadelphia Medical Journal, beginning with the issue of June 20th, are consolidated. Instead of two excellent medical papers we shall have in future one which shall be more excellent still. Each journal has had a wide circle of readers composed of the best elements of the profession, and each has exerted a strong influence for good. With their forces united even better things may be expected.

Reviews and Notices of Books.

CLINICAL TREATISES ON THE PATHOLOGY AND THERAPY OF DISORDERS OF METABOLISM AND NUTRITION. By Prof. Dr. Carl von Noorden. Authorized American Edition, translated under the direction of Boardman Reed, M.D. E. B. Treat & Company, New York, 1903.

Part I.—Obesity. The Indications for Reduction Cures. pp. 59. Price 50 cents.

Part II.—Nephritis. pp. 112. Price $1.00.

Part III.—Membranous Catarrh of the Intestines (Colica Mucosa). pp. 64. Price 50 cents.

Prof. von Noorden is already so well and favourably known as a careful and scientific observer, an original thinker, and a most successful physician, that it seems almost unnecessary to recommend his works to the medical public. The excellent translations of the three handy little volumes which form the first instalment of, it is to be hoped, a long series of monographs from the same pen, call, however, for at least some mention of their excellence and of their usefulness to the practicing physician. It is seldom indeed, that one finds in such a small space so much that is worthy of being retained, so little that is not of prime importance—so much "meatiness" without "padding." Prof. von Noorden speaks *ex cathedra* and with good reason, for his personal experience in the subjects he deals with has been unusually large and varied, and yet he does not weary the reader with detailed accounts of cases, but confines himself to a discussion of broad principles of treatment. The subject of Obesity is considered under the two main heads of, first, simple obesity in otherwise healthy subjects, and secondly, obesity complicated with other diseases. The author draws attention to the necessity of distinguishing between advanced, medium and slight degrees of simple obesity in deciding whether or not a reduction cure is advisable in each of these classes of corpulency, and discusses in a broad way the different measures to be adopted, laying special emphasis on the need of individualizing in every case and not adopting routine treatment. In the second section, obesity associated with diseases of the circulatory system and of the kidneys, chronic pulmonary diseases (apart from tuberculosis), chronic articular rheumatism, gout, other diseases of the organs of locomotion, diseases of the nervous system, diabetes mellitus, and pulmonary tuberculosis, is dealt with in the same broad outlines, and with regard to the last mentioned disease a protest is made against such over-feeding as will lead to permanent obesity with its train of ills.

Part II, on Nephritis, is, to quote the translator's preface, "bold, original, and somewhat iconoclastic." This is particularly evident in the section on the treatment of contracted kidney, and will no doubt startle those who have been accustomed to pin their faith to the time-honoured but apparently fallacious teaching of nearly every text-book on the practice of medicine, ancient and modern. Beginning with a short review of the customary therapy of kidney diseases, the author follows with sections on the principle of saving the kidneys in renal diseases, on the facts of metabolism as a basis for the dietary regulations to be adopted in the protective therapy of kidney diseases, and, finally, the application of these data to the treatment of acute, subacute and chonic forms of nephritis.

Part III, written in corroboration with Dr. Dapper, deals with Membranous Catarrh of the Intestines and begins with a review of the various opinions held by clinicians as to the etiology of this affection. This is followed by a detailed account of the symptoms, and their interpretation according to the author's theory of their causation, which is in brief, constipation *plus* excessive irritability and over-activity of the glands of the large intestine, and occurring in persons with a neurasthenic or an hysteric predisposition. The chapter on treatment is very full, and follows naturally on the writer's conception of the morbid processes in operation. *H. A. L.*

CLINICAL HÆMATOLOGY. A practical guide to the examination of the Blood with reference to diagnosis, by John C. DaCosta, Jr., M.D. P. Blakiston's Son & Co., Philadelphia, 1902, pp. 474. Eight full-page colored plates, three charts, and forty-eight other illustrations.

As stated in the preface, "this book, designed as a practical guide to the examination of the blood by methods adapted to routine clinical work, represents an endeavor to recount the salient facts of hæmatology as they are understood at the present time, to correlate certain of these facts with familiar pictures of disease, and to apply them to medical and surgical diagnosis. The purpose has been to interpret the blood report according to its true value as a clinical sign, neither exploiting it as a panacea for every diagnostic ill, nor belittling it because of its failure consistently to give the sought-for clue in every instance." A perusal of some of the principal sections of the volume shows that this claim is fully warranted by the careful consideration of facts personally observed and gathered from reliable authorities, and by judicious conclusions based upon these. The author's experience is based upon some four thousand blood examinations in hospital and private practice, and in the army medical service, and he has drawn upon the

records of the German Hospital in Philadelphia, for the bulk of the original data referred to in the text. The volume contains seven sections under the following headings:—

Examination of the Blood by Clinical Methods; The Blood as a whole; Hæmoglobin, Erythrocytes, Blood Plaques, and Hæmocomia; The Leucocytes; Diseases of the Blood; The Anemias of Infancy and Childhood; General Hæmatology. The first section is very comprehensive and contains a full description with appropriate illustrations of the various instruments in use, the preparation and uses of blood stains, and sub-sections on spectroscopic and bacteriological examinations, and on serum reactions. In the last section the blood findings in sixty-eight different diseases or pathological conditions (apart from diseases of the blood itself) are considered. Possibly too much space has been devoted to this section, 181 pages, considering the variable results obtained by different observers, and the frequent impossibility of drawing any conclusions whatever from the mass of facts adduced. The sections on the blood diseases are quite exhaustive and satisfactory. The volume is certain to be a very useful one, both to those who wish to acquire thorough and careful methods of blood examination, and to clinicians as a reliable and up-to-date work of reference in hæmatology. *H. A. L.*

PROGRESSIVE MEDICINE. Fifth Annual Series. Volume II., June, 1903. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by HOBART AMORY HARE, M.D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia. Octavo, bound in cloth, 427 pages, with 46 illustrations. Per volume, $2.50, by express prepaid. Per annum, in four cloth-bound volumes, $10.00. Lea Brothers & Co., Publishers, Philadelphia and New York.

This book represents what is of real scientific and practical value in current medical literature; it is not merely a mass of abstracts of articles which have appeared in magazines, but each of the contributions possesses features which render it valuable. Dr. W. B. Coley has an article upon the surgery of the abdomen, including hernia, and the discussion of the operative treatment of hernia shows how the radical cure of that affection has been placed upon a scientific basis.

Dr. Clark begins the section on Gynæcology with a thorough discussion of all the various phases of cancer of the uterus, and then takes up the various affections of the abdominal and pelvic viscera, describing fully their diagnosis and treatment.

Dr. Stengel's section on Diseases of the blood includes morbid conditions of the ductless glands and disorders of metabolism, and a discussion of the effect of various poisons upon the constitution of the blood in infectious diseases.

THE GEOGRAPHY OF DISEASE. By Frank G. Clemow, M.D., Edin., British Delegate to the Ottoman Board of Health, Physician to H. M. Embassy at Constantinople, Hon. Member of the Russian National Health Society. University Press, Cambridge, 1903.

This work forms one of the Cambridge Geographical Series, under the general editorship of F. H. H. Guillemard, M.D. Dr. Clemow, the author, is a man who has seen many lands and many peoples; indeed the preface is dated from Constantinople. From his affiliations with foreign bodies and his acquaintance with outland peoples, he has been able to deal with the geographical distribution of disease at first hand, and to produce a valuable and interesting book.

The rapid expansion of British and German colonial possessions has directed attention to the diseases of strange peoples, particularly in tropical climates, and such writers as Hirsch, Davidson, Patrick Manson, and Lombard have made the subject their own, but they deal chiefly with particular cases. Dr. Clemow has gathered together a mass of information and made a convenient and useful book. In a subject so general there is necessarily a good deal of surmise and the author makes free use of "it is said," "it is believed." One misses any reference to Hamilton Wright's work on beri-beri, and it is a new doctrine that syphilis was introduced into Scotland by Cromwell's devout troopers.

A MANUAL OF BACTERIOLOGY FOR STUDENTS AND PHYSICIANS. By Fred C. Zapffe, M.D., Professor of Histology in the College of Physicians and Surgeons, and Professor of Pathology, Bacteriology and Hygiene in the Illinois Medical College, Chicago. 350 pages, 150 engravings, 7 coloured plates; $1.50, flexible leather, $2.00. Lea's Series of Pocket Text-Books, edited by Bern B. Gallaudet, M.D.

This book is sure to meet with the favour of students and practitioners, as it contains all they need know upon the subject of bacteriology, presented in an attractive form. The compass of the book, 350 pages, prevents an elaborate discussion of disputable matters, but they are not passed over in silence and interest is stimulated to further enquiry. The book is a safe guide and an adequate summary of present knowledge.

THE LAW OF MENTAL MEDICINE, by THOMAS HUDSON, Ph.D., LL.D. A. C. McClurg & Co., Chicago.

The object of this book, as set forth in the preface, is to assist in placing mental therapeutics on a scientific basis, which in itself is a desirable thing. There is a method of treatment by suggestion and there must be a principle underlying it. It is to the elucidation of this principle the author addresses himself, and certainly if he has not laid it entirely bare, he has made a most interesting book by the operation. Many of the curiosities of history are dealt with, especially the ones recorded in those Semitic writings, which have obtained so wide a circulation in the western world.

