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**CASES IN PRACTICE.—TWO MONTHS' WORK IN
ABDOMINAL SURGERY.**

By ERNEST HALL, M.D., Victoria, B.C.

Fellow of British Gynæcological Society.

CASE I.—Mrs. I., aged 43, mother of three children, youngest six years old, several miscarriages since. Suffered from pelvic pain, backache, severe hæmorrhagia, anæmia and nervousness. Examination showed lacerated pernum, enlarged and retroverted uterus, appendages normal. Patient was placed in the hospital, a tent inserted, and the following day an anæsthetic given. The cervix was sufficiently dilated to allow exploration of the uterus with the finger, the cavity was found filled by a fibroid growing from the fundus. Previous experience with intrauterine fibroids led me to select vaginal hysterectomy in preference to the risk of enucleation, the possibility of subsequent hæmorrhages and malignancy. The uterus with one appendage was easily removed by the clamp method. The patient suffered little or no shock, temperature did not exceed 100°, clamps removed in thirty-six hours. The patient felt so well that on the third day she wanted to go home. Convalescence ideal, left hospital in two weeks.

CASE II.—Mrs. R., aged 47. Mother of eleven children, youngest eight years old. Passed menopause two years ago. During last six months had slight discharge at irregular intervals, with pain in the right side, worse upon lying down, general health good. Examination showed lacerated and eroded cervix (the finger was smeared with blood after examining), right ligament thickened, uterus drawn slightly to that side. A guarded diagnosis was given and the patient advised to go to the hospital for a more thorough examination. Under ether the uterus was curetted and a piece of the cervical tissue submitted to microscopical examination by Dr. Hart, who reported malignancy. Radical measures were then decided upon, and after a few days' rest and preparation the uterus was removed as in previous case. After history

all that could be desired. She left the hospital twenty-one days after the operation and travelled some forty miles home with but little fatigue.

CASE III.—Mrs. W., aged 28. Married seven years, no children. One miscarriage five years ago, followed by "inflammation." Since that time she had complained of pain in left side and back, but was able to do housework. Examination showed retroversion with adhesions. Anterior colpotomy (vaginal section) was done, the adhesions which bound the uterus to sacrum and rectum were broken down with the finger passed through the vaginal incision and over the uterus, the ovaries and tubes aside from adhesions were normal. The uterus was then antverted and attached to the anterior vaginal wall (vagino-fixation). Patient left hospital on the tenth day.

CASE IV.—Mrs. C., aged 24. Nullipare. One year ago I removed a pustube and septic ovary through the posterior cul-de-sac. On account of the narrow and deep pelvis, with great muscular development, the operation was difficult, in fact it was a mistake to attempt vaginal work in this case. The right ovary and tube appeared normal and were not molested. The present sickness was a typical acute septic salpingitis. After waiting until the active stage had passed, I opened the abdomen and removed one-half of the ovary which was cystic and disinfected the tube as much as possible hoping to save it, but upon passing a probe through the funbrated end the tube was found impervious, and removal was decided upon. No drainage, convalescence normal, left hospital on ninth day.

CASE V.—Mrs. W., aged 26. Married, no children. One year ago she noticed an enlargement in lower abdomen, which gradually increased in size. Menses had been regular and painless with exception of one intra-menstrual hæmorrhage in July and an excessive menstruation in December. She had occasional discharges of large masses of thick mucus. Was examined by several medical men in an adjoining city, and the tumor pronounced non-removable but would probably become absorbed. Examination showed uterus crowded to the extreme right, pelvis and lower abdomen filled with a semi-fluctuating mass. The diagnosis lay between a cyst with thick tense walls, or a semi-solid fibroid. In either case, considering the age of the patient, operative measures were justifiable. Abdominal section showed the mass to be fibroid with immense varicocele of ligaments and enlarged and cystic ovaries. The whole mass was removed (pan-hysterectomy) and drains inserted through abdominal wound and into the vagina. Abdominal drain removed second day, vaginal drain on sixth day. Temperature did not exceed 100 2-5. Excellent convalescence, remained in hospital five weeks.

CASE VI.—Qui For, Chinese, aged 28. Married, no children. This patient, when a girl, was rescued from the slavery which exists among this race of people, and educated in the Methodist Mission school. Being subject to that common to all races, she married Cha Hong, also one of the "Mission," but alas for the frailty of poor humanity, the ubiquitous gonococcus found lodgment in both urethra and joints, and Cha Hong was rendered *hors de combat*. During his sickness he was supported by faithful Qui For until she too fell a victim to gonorrhœal infection. The patient complained of great pain in lower abdomen, increased under pressure, worse upon right side, with right rectus actively on guard. Constipation and vomiting. A vaginal examination gave no definite information. As the local indications were suggestive of appendicitis, I determined to open the abdomen at once. The appendix was but slightly congested, but was summarily disposed of. The pelvis was examined through the same opening and an acutely inflamed and distended pustube removed from the opposite side. The pelvis was thoroughly flushed and drain inserted. Patient made an excellent

recovery from this operation, temperature not exceeding 100° , and was about ready to leave the hospital when she began to complain of pains in the abdomen. The bowels became rather sluggish, yet would respond to active cathartics. Vomiting and tympanitis, temperature continued normal, while pulse began to climb up. Seventeen days after the primary section the symptoms indicated obstruction, the abdomen was opened through the first incision which had firmly united. The intestines were deeply congested and a two inches of the ilium were found bound to the peritoneum along line of incision, with gut acutely curved upon itself, completely closing the lumen. The bowel was very friable and the muscular coat tore several times in freeing the adhesions, these tears were adjusted as accurately as possible. Other minor adhesions and bands were broken down, sterilized oil left in peritoneal cavity and the wound closed. The pulse which was 131° before the operation dropped to 98 by midnight with a temperature $98.1-5^{\circ}$. Urine free, bowels moved the following day, also vomited mucus and bile. The pain disappeared and the patient was comfortable. Next day flatus passed, vomited several times, and pulse 124. On the evening of the third day temperature reached $100.2-5^{\circ}$, and pulse 136. On the following morning as a last resort she was again opened. General peritonitis was found with partial stricture of a knuckle of small intestine deep in the pelvis. Rapid collapse compelled immediate termination of the operation.

CASE VII.—Mrs. R., aged 38. One year ago, after walking rapidly to catch a train, and partaking freely of cold drinks, she experienced severe pain in "the bowels." The suffering continued during the following night but was relieved by free catharsis. About every two months patient suffered from similar attacks which lasted some two or three days, frequently beginning at night, the patient being awakened by the pain. Had not consulted any physician in this matter, fearing that it would be called appendicitis and operation recommended, so permanently fixed has the connection between this disease and the hospital become in the public mind. Patient presented temperature of 101° , rigid right rectus, pulse 86, and suffering intense pain diffused over the abdomen. Acute pain upon deep pressure over right side, an enema relieved the bowels and the patient slept. Operation was discussed, but as the pain had eased and the patient comfortable it was temporarily refused with the promise to consider it during the interval between the attacks. Twelve hours later I called and found temperature and pulse increased, with appendix region still very sensitive to pressure. Surgical measures were imperative, and the patient was given the alternative of accepting them or dismissing her attendant, as the responsibility in such cases is too great to permit of any compromise. Section showed a perforated appendix with abscess. The suppurating organ was removed, the abscess wiped out with gauze, and a drain inserted. Convalescence normal.

CASE VIII.—Mrs. J., aged 28. Mother of three children, youngest three years old. Had suffered four years with pelvic pain, was somewhat relieved before birth of last child, but increased afterwards. Had several miscarriages during last two years. Some four months ago her husband took grippe and followed with pneumonia which confined him some two months. During this time she acted as his nurse as well as doing her share of the household work. During the convalescence of her husband the patient became nervous, hysterical, and latterly melancholic, refusing food and unable to sleep. A pelvic examination showed lacerated perium, retroverted uterus and thickened ligaments. Local treatment was discussed, but postponed until the system could be improved. Massage, electricity, and even seclusion proving futile, and the mental condition becoming more pronounced, I opened the abdomen and

found both ovaries enlarged to almost double their normal size, upon one a cyst as large as a walnut, and upon the other a cyst half the size. Upon this finding the appendages were removed and uterus replaced. Recovery from the operation was normal. For a few days there was some improvement in the mental condition, but afterwards she relapsed and at date of writing has not made any progress. Of course it is yet too early to express any opinion as to the effects of the operation.

There are a few questions arising in connection with these cases that I wish briefly to allude to.

Re CASE I.—Why in such a case of submucous fibroid is hysterectomy preferable to enucleation?

It is a very difficult matter to thoroughly disinfect the uterine cavity when there has been disease existing for some time. I know of one death following enucleation of a fibroid. Then there is the liability of injuring the uterus. I saw no less an expert than Martin perforate the uterus in the attempt, necessitating immediate hysterectomy, not forgetting the possibility of recurrence, hæmorrhage, and malignancy, many of which conditions are completely removed by the radical operation, while the liability to sepsis and shock is lessened. In young patients the attempt to save the uterus would be justifiable, but in a patient aged 43, presenting a neoplasm with exhausting hæmorrhage anything short of hysterectomy is not to be considered.

Re CASE II.—Commencing malignant disease of cervix. Dr. Macnaughton Jones, of London, in his inaugural address as President of the British Gynæcological Society, said: "We do not now permit any 'old fashioned' views as to the limitation of carcinoma of the uterus to the cervix to influence us in pursuing old womanly methods in dealing with a disease so destructive to human life. We know that cervical cancer does frequently invade the fundus, and though we may clinically distinguish carcinoma from epithelium of the cervix, we do not permit clinical distinctions between canceroid and carcinoma, and sarcoma, to influence our operative procedures." Martin as far back as 1888 stated, "I recommend in the earliest stages of all forms of carcinoma of the collum, to take the radical treatment into immediate consideration, and if the presence of carcinoma is indubitably established by the microscope, to perform immediately extirpation of the whole uterus." And authorities might be multiplied, yet it seems a difficult matter to grind this into the average practitioner. It is but a few months since in the report of one of Toronto's medical societies, a surgeon of no mean ability, and of more than local reputation, urged as a reason for amputation of the cervix in malignant disease the comparative high mortality of hysterectomy. With our modern surgical technique the mortality of vaginal hysterectomy should be but little greater than that of the high amputation of the cervix. Jacobs published 166 cases with but four deaths. Richelot gives a series of 144 cases without a death. Surely with such a record no one should object to vaginal hysterectomy on account of the high mortality.

The questions of the proper field for vaginal section and of the relation of insanity to disease of the pelvic organs might also be discussed, but as this paper is already too long it will be the subject of a subsequent communication.

CONTINUOUS IRRIGATION IN PUERPERAL SEPTICÆMIA.

By F. C. HAGAR, Portland, Ont.

On August 29th Mrs. C. passed through her third confinement. Labor was normal, a healthy child was born, and there were no noticeable lacerations. I saw her subsequently on the second and fourth days; pulse and temperature were normal. I left her with instructions to send for me if anything went wrong. On the 8th September she got up, it being the eleventh day after her confinement. The next two days she did not feel so well, and on the eleventh, at 2 a.m., she sent for me. I found her in bed; temperature 104 2-5, pulse 124. On examination found a persistent discharge exuding in considerable quantity. Washed out the vagina and uterus and curetted with dull curette. A few shreds only were found in the uterine cavity.

Gave 5 gr. quinine every four hours. At 10 a.m. no change. I again washed out the uterus with bichloride. At 2 p.m. temperature 104 4-5, pulse 134. Called Dr. Mallory in consultation. At 4 p.m. we again gently curetted and disinfected; at 7 p.m. no improvement.

Considering the case critical I resolved to try continuous irrigation. The os being quite patent, I introduced a male metal catheter bent to the proper curve, and attached it to a fountain syringe, the patient being placed on a Kelly's pad near the edge of the bed. Sterilized warm water was allowed to flow through her uterine cavity at the rate of about six gallons an hour. After four hours the temperature began to drop and the patient fell asleep. Irrigation was continued for four hours longer, or until 3 a.m. At this time the condition of patient was as follows:—Temperature 100 4-5, pulse 105, headache gone, patient resting easily. Stopped irrigation for two hours, and allowed patient to rest. At 5 a.m. temperature and pulse were found to be rising. The irrigation was then continued eight hours longer. At end of this time, temperature 101, pulse 104, the irrigation was discontinued for two hours. The temperature rose during the second hour to 103, pulse 112. Irrigation was again commenced and continued for seventeen hours longer. By this time temperature was again down to 100 4-5, pulse 102. In two hours it again started to rise. Irrigation was again continued fourteen hours; temperature remained between 101 and 102.

By this time I was convinced that the slight fever remaining was caused by streptococci in the blood. I administered 10 c.c. antistreptococcic serum and stopped continuous irrigation. Within six hours temperature dropped to normal, pulse to 95. For two days longer it was necessary to irrigate uterus every three or four hours with bichloride, and after that twice a day, about a gallon of bichloride, 1-5000, being used each time. Later this was changed for carbolic acid 1-40, as the bichloride was found to cause smarting.

Four days after treatment was commenced the temperature reached normal and remained so, injections being merely kept up as a precautionary measure, and on eighth day patient was able to sit up for her meals.

There are two chief points of interest in this case.

First, the prompt action of the continuous irrigation in relieving all the urgent symptoms.

Previous to its rise the case had been treated vigorously in the ordinary way, the uterus being first curetted and then washed out every three or four hours. But between these treatments considerable discharge would form and

toxines were being constantly absorbed into the blood, so that the patient was being overwhelmed with their virulence. The continuous irrigation stopped all this. The toxines, as fast as they were formed, were washed away. Fragments of tissue, doubtless loaded with micrococci, were constantly loosening up and being washed away, so that nothing was left for a moment in the uterine cavity to act as a suitable pabulum for microbic action. About every three hours a gallon of bichloride, 1-5000, was allowed to flow through instead of the sterilized water, and this also aided in the destruction of the bacteria working in the uterine mucous membrane.

The second point of interest was the action of the antistreptococcic serum. It was found that the continuous irrigation, after two days, did not bring the temperature within two degrees of normal, therefore it was reasoned streptococci had already entered the blood and were beyond reach of the irrigation, consequently the injection of 10 c.c. antistreptococcic serum was made more as an experiment than because of any strong faith in its efficiency. The results, however, were all that could be desired and strongly supported the hypothesis. The temperature came down promptly to normal and the pulse dropped below a hundred to rise no more, and while it was found for a couple of days longer that the fever would go up a degree or so, free flushing of the uterus would cause it to rapidly drop to normal, so that within a week the patient was convalescent and required no further close attention.

In all about 400 gallons of sterilized water flowed through her uterine cavity. Had the temperature not come down under six gallons an hour I should have doubled the amount, as Mauseau of Montreal quotes several cases in the *New York Medical Journal* where this was found necessary and was followed by brilliant results.

In continuous irrigation, then, we have a method of treating severe cases of puerperal supraemia which will prove of value when ordinary methods fail, and by its use cases can be pulled through which otherwise could only be saved by hysterectomy, or not at all.

Under its use involution goes on rapidly. Irrigation must be kept up until suppuration has ceased and until the uterine cavity has undergone sufficient repair to prevent further absorption.

Special Selections

UPON THE BACTERIOLOGY OF PROGRESSIVE CIRRHOSIS OF THE LIVER.*

By J. G. ADAMI, M.A., M.D., F.R.S.E.,

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

It is needless for me here to enter into a disussion of the various theories which have been adduced to explain the development of cirrhosis of the liver. I need only say that the experience of a large number of observers, who for weeks and months have inoculated and treated animals with various alcohols has shown that alcohol itself induces at most the fatty liver, it may be, a very slight amount of fibroid change in the portal areas, and that not a single observer has by this means been able to produce anything at all resembling the extreme deposit of fibrous tissue which we meet with in the hobnailed liver.

Alcohol in the main leads to the fatty liver, while on the other hand the evidence has steadily accumulated, notably in India, that extreme cirrhosis may attack children and adults who have not taken a particle of alcohol either medicinally or otherwise.

Within the last few years, the French school of pathologists headed by Hanot, has regarded the enlarged cirrhotic liver with jaundice as being of infectious origin, and it is common in France, nowadays, to speak of "*le foie infectieux*," but to the best of my knowledge no one has as yet described any one micro-organism as being found frequently associated with these cases of so-called infectious liver. At most, Levi† from a case of cirrhosis in a

seventeen-year-old male, with marked periportal fibrosis and enlarged spleen, obtained a diplococcus pathogenic for guinea-pigs. The age of the patient, the proliferation of the bile ducts and the absence of ascites, would indicate that his case was one of what is termed "Hanot's Cirrhosis," but the bacteriology is rendered somewhat doubtful in that there were also present bacterial endocarditis of the pulmonary valve and suppurative meningitis. Unfortunately I have not been able to obtain the original paper, nevertheless, this brief statement of the main features of the case makes it at least possible, as Paltauf has urged, that the endocarditis and meningitis and the presence of diplococci in all the organs, may have been due to a complication.

