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THE
MONTREAL MEDICAL JOURNAL.

VOL. XXXI.

FEBRUARY, 1902.

No. 2.

Original Communications.

INTERMITTENT CLAUDICATION.

BY

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In 1877 or 1878, when studying comparative pathology, I went one day to the country with some of the members of the Montreal Veterinary College to see an autopsy on a horse which had had a peculiar form of intermittent lameness. Dr. McEachran said the condition was well recognized, and had been described by the French writers, but it was very obscure. I have forgotten now the details of the autopsy, except that we found verminous aneurisms of many of the mesenteric vessels and of the iliac arteries. At the time I was much interested, and looked up Bouley's paper on *Claudication Intermittente*. He described an affection in the horse, in which, after being driven for fifteen or twenty minutes, the animal stopped, one or both of the hind legs got stiff, and soon it was unable to stir. In from half an hour to an hour it recovered and was able to go on comfortably for another fifteen minutes, when the attack recurred. In such cases, post-mortem, the artery of the affected limb was found blocked with a clot, or, when both hind legs have been involved, the abdominal aorta contained thrombi.

The subject was not brought to my attention again until a few years ago, when working at the subject of angina pectoris. I then looked up Charcot's description of this intermittent claudication in man, and made also the interesting discovery that Allan Burns in his *Observations on Some of the Most Frequent and Important Diseases of the Heart, 1809*, had given an explanation of this remarkable phenomenon.

One or two of his sentences I may quote: "In health, when we excite the muscular system to more energetic action than usual, we increase the circulation in every part, so that to support this increased action the heart and every other part has its power augmented. If, however, we call into vigorous action a limb round which we have with a moderate degree of tightness applied a ligature, we find that then the member can only support its action for a very short time, for now its supply of energy and its expenditure do not balance each other; consequently, it soon, from a deficiency of nervous influence and arterial blood, fails and sinks into a state of quiescence." He puts it very tersely when he says, "the supply of energy and expenditure do not balance each other."

Charcot was the first to describe a condition in man identical with that met with in the horse. His Memoir was presented to the *Société de Biologie* in 1856, and is also to be found in the *Leçons du Mardi, I.* One day a patient in the service told him that he was not able to walk for more than a quarter of an hour without being taken with cramps in the legs. After resting a while he would get better, and would be able to resume his walking, and then a crisis recurred. At the autopsy Charcot found a ball encysted in the neighbourhood of the iliac artery, and a traumatic aneurysm which had obliterated the artery in its lower part. The circulation was carried on by collateral channels, which were ample to maintain the nutrition while the patient was quiet, and for a short period during exertion, but after a time, when the limbs were fatigued by the movements, the quantity of blood which reached them was insufficient, causing a relative ischæmia, with tingling, cramps, and impossibility of walking. He refers to the fact that the condition is often preliminary to gangrene, and narrates a case in which a patient with the affection had his leg amputated for gangrene.

Interest has been reawakened in the subject by the very careful studies of Erb (*Deutsche Zeitschrift für Nervenheilkunde*, 13), in which he has reported twelve cases, and has called attention particularly to its association with arterio-sclerosis and calcification of the arteries of the legs. The whole subject, too, has been reviewed this year (1901) by Goldfiam in the *Neurologisches Centralblatt*, and in this country cases have been reported by Gordon (*New York Medical Journal*, 1900), and by Riesman (*American Medicine*, 1901).

Familiar as I had been for years with the disease in the horse and with the early literature on the subject in Burns' work and with Charcot's description, I had never recognized the condition clinically until in the patients whose histories I here give.