BOOKS RECEIVED.

Climates and Health Resorts in the Dominion of Canada, by Guy Hinsdale, M.D.; reprinted from the Transactions of the American Climatological Association.

Transactions of the American Climatological Association, Vol. XVII., 1902.

Medical News.

McGILL MEDICAL CONVOCATION.

The meeting of convocation of McGill University for conferring degrees in the Faculty of Medicine, was held in the Windsor Hall at 3 p.m., on the 12th June. Dr. Robert Craik in his capacity of Governor presided, and the duties of the Principal were filled by Dr. Johnson. The public attendance was large. Rev. James Barclay opened the convocation with prayer.

The Dean, Dr. T. G. Roddick read the prize, honour and class lists. The prize list was as follows:—

Holmes gold medal, for highest aggregate in all subjects forming the Medical curriculum—E. M. McLaughlin, Winona, Minn.

Final prize for highest aggregate in the fourth year subjects—F. S. Patch, B.A., Montreal.

Third year prizeman—J. L. Robinson, St. Marys, Ont.

Sutherland medallist—J. Graham Willmore, Montreal.

McGill Medical Society senior prizes—D. W. McKechnie, first; W. G. Campbell, second.

Second year prizeman—H. C. Mersereau, Doaktown, N.B.

Senior anatomy prize—H. C. Mersereau, Doaktown, N.B.

McGill Medical Society junior prizes—D. L. S. Likely, B.A., first; L. de C. McIntosh, second.

First year prizeman—C. S. Williams, Tyne Valley, P.E.I.

Junior anatomy prize—P. A. MacDonald, Alma., N.B.

Honour list: Fourth year. F. S. Patch, B.A.; N. D. Parris, W. E. Nelson, E. M. McLaughlin, G. H. Turner, B.A.; J. M. McCulloch, R. King, B.A.; R. Elder, B.A.; A. S. Burns, B.A.; L. C. Bishop.

Honour list: Third year. J. L. Robinson, J. A. Nutter, B.A.; J. C. Fyshe, A.B.; J. G. Willmore, F. D. Charman, H. S. Atkinson, F. P. Yorkston, M.A.; A. C. Sellery, W. W. Chipman.

Honour list: Second year. H. C. Mersereau, J. H. MacDermot, F. J. Tees, B.A.; F. A. C. Scrimger, B.A.; H. A. Leslie, C. F. Moffatt, B.A.; J. W. Dykes, T. R. B. Nelles, E. H. Henderson, B.A.; H. C. Burgess, J. H. Soady, B.A.; D. S. Likely, B.A.; B. W. Robertson.

Honour list: First year. C. S. Williams, J. H. Donnelly, H. S. Crowe, B.A.; P. A. MacDonald, A. W. Hunter, D. R. Fraser, R. L. McArthur, O. S. Hillman, W. L. Mair, J. J. Sheahan, H. L. Sims, H. C. B. Allen, R. F. Flegg, J. W. Turnbull.

When the prizes were awarded, the degrees of Doctor of Medicine and Master of Surgery were conferred upon the following undergraduates:—

R. Allen, Montreal; A. W. Allum, Renfrew; C. W. Anderson, B.A., Halifax; J. J. Andrews, St. Lambert; G. A. Bishop, Kinburn, Ont.; L. C. Bishop, Marbleton, Que.; A. K. Blair, Chicoutimi; J. H. Boulter, B.A., Picton; O. Boyd, Russell, Ont.; R. M. Boyd, Belleville, Ont.; J. E. Brooks, B.A., Eastport, Maine; A. S. Burns, B.A., Boston; W. G. Campbell, Brantford; H. B Chamberlain, Montreal; E. C. Chandler, Montreal; H. L. S. Chaplin, St. John's; H. C. Church, Chelsea; H. H Cowperthwaite; St. John's; L. V. Croft, B.A., Middleville, Ont.; W. G. Cumming, B.A., Montreal; A. J. Dickson, B.A., Goderich; W. H. Donnelly, Ogdensburgh; F. C. Douglas, Montreal; F. H. Doyle, Natick; P. L. B. Ebbett, Gagetown; R. Elder, B.A., Trout River, Que.; R. H. Ells, B.A., Ottawa; J. M. English, New Westminster; W. H. Ferguson, St. Thomas; R. D. Forbes, Stratford, Ont; C. E. F. Fortin, B.A., Winnipeg; E. H. Freeze, Penobsquish, N.B.; A. C. Frost, Montreal; W. P. Gale. Quebec; C. R. Gilmour, Brockville; N C. Hansen, M.A., Portland; R. H. M. Hardisty, B.A., Montreal; F. L. Horsfall, B.A., Montreal; W. T. Hynes, Darnley, P.E.I.; R. W. Kenny, Ottawa; R. King, B.A., Sackville: J. W. Kissane, Chataguay, N.Y.; W. V. Lamb, St. Andrews, N.B.; Ernest Laurie, B.A., Montreal; J. A. Lundie, B. A., Montreal; W. S. Lyman, Ph.B., Knoxville, Tenn; A L. Lynch, Ottawa; P. A. McDonald, B.A., Bailey's Brook, N.S.; W. A. Mackenzie, Wood Islands, P.E.I.; J. W. MacKinnon, Charlottetown; J. M. McCulloch, Durham, Ont.; C. A. McDiarmid, Kemptville, Ont.; P. A. McDonald, B.A., Dundee Centre, Que.; S. H. McDonald, B.A., St. John, N.B.; I. W. T. McEachern,

Rockland; J. R. McEwen, B.A., Dewittville, Que.; F. C. McGrath, Norway, P.E.I.; J. D. McGuigan, Kelly's Cross, P.E.I.; D. W. McKechnie, Dundas, Ont.; H. H. McIntosh, Montreal; J. A. McIntosh, Vankleek Hill; D. D. McLaren, Russell; E. M. McLaughlin, Winona, Minn.; Thos. McPherson, B.A., Stratford; W. J. Maby, Cohoes; C. F. Magee, North Gower, Ont.; A. G. Meindl, Mattawa; I. E. Mitchell, B.A., Sherbrooke; C. H. Montgomery, St. John, N.B.; S. C. Morris, Wallace, N.S.; H. B. Munroe, B.A., Almonte; H. E. Munroe, St. Elmo, Ont.; J. H. Munro, Maxville, Ont.; J. S. Murray, St. John, N.B.; J. S. Nelson, Ottawa; W. E. Nelson, Montreal; C. W. O'Brien, B.A., Montreal; J. M. O'Neill, Massena; N. D. Parris, Barbadoes; F. S. Patch, B.A., Montreal; H. L. Pavey, London; G. R. Peterson, Toys Hill, Ont.; B. A. Puddington, St. John, N.B.; W. N. Rehfuss, B.A., Bridgewater, N.S.; W. E. Saunders, Woodstock; W Scott, Montreal; W. H. Secord, Brantford; D. Le B. Shaw, Portland; M. R. Slack, Farnham; E. O. Steeves, Upper Sackville, N.B.; F. E. Stowell, Worcester, Mass.; N. W. Strong, B.A., Cambria, Que.; E. A. Taggart, Ottawa; S. B. Thomas, Barbadoes; R. H. Townsley, Montreal; W. Truax, Farnham; G. H. Turner, B.A., Baie Verte, N.B.; J. G. Warren, Montreal; S. G. White, Ottawa; A. Wilson, Russell, Ont.

The valedictory address was read by Dr. F. S. Patch on behalf of the students; and it was replied to by Dr. Frank Buller for the Faculty.

The Dean, Dr. Roddick in his sessional address spoke in part as follows:—

The seventy-fourth session of the Medical Faculty of the University of McGill closes to-day. The number of students in attendance was 421, which with 13 graduate students, makes a total of 434. The graduating class of this year is the largest in the history of the faculty, being exactly one hundred, or seven more than that of 1900-01, hitherto the largest. The graduating class of this year is practically double that of ten years ago, showing that in spite of the enormous competition this faculty is holding its own fairly well.

I regret to have to report that death has been busy in the ranks of both professors and students. The echoes of the convocation of last year had barely rolled away when the sad announcement came that our gifted colleague, Professor Wyatt Johnston, was no more. He died on the 19th of June, 1902, from the effects of a post-mortem wound, incurred in the autopsy room of the Montreal General Hospital. Professor Johnston's loss to this university is well nigh irreparable. In his comparatively short career he accomplished an immense amount. He was a most original thinker, and an indefatigable worker. As a scientific physician he will be longest remembered for his splendid work in connection with bacteriology and its application to public health, for

his methods of diagnosis of diphtheria and typhoid fever, and for his original studies in the field of medical jurisprudence, in which he stood pre-eminent in this country, and perhaps on this continent. As a practical teacher he had few equals. His constant delight was to simplify methods and bring them within the ken of those to whom they would be most useful, whether student or practitioner. His delightful personality made him many friends, both in and out of the profession. He was well characterized by his friend Dr. Ruttan as, "intellectually honest, direct and simple to an unusual degree, he had the greatest contempt for all that savored of dishonesty and pretence in scientific work. His wonderful personal magnetism, his ready wit and sympathy, made him hosts of friends and admirers among those associated with him in the various organizations and societies with which he was connected." Owing to his versatility of genius, his loss has been keenly felt by many scientific associations in this country and in the United States, and by the faculties of comparative medicine and law of this university, with both of which he was more or less directly connected as a teacher.