On the other hand there is a somewhat suggestive relationship between these cases of Hanot's cirrhosis and epidemic jaundice, in some cases of which observers have noticed the presence of a diplococcus or bacillus with polar staining.

To the best of my knowledge, no one has as yet recognized the frequent presence of any one form of micro-organism in the commonest form of hepatic cirrhosis—the so-called portal cirrhosis, tending to the production of the hobnailed liver, with or without marked atrophy of the liver.

On behalf of the Government of the Dominion, I spent the summer of 1894 and 1895 in Nova Scotia investigating a very remarkable disease affecting the cattle in a limited area of the country—the so-called "Pictou cattle disease"—of which the main lesion is a singularly extensive cirrho-

* A paper read for the author by Professor Osler, in the Section of Medicine, at the meeting of the British Medical Association at Edinburgh, July, 1898.

† Arch. Gen. de Med., March and April, 1894.

sis of the liver. The disease is only found in a district spreading along the northern coast of the peninsula, in a tract of country about forty miles long by from five to twelve miles broad. There apparently it has been noticed for some forty years, now at one end of this area now at another. The disease would seem to be very chronic and not to affect all the cattle on a farm simultaneously, but unless due precautions are taken, in the course of three or four years most of animals upon a farm will, one after the other, be affected. It would seem further that the disease does not spread directly from animal to animal, for there appears to be no special incidence of cases following upon the long winter sojourn of the animals in the byres, which, with rare exceptions, are miserably dark and ill-ventilated, the attempt being to keep these as warm as possible in consequence of the severity of the winter.

One or two cases are on record in which the disease has broken out in a neighborhood after the body of a cow affected with the disease has been washed down by one of the streams and stranded upon the farm lands. The gradual extension from farm to farm, through any given district, seems to be largely brought about by the fact that each farm has at the back of it a belt of woodland into which the cattle roam during the summer. The belts are badly fenced off from each other, and here, if an animal is affected, it attempts to wander off into the woodland and there die in some remote corner. Thus, unless precautions are taken, the carcasses of these animals remain uninterred and appear to act as centres of infection. Under the present Government regulations, notification is given of every suspicious animal, and the Government Inspector, if satisfied that it is a case of the disease, immediately destroys the beast and burns the carcass, or has it buried in quicklime. By this means the number of animals affected is rapidly

being reduced, so that within the last few years the number of cases occurring annually has sunk from 150 to under thirty.

As for the symptoms of the disease, the first symptom which is noticed is that the milk has a somewhat acrid odor upon boiling and acquires a peculiar bitter taste; within a few days the animal becomes dry, it is weak and restless, the coat stares and the limbs are dragged, the bowels loose, the abdomen a little swollen, the eyes are staring, the conjunctivæ subicteroid. The animal becoming weaker and weaker dies apparently in a condition of complete exhaustion. In some few cases death is preceded by a period of intense excitement almost maniacal in character, the animal rushing about charging at obstacles and then falling into a condition of paresis followed rapidly by death.

I killed and made post-mortem examinations upon some thirty animals during two years and found, as Dr. Osler and Dr. Wyatt Johnston previously determined, that the main lesions are an extreme condition of generalized cirrhosis, not only periportal and pericellular, the organ being somewhat enlarged and having a smooth and rarely a finely granular surface. There is evidently an abundant production of thin bile, for with scarce an exception the gall-bladder was found very full and the fæces well stained. The periportal and abdominal lymph glands in general are large and succulent, there is a moderate amount of ascites, the fluid being perfectly clear and limpid, and together with this there is a rather remarkable condition of a gelatinous œdema of the mesenteries and intestinal walls. A further constant lesion is the presence of numerous follicular ulcers in the fourth or true stomach. These, save in the very acute cases, are found in a cicatrized condition, giving strongly the impression that the earliest lesion in the case has been gastric and has been followed by in-

fection of the abdominal lymphatic system and the portal area.

From all the animals which I killed, I was more fortunate than my predecessors in gaining a characteristic micro-organism. This may have been due to the fact that I employed a somewhat different method of gaining my cultures. Instead of taking the media and inoculating on the spot, all I employed was a series of sterilized glass pipettes in which I collected relatively large amounts of the juices of the various organs; ascitic fluid, blood, etc., and then when back in my temporary laboratory, either upon that or the following day, I inoculated my media. By this means, constantly from the lymph juice of the abdominal glands and from the liver juice or bile and more rarely from other organs and fluids, I obtained in each case growths of a characteristic micro-organism; small, polymorphous, at times appearing as a diplococcus and at others as a diplobacillus which by its polymorphous character gave me a considerable amount of trouble, until I found that employing the same broth tube, at the end of twenty-four hours I obtained the one form, at the end of forty-eight, the other. Further study showed me that this micro-organism was in reality a short bacillus with polar staining, in this resembling to some extent the micro-organisms of hæmorrhagic septicæmia in the lower animals, but unlike them, possessing a slight capsule. I was able to grow this upon all the ordinary media of the laboratory. Into the character of this micro-organism I will not here further enter, beyond stating that I found it pathogenic for rabbits, guinea-pigs and mice, rabbits dying in from fifteen to thirty-five days, guinea-pigs in from thirty to thirty-five on the average.

The characteristic features of this disease—the ascites without jaundice, the gastric and intestinal disturbance and the condition of the liver—led me to seriously consider the points

of similarity between the course and symptoms of these cases and those present in portal cirrhosis in man, and though it may seem a small matter, I was especially struck by the fact that the first post-mortem which I performed upon a case of atrophic cirrhosis upon my return from Nova Scotia in 1895, presented the same gelatinous œdema of the mesenterics and intestinal walls which was so prominent a feature in the Pictou cattle disease.

Thus on and off for the last three years my attention has been directed toward this possibility of discovering bacteria in ordinary progressive portal cirrhosis. Upon three occasions I have thought that I have gained specific micro-organisms. In two, unfortunately, the growth became contaminated with the colon bacillus, and as this occurred on the eve of my vacation I was unable to continue the search further. In the third, which occurred a little over a month ago, the growth was very slight, and although pure, it had apparently died out on the fifth day and I was unable to gain any further cultures, if indeed what I saw was anything beyond the frequent presence of diplococci already existing in this liver juice at the time of extraction.

The difficulty that has pursued me in this search has been that which has prevented me from publishing so far any extensive report of my studies upon the Pictou cattle disease, namely, the extraordinary difficulty in staining the micro-organism in the tissues. I have tried a very great number of methods, and while with many I have been able to recognize the bacteria, the results obtained have been so inconstant that I have felt that others following me might very possibly have negative results: thus I have been unwilling to make any full statement until I should be able to state clearly how to be able to recognize the micro-organism. While this micro-organism stains deeply it

appears to lose its stain even more rapidly than does the tissue. Sometimes Gram's or Weigert's method shows them perfectly, but while the iodine appears to have a deterrent effect upon the decolorization of the microbes, the stain is not properly fixed by its means. And while again I have obtained good results by staining with methylene blue dissolved in anilin oil, a momentary passage of sections so stained, through a mixture of anilin oil and xylol and so through xylol into Canada balsam, yet even here the color appears to fade out rapidly so that in a few days the micro-organisms are unrecognizable. Eventually the thought struck me that bleaching in the sunlight might be a possible means. By this process there would be no diffusion currents set up, and if, as my previous work had shown, the bacilli took up the stain with rapidity then the deeply stained sections would have so much of the dye in the bacilli that, upon bleaching out, the bacilli would be left stained when the tissue itself had become colorless.

My laboratory assistant, Mr. E. W. Hammond, prepared a large series of sections in this way and obtained some excellent results. He found that, as I suggested, strong staining with carbolized fuchsin followed by bleaching for a short time each day for a period of a fortnight or more, demonstrated the bacteria admirably. While the process is a slow one it has the undeniable advantage that each day the mounted section can be examined to see how far the process of bleaching has progressed. By this means I was able to find out that in the Pictou cattle disease the micro-organisms, while present scattered through the new fibrous tissue, are present also in large numbers within the liver cells, and in the liver of a rabbit which had been inoculated with the micro-organisms isolated by me, although the animal died before any marked cirrhosis had developed, the liver cells were seen to contain these

microbes in very great numbers. As to how the micro-organisms enter these cells, that is a point on which at present I can throw no light, but the appearances given as will be seen in a specimen under the microscope in the Pathological Exhibit, is that these cells contain large numbers of extremely minute diplococci.

Recently, within the last month, a remarkable case of cirrhosis with pigmentation unaccompanied by diabetes has again drawn my attention to the bacteriology of atrophic cirrhosis. Dr. Maude Abbott, who is working in my laboratory at the Royal Victoria Hospital, showed me some sections of the abdominal lymphatic glands, stained by Weigert's fibrin stain in which, under high power, I noticed a peculiar fine granulation, and upon examining under the 18th inch immersion, these fine granules resolved themselves into minute diplococci.

Examining the liver stained the same way, I there noted large numbers of the same micro-organism, and since then I have gone through all my five cases of cirrhosis, which I have had during the last three years; through specimens of four well marked cases of hobnailed liver received from Professor Hektoen, of the Rush Medical College, Chicago, and through a series of sixteen livers, some of well marked atrophic cirrhosis, others of milder stages of cirrhosis sent to me by Dr. Flexner from the Johns Hopkins Hospital. So far in every case of well marked portal cirrhosis, whether of the small shrunken type or of the large hobnailed type, whether associated with jaundice without ascites or with ascites without jaundice, I came across constantly one characteristic form of micro-organism, obtaining the best and most permanent results by the method already mentioned, of staining in carbolized fuchsin and bleaching or partially bleaching in the sunlight.

This micro-organism is extraordinarily minute; by the trained eye,

in well stained specimens, it can be recognized under the 12th inch immersion, but for satisfactory work it is absolutely necessary to employ the 18th or 20th inch immersion lens. According to the depth of the stain, so does it appear either as an ovoid bacillus, which might easily be mistaken for some stained deposit in the liver cells, or as a minute diplococcus surrounded by a halo, the explanation being that with strong staining the bacillus and capsule are stained throughout, with weak, the body of the micro-organism and the capsule are decolorized, leaving simply the polar staining. Even in the tissues this micro-organism is somewhat polymorphous, that is to say, that at times one sees the two stained portions so close together as to resemble a minute edition of the gonococcus, at other times they are further apart and appear rounded like the coccus form of pneumo-coccus, while in the same specimen a rare form may be seen in which the two stained portions are even slightly elongated. These are present in greatest numbers within the cells. A remarkable feature about them, and one which years ago I noted in connection with the Pictou cattle disease, is whether they be seen in the lymphatic glands or in the liver, in the unstained condition many have distinctly a brownish tinge, so that in the liver especially these bodies may at first sight be mistaken for minute granules of precipitated bile pigment. They vary in number; in two cases in which the disease appeared to be of very slow progress but few were present; in those cases in which the bands of portal connective tissue showed an abundance of small round cells and in which the disease according to all indications was active and progressing, the number was remarkable, in fact so numerous were they that it was impossible for me to arrive at any other conclusion than that there is a distinct association between the presence of this micro-organism and the development of the disease.

So minute are these micro-organisms that it is difficult to focus them, and I would strongly urge those attempting to confirm these observations to take, if necessary, from twenty minutes to an hour studying an individual field of the microscope before arriving at any definite conclusion.

Here, perhaps, I should correct myself. In the fully stained condition the micro-organisms while small are not so very much smaller than the ordinary run of pathogenic bacteria. But in this fully stained condition, as already stated, they are very difficult to distinguish from granules scattered through the cell protoplasm; it is in the partly decolorized condition in which the polar staining alone is recognizable and is peculiarly characteristic, that they appear so very minute. Indeed, I know of no form so minute, save that recently described by Nocard and Roux as being the causative agent in the contagious pleuro-pneumonia of cattle, and the strain upon the eyes in studying these microbes is most severe. This adds greatly to the difficulty of photographing the micro-organisms.

I am indebted to Dr. Patrick, the photographer of our hospital, for the accompanying lantern slides, in which despite great difficulties he has managed, I think successfully, to demonstrate the organisms in the tissues; but with regard to this I may say that where he shows one micro-organism the slightest change of focus would bring others into view, so that his slides show but about 1-20th of the number recognizable in any given field.

As to whether the micro-organisms in the human and in the bovine liver are identical, it is impossible for me to affirm. At Johns Hopkins, as in our own hospital and in a large number of foreign hospitals, not to mention the leading hospitals in the old country, it is now the custom to obtain cultures from half a dozen or more regions, including the liver, in every autopsy performed within fif-

teen hours after death. And, while the methods employed for obtaining cultures are in many cases faulty, to the extent that an insufficient amount of tissue juice is taken, it seems to me unlikely that had this form been cultivable upon the ordinary media, it would not before now have been isolated. Nevertheless, there is this to be said, that very frequently the colon bacillus grows upon cultures made from the liver; isolated colonies of the micro-organisms from the Pictou cattle disease, while growing more slowly, are not unlike those of the colon bacillus, and thus possibly the micro-organism if growing in a manner similar to that of the Pictou cattle disease, might be neglected on account of this similarity in appearance.

It so happens that here in Montreal cases of the disease are few and far between; five cases only have come under me in four years, and in a series of 934 autopsies made during twelve years at the Montreal General Hospital and indexed by Professor Wyatt Johnston, I find that altogether thirty-one cases of cirrhosis of the liver are recorded and fourteen of the cirrhotic and fatty liver, with one recorded as "hypertrophic cirrhosis." I have thus thought it wise to publish these observations, even though I can at the present moment make no absolute statement with regard to the isolated micro-organism and its character, beyond the statement that, as already mentioned, in one agar tube made from the live juice, I was able to recognize the form, although in not very great numbers and with the absence of any visible growth.

Lastly, as to the cases in association with which I have found this micro-organism. If future observers confirm the observations given above, then we must conclude that many of the divisions and distinctions attempted to be drawn between the forms of advanced cirrhosis of the liver, must be broken down for, in the first place, I have found the same appearance in

the large liver with moderate granulation or slight hobnailed condition, which some would speak of as "hypertrophic cirrhosis," as again in the small contracted typical hobnailed liver; in cases frankly multilobular with sharply defined bands of connective tissue cutting off relatively large areas of liver substance and showing relatively few bile ducts; as again in cases of the more unilobular type with ill-defined edges to the lobules and abundant bile ducts; in cases which have shown jaundice without ascites, ascites without jaundice, and again both jaundice and ascites; lastly, in cases with a pronounced alcoholic history and others in which no history of alcoholism could be obtained.

I am far from wishing it to be understood that I am here laying down that all cases of fibroid change in the liver present these minute micro-organisms; to make any such suggestion would be absurd. Nor again am I prepared to say that Hanot's cirrhosis affecting the young adult and presenting the enlarged liver with smooth surface and accompanying this, crises of icterus, is identical with the more ordinary form of progressive cirrhosis affecting the adult. It may be so or it may not. All that I at present am prepared to lay down is this, that the progressive and extensive cirrhosis affecting the adult at or after forty years of age is, according to my investigations, accompanied by the presence in the liver cells, as again in the newly formed connective tissue, of an extraordinarily minute bacillus, having a polar staining and resembling greatly in its appearance under the microscope a form which I have isolated from cases of infective cirrhosis among cattle.

I cannot conclude without again expressing the debt under which I labor to several helpers. To Dr. Maude Abbott and Dr. Patrick; to my Laboratory Assistant at the University, Mr. E. W. Hammond, who

aided me very materially in Nova Scotia; Mr. Howell, my assistant at the Royal Victoria Hospital, but for whose energy I should have been unable to prepare and examine all my material; to Mr. Nicholson, who has most gladly crossed the Atlantic to demonstrate my specimens during the course of the meeting; and above all, on this occasion am I indebted to a member of McGill University, my predecessor not only in the teaching of pathology, but also in the investigations in the Pictou cattle disease, than none, not even myself, could more willingly or more appropriately, or better, have brought this subject before you.

(*Appendix, July 12th, 1898.*)

By a remarkable coincidence, upon the afternoon of the day upon which I completed the dictation of the foregoing in order that I might have it complete for Dr. Osler to take with him to Edinburgh, I was called to perform a post-mortem upon a case apparently of heart failure which turned out to be one of atrophic cirrhosis of the liver. I should here add that a diagnosis of cirrhosis of the liver had been considered and had been left in doubt; while clearly, from the condition of the heart, death had resulted from failure of that organ.