Case I. *Vomiting and pain in abdomen—Pulsating tumor in epigastric region—History of syphilis—General arterio-sclerosis—Wiring and electrolysis of aneurismal sac—Marked improvement—Return in nine months with well marked intermittent claudication.**

W. B., aged 31, from Virginia, came first to the hospital in December, 1899, complaining of vomiting and great pain in the upper abdomen. These symptoms had been present for several months. He had lost in weight and had become very nervous. He had been a healthy fellow, but had had syphilis six or seven years before. The radials were sclerotic, the aortic second sound ringing and accentuated, and in the epigastric region there was a wide area of impulse; on palpation an expansile tumor which could be easily grasped in the hand. I urged him to have the sac wired. To this he consented and went home to settle his affairs. He returned early in January, and Dr. Finnie opened the abdomen and found an aneurism of the abdominal aorta, into which he inserted ten feet of wire, through which he passed an electric current for an hour. The patient did well and returned to his home very greatly benefited, particularly in the relief of the pain. He returned in October, 1900, for examination. He had continued free from pain and vomiting. His general condition was excellent, though he was still nervous and apprehensive. The sac was decidedly smaller and the area of pulsation much less.

He volunteered the statement that there was an additional symptom which had disturbed him not a little; namely, after walking for a certain distance his legs would, as he expressed it, give out completely; so that he could not move another step, and had to sit down. After resting a few minutes he could then go on again. This was more particularly noticeable when he walked on the street. He had to go very slowly and could not go for any distance. There was no paralysis accompanying the loss of ability to walk. He could move his legs, but there was an uncontrollable feeling that he could not take another step. Accompanying this there was a sensation of dead, heavy weight in the legs, but no cramps. Walking about in the house (and in the yard) did not bring on the condition, but he had had it very frequently in the past few months, and he had learned to ward it off by walking very cautiously and slowly and resting at intervals. The femoral arteries and the dorsal arteries of the feet were distinctly sclerotic.

* As I look over this paper for the press this patient has been readmitted to the hospital (January, 1902). He has remained very well since the operation two years ago. The aneurism can be felt. It is hard and firm. He has no pain, but is still very neurasthenic. He has not had the intermittent claudication for nearly a year.

In aneurism of the abdominal aorta the condition is the same as that which produces the intermittent claudication in the horse, and one can readily understand how, as Allan Burns expressed it, the supply of energy and expenditure did not balance each other. In fact, it is surprising that lameness is not more common in such cases.

The following case is a typical illustration of the more frequent cause; namely, general arterio-sclerosis. The patient had, moreover, the associated vaso-motor and nervous disturbances which are not uncommon with disease of the arteries of the extremities.

Case II. Mitral stenosis—General arterio-sclerosis—Attacks of intermittent lameness with numbness and tingling in the feet and marked vaso-motor disturbances—Absence of pulsation in the dorsal arteries of the feet.

Mrs. W., aged 55, admitted June 7th, 1900, complaining of pains in the right leg, difficulty in walking, and heart trouble. There was nothing of any special moment in her family history. Her mother died of tuberculosis, and probably one sister. She had had the usual diseases of childhood, and had acute articular rheumatism at sixteen. She had had seven children and five miscarriages. The last child was born seven years ago. She had always enjoyed good health, and had had no serious illnesses. She said, however, that she had had heart trouble all her life, and occasional attacks of shortness of breath.

Present Illness. While at Baden last August she went out for a walk after eating a very hearty dinner, and after going a little distance from the hotel she lost control of her legs. There was no pain, but they simply refused to carry her, and she had to be carried back to the hotel. There was no loss of consciousness. She was very much alarmed about herself, and she was given aromatic spirits of ammonia, which made her very nauseated, and a little while later she vomited. The following day she felt well enough to leave Baden. Prior to this time she had begun to suffer a good deal with dyspnoea on exertion. She stood the journey back to this country very well, and remained quite well until about six weeks ago. Walking rapidly one day to the boat at Norfolk, she got somewhat out of breath. She got on the boat all right, and felt quite well until she reached Fortress Monroe, when she found on attempting to get up she was unable to walk. She had at this time a feeling of pins and needles in her feet, chiefly in the right foot. There was no difference in the color, and no swelling. About three weeks ago it was noticed for the first time that the right foot and leg were slightly blue, and she has had a good deal of pain in this foot and leg, sometimes sufficient to require

morphia. For the greater part of the time since the attack she has been in bed. On attempting to move about the legs give way. The pain in the right leg is much intensified if the foot hangs down. She has been very much worried and disturbed about herself, but her general health has been pretty good. She does not think she has been more short of breath of late. She has had a little palpitation and pain about the heart. The dyspnoea is altogether on exertion.