The Strathcona chair of hygiene, which Dr. Johnston had occupied for a few months only, but which he was busily engaged in equipping at the time of his death, having thus become vacant, it behooved the faculty to look for a suitable successor. As none of our own graduates could be found who had paid special attention to this subject, it was decided to look abroad. After some delay, we were fortunate in securing the services of Professor Starkey, who took over the duties of the chair in January last. We heartily welcome him among us, and have every reason to believe that he will prove a fitting successor to our esteemed ex-Dean Dr. Craik, and Dr. Johnston, both of whom labored strenuously to organize the Strathcona chair of hygiene, and make it worthy of the name it bears.

Although our success as a faculty may appear to be phenomenal, we have still much to be desired in the matter of endowment. I stated in effect, at the last meeting of convocation, that we must either attract at once many more students, or secure additional financial aid from our friends; and in order to enable us to do the work which it would be possible to accomplish with our present facilities, we should have an annual income, over and above the students' fees, of about forty thousand dollars. I have no reason to change that opinion; on the contrary, I would further emphasize it. Our competitors to the west and south of us are growing stronger every day. The faculties of medicine of Toronto and Trinity Universities have practically completed a scheme of amalgamation. These, singly, were very powerful competitors; but if they join forces their strength will be increased fourfold.

Harvard, Columbia, and Chicago Universities are being practically bombarded with money; and, with their admirable equipment, are certain to attract many Canadians to their halls.

Surely our friends will not stand by and see us outclassed. I have more faith in the wealthy men of Montreal, and believe that as soon as the urgency of our needs is realized, help will be forthcoming.

One of our most immediate needs is a well equipped Maternity. The committee in charge of this work have been very much handicapped. Thanks to our generous benefactor, Sir William C. Macdonald, the site has been secured; but the amount on hand for building purposes is still very inadequate; so that unless additional help be forthcoming, another year will have to elapse before this important and most necessary work can be accomplished. Meanwhile, we must be patient and make the most of our present very imperfect conditions.

The ever-absorbing problem of medical registration still remains unsolved. Owing to the stubborn opposition of a section of the profession in this province, the Medical Act of Canada, providing for the establishment of a Dominion Medical Council, was, as you are aware, recently rejected in the local Legislature, by an overwhelming majority. However, four of the provinces, Nova Scotia, Prince Edward Island, Manitoba, and the Northwest Territories, have passed the necessary concurrent legislation, and I have assurances that New Brunswick will follow within the next week or two. Things political in Ontario and British Columbia have been of late in such a muddle that I doubt if much can be expected from them for the present. With a majority of the provinces in line, I think it will not be unreasonable to ask the Dominion Government to grant permission to bring in an amendment to the original act, allowing those provinces which wish Dominion registration to begin the work. I have reason to believe that this permission will be granted.

Gentlemen of the graduating class: I have nothing to add to the admirable advice given you by Dr. Buller. Go forth on your noble mission. "Let the world be your country, and to do good your religion." Let me ask you to remember your Alma Mater, while it is yet well with you. God speed you; farewell.

ROYAL VICTORIA HOSPITAL.

The ninth annual report of the Royal Victoria Hospital has been issued. The number of patients admitted during the year was 2,814, an increase of 235 over the previous year. There were 1,694 Protestants, 989 Roman Catholics, 105 Hebrews and 26 of other faiths; 1,544 were free patients, 807 public ward patients paying fifty cents per day and 463 private ward patients; 2,074 were residents of Montreal and 740

came from districts outside of the city. The total days of hospital treatment aggregated 70. 609 as against 71,551 the previous year, a decrease of 942 days. The average number of days' stay in hospital per patient was 25.22 as against 27.51 the previous year.

On the 1st January, 1902, there were 173 patients in the hospital remaining from 1901, and during the year 2,799 were discharged, of whom 1,354 were well, 856 improved, 157 not improved, 307 not treated and 125 died; remaining in hospital 31st December, 188.

Of the 125 deaths 26 took place within 48 hours of admission. The death rate for the year has been 4.62 per cent., or, if those dying within 48 hours after admission be deducted 3.62 per cent.

The highest number of patients in the hospital on any one day was 215 on the 11th December, and the lowest was 166 on the 7th August; the highest monthly average was 201, in December, and the lowest 177, in August, the daily average for the year being 193.4 as against 196 for the previous year.

In the Out-Patient department the total number of patients treated was 4,102; the number of visits of these patients aggregated 21,950:—Medical, 9,381; Surgical, 4,547; Eye and Ear, 3,393; Nose and Throat, 3,337; Diseases of Women, 1,292.

The income for the year was $133,771.88, while the ordinary expenditure amounted to $113,193.36, the balance of $20,578.52 being applied in reduction of the indebtedness incurred by the new power house, isolation pavilion, chapel, and other extensions. The increase in expenditure for 1902 over 1901 was 913.16.

The total cost per day per patient was $1.60; the cost per day of maintaining each person in the hospital was 86 cents, and the daily cost of provisions per person was 24 1-3 cents.

The Medical Board has recommended to the governors for appointment to the resident medical staff for the year ending 31st August, 1904, as follows:—

Admitting officer, A. G. McAuley; Physicians, W. W. Francis, G. H. Turner, J. M. McCulloch and Robert King; Surgeons, J. D. Dixon, Dr. L. C. Harriss, H. C. Church and A. L. Lynch; Eye and ear, nose and throat, N. C. Jones; Anæsthetist, J. M. English; Locum Tenens in Surgery, D. W. McKechnie; Locum Tenens in Medicine, A. C. Frost; Externe in Medicine, R. H. M. Hardisty.

WESTERN GENERAL HOSPITAL.

The thirtieth annual report of the Western Hospital has just appeared. During the year 589 patients were admitted, an increase of 193 cases. Of these 341 were Protestants, 228 Roman Catholics, 19

Jews, other religion 1; males, 269; females, 320; 373 were free patients, 52 public ward patients, paying 50 cents or less a day; 63 were semi-private patients paying one dollar a day; 101 were private patients; 547 were residents of Montreal; 42 came for treatment from a distance or were sent from the country districts. 195 were medical cases; 279 were surgical; 115 were gynæcological.

On the first January, 1902, there were 26 patients in the hospital, and during the year 556 have been discharged, of whom 379 were well, 138 improved, 24 unimproved, and 10 not treated; 36 died and 28 remained on the 31st December.

The death rate for the year has been 6.11 per cent.; if those dying within 48 hours after admission be deducted, 4.41 per cent.

The largest number of patients in the hospital at any one time was on July 17th, and the smallest on January 3rd. The highest monthly average was 34 in July, and the lowest 26 in January. The average number of days of treatment in the hospital per patient was 18.6. The total number of patient days was 11,049. The number of ambulance calls for the year was 110.

In the outdoor department the total number of consultations was 6,570, as compared with 2,457 for the previous year. They were made up as follows:—Medical, 2,252; surgical, 1,055; diseases of women, 1,034; eye and ear, 561; nose and throat, 1,008; genito-urinary, 493; skin, 167. The work in this department has increased 267 per cent. in the last two and a half years.

The Maritime Medical Association will be held in St. John, 22nd and 23rd July.

The Brandon General Hospital is to be increased by an addition, which will cost $18,000, and accommodate 32 beds.

The hospital board in Galt are in trouble over a recent bequest of $800. Three of the heirs are contesting the will at law. During the month of May, free patients enjoyed 152 days treatment, and paying patients 393 days.

The jubilee of the University of Bishop's College was celebrated at Lennonxville on the 18th of June. Degrees were conferred in the faculties of Divinity and Arts, and the Governor-General was present to receive the degree of D.C.L. The alumni held a dinner in the evening.

Queen's University medical faculty has decided to celebrate the jubilee in October, at the same time as the principal's installation takes place. The fifty years will not have elapsed till the spring, but it was thought better to have the ceremony take place at the beginning, rather than at the close of the session.

The citizens of Vancouver have subscribed $30,000 for the new general hospital; the city has given $20,000, and as a result the Province now announces that it will contribute $20,000 in addition to these sums. Seven different plans are under consideration for a building capable of accommodating 100 patients and providing for the necessary executive offices, but capable of being enlarged to provide for at least 300 patients with all the appurtenances of a modern hospital.

Smallpox is reported from several districts in New Brunswick, and there is a feeling that the outbreak has not been well handled, particularly in the shore parishes of the county of Kent. Lack of firmness in enforcing quarantine and other precautionary measures is said to prevail. In some parts of Kent county it is charged that great indifference prevails as to needed precautions in preventing the spread of the disease. The people of Westmorland who enforce vaccination and precautionary regulations firmly are appealing to the Government against the indifference displayed by their neighbors.

The following have received their diplomas in Medicine from Laval University:—Andre Brisset, J. C. Bourgoin, D. Bergeron, J. R. Belisle, George Etienne Bedard, Albert Cleroux, D. Chagnon, L. P. Dorval, W. G. Drouin, Edward David, W. N. Godin, J. C. B. Godbout, Joseph Guertin, Horace Gervais, Josaphat Isabelle, Hormidas Larose, J. Lapointe, Albert Larose, A. P. Lachance, J. P. Laporte, Arsene Labarre, Eugene Isatreille, L. P. Marleau, Jos. Melandon, J. H. Meunier, A. Mailler, J. L. Mauffet, W. Ouimet, Lachance Perron, Henri Prevost, Edouard Pelletier, Philippe Quesnel, J. A. Rousseau, J. A. M. Riopel, P. E. Riopel, J. A. C. Riopel, J. E. Racicot, J. A. Robinson, Edgar Smith, J. A. Sabourin, E. Touchette, W. Tetrault, Alexandre Thibaudeau, Hector Viau.