Not to enter too fully into the details of the case, for the clinical notes of which I am indebted to Dr. James Stewart, I may say that the body was that of a female of fifty-six, who had always lived in Canada, and who, after the diseases of childhood had, until two years previously, enjoyed good health. She had ten children with no miscarriages, and there was no history of inherited disease. She gave a moderate history of alcoholism, stating that she chiefly drank beer, but if one may base any argument upon the frequent presence of minute whitish plaques which were found scattered along the œsophagus, she was a pronounced alcoholic.

For the last two years she had not

been well, dating her impaired health from a fall while out walking, when she injured her back somewhat. For the last year her heart had been very weak and upon exercise her feet and legs became swollen. Since last April, the weakness, swelling of the legs and abdomen, shortness of breath and palpitation have been much worse, and for three days before admission, dyspnoea, sleeplessness and weakness had been extreme, while for months she had been steadily losing flesh.

Upon examination she was found sallow, with moderate anæmia of mucous membranes, the sclerotics were icteroid with distension of the superficial vessels; the face was emaciated and there was orthopnoea; the temperature was normal, the pulse rapid and the respirations were thirty-six. The skin, more especially the face, neck and arms, was of a peculiar ashy color; this, she stated had been noticeable for some years; there was slight general œdema, marked œdema of the lower extremities, and definite ascites. The pulse was 100, very irregular in volume and rhythm; the apex beat was unrecognizable; there were no murmurs. There was evidence of right-sided pleurisy and numerous coarse and fine râles with expectoration of frothy mucus. There was frequent vomiting and retching, though this had begun only a few days before admission to hospital. The urine was dark, amber colored, with flocculent sediment, a fine ring of albumin and contained some bile. For a week or more her condition improved; the heart became more powerful, the ascites diminished. Suddenly upon the 6th, the patient died.

The autopsy was held six hours after death, and showed the following conditions:

Heart.—Large, full, with dilatation of the cavities, the muscle being somewhat atrophied and fibroid. The coronary vessels were atheromatous. All the valves were normal.

and in both auricles were puriform and breaking down ball thrombi indicating a very feeble circulation.

Lungs.—Both showed adhesions to the diaphragm and elsewhere, and on section presented little beyond œdema, save that the lower lobe of the right lung was almost completely compressed and airless as a result of the right-sided pleurisy. The right pleural cavity contained about 700 ccm. of red stained fluid without floculi.

Abdomen.—The abdomen contained between 900 and 1,000 ccm. of turbid and greenish ascitic fluid. Neither liver nor spleen were visible.

Stomach.—This was long and narrow with mucosa thickened, the cardiac portion having a curious strawberry-like appearance with fine white dots standing out, but not projecting from the generally reddened surface. This faded off in the pyloric portion of the stomach where there was a fair amount of mucus.

Duodenum.—The first three inches presented an identical strawberry-like appearance to that seen in the cardia.

Intestines.—The small intestines in general were congested and the last three inches before the ileo-cæcal valve showed large prominent solitary follicles. The walls of the small intestine had a distinctly brownish tinge as of Von Recklinghausen's Hæmochromatosis. The mesentery of the small intestine was distinctly fatty and swollen, and upon section abundant milky lymph poured out wherever it was cut.

The abdominal lymph glands were in general reddened and succulent. The retroperitoneal glands, especially those in the neighborhood of the portal fissure and of the pancreas, were markedly enlarged.

Liver.—The liver was distinctly small, weighing 1045 grams or a little over two pounds; the two lobes were correspondingly diminished in size, the organ was pale and had a finely granular surface; there were abun-

dant old fine veil-like adhesions over the upper surface to the diaphragm. On section the organ cut fairly firmly more especially along the lower half of the right lobe and the under surface. On the whole the appearance on section was more fatty than fibroid. Microscopically, the organ presented along with fibroid thickening of the portal sheaths, a somewhat diffuse cirrhosis, the bands of fibrous tissue not being sharply cut and being infiltrated with a considerable number of small round cells. The cirrhosis was very obvious but not of the more usual type and the diffuse nature of the change may explain why the surface was finely granular rather than distinctly hobnailed.

Gall Bladder.—This had œdematous thickened walls.

Spleen.—Of normal size and rather soft, although on section the trabeculæ were seen larger and more prominent than usual.

Pancreas.—Voluminous and moderately firm.

Suprarenals.—Of fair size.

Kidneys.—These were the hog-backed type of mixed interstitial and parenchymatous nephritis. This so-called "hog-backed" appearance is that which, as I believe, Formad of Philadelphia, was the first to point out, is the more common form of alcoholic kidney in North America. The organs were large with a finely granular surface and full and firm cortex. There were white infarctus both in the kidney and the spleen.

The body was still warm at the time of autopsy and I obtained numerous sterilized pipettes of tissue juice from the liver, spleen, kidneys, abdominal lymph glands, ascitic fluid, pleural fluid, pericardial fluid, blood, and lymph from the mesentery, and with these made a series of inoculations on the surface of sloping glycerinated agar tubes, as also some into broth.

Portions of the collected ascitic and pleural fluid were centrifugalized; the cellular debris dissolved by caus-

tic potash and after further centrifugalization the deposit examined under the microscope after staining with carbolized fuchsin. This deposit showed rather rare minute diplococcus forms with a slight halo round them, similar in all respects to those recognized in the tissues.

A series of slide preparations were made from the various pipettes direct, fixed in the usual method and stained with carbol fuchsin, which was warmed until definite vapor was given off, then washed with water just cool enough to bear the hand in it, and mounted. As a result, the characteristic diplococcus form was found in the preparations made from the liver, lymph from the mesentery, the ascitic fluid, the heart blood, the left kidney and the mesenteric glands; they were not found in the pleural cavity, the bile or the pericardial fluid.

Next, using a fair amount of the fluid out of each pipette, I allowed this to flow over the surface of slanting glycerinated agar tubes, my experience with the Pictou cattle disease having shown me, that while the fluid in the pipettes could show numerous diplococci, apparently the majority of those are dead, and only a few remain alive. By this means, in twenty-four hours I obtained fairly frequent growths in tubes from the spleen and left kidney, and rare growths in the mesenteric glands and heart blood. Four colonies only appeared upon the tube prepared from the liver, and two from the ascitic fluid and these latter did not show clearly till the expiration of forty-eight hours.

Subcultures made again directly upon the glycerinated agar surface showed a fine rather thin growth at first of minute discrete colonies; later these ran together into thin waxy lines which upon the expiration of four or five days assumed a faint yellowish tinge. Other tubes were made directly from the pipettes of the kidney and spleen into beef broth. This upon the following day

showed a faint turbidity, which, just as in the case of the Pictou cattle disease, if anything, lessened with further growth, while a whitish deposit formed at the bottom. Since then, using the remaining pipettes, I have obtained a great number of broth cultures, the growth being much more free upon this medium than upon the agar, and further, yielding forms which are more characteristic and less liable to cause confusion; for the micro-organism is most remarkable in its characters.

Grown upon broth, in twenty-four hours it is present in the form of minute diplococci surrounded with a faint halo or capsule. Often these tend to be arranged in irregular chains in which the separate appearance of the dots are not quite regularly arranged, the long axis joining the two dots not of necessity coinciding with the long axis of the chain.

Grown upon glycerinated agar, the appearance is most puzzling, and although I had similar experience when working out the character of the micro-organism of the Pictou cattle disease, these agar cultures have given me a week of profound anxiety, until within the last twenty-four hours I have solved the problem. A twenty-four hour culture at 37° upon glycerinated agar, reveals minute forms which upon careful staining with fuchsin, not too deep, are clearly forms of diplococci. One gets every transition from the frank diplococcus form through one in which only very careful focussing shows that the somewhat oval bacterium has at either pole a deeper stained mass, to forms in which the polar staining cannot be made out so that one appears to deal with true short bacilli. Add to this, a certain number of oval forms can be seen still smaller than the diplococcus, in which the distinction between the two ends cannot be made out.

In forty-eight hours, and still more in seventy-two hours, the same cul-

ture which had given this appearance at the end of twenty-four hours appears to be contaminated by the presence of long distinct bacilli; that is, if sections be well stained with fuchsin, while this is still more the case after staining with Loeffler's methylene blue. At first sight, a culture from this variety showing these bacilli of irregular length with rounded ends, often lying side by side, appears to be undoubtedly of the colon bacillus or some allied form. And here I gain an explanation of the contrary results obtained by a bacteriological *confrère* and myself in London two years ago. I took to him cultures isolated from two cases of cirrhosis which, on examination in Montreal, seemed to be diplococci, and his statement that he found only colon bacilli made me cease my investigations for the time. I can now well understand his most pardonable mistake.

Yesterday upon examining the agar plate culture from the spleen which had been made upon the 7th inst., and had been left for twenty-four hours in the incubator, and there apparently yielded no growths, and which thus had remained for four days at the ordinary temperature in the shade, I recognized one form of growth alone present, extremely minute, the colonies well separated from each other.

Upon removing one colony and making a coverslip preparation stained with fuchsin, I found that I had to deal with long chain-like bacilli interspersed with some shorter forms of the same breadth. The appearance was so wholly unlike anything that I had previously made out in the broth cultures, that I neglected this colony and made a culture from another identical in appearance and equally isolated, and in this case after staining with fuchsin, and as I thought over-staining, I washed in absolute alcohol. The result obtained was most remarkable. The long bacillary forms could still be recognized in this as in the other specimen, and if any-

thing they were longer, but each long filament showed a discolored sheath in which, scattered at perfectly regular intervals, were pairs of dots deeply stained. In some places individual dots could be clearly recognized elongated and replacing the pairs. These pairs of dots in size resembled the diplococcus-like forms seen in the broth cultures and in the tissues to which I have already so frequently drawn attention. I regret that time has forbidden that I should obtain photographs of this very curious appearance so that they could be demonstrated with the lantern. In the series of preparations which will be found in the Pathological Museum, this form will be placed under the microscope, and there will also be a series of sketches made by me under Zeiss's Camera Lucida showing this appearance.

I touched the same colony with a platinum needle and inoculated a broth tube from it, and eight hours later the broth, which had in the meantime been kept at 37°, showed a faint turbidity, and now some specimens treated with carbolized fuchsin in the same way, showed in place of the singularly long filaments, numerous diplococcus forms, fairly large, in which the connecting more colorless portion could be well seen, while here and there a rarer form showed three instead of two dots along the course of the bacillus. These observations satisfactorily explain the curious condition of affairs.

The microbe which is seen in the tissues as a diplococcus surrounded by a faint halo, is in broth after twenty-four hours present also as a diplococcus, but rather larger, showing or not showing the halo according to the extent of the stain.

Upon agar agar, while first present as a diplococcus form, it gradually extends and each day is seen as a longer bacillary form, but if stained and decolorized with carbolized fuchsin and decolorized to the right extent, each long filament is seen to be

made up of diplococcus-like members lying in the common sheath. I made out a similar condition of affairs in connection with the Pictou cattle disease, but do not remember to have come across such long filamentous forms.

We seem thus to be dealing with a form totally unlike any which to the best of my knowledge has been described; the polymorphism is remarkable. It is most difficult, however, to determine how to describe the appearances seen, and I am at a loss whether to state that we are dealing with an encapsuled diplococcus or with a bacillus having inclusions taking a peculiar deep staining, just as in the ordinary cell the nucleus stains deeper than the surrounding protoplasm. The general appearance in the tissue is certainly that of an encapsuled diplococcus, but on the other hand, grown outside the body and upon agar and then treated with Loeffler's methylene blue, the whole of that portion which plays the part of a capsule to the diplococci takes on a stain with as great intensity as do ordinary bacteria. On the whole at present, I am inclined to the latter view, because examining tubes in which proliferation is most rapidly proceeding, I find upon staining with carbol fuchsin and decolorizing with alcohol, that one has in the youngest ovoid forms what is most suggestive of the polar staining such as one sees in the bacteria of hæmorrhagic septicæmia, that is to say, there is at either pole not a complete coccus form, but a generally deep staining concavo-convex segment, the two parts being separated by a clear space and the membrane joining the ends of the opposite crescents being clearly visible.

If this form coincides in other respects with the micro-organism of Pictou cattle disease, it will grow rather more easily upon slightly acid media, it will grow upon serum and very slowly in gelatine without marked liquefaction, and will be fatal for animals

of the laboratory at a relatively long period after inoculation.

It so closely resembles the micro-organism of the Pictou cattle disease that I feel that I may safely prophesy this, for the time taken in unravelling the mutability of growths upon agar agar has prevented me from working out these points till the last few days.

The great similarity in appearance presented by growth upon agar agar under ordinary staining to the colon bacillus may perhaps make it necessary to say a few words about the relationship of the micro-organism isolated by me, to the bacillus in question.

I have made growths side by side, and find that in broth the colon causes a greater turbidity and appears to grow more freely upon agar agar and also to be endowed with greater motility. While upon staining an eighteen hour broth culture of the micro-organism by the Nicolle Morax method, in order to demonstrate flagella, I found that the micro-organism, which are even stumper than the colon bacillus, under similar circumstances to be possessed of terminal flagella, either one or two, and not of lateral. This, if it were necessary, would seem distinctly to prove that the micro-organism is wholly distinct from the colon group. However, I make this statement provisionally, and will give fuller details as to the characters of the micro-organism within the next few months, probably in the *Journal of Experimental Medicine*.*

I trust, however, that I have said sufficient to prove: 1st, That in at

*August 20th.—Fuller studies have shown me that these statements need amending. While the bacilli at first caused no fermentation of glucose and lactose broths, later growths gave definite gas production, though not so extensive as the atypical colon bacillus. The broth growths also remain atypical, but undoubtedly the bacilli when growing freely have, like the colon bacillus, lateral flagella. The germ belongs to the colon group. Fuller details of its characters will be given in a later communication.

least a very large number of well-marked cases of progressive cirrhosis in man, there is to be found largely within the liver cells, also in the lymph spaces in the newly formed connective tissue, a peculiar and very minute form of micro-organism present on staining to the proper extent, as a diplococcus surrounded by a faint halo, or when stained deeply, being a rather obscure bacterium, which may easily be mistaken for stained deposits within the cells.

2nd. That in the infective cirrhosis of cattle, a very similar micro-organism is recognizable, present in like positions within the tissues and showing similar appearances when stained.

3rd. That from at least thirty cattle affected with this disease I have been able to isolate the micro-organism—from the liver, bile, abdominal lymph glands, and in some cases from the various organs of the body.

4th. That the micro-organism isolated is a polymorphous micro-organism, appearing as a small diplococcus when grown in broth, tending to assume a distinctly bacillary form when grown for a few hours on other media, or in broth for a longer period.

5th. That this micro-organism is pathogenic for the animals of the laboratory, and that in them it is to be recognized within the hepatic cells as in other regions.

6th. That from a case of distinct atrophic cirrhosis in the human being, I have been able to isolate from various organs of the body a similar micro-organism, which grown in broth has a diplococcus form, grown upon agar, is present as a short or longer bacillus according to the age of growth.

This is not the occasion for me to discuss at length the bearing of these observations upon the nature of progressive cirrhosis in man. It is only necessary for me to say that if they are confirmed, as personally I feel they must be confirmed by everyone who proceeds with sufficient caution to follow the methods employed by

me, then cirrhosis of the liver assumes an entirely new aspect. We gain a satisfactory explanation at once of such phenomena as the enlargement of the spleen, which, as has already been noted by more than one observer, may be made out before there is any sign of portal obstruction; we see why so frequently there should be right-sided pleurisy, and may even find that the question as to whether a case is complicated with ascites or jaundice, depends upon this micro-organism; depends upon whether it sets up a low inflammation of the peritoneum, or whether it more especially affects the liver cells and bile ducts; while disturbances which may occur not immediately in connection with the liver, in the pancreas and in the kidney, would seem to gain a possible explanation from the fact brought out by me, that this micro-organism, common in the liver cells, is in an advanced case to be gained from the heart blood and from the kidney.

That the micro-organism only causes cirrhosis, I do not believe; indeed, we may find that it is the cause of more than one disturbance in the liver, and indeed in other organs. This I base upon the fact that in the case in which I have isolated this allied form from man, the micro-organism shows itself capable of existing in several regions of the body; in fact, of setting up what bacteriologically we regard as a septicæmic condition.

COFFEE AND TEA AS CAUSATIVE FACTORS IN NERVOUS DISEASES.

Dr. Charles E. Lockwood has contributed a very excellent paper to the *New York Medical Journal* on the study of alcohol, tobacco, coffee and tea as causative factors in the production of nervous diseases, and we here give his conclusions in reference to coffee and tea.