Present Condition. The patient was a medium sized woman, quite stout and looked nervous. The tongue was clean. She gave a very good account of her history and condition. The radial pulse was regular, 96, vessel wall not sclerotic. No sclerosis of the temporal arteries. The pupils were equal, and reacted to light and on accommodation.

Heart. Point of maximum impulse was visible in the fifth interspace about the nipple line. There was an exaggerated systolic impulse on palpation; no definite thrill. On auscultation there was an extremely sharp, flapping first sound at the apex, almost amphoric in tone, and preceded by a short, rumbling murmur. There was a soft systolic bruit at the aortic area, and the second pulmonic sound was loudly accentuated.

The abdomen was not swollen; liver and spleen not enlarged.

Legs. Both could be moved freely in bed. Power of movement of right toes and ankle slightly impaired. The right leg looked cyanosed from the knee down. There was no œdema. It was extremely tender to the touch. The right calf measured the same as the left— $31\frac{1}{2}$ cm. Left leg and foot normal in size and color, and not tender to the touch. Both feet felt cold, the right more so than the left, and she complained very much of the numbness in them. There was no pulsation to be felt in the dorsal artery of the right foot, nor in the right popliteal artery. Slight pulsation to be felt in the femoral artery. No pulsation in the dorsalis pedis or popliteal arteries of the left leg. Pulsation in the left femoral was well felt. Pulsation in the external iliacs could be just felt. There were no patellar reflexes in either leg, and the plantar reflexes were very difficult to obtain as she winced so much from tenderness of the soles.

The patient had warmth applied to the legs, careful friction, and she did remarkably well. On the 11th there was no cyanosis in either the leg or foot. It was still cooler to the touch and tender. No pulsation could be felt in the femoral artery.

I heard subsequently from this patient's daughter that she died a month or two after leaving the hospital.

This case illustrated the good effects of careful treatment as recom-

mended by Erb. With rest in bed, warmth to the legs and careful friction she improved very much. She received great benefit too from the use of full doses of nitroglycerine.

A word as to the name. I think it is very much better to use the term intermittent claudication, though it does not specify the etiology. It expresses well the most characteristic feature of the complaint. Erb's term, *intermittirendes Hinken*, is simply the German equivalent. Other terms have been used, such as *angio-sclerotic intermittent dysbasia* by Charcot, *intermittent muscle paresis* by Erb, and *angio-sclerotic paroxysmal myasthenia* by Higier, the author of a long article on this subject in *Deutsche Zeitschrift für Nervenheilkunde*, July, 1901. As shown in the horse and in the first case which I here report, the affection is not always due to simple arterio-sclerosis, but may be due to aneurism, as in Charcot's case and as in the rule in the horse. Oppenheim has reported instances in nervous individuals in which the condition seems to depend upon vaso-motor disturbances.

THE TREATMENT OF GENERAL SEPTIC PERITONITIS.*

BY

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The great mortality of general septic peritonitis is a sufficient reason for an occasional review of our knowledge of its pathogenesis and pathology; and our lack of success in its treatment a sufficient stimulus to effort looking toward improvement of our therapeutic resources.