Amongst the other peculiar things that came before the Ontario Legislature during the present session, was an anti-vaccination bill. Mr. Kribs the proposer said, the object was to remove the compulsory clauses of the Public Health Act, and he read several letters from persons who claimed to be permanently injured by vaccination. He

had a petition, signed by 1,271 residents of Galt, which has just had a smallpox epidemic, in favor of his bill. Dr. Currie said the trouble was that there was too much dirty vaccination. Dr. Reaume said he had been vaccinating for 20 years and had yet to see the first evil result. He quoted a bulk of statistics, all favourable to vaccination. Dr. James continued the discussion, claiming that the subject was more properly one for a medical association than the Legislature. The bill was read a second time.

The annual report of the Prince Edward Island hospital shows that the number of patients admitted during the year amounted to 243, seven more than the previous year. The paying patients were 165, being 12 in excess of the previous year; non-paying 78, being 5 less than the previous year. The medical cases were 70, surgical 173, a slight increase on the previous year, 131 underwent operations. There were 183 patients discharged cured, being 12 more than the previous year, while the deaths were 8 as compared with 2 during the previous year. There remained in the hospital 23rd May, 16 patients. The city patients numbered 80, being two in excess of the previous year; country patients 143, or one less than the previous year, while 20 patients came from other provinces. The out-door patients numbered 38, and there were 115 prescriptions and 150 surgical dressings supplied and 23 operations performed for out-door, non-paying patients.

The Medical Society of Nova Scotia, will hold the twenty-fifth annual meeting in Antigonish on Wednesday and Thrusday, July 1st and 2nd, 1903. The following are the officers: Dr. J. Cameron, Antigonish, president; Dr. W. Graham Putnam, Yarmouth, and Dr. M. Chisholm Halifax, vice-presidents; Dr. W. Huntley MacDonald, Antigonish. secretary-treasurer. The public meeting will be given up to the presidential address, and to papers upon tubercular arthritis; pathology by Dr. J. Stewart, Halifax; diagnosis by Dr. A. E. Kendall, Sydney; treatment by Dr. N. E. McKay, Halifax; these will be followed by a discussion in which Drs. J. Hayes, W. B. Moore and others will take part. Dr. W. H. Hattie, Dartmouth, will also read a paper, and Dr. D. A. Campbell, Halifax, will give a history of the society.

The remainder of the programme is as follows:—

Every day questions—Dr. H. P. Clay, Pugwash.

Further remarks on Insomnia—Dr. H. H. McKay, New Glasgow.

Paper—Dr. R. A. H. McKeen, Glace Bay.

Case Reports—Dr. J. S. T. Patton, Truro.

Paper—Dr. Jas. Ross, Halifax.

The buried absorbable suture, its value in surgery—Dr. H. O. Marcy, Boston.

Caesarian Section—Dr. J. Hayes, Parrsboro.

Strangulated hernia with unusual sequelae—Dr. D. Murray, Logan's Tannery.

Extra-uterine pregnancy—Dr. A. E. Kendall, Sydney.

Acute Inversion of Uterus during labor—Dr. C. P. Bissett, St. Peters.

Paper—Dr. J. W. McKay, New Glasgow.

Address in Medicine—Dr. G. G. Campbell, Montreal.

Venesection—Dr. M. Chisholm, Halifax.

Toxic haemoglobinuria with report of case—Dr. J. L. Churchill. Isaacs Harbor.

Paper—Dr. M. A. B. Smith, Dartmouth.

Case Reports—Dr. J. W. Reid, Windsor.

Some notes on milk hygiene and infantile feeding—Dr. E. D. Farrell, Halifax.

Treatment of tuberculosis—Dr. H. M. Neale, Pennsylvania.

Nasal tumors—Dr. G. Cox, New Glasgow.

Further remarks on mastoiditis—Dr. W. G. Putnam, Yarmouth.

Some notes on recent epidemic of smallpox—Dr. J. F. Ellis, Sherbrooke.

The Ontario Medical Association held its 23rd annual meeting on the 16th, 17th and 18th of June, and elected officers as follows:—President, J. W. Ross, Toronto; vice-presidents, Dr. Burt, Paris, Dr. Turnbull, Goderich, Dr. J. C. Connell, Kingston, Dr. J. H. Elliott, Gravenhurst; secretary, Dr. C. P. Lusk, Toronto; treasurer, Dr. A. R. Ogden, Toronto.

Dr. J. C. Mitchell, Toronto, read the annual address, and amongst those who presented papers were: Drs. Geo. A. Bingham, Toronto; Herbert A. Bruce, Toronto; H. B. Anderson, Toronto; T. W. G. McKay, Oshawa; John Caven, Toronto; Hugh McCallum, London; J. C. Connell, Kingston, and J. L. Davison, Toronto.

The other papers on the programme were: The Business Aspect of Modern Practice, by Dr. N. A. Powell, Toronto; Exercise in the Treatment of Chronic Diseases, Dr. A. McPhedran, Toronto; The Treatment of Pneumonia, Dr. J. H. Musser, Philadelphia; The Diagnostic Significance of Albumen in the Urine, Dr. J. Amyot, Toronto; Sanitorium Treatment of Tuberculosis, Dr. C. D. Parfitt, Gravenhurst; and X-rays in Sarcoma, Dr. C. R. Dickson, Toronto.

The thirty-sixth annual meeting of the Canadian Medical Association will take place at London, Ontario, on the 25th, 26th, 27th and

28th of August, with Dr. Walter H. Moorhouse as president. Dr. George A. Hodge, Queen's Avenue, is chairman of the Programme Committee, and Dr. Hadley Williams, Park Avenue, is local Secretary, to either of whom, or to the general secretary, Dr. George Elliott, 129 John St., Toronto, titles of papers may be sent. Arrangements for reduced fares on the regular Standard Certificate plan have been already completed with the Grand Trunk and Canadian Pacific Railways, and negotiations are in progress with the Intercolonial and the Canadian Pacific officials as to transportation rates from the Maritime provinces and points west of Fort William. These arrangements will be published in full in due time. Entertainment is in the hands of a strong committee. The meetings will take place in the Normal School buildings.

The seventy-first annual meeting of the British Medical Association will be held at Swansea on July 28th, 29th, 30th, and 31st. Mr. Walter Whitehead of Manchester, will be succeeded in the office of President by Dr. Thomas Dryslwyn Griffiths of Swansea. The address in Medicine will be delivered by Dr. Frederick T. Roberts, and that in Surgery by Mr. A. W. Mayo Robson. The scientific business of the meeting will be conducted in eleven sections: Medicine—President, Sir Isambard Owen; Surgery—President, Mr. Edmund Owen; Obstetrics and Gynæcology—President, Professor William Stephenson; State Medicine—President, Dr. John C. McVail; Psychology—President, Dr. Robert Jones; Pathology—President, Professor D. J. Hamilton; Ophthalmology—President, Mr. H. E. Juler; Diseases of Children—President, Mr. W. Arbuthnot Lane; Laryngology and Otology—President, Dr. P. Watson Williams; Navy, Army, and Ambulance—President, Inspector-General H. C. Woods; Tropical Diseases—President, Dr. G. H. T. Nuttall.

In the Section of Surgery the subjects selected for discussion are: the methods of intra-abdominal anastomosis, and the treatment of advanced tuberculous disease of the knee-joint. In the Section of Obstetrics and Gynæcology two discussions will be held; one on the management of pregnancy complicated with uterine fibroids, and the other on the diagnosis and treatment of tuberculosis of the uterus and adnexa. In the Section of State Medicine the subjects selected are the Vaccination Acts and small-pox prevention, the prevention of river pollution and and of sea-shore pollution, and food poisoning and adulteration. The subjects selected in the Section of Psychology are the pathology of general paralysis, alcohol in its relation to mental diseases, and the care and treatment of incipient insanity. In the

Section of Pathology there will be a discussion on splenic anæmia. In Ophthalmology the subjects selected are eye changes in relation to renal disease, conical cornea, and the treatment of strabismus. In the Section of Diseases of Children the subjects chosen are chorea, congenital dislocation of the hip, and the relation of tuberculosis in children to bovine tuberculosis. In the Section of Laryngology and Otology there will be discussions on malignant disease of the larynx, on operations on the temporal bone in suppurative middle-ear disease, and on the upper respiratory tract as a source of systemic infections.

Retrospect of Current Literature.

MEDICINE.

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

The Micrococcus of Acute Rheumatism.

E. W. AINLEY WALKER. "The Micrococcus of Acute Rheumatism." *The Practitioner*, February, 1903.

It is gratifying to find that the work upon the etiology of Rheumatism from the bacteriological standpoint, begun in 1875 by Klebs, is bearing much fruit. The results of Triboulet, Westphal, Wassermann, Malkoff, and Paine and Poynton, in 1899, have been reviewed in this Journal. The work done by Drs. Walker and Beaton is along the same line and is cofirmatory of the more recent work by Paine and Poynton and that by Fritz Meyer. They find a streptococcus, indistinguishable by ordinary methods from an ordinary streptococcus. It appears often as a diplococcus, and hence some confusion concerning its identity may have arisen.