"Coffee is the seed of the coffee plant (*Coffea Arabica*), a good-sized shrub or small tree, and is contained in the fruit of the plant, which is an oblong, rounded, scarlet or purple, slightly juicy berry, with a thin, fleshy mesocarp and a papery endocarp inclosing the two seeds. The seeds are the coffee of commerce. This shrub is a native of tropical Africa, where it grows very extensively on both coasts and far into the interior. It is also cultivated in most warm parts of the earth, especially in Java and Brazil.

"The earliest knowledge of coffee came from Abyssinia, where it was introduced from Abyssinia at least four hundred years ago. The employment of coffee as a beverage was introduced from Arabia in the sixteenth century into Egypt and Constantinople. Leonhard Ranwolf, a German physician, was probably the first to make coffee known in Europe by the account of travels printed in 1573. The first coffee-house was established in London in 1652, and in Paris in 1672. When we consider that 643,234,766 pounds of coffee, valued at \$94,599,880, were imported into this country in 1895, and a consumption per capita of 9.22 pounds, we realize the universality of its use and the importance of a clear understanding of the article and its physiological action.

"The average composition of unroasted coffee is:

Caffeine	0.8
Legumin.....	13.1
Gum and sugar	15.5
Caffeotannic and caffeic acids	5.0
Fat and volatile oil...	13.0
Woody fibre.....	34.0
Ash.....	6.7
Water	22.0

"The chemical composition varies somewhat after roasting; unroasted coffee contains caffeine and a kind of tannin, called caffeotannic acid. Dur-

ing roasting a part of the caffeine is volatilized and an empyreumatic substance called *caffeon* is developed.

"According to the article in the 'International Cyclopædia,' vol. iv., coffee owes its exhilarating and refreshing properties to the presence of three substances in the roasted bean:

"1. Caffeine, which occurs in the roasted bean to the extent of from three quarters to one per cent.

"2. A volatile oil, which is not present in the raw bean, but which is developed during the process of roasting to the extent of only one part to fifty thousand of the roasted coffee.

"3. Astringent acids resembling tannic acid, called caffeotannic and caffeic acids.

"According to T. Lauder Brunton, the action of coffee is something like that of caffeine, but differs from it in some respects inasmuch as the *caffeon* increases the peristaltic movements of the intestine and causes, indeed, tetanic contraction of it. While caffeine does not alter peristaltic movements, *caffeon* quickens the pulse, dilates the vessels and lowers the blood-pressure, and produces a sensation of warmth on the surface. In some persons coffee produces a feeling of weight in the abdomen and a tendency to hemorrhoids. As tea has not this action, or has it only to a comparatively slight extent, it is probably due to the combined action of the caffeine and *caffeon*.

"As to the physiological effects of caffeine, Dr. G. E. de Schweinitz classifies theine and caffeine as drugs which are nervous stimulants in physiological and nervous depressants in toxic dose. Dr. T. Lauder Brunton gives the following as the physiological effects of caffeine:

"1. Its effects on oxidation are to hasten it.

"Action on the muscles: In small doses it increases muscular work, and causes the muscle to recover rapidly after exhaustion.

"3. On the spinal cord it has the effect of lessening the conducting power of the sensory columns of the cord. This was proved by Bennet, who found that while irritation of the posterior roots of the cord caused violent struggles and loud cries before the injection of caffeine into the circulation, similar irritation after injection caused only a slight quiver, and this effect was not due to motor paralysis, as shown by the fact that irritation of the anterior columns caused violent muscular contractions after the injection as well as before it.

"I have given this demonstration in full, as I notice in the article on 'Caffeine,' in Foster's 'Encyclopædic Medical Dictionary,' it is stated that caffeine heightens the reflex activity of the spinal cord.

"4. On the brain: It is probable that tea and coffee cause local dilatation of the arteries supplying the brain, and possibly caffeine may increase the mental powers by a direct action on the brain tissue itself.

"5. On the accelerating centre the stimulating effect of caffeine is evidenced by the injection of the drug after previous section of the vagi, rendering the pulse still more rapid than before.

"6. On the vasomotor centre stimulation is evidenced by a rise of blood-pressure, which disappears on section of the spinal cord below the medulla, and does not occur if the cord has been divided before injecting the drug.

"7. On the cardiac muscle caffeine acts as a stimulant, as is shown by increased energy of contraction, the rate of pulsation remaining the same or becoming slower.

"8. As a diuretic caffeine acts on the secreting nerves or secreting cells of the kidney itself, causing an increase of water excreted.

"9. Its action on the respiratory centre is to increase the respiration.

"10. The salivary secretion appears sometimes to be increased.

"11. On the peristaltic action of

the intestine it has little action, but it causes the intestinal veins to become much dilated and appears to cause hemorrhoids.

"12. The temperature is not altered by small doses of caffeine, but is increased by large doses.

"As regards heat production and tissue metamorphosis, the investigations of Dr. Edward T. Reichert on the action of caffeine on tissue metamorphosis and heat phenomena are of great interest. His conclusions are that caffeine increases heat production, and as a corollary increases destructive tissue metamorphosis, and therefore concludes that the virtues of coffee in the wear and tear of active life are entirely subjective and depend upon a general excitation of the higher tissues, and chiefly upon its powerful exhilarant action upon the mental processes. He also says that the assumed ability of coffee to replace food or to increase the power for work without corresponding tissue destruction is consequently entirely deceptive, and the conditions produced by it are comparable to those observed at times in the insane, in hysteria, or in fright, when the individual may be capable of performing prodigious feats of strength and endurance but nevertheless at the direct expense of his tissues.

The toxic action of coffee and caffeine or persons easily susceptible to their influence, or in toxic amounts, is confined exclusively, so far as we know, to overstimulation or functional depression of the various nerve-centres and some local irritation of the stomach and bowels.

Caffeine, according to Dr. Brunton, causes at first stimulation and subsequently paralysis of nerve-centres in cerebrum, cord and medulla.

"As to its action on the muscles, voluntary and involuntary, caffeine in small doses has a restorative action, while in large doses it is a powerful poison.

"From its stimulant action on the brain, caffeine, in doses of two to

eight grains, sometimes causes heaviness of the head, flashes of light before the eyes, ringing in the ears, loss of sleep, great restlessness, and delirium.

"Large doses depress the respiration and pulse and lower the blood-pressure.

"In man, the pulse, after somewhat large doses, becomes very frequent, irregular and intermittent. This effect, Dr. Brunton says, occurs in some persons after a single cup of coffee, but is prevented in such cases by adding a little brandy to the coffee.

"As a causative factor in nervous disorders we can say that its role is that of a stimulant or depressant, varying with the amount, strength and time at which it is taken, and the condition and susceptibility of the subject. Such disorders of the nervous system are insomnia and restlessness, fulness and heaviness of the head. Disorders of special sense, as flashes of light before the eyes and ringing in the ears, frequency, irregularity and intermittence of the heart's action, and muscular tremor.

"The physiological effects of tea have been given much study, and it is very difficult to formulate them in such a way as to make them applicable to all cases, as these effects differ greatly in different individuals in accordance with different circumstances, such as age, temperament, climate and conditions of health.

"Dr. Rolleston, I think, puts it well when he says: 'Tea and coffee are nervine stimulants without narcotism. It would seem that in their case the work of the nervous matter is increased directly, not let loose by narcotism of controlling centres. This stimulation, as is usual in such cases, is followed by exhaustion according to degree of previous stimulation.'

"It seems probable that the aromatic oils, which are obviously very different in tea and coffee, are concerned in the disturbance.

"In my examination of the litera-

ture of the subject, the observations of Dr. William J. Morton, of New York, and Dr. Edward Smith, of London, seem to me to throw considerable light upon the matter of our inquiry, and I shall therefore quote largely from the deductions drawn from their experiments.

"1. With tea, as with any potent drug, there is a proper and improper dose.

"2. In moderation, tea is a mental and bodily stimulant of a most agreeable nature, followed by no habitual reaction. It produces contentment of mind, allays hunger and bodily weariness, and increases the incentive and the capacity for bodily work.

"3. Taken immoderately, it leads to a very serious group of symptoms, such as headache, vertigo, heat and flushings of the body, ringing in the ears, mental dulness and confusion, tremulousness, 'nervousness,' sleeplessness, apprehension of evil, exhaustion of mind and body, with disinclination to mental and physical exertion, increased and irregular action of the heart, and increased respiration. In short, as Dr. Morton says, 'in immoderate doses tea has a most injurious effect upon the nervous system.'

"We will now endeavor to classify the physiological effects of tea as to its action upon the different organs and functions of the human body.

"*On the Mind.*—Tea quickens the intellect both in thought and imagination, and takes away the tendency to sleep. Tea taken twice through the night, according to the experiments of Dr. Edward Smith, prevented any desire for sleep.

"*On Muscular Activity.*—Its effects are an increase and a greater readiness for and ease on making exertion and a greater sense of exhaustion following.

"*On Respiration.*—It has the effect of a respiratory stimulant; the depth of inspiration was greater, an increased volume of air was inspired at each inspiration, varying from three to 10.6

cubic inches, and it caused an evolution of carbon greater than that which it supplied, from which it follows that it must powerfully promote those vital changes of food which ultimately produce the carbonic acid evolved.

"The rate of pulsation followed that of respiration, but in less degree, being either not increased or slightly decreased.

"*On the Digestion.*—There is no ground for believing that it promotes digestion.

"*On Salivary Digestion.*—Tea, according to Roberts, has an intensely inhibitory effect, due to the large quantity of tannin contained in the tea leaf. Coffee and cocoa have only a slight effect on salivary digestion. He says the only way to mitigate the effect of tea on salivary digestion is not to sip the beverage with the meal, but to eat first and drink afterward.

"In some instances, especially when used immoderately and for a considerable time, it produces delay of gastric digestion, which has been ascribed to the effect of tannin by some authorities, while others are not certain as to what constituent of tea and coffee is the active agent in producing dyspepsia.

"*On the Skin.*—Tea tends to induce perspiration and thereby to cool the body.

"*On Mucous Membranes.*—Tea has the effect of increasing secretion, so that there is no dry skin or mouth after tea.

"On the kidneys tea acts sometimes as a diuretic, due partly to its stimulant action on the heart and the rise of blood pressure, and partly to its stimulant action on the cells of the urinary tubules. Bartels, in his article on 'Parenchymatous Nephritis,' in vol. xv., 'Ziemssen's Cyclopædia,' says in his remarks on *treatment*: 'I forbid the use of tea and coffee, which are supposed, and certainly not without reason, to exert an irritating action on the kidneys.' As to its effects upon the urinary excretion, the following facts are given by

Dr. W. J. Morton as to the results of experiments made on himself covering seven days:

"1. A decided increase in the sulphuric and phosphoric acids and a moderate increase in the uric acid, while the chlorid of sodium remained about stationary.

"2. A steady daily decline in the amount of urine excreted; this amounted to an average daily decline of about two fluid ounces, or to a total decline for the week of thirteen fluid ounces.

"3. A large daily decline in the amount of urea excreted; this amounted to an average daily decline of twenty-four grains, or to a total decline of one hundred and sixty-eight grains. The most marked decline was that on the first day of ninety-five grains, when he suffered for twelve hours from the extreme toxic effects of tea.

"These results would seem to point to nerve depression and a decrease of normal metabolism.

"*As a Cardiac Stimulant.*—Schroetter, in vol. vi., 'Ziemssen's Cyclopædia,' says: 'For the acute dilatation of the heart which occurs in the course of inflammatory diseases, our object will be simply to maintain the energy of the heart's contraction only through a short period of time, and for this purpose stimulants will be of great assistance, and among these I consider tea of special value.'

"The perceptible effects of full doses of tea are, according to Dr. Edward Smith:

"1. A sense of wakefulness.

"2. Clearness of mind and activity of thought and imagination.

"3. Increased disposition to muscular exertion.

"4. Reaction with sense of exhaustion following preceding efforts and in proportion to them.

"To sum up, then, tea in moderate doses is a stimulant to the nervous system, and in excess a depressant to the functional action of the nerve-cells of the cerebrum, medulla, spinal and

vasomotor systems ; and the nervous disorders produced by its use, different cases and under different circumstances, such as age, climate, susceptibility, temperament, and general constitutional conditions, are such as are due to overstimulation and depression, the result of the reaction following overstimulation of the various nerve-centres, and may be grouped as follows :

"Insomnia and restlessness, partly through its stimulating action on the brain-cells and partly through stimulation of the pulse and respiration, as a subsidence of respiration is necessary to sleep.

"Headache, vertigo, ringing in the ears, flashes of light, mental dulness and confusion, apprehension of evil, with exhaustion of mind and disinclination to mental exertion.

"Increased and irregular action of the heart, increased respiration, muscular tremor, 'nervousness,' disinclination to physical exertion, hyperesthesia, paresthesia, heat and flushings of the body."—*The Dietetic and Hygienic Gazette*.

EXPERT TESTIMONY.

Dallas Sanders, of the Philadelphia Bar, read by invitation, before the Philadelphia County Medical Society, May 25th, 1898, a paper upon this subject, in which he said :

"No clearly definite rule is to be found in the books as to what constitutes an expert. According to the 'Century Dictionary,' an expert witness is 'in law, a person who, by virtue of special acquired knowledge or experience on a subject presumably not within the knowledge of men generally, may testify in a court of justice to matters of opinion thereon, as distinguished from ordinary witnesses, who can in general testify only to facts.' Justice Sharswood said in 1869, in *The Ardesco Oil Company vs. Gilson*, 63 Pa., 146, that a court would not allow the

opinion of the witness, not a doctor, as to the effect of an injury to the plaintiff's health, to be admitted as evidence. *Water Co. vs. Stewartson*, 96 Pa., 436. It is proper, however, for a physician, after he has described the injuries found on the body of the deceased, to state what, in his opinion, caused her death and how the injuries were inflicted. *Commonwealth vs. Crossmire*, 156 Pa., 304.

"The opinion of a witness who neither knows nor can know more about the subject matter than the jury, and who must draw his deductions from facts already in the possession of the jury, is not admissible. Were it otherwise, the opinions of the jurors upon the most obvious facts might be always shaped for them by testimony of so-called experts, and thus would a case be constantly liable to be determined, not by the opinions and judgment of the jury, but by the opinion and judgment of the witnesses. *Dineoski vs. Coal Co.*, 157 Pa., 273.

"Before a doctor was asked to give his professional opinion as to whether a fractured limb had been skilfully or unskilfully treated, he had testified that he had graduated at a medical college and had subsequently served as a surgeon for three years in the army, and that he had examined and treated the plaintiff's injured limb. The court held that he was competent to testify as an expert. *Olmsted & Bailey vs. Gere*, 200 Pa., 127.

"A witness called to testify as to the chemical purity of certain whiskey stated that his profession was that of an attorney-at-law—he had practiced it for forty years, and had never been a practising chemist. It was decided that he was not qualified as an expert. *Hass vs. Marshall*, S. C. May 22nd, 1888, C. P. of York County.

"Witnesses, except experts, who are produced in court and examined, are not allowed to give their opinions or their beliefs. They are merely produced in court to testify as to the facts that have come under their

actua? knowledge, but an expert can give the jury and the court the benefit of his opinion and of his belief. Therefore, physicians and surgeons when produced to testify in court, not as to an injury that they have seen or at which they were present when it took place, but as to their belief as to the result of that injury, or as to the condition of the party, have higher rights; that is, what you might call higher rights; they stand on a different plane from ordinary witnesses, and it is very important that the medical profession should realize the position that they held before the court and jury, for their testimony may take away a man's liberty or his life or his property or his possessions.

"The difficulty that I have seen in expert testimony of the medical profession is that it is hard to make the jury realize the standing of the men who are testifying, and the thoroughness with which some have followed their profession as against others who have not been so careful. In the presentation of a case by doctors as expert witnesses on the one side and on the other side, the standing, the ability and the thoroughness of each man should, in some way or other, be shown, so that the jury could realize whose opinion should have the greatest weight. English judges probably present this more clearly and more emphatically to the jury than our judges do.

The criticism that I have to make of medical experts is that they are inclined to testify that a possibility is a probability; that is to say, when a man has been injured, there is a possibility that he may be permanently injured from the accident, or that he may die from it, but the expert, becoming a little over-zealous or too much interested in the cause which he has at heart, will state to the jury that a man probably is permanently injured, or probably may die from his injuries, when the history of such case will probably show that

he will get well, and probably not die, but that there was a possibility of his being permanently injured and a possibility of his death.

"According to the Act of 1895, a physician cannot be compelled to testify as an expert.

"According to the Act of June 25th, 1895, Section IV., no physician is allowed in any civil case to disclose any information which he acquired in attending a patient in a professional capacity, and which was necessary to enable him to act in that capacity, which shall tend to blacken the character of the patient without his consent.