Let us for the purpose of facilitating the discussion this evening, define general septic peritonitis as a septic inflammation of that portion of the visceral and parietal peritoneum occupying the pelvic and small intestine area. I would thus limit the area, because at the operating table one may generally form a moderately accurate estimate of the condition of this region. It is seldom that the operator can say very definitely much about that part lying above the transverse colon. It is desirable also to eliminate from this discussion all side issues and complications, important as they are. General peritonitis, unfortunately, is only too frequently associated with other equally grave pathological lesions. These complicating conditions contribute in no small degree, when present, to the fatal ending by their influence upon the patient, and by lessening the efficiency of the therapeutic measures employed. They are, notably, advanced renal disease and insufficiency, septic pleurisy, pneumonia, pulmonary emphysema and cardiac lesions. It is desirable also to eliminate from the discussion cases of general peritonitis advanced to a stage in which profound toxæmia and collapse indicate that the conditions rendering cure possible have passed away.

Treves puts the mortality of general septic peritonitis at 70 per cent. Abbe, in his article in the *International Surgery*, estimates the mortality by cases treated medically at 90 per cent., and in over 200 cases treated surgically within the last few years, at 60 per cent. Senn, in his recently published work on *Practical Surgery*, says, "I have drained and washed out the peritoneal cavity in many cases of diffuse septic peritonitis and I am free to confess without a single successful result. All my cases have died of sepsis a few hours to a day or two after the operation, in spite of heroic stimulation and in some cases of frequently repeated irrigation with sterilized water,

* Read before the Montreal Medico-Chirurgical Society, December 20, 1902.

normal saline solution, or mild antiseptic solutions, such as boric acid and acetate of aluminum." McCosh states in the *Annals of Surgery*, Vol. I., 1897, that he has operated "on 43 cases of general septic peritonitis. Of these 37 have died and 6 have recovered, a mortality of about 86 per cent." These references are sufficient evidences, if such were needed, of the tremendous mortality of general septic peritonitis under present methods of treatment.

Of its pathogenesis and pathology we know something but not too much. It is conceded that septic peritonitis results from septic infection by various pathogenic organisms of various degrees of virulence. It is also conceded that the sum total of effect is in some degree dependent upon the resisting and reparative power of the patient, and of the therapeutic measures adopted; and here one must call a halt. The nature of the poisons produced, their method of production, their path of entrance into the system, and their neutralization and elimination, are, for the most part, not yet definitely determined. We cannot as yet just say what is the effect of these germs and their toxins upon the different coats of the intestine. Nor do we know definitely to what extent the intestinal distention and paresis is due to pressure from within the lumen of the gut, or to the paralysing effect of poisons upon Auerbach's plexus, or to their degenerating influence upon the muscular coats. Here, indeed, it seems to me, is a great field for research work, rich in possibilities, in which the pathologist, bacteriologist, and chemist might work together with mutual advantage.

The symptomatology is tolerably well understood; the prognosis is certainly bad. Can we adopt a more effective method of handling this disease? The advantages of a prompt recognition of the condition and the institution of appropriate treatment at the earliest possible moment are evident to all. The wisdom of removing the cause, when possible, is hardly open to question. If seen early, this may be done with the thoroughness, permitted and facilitated by general anaesthesia. In advanced cases, however, I am convinced that the administration of a general anaesthetic is harmful and sometimes hastens the end. In such cases one can only make a small opening for drainage with the aid of a local anaesthetic. Through this opening a quantity of foul-smelling, septic, sero-perulent discharge escapes, and an imperfect but helpful lavage may be performed.

It is to the after treatment especially that I desire to direct your attention.

Given a condition of ingravescent or already generally diffused peritonitis, in a patient whose respiratory, circulatory, and other ex-

cretory and eliminative organs are normal and may be relied upon to perform more than their normal share of work, what resources give the greatest promise of success? It matters not whether the peritonitis has resulted from a ruptured gangrenous appendix, a perforated typhoid or other ulcer, or a strangulated hernia, the principles involved in the after treatment are much the same if the inflammation is more than local and further spreading is not prevented by limiting adhesions.

The indications are to arrest the spread of the infection and inflammation by continuity of tissue, to lessen the production of toxins, to favour the elimination of the poison already generated, and to aid the natural recuperative powers. These indications, I think, are best met by arrest of peristalsis and by adapting such means as favour rapid elimination of the toxins.