In attempting to answer the question whether this is an ordinary streptococcus or a specific organism, Beaton and Walker on two occasions made application of Marmorek's test that all streptococci save that perhaps of scarlet fever, refuse to grow in filtered culture-fluid, in which a streptococcus has been previously grown and filtered out with the result of an abundant growth. Thus it is claimed that the micrococcus under discussion is "specifically different from the streptococcus," although they are not over sanguine in this matter. Five problems are suggested for investigation. (I) That of specificity; (II) If bacteral specificity, is there toxic specificity? (III) The pathway of infection (Tonsils, pulmonary area); (IV) A specific therapeutic agent.

Recurrent Vomiting in Children.

DAVID L. EDSALL, M.D. "Recurrent Vomiting in Children." *American Journal of Med. Sciences*, April, 1903.

Recurrent, periodical or cyclic vomiting in children is a subject upon which now and then one finds an article. The nature of the disorder is not understood and the treatment is ineffectual. To a neurosis or a gouty or uric acid diathesis, the attacks have been attributed. Dr. Edsall finds in five cases that "a severe acid intoxication of the type seen in diabetes mellitus was present during the attacks and in the intervals, and that treatment directed towards this intoxication has been remarkably satisfactory. Acetone and diacetic acid have been in the urine of such patients at the time of the attack. Large doses of sodium bicarbonate have been successful in either aborting the attack or averting it completely.

In the treatment of such cases it is recommended that large doses, 100 grains of sodium bicarbonate or citrate, and even more should be given as rapidly as possible.

Some Experiments on the Nature and Specific Treatment of Hay Fever.

SIR FELIX SEMON, C.V.O., M.D., F.R.C.P. "Some Experiments on the Nature and Specific Treatment of Hay Fever." *The British Med. Journal*, March 28, 1903; April 18, 1903.

Since the publication of Professor Dunbar's pamphlet on the Cause and Specific Treatment of Hay Fever, in 1902, views upon this subject somewhat more scientific in character have been entertained. Prof. Dunbar succeeded in isolating from the pollen of certain grasses, a toxic substance which when applied in very small quantities to the eyes and nostrils of people predisposed to hay fever, produced, more or less characteristically, the symptoms of hay fever. When so applied to those not predisposed it failed to induce symptoms. The same investigator succeeded in producing an antitoxin in experimenting with the pollen of rye, maize, and other grasses, which quelled the symptoms of hay fever artificially produced.

The toxic substance is in all probability a proteid. It is not the ethereal oil of any of the plants regarded as inducing hay fever.

Sir Felix, with the aid of Prof. Dunbar's assistant, Dr. Prausnitz, carried out independent experiments upon those liable to hay fever and those on whom no susceptibility was known to exist. At the same time the antitoxin was employed in those cases where the toxic manifestations developed.

The results, which must be regarded as altogether preliminary, are about as follows:—The pollen of certain grasses when extracted yields a

toxin which instilled into the eyes or nostrils of susceptible individuals induces symptoms of hay fever, variable in intensity, and it fails to do so altogether when those not susceptible are so treated. The antitoxin experiments corroborate those of Dr. Dunbar, showing that in some instances the effects of the antitoxin appear to be sufficient to prevent a reappearance of subjective symptoms. More is anticipated upon this most interesting and important subject, especially as it deals with the treatment of hay fever. *W. F. H.*

On the Diagnostic Value of the Position of the Head in Cases of Cerebellar Diseases.

Dr. Frederick E. Batten of London contributes to the Spring number of *Brain* of the present year a valuable paper on the above subject.

In six cases which he had the opportunity of investigating pathologically, a characteristic position was present in three, while in the remaining three no special position of the head was assumed.

The special position described is one where the face is turned towards the side of the lesion and where the ear approximates to the shoulders on the side opposite to the lesion. The former is the same result that happens when one lobe of the cerebellum is experimentally removed, while the latter (the approximation of the ear to the shoulders in the side opposite to the lesion) is the reverse.

In estimating the diagnostic value of this symptom, Dr. Batten considers that it is worthy of special value, but probably less so than either disturbance of coordination or weakness. It is not likely if alone present as a localizing symptom to be of any distinct value, but when present in conjunction with other symptoms pointing to this situation, then it is of considerable worth.

SURGERY.

UNDER THE CHARGE OF GEORGE E. ARMSTRONG.

Clinical Remarks on the Results of Operations for Strangulated Hernia.

ARTHUR E. BARKER, F.R.C.S., Eng. "Clinical Remarks on the Results of Operations for Strangulated Hernia." *Lancet*, May 30, 1903.

The clinical remarks are drawn from a consideration of tables made up by the Surgical Registrars of the University College Hospital, being a very careful analysis of this condition, and consisting of 406 consecutive cases.

With reference to the frequency of operation for strangulation, the tables show that for the last 10 years the number is just twice as great as 20 years ago. This may be partly explained by the fact that in the severer forms of strangulation taxis has not been lately so frequently

performed as formerly on account of the high mortality attending this method alone being employed (13 p.c.). So high, indeed, has been the mortality after the strangulation was relieved by taxis alone, that the writer believes it ought never to be employed "except in the very recent cases and among aged patients in a state of great weakness." The gross mortality following operation is given in the report as no less than 31.2 per cent., but it is encouraging to note that whereas in the first series of cases the mortality was 53 per cent., during the last four years it was reduced to 18 per cent. That this great reduction is not due in any very marked degree to the cases being operated upon earlier is shown by the fact that "the number of cases in which the condition of the patient and the bowel was so bad as to forbid anything more in the opinion of the surgeon than an artificial anus being made, remains almost equal.....and was exactly the same for the first and penultimate." The cause of death in the great majority of cases was due either to perforation or to a general peritonitis spreading from the reduced gut without any apparent perforation. This leads to the question of how best to treat the damaged gut; whether to bring out the damaged portion and establish an artificial anus to be closed later, or to remove the entire portion and perform an end to end anastomosis at once. Inasmuch as there were only two successful cases of artificial anus in the whole series prior to 1899, and that from then to the end of March, 1903, three cases of artificial anus resulted in two deaths—66 2-3 per cent.—while for the same period seven cases of primary enterectomy gave four deaths—57 per cent.—and that "as to the condition of the gut in each case we can speak with confidence, it was hopelessly damaged," the writer believes "that in primary enterectomy in selected cases we may in the future have the means of reducing our mortality still further." Indeed he goes so far as assuming that these cases treated by primary enterectomy would all have proved fatal had a simple herniotomy or an artificial anus operation been performed. There are some cases in so collapsed a condition as not to justify the hope that any long operation will save them, and these would have to be treated by the formation of an artificial anus. *W. L. B.*

OPHTHALMOLOGY.

UNDER THE CHARGE OF FRANK BULLER

The Use of X-Rays in Ophthalmic Surgery.

MAYOU. "The use of the X-ray in Ophthalmic Surgery." *Lancet, Feby, 28, 1903.*

SYDNEY STEPHENSON AND DAVID WALSH. *Lancet, Jany. 24, 1903.*

The X-rays set up a leucocytosis with an absolute minimum of des-

truction of epithelial and other tissues. This leucocytosis can vary in degree from very slight to great severity, and further, this leucocytosis is much more prolonged than in any method previously adopted and the destruction is not nearly so great. The action of the rays with due care and experience, can be kept under almost perfect control. Granules disappear very rapidly under X-rays, but operative methods which have the additional advantage of removing the diseased tissue must in some cases be preferable, such operations can be followed by X-rays to complete the work in preferance to one of the other irritants now in use. Operation, however, should not follow X-ray treatment without a considerable interval.

Mayou in his treatment at first used a mask for the face, but has since discarded it, as he never exposes the patient sufficiently to get any reaction in the skin.

In trachoma, the upper eyelid is everted and the lower lid pushed up so as to cover as much of the cornea as possible, except in bad cases of pannus, when the cornea is exposed. The patient is seated nine inches from the anode with a moderately soft tube and a current of six amperes. Two minutes exposure is given on from four to six successive days, the limit of four being for acute cases. A week's rest ensues, when, if no reaction occurs, the treatment is repeated twice a week until there is a slight increase in the photophobia, about this time the granulations begin to disappear and exposures once, twice or thrice weekly are kept up until they disappear entirely. When they have disappeared, all treatment must be stopped until the infiltration set up by the X-rays has gone. The result is an unscarred, noncicatricial conjunctiva.

The pannus is also greatly improved by the treatment. The most suitable cases are those with the chronic granular conjunctivitis. Acute diffuse infiltrations, with much thickening of the lids and photophobia require more careful exposures extending over a longer period. Mayou mentions that he had no trouble with the globe following X-ray treatment and cites a case of rodent ulcer of the lid in which the treatment was continued for six months and in which the only disturbance was a conjunctivitis. Mayou's experience covered fifteen cases, Stephenson and Walsh four. The four were children with typical severe hypertrophic trachoma, three having corneal complications. Stephenson and Walsh's employed a "hard" focus tube with the anode at a distance of eight inches from the eye and an average exposure of from ten to fifteen minutes. The average current strength was five amperes and twenty to twenty-five volts. They found it was not necessary to evert the eyelids, they also use a mask of lead foil for the face. The cures resulted after sixteen to seventeen applications.