"The testimony of an expert is of great importance to the man who is employing him. The technical terms in your profession are much more numerous than the legal profession, and they are very difficult, even to a lawyer who has paid some little attention to accidents and to medical matter, to follow; therefore, it is much harder for a jury to follow these terms, and it is of importance that medical expert testimony shall be delivered in careful, plain English that every man in the jury, whether he is a bricklayer, or whether he is a coachman, or whether he is a merchant, or whether he is a professor in college, may understand it. That has as much weight in the success of a case, in the view the physician gives, as almost anything else. I think the profession realize the growth and the importance of expert medical testimony. The courts, certainly in this country, have had more physicians before them in the last ten years than they had twenty-five years ago. The most eminent men in the profession are called frequently, and I have seen them in court, and it is a very important branch of your professional work. Probably there is some criticism employed, one or the other differ in their expert opinion as to whether a man is sane or insane, whether injured permanently or not, whether he will die or live from the

effect of an accident. It might be better if the court could pass rules that there should be a certain number of experts on each side, that their fee should be recovered as part of the costs of the case, and regulate the fee and rule that the number of witnesses should be the same on both sides, except when an accident happens, where the family physician comes in. In this instance the family physician would be presented by himself on one side, and then the other side should have a right to call a person opposed to him. I have always found in the trial of accident cases that the family physician generally gives a very fair and truthful statement of the case. The greatest source of difficulty when expert medical testimony is brought into court is to find on one side able men who have one view of the case, and on the other side able men who have another view. Even when it holds with our theory of the case, we are sometimes startled by the testimony given by distinguished physicians, who are known as specialists, either alienists or neurologists, for instance, when they tell you a man, who is looking perfectly well, is doomed to live a life of misery or to die. It is very difficult to understand. At the same time I must admit that when I have been on commissions to determine whether a man was sane or not, and from my own conversation with and examination and observation of the man, as a layman, could not clearly decide as to the insanity, having confidence in and relying upon my medical associates, I have felt perfectly satisfied that our views on the subject, when they said the man was insane, were correct. They could give me reasons I had not known of how the man we were examining was insane. So, when a jury is treating a question of insanity, they do not see any particular defect in the man's eye or peculiarity in his manner, but still the physician can come forward and tell them and they are convinced.

Thus, I say, the medical profession, in the line of experts, is every day becoming more and more important in their bearing on a man's life and liberty, and upon his retaining business and his property; and I feel a great interest, and am very much gratified at being called to say these few words before the medical profession, for my brother members of the legal profession have the highest regard for the work that you gentlemen are doing.

"Years ago the expert testimony of physicians did not have the great weight that it does to-day, so the profession should be profoundly impressed with their grave responsibility as expert witnesses."—*Philadelphia Polyclinic*.

THE ROLE OF THE MOSQUITO IN THE EVOLUTION OF THE MALARIAL PARASITE.

Dr. Patrick Manson, the president of the Section on Tropical Diseases, at the British Medical Association held at Edinburgh, gave, by special request and with the permission of the Secretary of State for India and of Surg.-Maj. Ronald Ross, of the Indian Medical Service, a lecture and exposition of the work done lately by the latter in the investigation of this subject. It was now over three years since Dr. Manson first promulgated a clear hypothesis as to the manner in which the mosquito removed the malarial parasite from the human body, and acted as its extracorporeal host. Not able to follow up the subject himself, Dr. Manson had found in Surg.-Maj. Ronald Ross a pupil endowed with keen scientific instinct, a firm believer in his theory, and a master of technique. To him Dr. Manson had set the task of working out and establishing the truth or otherwise of his views. To this, for three years, Ross had devoted himself with rare ability, and with the result that his investiga-

tions had placed us on the threshold of, if we had not already entered upon, one of the most important discoveries in the etiology of this or any other age. Up to the time Manson indicated the meaning to be attached to the evolution of the flagellated body outside the human body, observers were content with merely recording the differences of the various forms of the plasmodium. Since that important induction, however, the prosecution of the study had entered a new phase and one which promised to lead to results of the greatest importance. Seeing that certain phases of the parasite developed into a flagellated body in the microscope field, some twenty minutes, more or less, after withdrawal from the body; seeing also that these flagella broke away and sought to enter other cells, Manson recognized in this an indication, if indeed he did not establish the fact, of the commencement of the extracorporeal life of the parasite. Beyond this, however, no clew was forthcoming as to how the parasite bred and continued its existence. It was at this stage that Manson propounded his mosquito theory and entrusted its elucidation to Ross.

The various stages of their work were arranged under several headings: (1) Ross found that the mosquito, in imbibing the human blood, ingested the parasite. (2) He saw the formation of the flagellated body in the blood in the mosquito's stomach. (3) He observed the flagella break away from the parent cell and attain a separate existence. Ross thereby established the probable correctness of the conjecture that, in the mosquito the parasite entered a new stage of existence. To work out the behavior and development of the parasite in the mosquito was now the problem. After partial success with the human malaria, and for several reasons, Ross elected to investigate the problem in birds. Birds, the speaker said, suffered from intracorporeal blood parasites like those in human malaria,

and Labbé had shown that definite forms of parasites were frequent in Europe. Two species in particular he had described. They were known as *Proteosoma* and *Halteridium*; they were definite organisms, readily found by those experienced in this branch of parasitology in bird's blood. (4) Ross now allowed a particular species of mosquito (the gray mosquito) to feed on birds with *Proteosoma* in their blood, and soon discovered that the parasite entered with the blood the mosquito's stomach. (5) Examining his mosquitos some hours later, he discovered certain oval pigmented bodies in the muscular coat of the mosquito's stomach. (6) By hundreds of observations he established the important fact that it was only in gray mosquitoes that had fed on birds in whose blood the *Proteosoma* parasite was present that those pigmented bodies occurred. (7) From this Ross correctly inferred that the pigmented body was an evolutionary form of *Proteosoma*. (8) McCallum had previously shown that in the case of the analogous parasite—the *Halteridium*—the flagellum, of the flagellated phase, after breaking away, entered certain spherical, pigmented *Halteridia*, causing them to be transformed into little travelling pigmented vermicles, which, in virtue of their sharp beak and mechanical power, traversed freely red and white corpuscles. (9) Analogy suggested that a similar thing occurred in *Proteosoma*, and that the travelling pigmented *Proteosoma* vermicle entered the tissue of the mosquito's stomach and became Ross' pigmented body, in the same way as Manson had shown took place in the case of the *Filaria sanguinis hominis*. (10) Arrived in the stomach wall of the mosquito, the *Proteosoma* increased rapidly in size until it projected beyond the stomach into the coelom, or body cavity, of the mosquito, as a rounded body, which he styled the *Proteosoma coccidia*. (11) During its passage and growth various changes took place in size and

in the appearance of the contents of the coccidia. Pigment diminished and then disappeared, and as the parasite protruded into the coelom it was seen that the contents had a more or less granular appearance. (12) The coccidia now burst, and what Ross called germinal vermicules, which had formed in its interior, were set free in the body, blood, and tissues of the mosquito. (13) The next step in the problem was one of great consequence—it was no other than the discovery of these vermicules in the venomo-salivary glands of the mosquito. Ross during dissection of the mosquito found a couple of head glands with a duct leading toward the proboscis of the animal, and traced the parasite vermicules into these glands. (14) The climax of the discovery was now within Ross' grasp, and he elucidated it thus: He allowed mosquitoes to feed on birds infected with *Proteosoma*; after a few days he fed the mosquitoes on birds whose blood was void of any parasite infection. He found in due course that the parasite-bearing mosquitoes had infected the healthy birds and that the blood of the latter was charged with *Proteosoma*.

Thus was the cycle completed, and the analogy between bird and human infection had only to be proved to establish what was no doubt a great scientific truth, that the mosquito was a carrier of malaria and an infector of man. Much had yet to be done, however, before the full significance of the mosquito in malaria was worked out. Malaria, it was known, multiplied without the intermediary of any vertebrate. Did it do so solely in mosquitoes? If so, we had yet to learn how it passed from mosquito to mosquito. Did it multiply in other media? If so, what were they? Dr. Manson said that he had given merely the outline of Ross' great work. Doubtless Ross or others would soon take up the other problems it suggested and show how to solve them. It was impossible in a short space to

give in detail the multitudinous experiments and observations he had carried out. Suffice it to say that they had been done in a masterly way and with a power of reasoning, of induction, and of technical detail which marked Ross as one of the most eminent scientific workers of the day. The practical applications of the discovery were immeasurable, and the fact that as the bites of the snake or the rabid dog inoculated the blood of their victims, so might the mosquito convey malaria, opened up a new and hopeful phase in the prevention of disease in the tropics.

Dr. Andrew Davidson put a resolution, which was unanimously carried, that the Section send a message of congratulation to Surg.-Maj. Ronald Ross, of the Indian Medical Service, for the excellent work he had done in connection with researches into the subject of malaria and the rôle the mosquito played in its spread.—*Med. Record*.

THE CARE OF THE WOUNDED AT SANTIAGO.

By VICTOR C. VAUGHAN, M.D.

Returning from Cuba a few days ago on board the *Seguranca* in charge of sick soldiers, one of the first things to meet my eyes was a reproduction in the daily papers of an editorial from your columns, attacking the medical department of the army. On this point I wish to say only a few words at present, and I hope to give more in detail later. I was at Siboney from the 27th of June until the 25th of July, and I think myself quite competent to speak concerning the treatment of the sick and wounded at that place, where the general hospital was located. Concerning the surgical skill of the operators at Siboney there can be no question. In the hands of such men as Le Garde, Nancrede, Parker, Fauntleroy, Ireland,

and medical officers from our fleet, the wounded soldier had the best scientific treatment. As to general care of the wounded, I may say that, while this is my first experience of taking care of those wounded in battle, I do not believe that there ever was before an engagement as bloody and as prolonged as that of Santiago in which the wounded were so well cared for. Every soldier carried in his knapsack a first-aid package, and all had been trained more or less thoroughly in their application. Personally I distributed about twelve hundred of these, and quite a number of these same bandages came back to me on wounded soldiers. I can from personal knowledge testify to the fact that many lives were saved by their use. So far as I know, this first-aid package has not been so extensively used in any other war. For many wounds these dressings, applied by comrades on the fighting line, were all that were needed until the wounded man reached the hospital.

The transportation from the front to the hospital at Siboney was not what we wished. There were only a few ambulances, and most of the wounded were brought to the hospital in army wagons. Many men suffered severely during this ride. The intense heat, the cramped position of many in the crowded wagon, and the jolting of the heavy vehicle over the rough road, all combined to give discomfort. Why were there not more ambulances? They were left at Tampa or were not unloaded on the Cuban coast. The medical department was not, however, responsible for this. To provide transportation is the duty of the quartermaster's department, but I do not know that any one can be censured very greatly for the failure to provide a sufficient number of ambulances. It is well known that the transports were crowded, and the landing of animals and vehicles both at Daiquiri and at Siboney was a difficult and dangerous task. I was

on a transport which approached the coast as nearly as the captain dared. When the anchor was dropped from the prow, the line went down forty fathoms, while the depth at the stern was only seven fathoms and not fifty yards away were the sharp rocks of a precipitous coast. It can be readily imagined that with high waves dashing against the ship such a position might easily become perilous. Horses and mules had to be pushed into the water, and, while most of them swam ashore, some were drowned. Even the landing of men was not easy. We had to drop as best we could into row-boats, which at the time were being tossed up and down by the waves, and when the boats neared the shore they often became unmanageable and were filled with water. Like many others, I waded ashore. There are many, especially among those who stayed at home, who are ready to tell us of the great mistakes made in this campaign. They say that Shafter should have taken more time. He should have encamped on the shore and built good docks, so that everything on board the transports could have been landed. He should have built good roads all the way from the landing-place to Santiago. He should have brought up heavy artillery. Soldiers should not have been allowed to charge fortifications and batteries without artillery support. These are some of the many things that we are told should have been done. I have no claim to military knowledge, and General Shafter did not consult me; but as a medical man I wish to say that in my opinion had half these things been attempted the Spanish flag would be to-day floating over Santiago and the American army would have been fortunate had one-half of it escaped both sickness and Spanish bullets. Enervated by heat and disease, the army could not have made two weeks later the glorious charge it did make on San Juan. Dock-building on Cuba's coast and road-making in its mountain

passes at this time of the year would, in my opinion, have caused more deaths than were due to the great fight at El Caney. This is not altogether a matter of medical opinion. It is a fact that the regiment left at Siboney and between that place and Agudores furnished the first case of yellow fever and suffered most severely from that disease. It is well known to students of epidemiology that yellow fever is most frequent and most virulent immediately along the shore. The fighting was practically over by the evening of July 3. On the 5th I saw the first case of yellow fever. Before that day had passed we had three or four more cases, the next day about thirty, and the next more than fifty; and all of these were among those working on the coast.

On the arrival of the wagons loaded with the wounded at the hospital at Siboney the men were placed as best we could. At the request of Dr. Le Garde, I superintended the placing of several trains of the wounded. It is true that there was not always a cot ready for the reception of each man, and those least seriously wounded had to lie on the ground for some hours; but we had blankets and made them as comfortable as possible. No one was neglected. Every one who could do so lent a helping hand. At least one newspaper reporter gave his time for days to feeding these men. I think that he furnished the food from his stores and prepared it himself. That it was good I can testify, because he brought me a cup of his broth late at night on more than one occasion. That no one was neglected I know, because on Dr. Le Garde's order I went with an orderly carrying a hypodermic syringe and tablets of morphine and strychnine late every night through all the tents, and ordered special attendants for those in need. Drs. Fauntleroy, Ireland, and others went through the tents more frequently and were untiring in their labors.

As to the lack of dressings and

other supplies, I wish to say that, so far as I know, the charge on this score is as unfounded as is the general statement that the wounded were neglected. I never failed to find suitable and sufficient material for dressing wounds. We exhausted certain things. We ran out of iodoform gauze, but there was plenty of bichloride gauze. The Red Cross sent up a big box of dressing, for which Dr. Le Garde gave thanks in his big-hearted way so warmly that one of the officers of this society now tries to make it appear that without this aid the wounded soldier at Siboney could not have had his broken limb bound up. The absurdity of this is evident from the fact that medical officers from the *New York, Iowa*, and other ships of our fleet came over daily and worked at the operating-tables. Will any one claim that there were no surgical dressings on these ships?—*Med. Record.*

THE NATURE OF THE ANTAGONISM BETWEEN TOXINS AND ANTITOXINS.

The antagonism of toxins and antitoxins is a subject in regard to which our actual knowledge has been limited thus far, and any contribution is therefore welcome. We know really very little about the true nature of these substances; our therapeutic acquaintance with their qualities has been gained by experiments suggested by empirical observation, not thought out and elaborated à priori from any actual knowledge of the true nature of the materials dealt with. The how and why there exists a therapeutic antagonism have been up to the present, mainly matters of conjecture, not of knowledge, and whether it is chemic or bio-chemic, or more strictly physiologic, has been disputed with more or less weight of argument on either side.

A late issue (August 4) of the English scientific publication *Nature* contains an abstract of a communication to the Royal Society, June 6, by Messrs. Martin and Cherry that seems to add at least some facts on this matter of the antagonism of toxins and antitoxins. Behring, Ehrlich, Kanthack and Brodie had advocated the view that this antagonism was a chemic one, somewhat analogous to the neutralization of an alkali by an acid, while Buchner, Calmette, Metchnikoff and others have maintained that it is indirect, and operates through the cells of the organism. If, therefore, it can be proved that antitoxin neutralizes toxin outside of the body, *in vitro* and not necessarily *in corpore*, it would go far to establish the theory that the action was a chemic and not a physiologic one. Calmette has shown that in a mixture of cobra poison with a neutralizing quantity of its antitoxin and heated to a temperature of 68 degrees C. for ten minutes, the toxin retained its powers, while the antitoxin was destroyed. The authors considered this experiment inconclusive, as not taking into account the element of time, which should be considered as well as that of temperature in estimating chemic action. They therefore made a series of experiments on guinea-pigs, with a mixture of one cubic centimetre of antitoxin to twice, three times, and four times the usual fatal dose of snake venom. In the control experiments with the venom only, all of the animals died within a few hours. The mixture was allowed to stand at the usual laboratory temperature of 20 degrees to 23 degrees C. for the period respectively of two, five, ten, fifteen and thirty minutes, then pipetted off and heated for ten minutes to a temperature of 68 degrees C. and then injected. The animals subjected to the mixture of the stronger doses of venom that had stood for ten minutes or less mostly died or were very seriously affected, all of those that received the fifteen-

minute mixture survived though two were sick, while the thirty-minute mixtures produced no symptoms whatever, as was also the case with a similar series of unheated mixtures in the same proportion that had been allowed to stand for eight minutes before injection. Similar results were obtained with diphtheria toxin and antitoxin.