I have been like some others, perhaps, very much influenced by the teachings of that surgical genius, the late Mr. Lawson Tait. I faithfully withheld opium and as faithfully endeavoured to secure free movements of the bowels, thinking that by so doing I prevented the formation of adhesions that might become obstructive, and that I stimulated the elimination, through the intestinal wall, of toxins. Experience has convinced me that this is a wrong principle upon which to act. I have seen too many peritonitis cases gradually sink and die from toxæmia, while at the same time passing several, loose, watery, diarrhœa stools daily. Those stools were the result of the administration of various enemata and of salines by the mouth. Disheartened by these results, I began adopting an almost opposite course in the after treatment of peritonitis cases. It is quite possible that in his special work Mr. Tait was quite right in his methods. His work was largely gynæcological, a class of work in which there is comparatively little sepsis and that of a mild degree of virulence. I am of opinion, however, that his principles applied to ingravescant and general septic peritonitis, such as comes before the general surgeon, are too often followed by disastrous results to be adopted. I believe better results are to be obtained by arresting peristalsis and endeavouring to promote toxine elimination by channels other than the intestinal tube.

The plan which I have successfully adopted in a few cases, too few I admit to prove anything conclusively, is to arrest peristalsis and promote the elimination of the poisons by:—

(1) Stomach lavage. This may be carried out with the aid of a little cocaine spray in the pharynx; or, if an anæsthetic is adminis-

tered, I have the stomach washed out before the patient leaves the operating table, and while yet somewhat under the influence of the anæsthetic. It gives relief in the lessening of vomiting. If the contents of the upper bowel are regurgitating into the stomach, the lavage may be repeated one or more times. By emptying the stomach it also promotes better breathing and lessens peristalsis.

(2) The withholding of all food from the stomach and the substitution of rectal feeding. The withholding of food not only lessens vomiting, but also lessens peristalsis.

(3) The administration of opium, generally in the form of hypodermic injections of morphine. I wish it to be understood that my advocacy of opium refers exclusively to its use in the after-treatment of cases of peritonitis, after the initial lesion or cause has received attention. Its use before operation is, in my opinion, to be strongly condemned, as also its use with a view to the doing away of the necessity for operation.

After the cause of the peritonitis has been considered and dealt with so far as possible, then opium may be, I think, administered with benefit. As you are all aware, the practice of administering opium in peritonitis is not new. Before as much was known of the disease, especially concerning its causes, as we now know, the most successful was the opium treatment. The knowledge of its usefulness was of gradual growth, until, finally, Professor Alonzo Clark grasped the idea of its therapeutic value and popularized its use. Just how opium does good is not easily told. It is clearly known that patients suffering from peritonitis have an increased tolerance of opium. The late Austin Flint, in his *Practice of Medicine*, published in 1873, tells of a case of peritonitis under the care of Prof. Clark in which huge doses of opium were administered with impunity and apparent benefit. The patient took the first 26 hours a quantity of opium and morphine equivalent to 106 grains of opium, in the second 24 hours she took 472 grains, on the third day 236 grains, on the fourth day 120 grains, on the fifth day 64 grains, on the sixth day 22 grains, on the seventh day 8 grains, after which the treatment was suspended. This patient, Professor Clark had reason to believe, "was not accustomed to the use of opium in health and was not intemperate." Why this lessened susceptibility to opium I do not know unless it is antidotal to some poison present in the system.

I believe one advantage gained by the exhibition of opium is its influence in lessening peristalsis, and that the lessening or arrest of peristalsis lessens the spread of infection, lessens the production of toxins, and increases the formation of limiting adhesions. These

are all important points. The arrest of the spread of the disease is tantamount to the lessening of the toxine production. Ochsner thinks that he arrests peristalsis by withholding food by the mouth and the substitution of rectal feeding. Possibly this is true; probably it is partially true.