These writers also report the cure of a case of trachoma by the high frequency current.

The rapidity of the cures and the painlessness are the great points in favour of this treatment, if further results bear out these favourable reports.

Paraffin Injection after Enucleation of the Eye-ball.

A. MAITLAND RAMSAY. "Paraffin injections after enucleation of the eyeball." *Lancet, Jan. 31, 1903.*

OATMAN. Plastic artificial vitreous in Mule's operation. *Medical Record, March 7, 1903.*

Ramsay divides the conjunctiva as closely as possible to the corneal margin, each rectus muscle is caught up on a strabismus hook and sutured with catgut to the superjacent conjunctiva, the tendons are then cut at their insertion into the sclera, and the eye then removed in the ordinary way. Hæmorrhage being stopped, the capsule of Tenon is packed with gauze until a strong black silk purse suture has been passed around the conjunctival margin, when the gauze is removed, and the melted paraffin injected filling the cavity to overflowing.

The purse suture is now drawn tight and knotted and then the catgut ligatures are tied, that from the superior rectus to the inferior, and that from the external to the internal rectus. The strictest asepsis must be observed. The excess of paraffin is wiped away, and after the conjunctiva has been bathed with boracic acid lotion, a compress and bandage is applied. The purse string is removed in fourteen days, and later an artificial eye may be inserted over the movable stump.

Oatman eviscerates as in Mule's operation, but instead of inserting a metal or glass sphere into the scleral cavity, he inserts a paraffin ball. The paraffin is brought to the boiling point, then cooled rapidly to prevent crystallization and the formation of bubbles. A ball is now roughly shaped with a knife and is brought to the required size by putting it on a long needle and rotating it in the flame of an alcohol lamp, the action of the flame being controlled by occasionally dipping the ball into a cold bichloride of mercy solution. The sclera must be sutured tightly so no paraffin may exude.

The plastic nature of paraffin will allow it to mould easily to the shape of the glass eye, and ulceration from pressure is not apt to occur.

Methylene Blue in Diseases of the Eye.

JACQUEAU. "Methylene blue in diseases of the eye." *Allgemeine Weiner Med. Zeitung, 1903, 5.*

Solutions of 1,1000 have a markedly curative action in corneal lesions

with or without formation of ulcers or abscesses. The solution is instilled twice daily. Courmont averted the ocular complications of smallpox by irrigating the eyes with this solution.

Rollet uses 2:1000 solutions, as subconjunctival injections in iritis complicated with hypopyon. In blennorrhœa pain is much lessened.

Leprince in three cases of epithelioma of the lower eyelid obtained complete recovery by painting the lid twice daily with 1:120 solution of arsenious acid and 1:100 solution of methylene blue. It is important to get pure methylene blue, as most preparations contain as impurities zinc and arsenic.

Internally, methylene blue is used in pill form 0.20 grammes twice or thrice daily. For subcutaneous injections a sterile five per cent. solution is used. Toxic effects are unlikely. (I have found the crayon of methylene blue of great service in infiltrated ulcers—J. W. S.)

Asepsis and Prophylaxis in Ophthalmology.

Panas. "Asepsis and Prophylaxis in Ophthalmology." *Archives d'Ophthalmologie, Jan. 1903.*

This communication in addition to its intrinsic value, is of sad interest as being the last production of this acute and talented observer.

In preparing an eye for operation, he first washed the lids with sterile water and soap, after which he rubbed them over with cotton containing a small amount of ether. Then, they were rubbed with sterile cotton saturated with an oily solution of iodide of mercury four parts to one thousand. In cataract extractions this is done the night before, and the eye covered with sterile gauze and a bandage. At the operation the eye is irrigated with 4 per cent boric acid solution, or 1:5000 of perchloride of mercury solution, or 1.1500 borycyanide of mercury solution.

Foreign bodies, except where accessible, should not be removed until the eye is quiet, unless persistent symptoms of glaucoma are present. Of local antiseptics, the best is methyl violet 1.500 solution.

In plastic and suppurative affections of the globe, general treatment is important, mercury administered by inunction or injection being of great value.

Serum therapy is of marked service in diphtheritic opthalmia and serpiginous ulcer; antipneumococcic serum being used in the latter condition, as it is generally due to pneumococcus infection. Where serum treatment is not available, an attempt should be made to free the organism from toxins by means of the natural passages.

J. W. Stirling.

Society Proceedings.

MONTREAL MEDICO-CHIRURGICAL SOCIETY.

Eleventh Meeting, June 5, 1903.

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

DR. C. B. KEENAN showed a living case of multilocal cystic tumour of the lower jaw. The case was reported in the June number of this Journal.

DRS. E. W. ARCHIBALD and C. B. KEENAN showed a living case of sarcoma of the lower jaw.

DR. ADAMI said they had that evening two most interesting cases of relatively benign tumours affecting the lower jaw and evidently there was still very much to be learned about the malignancy of those tumours. On the one hand the myeloid tumours such as that presented by Dr. Archibald were found to be truly benign, and in those cystic tumours an example of which Dr. Keenan had brought before the Society, they had a certain amount of myeloid sarcoma. They were benign, yet might form metastases, and he suggested that the material obtained should be most carefully studied to see what relationship there was to malignancy.

DR. HUTCHISON said the subject was very interesting from a clinical point of view; they had heard a good deal about the sarcomatous element in them, and to the clinician that was really the important point, whether the disease should be interfered with at all, whether that interference should be limited entirely to the growth, or whether a wide margin of safety should be sought. To the patient the question of malignancy was important, as a too adequate removal left the patient with a facial blemish or deformity, and on the other hand the possibility of recurrence was to be considered. In two cases on which he operated he had this difficulty to face, and he decided on a fairly conservative operation; the patient had had no recurrence and he felt that rather a conservative view should be taken.

DR. KEENAN said that in his case the patient had refused operation but he hoped some time to open up the tumour and see the inside; he would not advise an extensive operation until full microscopical examination had been made. The consensus of opinion was that in such a case scraping would be sufficient. He had a case a year ago of myeloid sarcoma in which scraping was done and up to that time there had been no recurrence, though it might be a little early to draw conclusions.

DR. MACTAGGART submitted an autopsy report on a case of status lymphaticus. It was published in the June number of this Journal.

Rupture of the Spleen.

DR. JAMES BELL and Dr. Dickson showed a living case of rupture of the spleen and gave the following report:—Anastasia Torvas, a schoolboy aged twelve, was admitted to the Royal Victoria Hospital on 3rd April, 1903, between 2 and 3 o'clock in the afternoon with the following history:—

On the previous day, April, 2nd, after being released from school about 2.30 in the afternoon, he and some companions were descending to the basement of the school-house, when he fell upon the stone steps. He is said to have become unconscious at the moment, and was probably in a condition of syncope. On recovering he suffered very great pain and was unable to help himself. He was assisted to his home by his companions and at 5 o'clock commenced to vomit. He had a bad night, suffering much pain, and was brought to the hospital on the following day. On admission he was very pale and somewhat confused; the abdomen was much distended and tender, and he complained bitterly of pain on any movement of the body being made. His temperature was 101, his pulse 136 and respiration 36. In spite of the history the condition suggested acute general peritonitis. I first saw him at 8 o'clock the same evening. The condition was then much as above described, but there was a marked tenderness at the costal margin and over the lower ribs on the left side. What impressed me particularly at this time was the extreme pallor, pain and tenderness over the splenic region. I did not think that it was peritonitis so I ordered fomentations and enemata, and saw him again at 8 o'clock the next morning. There was then still greater tenderness and pain over the splenic region extending well up into the axilla, and the patient was still pale. The probable diagnosis of rupture of the spleen was then made. At 2 p.m. the abdomen was opened in the middle line below the umbilicus, and between two and three quarts of dark clotted blood were found lying between the coils of intestines and in the pelvis. This was removed and the wound closed. On exploration no fresh blood was found and no evidence of a bleeding point could be found in the mesentery or liver. The spleen was not brought into view and palpation did not show any lesion of its under surface. It was, however, hard and firm. The boy made an uninterrupted recovery was free from pain from the time of the operation, and with the exception of his being averse to taking food for the first four days, there was nothing special to record. The temperature reached normal on the 4th day and he was discharged on the 21st day after operation.

Complete Transposition of the Viscera.

Dr. Fry:—In April, 1903, there came to Dr. Martin's out-door service in the Royal Victoria Hospital, Emma M., aged 15, complaining of cough. Her card showed that in September, 1901, she had come on account of the same symptom, when Dr. Martin found the physical signs of a slight sub-acute bronchitis and recognised a complete transposition of the viscera. Her cough had disappeared until this Spring when a recurrence brought her back for advice.

She has had perfect health since 1901 till a week or two ago when slight cough appeared. Her family history is irrelevant. On close questioning one elicits no complaints referable to her anomaly. At two years of age she had measles and shortly after diphtheria was passed through without complications. She never had acute rheumatism, nor scarlet fever.