These experiments seem to show as far as anything can that the neutralization of toxins may occur *in vitro* and that the vital processes in the organism of the body cells are not essential to the process, and unless we assume what appears hardly justifiable, considering the usual mode of its preparation, that the antitoxin itself possesses some vital properties that are active in it, it must be some sort of chemic reaction that takes place. Messrs. Martin and Cherry, however, have supplemented the above experiments with another that appears equally conclusive, but in a different way. The molecular sizes of diphtheria toxin and antitoxin appear to be quite different; the toxin passes freely through a film of gelatin in a Chamberland filter under pressure, while the antitoxin is retained. They took a solution of diphtheria toxin, equal to eight fatal doses per cubic centimetre, and mixed it with a sufficient amount of antitoxin to neutralize it, allowed the mixture to stand for two hours and then passed it through the gelatin filter. Varying quantities of this filtrate up to four cubic centimetres (=3 $\frac{1}{2}$ fatal doses) were then injected into guinea pigs without bad results, not even a local œdema was produced, and the animals thrived under the injections. The unavoidable conclusion from this experiment is that the toxin was neutralized before filtration, as, were it otherwise, there was nothing to prevent it passing through a filter, as it had been repeatedly observed to do in fresher mixtures.

While the investigations of Martin and Cherry throw a very decided

light on the nature of the antagonism of toxins and antitoxins, and leave us to infer with almost a certainty that it is a chemic rather than a vital one, they still leave us almost as much as ever in the dark as regards the real character and nature of the two substances. This assumption that the toxin is an albumose is perhaps a reasonable one, more so, indeed, than the suggestion based only on the apparent size of its molecules, that antitoxin is a globulin. Whatever they may be, however, it is an important gain to know something more of the nature of their inter-reactions.

Although the reaction seems to be essentially a chemic one, it is also possible that it is especially favored by the vital processes within the body. When we consider the start that the toxins practically have in disease, it would appear probable that this must be the case to some extent, as otherwise the antitoxins could hardly be as effective as we find them to be, especially in diphtheria. In any case there is probably some natural resistance of the system to be accounted for in the practical problems of the action of these agents on the organism.—*The Journal of the American Medical Association.*

THE PATENT ON ANTITOXIN.

The announcement that Professor Behring has been granted a patent as the inventor of diphtheria antitoxin will be received by the medical profession with feelings of keen disappointment. The profession of this country has always sternly discountenanced any attempt on the part of its members to make scientific achievements opportunities of personal profit. Such discoveries as the medical profession have made have been fully and freely donated to the service of suffering humanity. Prof. Behring's claim to be the exclusive inventor of antitoxin not only indicates a spirit of commercialism which does its pos-

essor no credit, but it displays a disposition to assume credit for the labors of others, and to make of these an occasion of personal gain which can only indicate a high degree of moral perversity.

Professor Behring claims as his invention:

1. A process "of producing diphtheria antitoxin, which consists in inoculating horses or other animals capable of being infected with diphtheria with repeated doses of diphtheria poison, or living diphtheria bacilli of gradually increasing quantity and strength so as to immunize them and form in the blood a counter-poison for destroying the poison secreted by said bacilli, drawing off the blood from said animals, separating the serum from the blood corpuscles, and concentrating the former for use substantially as set forth.

"2. As a new substance, diphtheria antitoxin, consisting of the concentrated serum of the blood of animals treated with diphtheria poison and having the characteristic of immunizing test animals against infection with diphtheria, and curing them when artificially infected with diphtheria, said serum containing a counter-poison having the property of destroying the poison secreted by the diphtheria bacilli substantially as set forth."

It is almost superfluous to point out to any well-informed reader that Behring's claim to have done this is as preposterous as it is unjust. The principles upon which immunization to diphtheria was finally achieved were of gradual growth, the outcome of researches by thousands of untiring workers. The foundation of the work was undoubtedly laid by Pasteur in his method of immunizing against chicken cholera and anthrax. So long ago as 1887, Sewall immunized pigeons against the poison of rattlesnakes. He says, with genuine modesty, his work was undertaken with the hope that it might form a worthy contribution to the theory of

prophylaxis, and it was a most worthy contribution. In 1887, Roux and Chamberland immunized animals against malignant edema with sterilized anthrax cultures. In 1890, the same year in which Behring and Kitosato published their results in immunizing animals against diphtheria and tetanus, Fraenkel published his results in diphtheria after treating animals by weakened germs and filtered cultures. In the clinical uses of the serum Aronson's name must not be forgotten. His serum was first used in the Children's Hospital in Berlin in 1894. The serum of Roux had been used in one of the hospitals of Paris a month earlier than Aronson's in Germany. Emerich and Aronson both dispute the priority of Behring, and the French Academy of Sciences awarded their prize for antitoxin jointly to Behring and Roux, a fact which very clearly denotes the difficulty of estimating priority of merit in a scientific struggle in which the numerous competitors were so equally distinguished.

The principle which lies at the foundation of the invention of diphtheria antitoxin, and that which underlies all serum therapeutics, is that the blood of immune animals can be used in the treatment of others. Behring did not discover this principle, and in its application he was undoubtedly anticipated by the Japanese workers. If to any single man must be ascribed the distinction of being the inventor and discoverer of the beneficent principle of immunization, the honor belongs to the immortal Pasteur.

The manufacture of antitoxin has been carried out for many years in England, France, Switzerland, Italy, Russia and Japan, and in these countries no one has had the temerity to attempt to control exclusively its manufacture. In this country it is made by five boards of health and by several manufacturing firms. In this country alone has an attempt been made to monopolize its production, it

being admitted that elsewhere the claims of any patentee are inadmissible.

If Professor Behring admits any merit in the work of his predecessors and contemporaries, his claim to be the exclusive inventor of diphtheria antitoxin is in contravention of all the ethics of a scientist's career. His claim is an offence against common morality. Had Simpson patented chloroform anæsthesia, or had Lister patented antiseptic surgery, the world would have had two selfish empirics, and lost two medical heroes. If Behring, by the righteous judgment of mankind, can be adjudged sole and undisputed inventor of antitoxin, he has a place in the Temple of Fame for achieving the most beneficent discovery of modern times. It remains to be seen whether temptation to be rich will overcome his ambition to be great, and whether for a tinsel crown he will barter a diadem of everlasting renown.—*Medical Age.*

CÆSAREAN SECTION.—Reynolds (*Am. Jour. of Obstet.*, June) considers Cæsarean section justified in all cases where a mechanical obstacle renders delivery, in an otherwise healthy woman, more than ordinarily difficult and dangerous. His experience covers twelve years' service in a clinic which delivers 2,500 women every year. He believes that symphyseotomy should be restricted to the class of cases from which he would exclude performance of Cæsarean section, *i.e.*, cases of moderately contracted pelves in women not previously healthy, or in women exhausted by long labor. His conclusions are: 1. That in women who are the subjects of visceral disease or other previous ill-health, and in women who are exhausted by long labor, the maternal mortality of the Cæsarean section is too great to allow of its performance in the interest of the child alone. 2. That in primiparæ with moderate contraction the decision whether or not the Cæsarean section should be

performed as an alternative operation at the beginning of labor in preference to an attempt at an intrapelvic delivery, is a decision which is intrinsically so difficult that it should be attempted by none but the most experienced obstetricians. 3. That in most cases of moderate contraction in primipara it is best to wait until the progress of labor teaches us which is to be the safer operation in the given case. 4. That when any woman has lost one child by a difficult operative labor in the hands of an expert she should in the next labor be prepared for Cæsarean section and delivered by it, unless the course of labor shows that from some changed condition, e.g., a small child, or a more favorable position, a forceps delivery is likely to be easy. 5. That when any case occurs in the practice of the comparatively few men who are really experienced in both obstetric and abdominal surgery, in which an attempted forceps operation proves to be exceptionally difficult and version promises no better results, the forceps operation should be suspended, and if the fetal heart is undisturbed should be abandoned in favor of the Cæsarean delivery. 6. That in very small pelves, e.g., those under three and one-fourth inches in the conjugate, the Cæsarean section in favorable circumstances is the operation of preference. — *The Jour. of Am. Med. Assn.*

THE TREATMENT OF CARBOLIC ACID POISONING WITH VINEGAR.—The following case is related by Dr. Steavenson in the *Indian Medical Record*: The patient was a girl eighteen years old, who said she was subject to "fits." On August 3rd, 1896, she was taken with one, and when the physician saw her she was in a semi-conscious condition and frothing at the mouth. She had vomited slightly, and the vomited matter had a sour smell, but no carbolic acid odor was observed. She regained consciousness, and a bromid draft was administered. She gradually became worse

and another physician was called to see her. He diagnosticated the case as one of carbolic acid poisoning and as he could not rouse the patient nor get her to swallow anything, he ordered her to be removed to the hospital. On admission she was still wholly unconscious, cyanosed and nearly pulseless. The lips and tongue were discolored and the breath had the odor of carbolic acid. The physician gave her a hypodermic injection of strychnin (one-eightieth of a grain). He then passed a soft stomach-tube, washed the stomach out with equal parts of vinegar and water, and followed this with about six pints of warm water. He then gave her five ounces of milk and an ounce of brandy. She was then put into bed and kept warm. She gradually regained consciousness, and a few hours afterwards she was able to speak. She was fed on Benger's food, milk and soda-water for the next three days. She did not vomit or complain of any pain. Carboluria was present for two days. The author states that he was led to use vinegar in this case by Prof. Carleton's suggestion in the *Practitioner* of August, 1896. He cannot state definitely how much carbolic acid was taken. The long period of unconsciousness, the rapid recovery, and the absence of discomforting after-effects speak well, he thinks, for the vinegar, and he is of the opinion that it should be given a fair trial, especially as it is a remedy easily obtained. — *The Jour. of Am. Med. Assn.*

TREATMENT OF BRONCHITIS.—Quicnke (*Berl. klin. Woch.*, June 13th, 1898) draws attention to the fact that in bronchitis, as in the case of collections of pus, the object of treatment is to facilitate the draining away of the exudation. This is, however, possible in bronchitis only to a limited extent. Cough, and especially the act of vomiting, assists to this end. The same object has been attempted by means of the elastic corset, res-

piratory exercises, etc. Often in the early morning the bronchitic brings up a large quantity of sputum by the help of more or less persistent coughing. Quincke recommends that at this time the patient should lie as flat as possible for a couple of hours, so as to assist the draining of the secretion into the large bronchi, and hence its expectoration. The patient becomes accustomed to the position, even though with some difficulty, and can expectorate by turning the head to one side. After a few days the foot of the bed may also be raised 20 to 30 cm. In suitable cases the author says that in two to four weeks there is a considerable diminution in the sputum. This mode of treatment is adapted to cases of chronic bronchitis which have led to a cylindrical or sacculated bronchiectasis in the lower lobes of the lung. It is of no avail in cases of diffuse, and especially recent, bronchitis, with general secretion, or in cases of abscess cavities communicating laterally or incompletely with the bronchi, or of cavities with irritating contents. It may be difficult to distinguish between these conditions in practice, and this mode of treatment may help in the differential diagnosis. The number of suitable cases is not large, but at times results are remarkable.—*Brit. Med. Jour.*

RELATIONS AND CONDITIONS OF THE SOIL TO THE SPREAD OF DISEASE.—Dr. W. H. Welch has shown that the possibilities of infection from soil contaminated with disease germs are numerous, and often intricate. The list of diseases whose causation has been shown to stand under conditions in more or less direct relation to contamination of the ground with their specific germs is a long one. Among the more important may be mentioned malaria, typhoid fever, cholera, yellow fever, dysentery, tuberculosis and the summer diarrhoea of infants. Experience teaches, unmistakably, that contamination of the soil with organic refuse

favors the development and spread of such diseases as these, and that the drainage and purification of the soil by proper systems of sewerage are among the most effective measures for their prevention. No more instructive illustration of the value of modern methods of public sanitation can be found than the inability of Asiatic cholera to secure a foothold during the last two European epidemics in clean cities, with proper sewerage and water-supply, and its ravages in notoriously filthy or insanitary cities, such as Toulon, Marseilles, Naples, and formerly Hamburg. Authorities have differed as to the relative value of sewerage and of water-supply in influencing the prevalence of typhoid fever. We need not pause here to discuss the matter. Both factors are important, the drinking water usually the more important. But it is sufficient for our purpose to show that purification of the ground by proper disposal of sewage is not one of the factors in determining a reduction in the occurrence of typhoid fever and other diseases. It is by no means an easy matter in all cases to assign to each one of the various recognized elements which go to make up an entire system of satisfactory municipal sanitation its due share in the beneficial result, for it rarely happens that one is introduced by itself alone, and the harmonious working of the whole system is often necessary to secure the best results from the individual factors, such as pure water-supply, efficient sewerage, good drainage, cleanliness of streets, improvement or removal of insanitary quarters, thorough sanitary inspection of dairies and food stuffs, public disinfecting establishments, hospital for infectious diseases, municipal laboratories, etc. In some instances, however, the conditions have been such as to furnish conclusive demonstration of the separate influence of the introduction of effective sewerage upon the death-rate from typhoid fever.—*The Sanitary Record.*

Correspondence

THE ANTITOXIN PATENT: WHY REFUSED FIVE TIMES YET FINALLY ALLOWED.

To the Editor of DOMINION MEDICAL MONTHLY:

SIR,—An examination of the official file wrapper and contents of the United States Patent granted to Behring, on diphtheria antitoxin, under date of June 21st, 1898, gives the clearest idea of the subject which is at present attracting world-wide attention. It appears that since January 11th, 1895, Behring filed five different applications, each being presented promptly after its predecessor was refused. The first lacked very materially in clearness, but like the other four, claimed for the would-be patentee the discovery and perfecting of "a successful plan or process by which diphtheria antitoxin can be obtained upon a large commercial scale." This claim is specially stated in the second application as an elucidation of the intent and purpose of the first, and is defended by argument in the last three. In the same application we find the clearest statement of what is not claimed, in the following words: "This invention does not cover a method of medical treatment (which is not patentable). While inoculation to immunize is known, no one, before the invention of this process, has gone beyond establishing general scientific principles. I lay no claim to underlying scientific principles, as these have been evolved by many."

The main argument advanced to sustain the claim is the fact the applicant was awarded the "Alberto Levy prize" for the discovery of diphtheria antitoxin. This, it may be remarked, is offset by the fact that the French Academy of Science prize was awarded conjointly to Behring and Roux.

The points in law scored against the applicant by the special examiner are, substantially, as follows:—

The process for which patent is

claimed consists of methods of which applicant is not the sole nor first inventor. It is an elaboration of basic principles which are the result of the labors and discoveries of many and hence is not patentable.

2. The process for which patent is asked is simply a particular application of a general process which is part of the professional knowledge and applies to the production of other antitoxins than that of diphtheria. The applicant is not the sole inventor and the process is not patentable.

3. The elaboration of a process so as to make it operative for commercial purposes, when the principles underlying it are common knowledge, is not a patentable novelty.

4. The substance produced by the process for which patent is claimed cannot be described by its physical or chemical properties, but only in terms of results obtained when medicinally employed, and for this reason is not patentable.

5. A method of medical treatment is not patentable. Diphtheria antitoxin is produced by and for a method of medical treatment.

6. The Alberto Levy prize expressly states that Behring and Kitosato published the results of their labors, hence either alone was not inventor.

7. It appears that a similar material was patented in England by Aronson, under date of February, 1894, hence the applicant is not the sole operator in this field.

The last application was finally rejected by the special examiner, March 19th, 1898, on the ground of the counter claims above stated. Four days later the claim was taken before the Board of Appeals and allowed because, forsooth, the process referred to has been instrumental in very much reducing the mortality

from diphtheria. Now it remains for the Supreme Court to decide whether this is sufficient ground for a patent.

The matter is one in which every American citizen should be profoundly interested. The manner in which the domestic medical journals have already taken up the subject editorially shows in what general esteem diphtheria antitoxin is held by the medical profession. In his native country Behring could not possibly receive a patent, and the fact that he was allowed such a grant in the United States is a lasting reproach upon our patent laws, or their interpretation. Had the domestic product proven inferior in a single particular to the Berlin product, there would seem to be a semblance of an excuse for the least encouragement of this inhumane monopoly. But such is not the case; indeed it is the reverse. American producers have taken the initiative in every improvement that has yet been made in antitoxic serum. Concentrated and standardized serums originated in Philadelphia and are now known the world over. Only within the last twelve or fifteen months have they been on the list of Berlin antitoxins. Again, the foreign product has never yet compared favorably with the domestic in clinical results, doubtless because of the facts already stated.

Bearing these facts in mind, the gross injustice of any act which closes American laboratories in order to give an inferior imported product an exclusive monopoly becomes strikingly apparent.