She is of good nutrition and color. On inspection of the chest one sees, under the right breast, a heaving diffuse impulse which extends in the fifth space to a point 3½ inches to the right of the median line. Palpation reveals a strong systolic thrill over the entire heart, but more marked at the base, especially over the third right cartilage. On percussion relative dulness is found in the vertical direction at the third right rib, while at the fourth rib there is absolute dulness which extends towards the left, to the right border of the sternum. Upon auscultation, a loud, very rough systolic murmur is heard at all points, but louder towards the base and definitely loudest at the third right cartilage. There is pulmonary accentuation. The pulse is normal. The lungs give no abnormal signs except a few moist bronchial rales. On the anterior aspect of the chest vocal fremitus is more marked on the left side (transposition of the lungs).

The liver is readily outlined by percussion, on the left side, absolute dulness beginning at the upper border of the sixth rib and extending to the costal border. A hand's breadth of dulness under the ninth and tenth ribs in the mid axilla on the right represents the spleen. Percussion of the stomach proves the fundus to be to the right and the pylorus to the left side.

The abdominal and thoracic viscera then are transposed; that is, one has to do with an example of the less rare or "complete" variety. The condition has not produced any symptoms. It is interesting that there is, in addition, a purely cardiac congenital anomaly. As we have seen there are no cardiac symptoms and no signs of disturbed compensation; while there is no evidence of pericarditis or endocarditis. The very marked thrill and rough murmur, both systolic and of maximum intensity, over the pulmonary valve, lead one to diagnose pulmonary

stenosis. This, and defect of the inter-ventricular septum are the commonest congenital defects, and they are found combined relatively frequently.

The possibility of the co-existence in our case of a defective septum suggests itself, though the fact that there is no history of her having been a "blue" baby, and that she has had no chronic circulatory or respiratory difficulty, proves there is no extensive defect in the septum. For the same reasons there cannot be a large patent foramen ovale or a patent ductus arteriosus.

In the literature there are between two hundred and three hundred cases of transposition of the viscera, Pick, up to 1895, finding record of 190 cases. Only thirteen examples of partial transposition are recorded. In speaking of the latter one does not refer to cases of acquired dextro-cardia in which fibrous adhesions between the heart on the one hand and the mediastinum, the lung, or the pleura, on the other, lead to displacement of the heart.

A much larger proportion of the cases are now recognised during life than previously, largely owing to the fact that a larger proportion of chests are now examined than used to be the case. In 1865 Gruber found 79 cases in the literature, of which only five or six had been discovered during life. Arneill (Amer. Journ. Med. Science, Nov. 1902) recently collected 44 cases, of which 38 were recognised during life. The first recorded case was published by Petrus Servius in 1643. In Montreal, Dr. MacCallum described a case in the late Dr. R. L. McDonnell's service in 1850, and recently cases have been observed by Dr. Lafleur and the late Dr. Grafton.

Sarcoma of Leg.

Dr. J. Alex. Hutchison reported a case of sarcoma of the fibula followed by paraplegia:—

F. H., aged 17, married, August 1901, no children, was admitted to my service in the Montreal General Hospital complaining of pain and swelling of the right leg. About December 15th, 1902, patient noticed slight swelling of the right leg half way between the knee and ankle on the outer side. At first it was painless, but pain soon developed. There was no history of injury at any time and the growth was very rapid. By January 3rd, 1903, she had to take to bed as she was unable to walk. There was loss of function of muscles, especially extensors and peronei, with tingling of foot and toes and partial anæsthesia of toes and dorsum of foot. The veins on outer side of leg became prominent, and general œdema of leg and foot appeared. The treatment up to the time of admission was fomentations and morphia.

Present Condition; March 16th, 1903:—Patient is a young woman of small size. The face is very pale, and shows great emaciation; mucous membrane, pale, no jaundice; cervical glands palpable on both sides. The inguinal glands are readily palpable, but do not show any more enlargement on right than on left side. The thyroid glands show moderate amount of general enlargement.

The right leg and foot are greatly swollen. The skin is tense and glistening, and shows some large prominent veins over the region of the upper third of the fibula. There is great œdema and cyanosis sharply delimited by the knee joint. Above the knee the limb is small and atrophied. The maximum diameter is about 6 ins. in striking contrast to the other leg with a diameter of less than 3 ins. No localized mass can be felt, or deep fluctuation made out, and no crackling. The limb is not very tender, but considerable pain since admission of aching character.

The skiagram showed the tibia apparently normal. The fibula showed evidence of absorption near the upper end, but the outline could be traced throughout. There is a shadow suggesting some mass at junction of middle and lower thirds.

On diagnosis of periosteal sarcoma the thigh was amputated on March 19th. The pathological report was small round celled sarcoma.

After the operation the patient experienced great relief from pain and the weight of the affected leg, and recovered well with primary union in the wound. The sutures were removed on the 29th, ten days after operation.

On March 30th the patient complained of very severe pain in the lumbar region, and pains shooting down the left leg and into the stump, so severe that morphia was required to control them.

April 1st. Patient developed retention of urine, and paraplegia with anæsthesia of legs.

April 3rd. Anæthesia reaches level about 2 ins. above symphysis pubis. Knee jerks absent, abdominal reflexes absent.

April 4th. Patient was seen by Dr. Shirres who found, in addition to the above, that there was a reaction of degeneration in the paralysed muscles and dissociated anæsthesia, sense of touch remaining while that of heat and pain were lost.

April 5th. Patient developed rectal and vesical incontinence. Examination of chest failed to show any evidence of recurrence in the lungs.

April 6th. Patient was seen by Dr. Lafleur who suggested a transverse myelitis as the probable lesion.

April 7th. Zone of anæsthesia has risen to 1 in. above umbilicus in front and corresponding level behind.

Condition is thought to be one of recurrence of the disease in the cord, with no hope of further improvement, and patient was removed from the hospital.

Dr. Abbott showed the specimen and supplied the following note:—Specimen 864, Sarcoma of Leg. This specimen when received showed the right leg with lower part of thigh and foot attached. A slice had been removed from the upper two-thirds of its outer surface, the sections passing in its whole extent through the shaft of the fibula. On mounting for the museum the thigh was removed at the knee, and the distal half of the foot cut off.

The leg is enlarged in its upper portion. The cut surface shows the head and shape of the fibula clearly demarcated from the surrounding tissue but infiltrated with soft material, hæmorrhagic in parts, all osseous tissue having disappeared from the anterior margin and lower third of the cut surface of the shaft. The muscular tissue on either side is transformed into a laminated strioma, between the layers of which soft yellow tissue is seen. A band of fibrous tissue running parallel to the posterior surface of the fibula is possibly the intermuscular fascia. Neither the bones of the foot cut through, nor the upper surface of the tibia exposed show invasion by the growth to the naked eye.

Election of Officers.

The nomination of officers resulted in the re-election of all the officials, chiefly on the ground that under the new rules the present incumbents who were elected last January, would otherwise only occupy their places for half a year, as the year in future begins in October. The officers are:—President, H. S. Birkett; vice-president, J. A. Macdonald; secretary, A. MacKenzie Forbes; treasurer, A. T. Bazin; trustee, F. J. Shepherd.

June 19th, 1903.

H. S. Birkett, M.D., President, in the Chair.

Dr. Hill, at the request of Dr. Hutchison presented an apparatus constructed by Dr. Lewis of Paris, and owned by Dr. F. Monod. This instrument was constructed so as to obtain separate specimens of urine from the two ureters.

Dr. Archibald thought this instrument marked a great advance, as everyone knew the difficulty in obtaining specimens of urine by catheterization of the ureters. Many urine separators had been devised, but none of them had brought the urine from the bladder in that way.

Dr. W. F. Hamilton reported a case of septico-pyæmia (staphylococcus infection); The patient came under his care a few weeks ago, complaining of severe pain in the stomach, loss of weight, weakness and occasional nausea. When admitted, he gave a history that four weeks previous he had an attack of illness, characterized by severe abdominal pain, referred to the right side and of such a character as led to the diagnosis of appendicitis. No vomiting occurred and there was no localization of pain. Shortly after the attack the pain or rather distress shifted to the epigastrium. He had been troubled with indigestion for several years, never marked by vomiting, and meat gave him less trouble than other food. The pain did not come on till about two hours after eating and sometimes a drink of water gave relief. On being admitted his condition was febrile, with great weakness and some abdominal tenderness on palpation. On careful examination nothing could be made out, which would assist in a diagnosis of the condition. It was thought in the beginning that he had some alteration in the breath sounds, and a few adventitious sounds were heard in the base of the right lung posteriorly; this was constantly present and increased in intensity. To further the diagnosis, blood examinations were made, and they found they had to deal with a condition which was well characterized as secondary anæmia without leucocytosis. The appearance of the patient was not unlike that presented in pernicious anæmia. The blood count showed 3,000,000 red cells, 4,600 leucocytes with a hæmoglobin percentage of 55. The temperature for many days was febrile and of a negative type, 97, 102, 103, 104; slight albuminuria, but at the beginning no casts. Dr. Hamilton's impression was that it was a case of early cirrhosis of the liver, or a case of tuberculosis. The after-events of the case showed that they had a pleurisy with effusion in the right side, also in the left, and finally, manifest ascites of rather a high degree. Further investigation of the case revealed the presence of staphylococci, which Dr. Bruere termed the staphylococcus pyogenes aureus. These were found in the fluid taken from the right side on two occasions, and also by exploratory puncture, from the peritoneum. Further examination of the blood was made, and the same micro-organism isolated in pure culture from the blood taken from the median basillic vein. Up to that time the view that a peritonitis was present was entertained, and on the ascitic fluid giving the same findings as that of the blood in the thorax, they thought there was a general staphylococcus infection and treated the patient with a view of removing this fluid containing the toxines and probably some of the bacteria. The temperature fell almost immedately after the withdrawal of a large amount of fluid. In the height of the condition they had to do, not with simple albuminuria but

with casts and a number of cylindroids in the urine. The kidneys at that time were more involved and possibly the mode of elimination by the kidney of the organism was the means of bringing about that involvement. He had yet to make subsequent examinations of the blood before the patient left the hospital. The urine had not been carefully investigated from a bacteriological standpoint. The discussion concerning the bacteriology of arthritis was interesting, as they had to do with two attacks of arthritis in the right ankle. At the time of reporting the case the patient was in a comparative state of well-being; there was still some fluid in the right chest and dulness at the two bases. They could not define the source of entrance, but it was worth noting that it was not infrequent to find that form of infection with cholecystitis and cholelithiasis. In his case there was no evidence of any such condition from the history, no jaundice, no recurrent attacks of colic, which one might put down as hepatic.

DR. LAFLEUR remarked, that, seeing there was effusion in both sides and subsequent peritoneal effusion, one might think it a case of pleuro-peritoneal tuberculosis, and he emphasized the necessity of bacteriological examination of the blood in all such cases.

DR. HAMILTON replied that tuberculosis had been thought of. This formed one of a series of cases, which Dr. Bruere and he were studying with a view of determining the cells in the effusions of serous sacs. Before a blood examination was made, it had been found that the cells were endothelial and polymorphonuclear as opposed to the lymphocytes in tubercular lesions, and from that it was concluded to be an inflammatory process other than tuberculosis.

DR. BIRKETT showed a living case of tuberculosis of the pharynx, which he said was of considerable interest to the general practitioner and interesting also because of its rarity. A boy, act. 15, son of a farmer, came to hospital last November, on account of difficulty in breathing through the nose. On examination of the throat he found the lateral walls of the pharynx infiltrated with two enormous masses on either side; this had the appearance of granulation tissue whose granulations were soft, almost resembling frog-spawn in color and consistency. The surrounding structures and mucous membrane were extremely pale. On examining the naso-pharynx one found the upper surfaces of the soft palate and the lateral walls of the naso-pharynx infiltrated with this same tissue, to such an extent that the boy absolutely could not breathe through the nose. The personal history was negative. The family history showed that three uncles on his father's side and one brother had died of tuberculosis, and the boy himself occupied the room in which the brother had died. The general system was negative; lungs absolutely normal, any secretion from the throat coughed up was abso-

lutely negative, and all that could be found in a general way was a slight enlargement of the glands beneath the lower jaw. The temperature was normal.

Three problems arose as to the condition; (1) inherited specific disease, (2) tuberculosis; (3) malignancy. The first was negatived by the absence of any other corroborative symptoms; eyes showed no keratitis, and the teeth no specific appearance. As to malignancy, the rarity left it to a great extent doubtful. The patient was placed under ether, and the large mass removed and submitted for microscopical examination. The local appearances of the throat were against malignancy, the granulation being of a rather indolent type, and no infiltration of the surrounding tissue. Examination under the microscope proved the existence of typical giant-cells, and the bacteriological examination revealed the presence of a few tubercle bacilli. This removed mass was also injected into guinea pigs with aseptic precautions; one died from a septic peritonitis, the other lived for about two months, getting fat and well, then suddenly died from some unknown cause. Tuberculin was used and the chart showed the typical reaction, locally as well as general, the granulations becoming intensely hyperæmic as also the surrounding mucous membrane. The question of treatment naturally came up. The infiltrated masses were excised; after curetting and rubbing in a strong solution of lactic acid but little progress was made. The x-rays were then tried, consisting of an ordinary coil and lamp applied directly through the mouth, having the face protected by means of a screen, with a central perforation; this was covered with some eleven coats of white lead; before this there was some definite dermatitis. He had 33 sittings, each lasting for a period of ten minutes, the tube placed at a distance of about 10 in., and a current of 110 volts and 2 to 3 amperes used. The infiltration had practically disappeared, leaving the posterior lateral walls of the pharynx quite smooth. The enlarged glands probably would be removed on his return in a couple of months.

Dr. Keenan, in reply to Dr. Fry, said that an autopsy had been made and no lesions found; cultures of the heart blood were sterile. He had noted very often in the treatment of lupus as well as tuberculosis with the x-ray that a secondary involvement of the neighbouring glands seemed to take place, and those already involved to have increased.

Dr. White showed for Dr. Hutchison a case of congenital nævi.

A Series of Stones.

Dr. Armstrong reported a case of stone in the kidney (illustrated by skiagraph) with the following account: Young man, aet. 24, with a history of pain in right kidney in boyhood, always in one place, half way between umbilicus and anterior superior spine of ilium on right side; attacks lasting from a few minutes to several days, with feeling of

nausea, bowels bloated and rumbling; attack generally followed by loose movements, no chills or perspiration; no blood in urine, though father states that it had been passed in boyhood. The interesting point was that the pain being referred to this region gave rise to a diagnosis of appendicitis and the appendix had been removed in Boston about a year ago. The pain remained same as before, urine clear, yellow, normal, alkaline, albumin occasionally present, no sugar, pus cells, a few blood cells, no epithelium, no casts. A further interesting point was the skiagraph. That method was becoming more and more perfect, and should be used in all cases suspicious of stone. He cut down upon the kidney about two weeks ago and immedately came upon the stone lying in the pelvis, chiefly an oxalate. He opened the posterior wall of the pelvis, extracted the stone and sutured the pelvis; no urine has escaped; the wound completely closed and convalescence was without a drawback.

Another case was that of a man of 63, who was unable to pass water and his physician used the catheter; next day he could not pass urine, and the physician was unable to pass the catheter; he was aspirated four times as no catheter could be introduced. On close questioning it was found that fourteen years ago he had an attack of pain in the back with vomiting and had been given morphia. On suprapubic incision he found the middle lobe pushed right up against the internal orifice of the ureter, and held there by the unusually large stone which was exhibited; it was a very fine specimen of oxalate.

Another case was that of 28 gall stones of uniform size; 25 removed from the common duct and 3 from the gall bladder. The woman had no symptoms until a year ago, when she had a number of attacks of gall stone colic, fever and pain, but scarcely any jaundice.

Yet another case, with large stones he said possessed interest, chiefly from the fact of difficulty of diagnosis. The pain had been in the region of the appendix for some five or six years, but on operation he found an atrophied appendix, and on passing his hand up he felt a large stone in the gall bladder. Since then there has been no pain in the appendix or gall bladder region.

The last case, he said, presented a number of points of interest in addition to the fact of there being 150 gall stones. A woman of 55 with no symptoms was seized with a typical attack of gall stone colic. The objection to operation was that she had pretty well advanced Bright's disease and ice bags were tried at first, but finally he operated and removed the stones. In such cases, he said, he depended more on the specific gravity of the urine than on the quantity of urea. The gall bladder was practically an abscess cavity, and he thought it wiser to remove the infected sac than to leave it.

Dr. Keenan did not think that skiagraphs invariably showed stones, as they might be present and not show on the plate. Undoubtedly an oxalate showed better than urates or phosphates and the clinical evidence was most to be relied upon for diagnosis.

Dr. Hamilton asked if the subject was a thin one, as his experience with the fluoroscope was that thin persons showed to better advantage.

Dr. Armstrong replied, in case of the skiagraph for stone, that in 28 cases of stone, 24 had been shown on the plate. His patient was a thin man and undoubtedly the thickness of the individual had a great deal to do with securing a good plate. Two or three plates were necessary to make sure, and it was quite possible that it might be present and not show on the plate.

Dr. Finley reported a case of carcinoma of the œsophagus involving the trachea. The patient, aet. 62 was admitted in March, complaining of cough and expectoration; had been subject to cough for several years, but recent attack was much exaggerated; a history of specific disease 17 years previous; he had evidence of bronchitis; cough, muco-purulent expectoration, numerous ronchi and sibilant sounds over chest; a day or two later noticed stridor, which directed attention to a probable obstruction in the trachea; became subject to very intense dyspnœa, during which he was cyanosed and became almost pulseless; died from pneumonia about a month after admission.

During life aneurysm had been thought of, but no evidence found, and from the history, a syphilitic contraction of the trachea seemed probable. The trachea was examined by the laryngologists, but with negative results, though the dyspnœa and very irritable throat rendered the examinations unsatisfactory.

Autopsy showed a growth in the œsophagus about 6 inches from the upper end surrounding three-fourths of the œsophagus; there was narrowing, but no marked stenosis. That condition caused no symptoms, until the metastasis in the trachea developed; that was about two or three inches above the growth. This mass lay alongside the trachea, and projected into the lumen, and was apparently a gland; it was of considerable size, and around it were two or three smaller nodules. This had caused a great degree of narrowing and was evidently responsible for the stridor and dyspnœa. This symptom of stridor was very important, and when present one was usually right in regarding it as arising from pressure or obstruction of the treachea. Microscopically the growth was a squamous-celled epithelioma.

Dr. Archibald reported a case of bony tumor of the elbow joint, illustrated by specimen. He also showed a specimen of tubercular osteo-myelitis of the rib, which had produced a spontaneous fracture and an external tumor, without the slightest symptom.