JACOB R. JOHNS, M.D.
Philadelphia.

To the Editor of DOMINION MEDICAL MONTHLY :

SIR.—I beg to enclose for your information copy of amendments of this session to North-West Territories Medical Ordinance. You will note provision for Central Examining Board, which I think gives us the

lead in respect of provision for future interprovincial examinations.

Yours fraternally,

D. A. PATRICK, M.D.,

Yorkton, N. W. T.

Legislative Assembly,

Regina, N. W. T.,

Sept. 16th, 1898.

BILL.

NO. OF 1898.

AN ORDINANCE TO FURTHER AMEND
"THE NORTH-WEST TERRITORIES
MEDICAL ORDINANCE 1888."

(Assented to Sept. 17th, 1898.)

The Lieutenant-Governor, by and with the advice and consent of the Legislative Assembly of the Territories, enacts as follows:

1. Section 15 of "The North West Territories Medical Ordinance 1888" No. 5 of 1888, is hereby amended by striking out the word "two" in the fourth line thereof and substituting the word "four."

2. Section 35 of the said Ordinance is amended by striking out the last nine words thereof and by adding the following:

"Provided that the Council may in any case in which it deems expedient, remit any annual fees due to the College by any member who is or has been resident out of the Territories during the period in respect of which such fees became due."

3. Section 1 of Ordinance No. 34 of 1894 is amended by striking out the word "or" in the eighth line thereof and substituting the word "and."

4. Section 1 of Ordinance No. 14 of 1890 is amended by striking therefrom subsection (b) and substituting the following:

"The Council shall admit upon the Register any member of any incorporated college of physicians and surgeons of any Province of the Dominion of Canada exercising powers similar to those conferred by this

Ordinance upon the College of Physicians and Surgeons of the North-West Territories by which, under the laws of the Province governing the said incorporated body, similar rights to register and to practice medicine are granted to the persons incorporated under this Ordinance.

5. The section substituted by Section 1 of Ordinance No. 24 of 1892 for Section 37 of said Ordinance No. 5 of 1888 is amended by adding the following sub-sections :

(2) The Council may, and upon the application of any three registered medical practitioners shall cause inquiry to be made into the case of a person alleged to be liable to have his name erased under this section and on proof of such conviction or infamous or unprofessional conduct shall cause the name of such person to be erased from the register. Provided that the name of a person shall not be erased under this or the last preceding section on account of his adopting or refraining from adopting the practice of any particular theory of medicine or surgery nor on account of a conviction for a political offence out of Her Majesty's domain nor on account of a conviction for an offence which, though within the provisions of the last preceding section ought not in the opinion of the Council or the committee hereinafter named, either from the trivial nature of the offence or from the circumstances under which it was committed, to disqualify a person from practising medicine or surgery.

(3) The Council may order to be paid out of the funds at their disposal such costs as to them may seem just to any person against whom any complaint has been made, which when finally determined is found to have been frivolous and vexatious.

(4) Where the Council direct the erasure from the register of the name of any person or of any other entry, the name of that person or that entry shall not be again entered on the register, except by the direction of

the Council or by the order of a Judge of the Supreme Court.

(5) If the Council think fit in any case they may direct the Registrar to restore to the register any name or entry erased therefrom either without fee or on payment of such fee not exceeding the registration fee as the Council may fix and the Registrar shall restore the same accordingly.

(6) The Council shall for the purpose of exercising in any case the powers of erasing from and restoring to the register the name of any person or any entry, ascertain the facts of such case by a committee of their own body not exceeding five in number of whom the quorum shall be three and a written report of the committee may be acted upon as to the facts therein stated for the purpose of the exercise of the said powers by the Council.

(7) The Council shall from time to time appoint and shall always maintain a committee for the purposes of this section and subject to the provisions of this Ordinance may from time to time determine the constitution and the number and tenure of office of the members of such committee.

(8) The committee appointed under this section may for the purpose of the execution of their duties under this Ordinance employ at the expense of the Council such legal or other assistance as the committee may think necessary or proper, and the person whose conduct is the subject of inquiry shall also have the right to be represented by counsel.

Provided that all meetings of any such committee when held for taking evidence or otherwise ascertaining the facts shall be held within the judicial district where the member complained of resides or the alleged offence was committed unless he shall consent to have the inquiry held elsewhere.

(9) At least one week before the first meeting of the committee to be held for taking the evidence or otherwise ascertaining the facts a notice:

shall be served upon the person whose conduct is the subject of inquiry and such notice shall embody a copy of the charges made against him or a statement of the subject matter of the inquiry and shall also specify the time and place of such meeting. The testimony of witnesses shall be taken under oath which the chairman or acting chairman of the committee is hereby authorized to administer and there shall be full right to cross-examine all witnesses called and to adduce evidence in defence and reply.

(10) For the purpose of procuring the attendance and evidence of a witness before the committee a Judge of the Supreme Court may on application of any party to the inquiry order the issue by a Clerk of the Supreme Court of a writ of subpoena and *testificandum* or a writ of subpoena *duces tecum*. The rules of evidence on such inquiry and the proceedings and penalties in the case of disobedience to any such writ shall be the same as obtain in civil cases in the said Court.

(11) In the event of the non-attendance of the person whose conduct is the subject of such inquiry the committee may upon proof of personal service of the notice aforesaid in accordance with the provisions of this section, which proof of service may be by statutory declaration, proceed with the subject matter of the inquiry in his absence and make their report of the facts without further notice to such person.

(12) Any person whose name has been ordered to be erased from the register may appeal from the decision of the Council to a Judge of the Supreme Court at any time within six months from the date of the order for such erasure and such judge may upon the hearing of such appeal make such order as to the restoration of the name so erased or confirming such erasure or for further inquiries by the committee or council into the

facts of the case and as to costs as shall be just.

(13) The appeal may be by summons to show cause, served upon the Registrar and shall be founded upon a copy of the proceedings before the committee, the evidence taken, the committee's report and the order of the Council in the matter, certified by the Registrar, and the Registrar shall upon the request of any person desiring to appeal furnish to any such person a certified copy of all proceedings, reports, orders and papers upon which the committee or council have acted in making the report or order complained of.

Amendments to North-West Territories Medical Ordinance, assented to September 17th, 1898 :

Dr. Patrick moves : "The Council shall have power to establish conjointly with the council or councils of any college or colleges of physicians and surgeons incorporated under any Act of the Legislature of any province of Canada, and possessing powers similar to those conferred on the College of Physicians and Surgeons of the North-West Territories, a Central Examining Board, and to delegate to such Board all powers possessed by the said Council respecting the examination of candidates for admission to practice medicine and surgery ; Provided, that such power shall not be exercised unless the persons passing any examination of such Central Examining Board shall, on complying with the laws and rules of the respective councils in other respects, be entitled to registration as legally qualified practitioners in the provinces whose councils may have conjointly with the said Council established such Central Examining Board ; Provided, that any examinations conducted by such Central Examining Board shall be held in at least one place within the Territories simultaneously with such examinations held in any province."

THE

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 .. AND ..
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EDITOR:
BEATTIE NESBITT, B.A., M.D., F.C.S.

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No. 4

NEW SANATORIUMS FOR TUBERCULOSIS.

We see constantly occurring notices in the daily press of different places being selected for new sanatoriums, their varying advantages discussed, with various professional pronouncements, authoritative and otherwise, on their merits. In fact, the tendency of some of the profession to appear in the daily press has reached proportions that a few years ago would not have been countenanced. Much of this is possibly due to the good example of the *Medical Record*, the opinions of whose talented editor are in such demand that it is rare for the Sunday edition of the *New York Journal* to appear without a dissertation from him on some subject medical. We regret to say that we have seen it occupy the same space in the scientific medical department as the recently discovered bacillus of baldness, a photograph of which microbe the *New York Journal* published. The only difficulty about the bacillus was that the photograph bore all the ear-marks of an old magnified cut of pediculus pubis. So with the bacillus tuberculous, there is a tendency at present to have it horned,

tailed and myriad-footed in order that the traces of mediæval superstition lingering in the public mind may be satisfied with a properly accredited monster for each disease. There is no doubt that in many of these schemes there is a large element of self-interest and too labored an attempt to make the health of the consumptive coincide with the convenience of the prospective visiting physician. We congratulate Dr. Bryce, however, on his selection of Cache Lake as the site of the Provincial Institution. This lake is situated on the line of the C., A. and P. S. Railway, about 150 miles west of Ottawa, lying in the Algonquin Park district. The reasons which guided its selection by Dr. Bryce, as given by him, are, first, its convenience of access. This convenience will be greatly improved when there is some arrangement between the Grand Trunk and the O. A. Railway so that the public can reach the Institution from the West. But when we consider what are practically the absolute requirements of a modern sanatorium of this kind, we cannot complain of the slight inconvenience

in reaching it, when possibly few States would be as fortunately situated as we are in this respect. In the mixing of consumptive and healthy people, bound to take place where these sanatoriums are located near summer resorts, where extra patients may be boarding in the same house or hotel, in rooms subsequently occupied by healthy people, there is very poor evidence of the capacity of the authorities in providing for the diminution of consumption. In a place like this, however, situated in the virgin forest, with the advantage in altitude of some thousand feet over Gravenhurst, we obtain two distinct advantages. First, owing to the presence of natural forests, we have that evenness of climate that does not exist in the older and more settled portions of the Province, the humidity is practically always the same, its variations at least are not sudden. Sudden changes of temperature are likewise avoided by this protective belt. Then the whole region is covered with small lakes, none of them large enough to be disturbed by storms, but always safe for canoeing and all classes of aquatic exercise at all times, so that it would be difficult to imagine a location more perfectly adapted to the mental and physical well-being of patients suffering with this disease. We again congratulate the able Provincial Health Secretary on the selection of this site, and trust that all other Sanatoriums will be located with the same care for the consumptive.

RECENT SYNTHETIC REMEDIES.

We append, at the request of a subscriber, a list of the later synthetic products which have been introduced as remedies.

Agathin— $C_6H_4 \cdot OH \cdot CH \cdot NH \cdot CH_3 \cdot C_6H_5$ — Salicyl-methyl-phenyl-hydrazone. Antirheumatic.

Airol— $C_6H_2(OH)_4CO_2BiI$ —Bismuthoxy-iodo-gallate. Antiseptic.

Argonin. Silver caseinate. Antiseptic.

Aristol — $C_{20}H_{24}O_2I_2$ — Di-thymol-iodide. Antiseptic.

Analgen — $C_9H_6(OC_2H_5)NH(CO \cdot C_6H_5)Na$ — Ortho-etoxy-anamono-benzoyl-amidochinolin. Antipyretic. Analgesic.

Antiseptol. Cinchonine iodosulphate. Antiseptic.

Asaprol — $CaC_{20}H_{14}S_2O_8 + 3H_2O$ — Calcium-beta-naphthol-sulphonate. Antirheumatic. Antituberculous.

Aseptol— $C_6H_4(OH)SO_3H$ —Phenol-sulphonic acid.

Alummol. Aluminum naphtho-sulphonate. Astringent. Antiseptic.

Benzosol— $C_6H_4(OCH_3)OC_6H_5CO$ —Benzoyl-guaiaicol. Antituberculous. Antiseptic.

Bismal — $4C_{15}H_{12}O_{10}3Bi(OH)_3$ —Bismuth methylene-digallate. Astringent.

Bromol— $C_6H_2 \cdot Br_3 \cdot O \cdot H$ —Tri-bromophenol. Antiseptic and disinfectant.

Chloralamid— $C_3H_4O_2Cl_3N$ —Chloralformamidate. Hypnotic and analgesic.

Creosol — $C_6H_3CH_3(OCH_3)OH$ — Homo-pyro-catechin-mono methyl-ether. Antiseptic.

Diuretin — $C_7H_7N_4O_2 \cdot Na + C_6H_4(OH)CO_2N$ —Theobromine-sodium-salicylate. Diuretic.

Durol — $C_6H_2CH_3CH_3CH_3CH_3$ — tetra-methyl-benzol.

Dermatol — $Bi(OH)_2C_7H_5O_5$ — Bismuth subgallate. Astringent. Antiseptic.

Eucaïne Hydrochloride — $C_{10}H_{27}NO_4 \cdot HCl + H_2O$ —Benzoyl-methyl-tetramethyl- γ -oxy-tetra-piperidin-carbonic-methyl-ester hydrochloride. Local anæsthetic.

Europhen— $C_4H_9(CO_2)(O)C_6H_3C_6H_2 \cdot OI \cdot CH_3C_4H_9$ —Iso-butyl ortho cresol-iodide. Antiseptic. Antisyphilitic.

Guaiaicol Synthetic— $C_6H_4(COH)CO_2H_3$ — Pyro-catechin-methyl-ether. Antituberculous antiseptic.

Guaiacol Carbonate— $C_6H_4(OCH_3)_2$
 CO_2 —Guaiacol-ester Carbonate. Anti-
 tuberculous antiseptic.

Heliotropin. Piperonal. Proto-
 catechu-aldehyde-methyl-ester. Anti-
 septic. Antipyretic. Used in per-
 fumery.

Hypnal— $CCl_3CH(OH_2)C_{11}H_{12}N_2O$
 —Chloral-hydrate-antipyrin. Anal-
 gesic. Antipyretic.

Hypnone — $C_6H_6CO \cdot H_3$ — Penyl-
 methyl-keytone-aceto-phenone. Hyp-
 notic.

Iodol— C_4I_4NH —Tetra-iodo-pyrrol.
 Antiseptic.

Itrol — $Ag_3C_6H_6O_7$ — Silver sitrate.
 Antiseptic in treatment of wounds.

Lactophenine— $C_6H_4(OC_2H_5)NH \cdot C$
 $O \cdot CH(OH) \cdot CH_3$ — Lactyl-amido-
 phenol-ethyl-ether.

Loretin — $C_9H_4NI \cdot OH \cdot SO_3H$ —Or-
 tho-oxychinolin-m-iodo-ana-sulpho-
 nate. Antiseptic.

Lycetol. Dimethyl-piperazin-tar-
 trate. Analgesic. Diuretic.

Losophan — $C_6HI_3 \cdot OH \cdot CH_3$ — Tri-
 iodo-meta-cresol. Astringent. Anti-
 septic.

Lysidine — $(C \cdot H_2)_2NH \cdot N \cdot C \cdot CH_3$ —
 Methyl-dihydro-glyoxaline Uric Acid
 Solvent.

Malakin — $C_{15}H_{15}O_2N$ — Salicyl-
 amido-phenol-ethyl ether. Antiseptic.
 Analgesic.

Microcidin. Sodium beta-naphtho-
 late. Used in Antiseptic Surgery.

Nosophen— $(C_6H_4I_2OH)_2 \cdot C \cdot C_6H_4CO$
 O — Iodophen. Tetra-iodo-phenol-
 phthalien. Antiseptic. Disinfectant.

Orthoform. Para-amido-m-oxy-
 benzoic-methyl ester. Local Anæst-
 thetic.

Phenocoll Hydrochloride — C_6H_4
 $(OC_2H_5)(NHCOCH_2NH_2)HCl$ —Ami-
 do-acet-phenetidid-hydrchloride. An-
 algesic. Antirheumatic.

Piperazin — $C_2H_4(NH_2)C_2H_4$ — Die-
 thylene-diamine. Antirheumatic.

Piperonal. Heliotropine. See
 above.

Resorcinol. Iodoform and resor-
 cin. Antiseptic dressing.

Salophen — $C_6H_4OH \cdot COO \cdot C_6H_4N$
 $H \cdot COCH_3$ —Acetyl-para-amidc-salol.
 Antiseptic. Antipyretic.

Salipyrin— $C_{11}H_{12}N_2OC_7H_6O_3$ —An-
 tipyrin salicylate. Antipyretic. An-
 algesic.

Salacetol — $C_6H_4(OH) \cdot COO \cdot CH_2C$
 $O \cdot CH_3$ —Acetol-salicylic-ester. Anti-
 septic. Antirheumatic.

Symphorol N. — $C_6H_5N_4O_2 \cdot SO_3Na$
 —Caffeine sodium sulphate. Diuretic.
 There are also lithium and strontium
 salts.

Tannalbin. Tannin albuminate.
 Astringent.

Terpinol — $(C_{10}H_{16})_2H_2O$ — Terpin
 hydrate derivative. Used in bron-
 chial affections and in perfumery.

Tetronal — $(C_2H_5)_2 \cdot C(C_2H_5SO_2)_2$ —
 Di-ethyl-sulphon-diethyl-methane.
 Hypnotic and sedative.

Thalline Sulphate— $(C_{10}H_{13}NO)_2H_2S$
 O_4 —Tetra-hydro-parachinanisol sul-
 phate. Hæmostatic and antiseptic.

Triphenine— $C_6H_4OC_2H_5NHC_2H_5C$
 O — Proprionyl-phenetidine. Anal-
 gesic. Antipyretic.

Thermidine— $C_6H_4(C_2H_5O)NCO_2C_2$
 H_5COCH_3 —Acetyl-*p*-ethoxy-phenyl-
 urethane. Antipyretic. Antiseptic.

Peronine — $C_{17}H_{19}NO_2 \cdot O \cdot C_6H_5 \cdot CH_2$
 HCl —Benzyl-morphin-hydrochloride.
 Narcotic.

Creolin, Lyso, Solveol, and Solutol
 are more or less impure cresol mix-
 tures obtained from coal tar.

PERSONAL.

DR. ALBERT DOWNING, of Mc-
 Donald's Corners, has been appointed
 an associate coroner in and for the
 County of Lanark.

DR. LAPHORN SMITH, who has
 been studying in Europe during the
 summer, has returned to Montreal.
 Following the example of the Euro-
 pean gynæcologists, he is forming a
 post-graduate class limited to six
 practitioners, each course of demon-
 strations lasting a month.

Editorial Abstracts

A CASE OF FAVUS SCROTALIS.

LEICK.—(*Deut. med. Woch.*, 1897, No. 31). The author reports a typical case of favus of the scrotum with no other assignable cause than that four weeks previous to the reception of the patient another with favus of the head and nails has been in the same room.—*From Cent. f. med. Wissens.*, 1898, p. 238.

ITCHING IN URTICARIA.

For the relief of the persistent itching in urticaria Gaucher recommends moistening the wheals with the following:—

Rx—

Menthol 5.0.

Chloroform.

Aether.

Spirit Camph. añ 15.0.

They are then dusted with rice powder or zinc oxide.—*Therap. Monats.*, 1898, p. 64.

PYRAMIDON IN TYPHOID FEVER.

BRANDEIS.—Treatment of typhoid fever with pyramidon. (*Prag. med. Woch.*, 1897, No. 44.) The use of pyramidon or di-methyl-amido-pyrazolon in typhoid fever has proven unsuccessful. Used in the ordinary dose of 0.1 to 0.2 gm. twice a day, there was an antipyretic action, but it was slow and uncertain. There was a very great increase of sweat, weakness, and in one case collapse, symptoms which occur with other antipyretics but to a lesser degree.—*From Therap. Monats.*, 1898, p. 49.

ORTHOFORM.

BOCK.—Contribution to the knowledge of orthoform. (*Therap. Monats.*, 1898, p. 413.) Having occasion to cauterize a rectal fistula with silver nitrate, Bock first applied orthoform to lessen the pain, and found after cauterization that the wound was covered with a green coating. On

adding orthoform to a 1% solution of silver nitrate it dissolves and the solution becomes green with the deposition of a brown powder, and the solution on warming deposits a silver mirror, in other words, the orthoform acts as a reducing agent.

A NEW ALBUMEN PREPARATION.

SCHREIBER AND WALDVOGEL.—Sanose, a new albumen preparation. (*Deut. med. Woch.*, 1897, No. 41.) Sanose is a mixture of albumen, consisting of 80% casein and 20% albumose. It has properties very similar to mother's milk and is digested at 40° by trypsin, or pepsin and hydrochloric acid. According to artificial digestive experiments it is to be preferred to nutrose, and is about equal to eucasin. It is a white, odorless and tasteless powder which can be stirred up into an emulsion and given with milk but preferably with metrol.—*From Cent. f. inn. med.*, 1898, p. 158.

INTESTINAL PUTREFACTION AND SKIN DISEASES.

HEVEROCH.—The causative relationship of intestinal putrefaction to some dermatoses. (*Wien. med. Woch.*, 1897, No. 44-46.) The quantitative estimation of the conjugate sulphates in the urine was undertaken in four cases of eczema, two of dermatitis herpeti formis and psoriasis, one of prurigo-mitis and several normal cases as control. The results were negative, an increase of the paired sulphates was not regularly present, and when it was, it appeared at a time when an improvement of the skin disease was noticeable.—*From Cent. f. med. Wissens.*, 1898, p. 206.

VALUE OF POST-MORTEM BACTERIOLOGICAL EXAMINATIONS.

HAUSER.—The bacterial find in cadavers. (Question as to the value of post-mortem bacterial examina-

tions.) (*Zeits. f. Heilk.*, v. 18, 1897, p. 421.) From intraperitoneal, intratracheal and intravenous injections of bac. pyocyaneus, prodigiosis and cholera spirilla into the bodies of animals and men it was found that during the time which usually elapses from death to the autopsy a considerable dissemination of the organisms occurred, so that in estimating the value of the find one should take into consideration the histological conditions and the number of organisms.—*From Cent. f. med. Wissens.*, 1898, p. 193.

POST-HÆMORRHAGIC AZOTURIA.

KOLISCH.—Post-hæmorrhagic azoturia (especially in *Ulcus ventriculi*). (*Wien. klin. Woch.*, 1897, No. 26.) In animals after severe venesection there is an increase in the albumin breakdown. There is some question as to whether the same occurs in man; in Von Noorden's cases there was no increase of the nitrogenous elimination. Kolisch reports a case of *Ulcus ventriculi* in which for two days after, in spite of the absence of food, there was an elimination of 20.16 gm. of nitrogen, that is about three times that eliminated by persons without food. He, however, has not found the same in all cases.—*From Cent. f. med. Wissens.*, 1898, p. 227.

CONTRIBUTION TO THE PHARMACOLOGY OF ALCOHOL AND WATER.

ROSEMANN.—Influence of alcohol and water on the metabolism in man. Numerous experiments show that alcohol is almost entirely burnt up in the body and without increasing the oxygen absorption or the carbon dioxide elimination. His pupil Schmidt administered daily 100–150 cc. absolute alcohol diluted with water and found the nitrogenous equilibrium undisturbed, corroborating V. Noorden's view that alcohol does not protect albumen. Rosemann found on himself that large quantities of water caused a greater output of nitrogen

than was taken in, but at the same time it injured the appetite.—*From Ther. d. Gegenwart*, n. s., v. 4, 1898, p. 385.

AUTO-INTOXICATION IN ADDISON'S DISEASE.

MORSE.—Contribution to the theory of auto-intoxication in morbus Addisonii. (*Fort. d. med.* 1897, No. 21.) From a man who died with the typical symptoms of Addison's disease, in whom the autopsy showed calcification and atrophy of the adrenals, extracts were made from the adrenals, liver and spleen according to Blumenthal's method. For white mice, the extracts of the adrenals and spleen showed a great toxicity, while the extract of the liver was only slightly toxic, the central extracts from the liver and spleen of a case of chronic nephritis were innocuous, so that apparently toxic bodies accumulate in the blood. The adrenals probably have the property of neutralizing toxic bodies.—*From Cent. f. med. Wissens.*, 1898, p. 227.

EXPERIMENTAL TYPHOID INFECTION.

LEPINE AND LYONNET.—Experimental typhoid infection, produced by the introduction of virulent cultures into a thiry loop. (*Comp. rend.*, 1897, v. 125, p. 846.) Typhoid bacilli were placed in the thiry fistula of a dog with the result that the ulcers produced in the loop perforated, producing general peritonitis. The agglutinating action of the serum of this dog was very marked. A second dog treated in a similar way did not die although the serum had marked agglutinating properties and ulcers were present in the loop. The authors believe the reason this dog did not become very sick was because in this case they had used a piece of the jejunum as a loop, while in the first a piece of the ileum. The fact that the rest of the intestine was free from ulcers speaks against the view that they are due to the elimination of toxins.—*From Cent. f. med. Wissens.*, 1898, p. 193.

ALIMENTARY GLYCOSURIA.

ROSENBERG.—The occurrence of alimentary glycosuria in health and in poisoning. (*In Aug. Dissert. Berlin, 1897.*) The investigations were carried on in one hundred and seventeen cases, forty of which were in health. A dose of one hundred grammes of grape sugar, free of water, was given on an empty stomach and the urine examined hourly for four or five hours. Those in health never showed glycosuria after this amount of grape sugar. In lead poisoning the power of assimilating sugar was lowered in 60% of the cases, in two cases out of three of delirium tremens and in traumatic neuroses in 33%; while in organic nervous diseases the result was doubtful. Conditions of general weakness, as anemias and cachexias, showed no influence on the sugar.—*From Cent. f. med. Wissens, 1898, p. 147.*

ELIMINATION OF TANNIC AND GALLIC ACIDS.

HARNACK.—The substances eliminated by the urine after the administration of tannin and gallic acid. (*Zeits. f. phys. Chem., v. 24, p. 115.*) After the administration of medicinal doses of tannin or gallic acid very little gallic acid is found in the urine, as the greater part of the acid which is administered, or may be formed in the body, is eliminated by the intestine, yet after the administration of large quantities of gallic acid a great deal may be found in the urine, the amount, however, varying for different individuals. The administration of alkalis seems to favor the passage of gallic acid into the urine. After the use of tannin no unchanged tannin is found in the urine, but is found if the tannin was given in alkaline solution. No pyrogallol is formed in the body from tannin, although it is readily formed in the test tube under the influence of potassium permanganate. Pyrogallol may, however, form from gallic acid in the urine by standing. The separation of small quantities of pyrogallol from gallic acid can only

be affected by the solubility of pyrogallol in boiling benzine as the reactions are uncertain.—*From Cent. f. med. Wissens, 1898, p. 146.*

AMMONIUM SALTS IN SUCKLINGS WITH GASTRO-INTESTINAL DISEASES.

KELLER.—Fate of the ammonium salts in the organism of sucklings with gastro-intestinal affections. (*Cent. f. inn. med., 1898 p. 137.*) In chronic gastro-intestinal diseases of sucklings, besides histological changes in the liver, there is an increased elimination of ammonia. It is a question whether this increased elimination of ammonia is due to a hindering of the conversion of ammonium salts into urea. Higinanus proved that in sucklings with gastro-intestinal affections, the administration of alkalis caused a diminution of this increased ammonia elimination by the urine, and that the increased output was due to an increase of the acids circulating in the organism. Keller put the children on a known diet and determined the total N, urea and ammonia before and after the administration of ammonium-carbonate, and found that after the administration of the ammonium-carbonate the total N and urea was markedly increased while the ammonia was not. The ammonia is therefore absorbed and converted into urea. The elimination of phosphoric acid is not increased so that the increase in the urea output is not due to an increased albumen breakdown.

ORGANISMS IN SYPHILIS.

DOEHLE.—Staining of organisms in syphilitic tissue and the communication of syphilis to guinea-pigs. (*Muench med. Woch, 1897, No. 41.*) In sections of inflammatory syphilitic products, chancres and gummata, from various organs, Doehle found after staining with a mixture of hæmatoxylin and carbol fuchsin and differentiating with iodine or chromium preparations and alcohol, bodies of various sizes usually round, staining deeply

red, and provided with processes. Outside of syphilitic lesions they were only found in one doubtful case of sarcoma. He believes they are identical with the motile flagellate bodies which he described in syphilitic secretions. Pieces of gummata of the lungs, or liver, or pieces of the spleen from still-born children were transplanted under the skin of guinea-pigs. The wounds healed, and around the site of transplantation there appeared an infiltration which persisted four weeks, and the graft was absorbed in about three or four months. In about four or five months the animals became sick and died with great emaciation in from eight to nine months after the transplantation. The post-mortem merely showed an enlarged spleen with rust-colored pigmentation, swollen lymphatic glands, and at times an increase of the pulmonary interstitial tissues, while in the blood these motile bodies were found together with numerous red corpuscles, as numerous very small non-pigmented discs—very small discs. The author

believes syphilis can be transmitted to animals.—*From Cent. f. med. Wissens.*, 1898, p. 223.

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SUPRARENAL EXTRACT IN CHLOROFORM
NARCOSIS.

MANKOVSKY. — Extract of the suprarenal capsules as a means of restoring life to those apparently dead from chloroform. (*Russ. Archiv.*) Based on his previous experiments that the extract of suprarenal capsule was a heart stimulant, the author chloroformed dogs till they were apparently dead and then injected intravenously a few c.c. of a 1 per cent. extract of suprarenal capsules. He found that if the injection was made in about 30 seconds after apparent death occurred, most of the dogs recovered. None of the dogs could be saved by other methods if the suprarenal capsules failed. Large doses are toxic. He recommends in all cases of apparent death from chloroform to inject small doses as soon as possible.—*From Cent. f. inn. med.*, 1898, p. 160.

Physician's Library

Saunders' Medical Hand Atlases.— Syphilis and the Venereal Diseases. Including a brief treatise on their Pathology and Treatment. By PROF. FRANZ MRACEK. Philadelphia: W. B. Saunders. Toronto: J. A. Carveth & Company Price, \$3.50.

In a series like this it is difficult to avoid repetition, but we may say in this connection that the plates are as good as any of the former, and in addition, what is very valuable to the student, the treatment is given of each case on the opposite page to the illustration. In this way it will be very valuable to students in their clinical lectures and hospital work. We are pleased to be able to give it the same high recommendation that we have in former issues.

BOOKS RECEIVED.

A Clinical Text-Book of Medical Diagnosis for Physicians and Students, based on the most recent methods of examination. By OSWALD VIERORDT, M.D. Authorized translation, with additions, by FRANCIS H. STUART, A.M., M.D. Fourth American edition, from the fifth German. Revised and enlarged. With 190 illustrations. Cloth, \$4.00 net; sheepskin or half morocco, \$5.00 net. Publisher, W. B. Saunders, Philadelphia. J. A. Carveth & Co., Toronto.

An American Text-Book of Gynecology, Medical and Surgical, for Practitioners and Students. By HY. T. BYFORD, M.D., J. M. BALDY, M.D., E. B. CRAGIN, M.D., J. H. ETHERIDGE, M.D., WM. GOODELL, M.D., H.

A. KELLY, M.D., F. KRUG, M.D., E. E. MONTGOMERY, M.D., WM. R. PRYOR, M.D., G. M. TUTTLE, M.D. Edited by J. M. BALDY, M.D. Second edition, revised. With 341 illustrations in the text and 78 colored and half-tone plates. Cloth, \$7.00; sheepskin or half morocco, \$8.00. For sale by subscription. Publisher, W. B. Saunders, Philadelphia. J. A. Carveth & Co., Toronto.

An American Text-Book of the Diseases of Children, including special chapters on essential surgical subjects. Orthopædics; diseases of the eye, ear and throat; diseases of the skin; and on the diet, hygiene, and general management of children. By American Teachers. Edited by LOUIS STARR, M.D. Assisted by THOMPSON S. WESTCOTT, M.D. Second edition, revised, \$8.00 cloth; sheepskin or half morocco, \$9.00. For sale by subscription. Publisher, W. B. Saunders, Philadelphia. J. A. Carveth & Co., Toronto.

A Text-Book of Materia Medica, Therapeutics and Pharmacology. By GEORGE FRANK BUTLER, Ph.G., M.D. Second edition, revised. Cloth, \$4.00 net; sheepskin or half morocco, \$5.00 net. Publisher, W. B. Saunders, Philadelphia. J. A. Carveth & Co., Toronto.

An Abridged Therapy Manual for the Biochemical Treatment of Disease. By Dr. MED. SCHUESSLER. 25th edition, in part rewritten. Translated by Prof. Louis H. Tafel. Cloth \$1.00. Publishers, Boericks & Tafel, Philadelphia, Pa.

Twentieth Century Practice. An International Encyclopedia of Modern Medical Science. By leading authorities of Europe and America. Edited by THOMAS L. STEDMAN, M.D., New York City. In 20 volumes. Volume XV., "Infectious Diseases." New York: William Wood & Company, 1898.

A Text-Book upon the Pathogenic Bacteria for Students of Medicine and Physicians. By JOSEPH MCFARLAND, M.D. 134 illustrations. Second edition, revised and enlarged. \$2.50 net. Publisher, W. B. Saunders, Philadelphia. J. A. Carveth & Co., Toronto.

PAMPHLETS RECEIVED.

"Insomnia." By I. J. HIGGINS, A.M., M.D., New York, N.Y. Reprinted from *The Journal of Medicine and Surgery*, August, 1898.

"Glaucoma with Detachment of Retina." By WILLIAM CHEATMAN, M.D., Louisville, Ky. Reprinted from *Annals of Ophthalmology*, July, 1898.

"Orthoform and Extract Suprarenal Glands." By W. CHEATMAN, M.D., Louisville, Ky. Reprinted from *The American Practitioner and News*, August 15th, 1898.

"A Contribution to the Study of the Symptoms of Chronic Urethritis." By FERD. C. VALENTINE, M.D., New York. Reprinted from the *Journal of the American Medical Association*, August 27th, 1898.