But, if I mistake not, opium has other and quite different effects. Abbe suggests that by relieving pain it permits freer movement of the diaphragm, which is known physiologically to be one of the most potent factors in the causation of the flow of lymph, and hence of the absorption of fluids from the peritoneal cavity. That the peritoneum has great powers of absorption is well known. The observations of von Rocklinghausen concerning the remarkable powers of taking up fluids and solid particles in suspension possessed by the central tendon of the diaphragm, have been confirmed by Ludwig, Schweigger-Seidel and Wegner. Auspitz has observed finely-divided rice meal pass through the central tendon, and an hour later has found it in the blood of the ear, and some hours later in the lung, liver, spleen, and kidney. Muscatello, Maffucci, and Beck have shown experimentally that substances are rapidly taken up from the peritoneal cavity through the central tendon, and that they then pass on through the thoracic duct into the vena innominata. It seems also to be established that other portions of the peritoneum absorb, although less rapidly. In particular may be mentioned the great omentum, the gastro-hepatic and gastro-colic omenta, and the mesorectum. For many of these facts I am indebted to Byron Robinson's work on *The Peritoneum*.

Abbe, then, has good reason to think that the freer action of the diaphragm stimulates lymphatic absorption in the great lymph sac, the peritoneum. It is quite possible, may I even say probable, that the longer excursion of the diaphragm exercises an equally important influence on the vascular system of the abdominal cavity. Practically the greater bulk of the blood from the abdomen enters the inferior vena cava through the portal system and liver. A freer action of the diaphragm causes greater pressure upon the liver, thus aiding in the propulsion of the blood through its cells. The diaphragm is thus made to do duty alternately as a force and suction pump, and its influence upon the blood and lymph channels must be great. Certainly the respiratory system can no longer claim a monopoly of the diaphragm.

The results of this action of the diaphragm in promoting and accelerating the circulation through the blood and lymph vessels is to lessen congestion in the affected area and to stimulate absorption

of the products of inflammation. These products of inflammation must, therefore, be conveyed almost directly by both sets of vessels to the lungs. If the result is beneficial to the patient, then we may assume that in the lungs and in the other excretory organs the poisons produced in the peritoneal cavity are successfully eliminated.

I think it was John Hunter who said, "Don't think, try it." I have tried it in the following cases, which I shall report very briefly:

Case I. There was admitted to my ward in the Montreal General Hospital in 1899, a young man, 25 years of age, in a collapsed condition. He was vomiting and had a distended abdomen. His respiration was rapid, his pulse 140. He had been treated for appendicitis, and perforation was said to have occurred fifteen hours before admission. I felt that the administration of an anæsthetic would in all probability prove fatal, and that it would be unwise to attempt any operative interference. I decided, however, to make a small incision in the median line with the aid of cocaine. This was done and a considerable quantity of sero-purulent fluid escaped. The soft rubber tube of an irrigator was inserted through the wound and the lower abdomen and pelvis washed out as well as possible with normal saline solution. He was then given hypodermics of morphine, gr. $\frac{1}{4}$, about every four hours. The next day he had a rigor and developed a scarlatiniform rash. He was isolated; desquamation occurred at the usual time, and he made a good recovery. He returned some months later and his appendix was removed by one of my colleagues. The man is now, I believe, in good health.

Whether or not the scarlatina influenced favourably the subsequent course of the peritonitis I am unable to say. I may say, however, that some years after this I operated very rapidly on a child about six years of age that was suffering from peritonitis, the result of perforative peritonitis. The next day the temperature rose to 106° F., and all the symptoms of scarlatina developed. This child also recovered. In this connection I may also say that I have used antistreptococcal serum without any apparent benefit.

Case II. My second case was a little girl, aged 6 years, admitted on 21st January, 1900, suffering from perforated appendix and general peritonitis with abdominal distension. The temperature was 102.5° F., pulse 144, respiration 40. An anæsthetic was administered, the appendix removed, and the abdomen washed out with normal saline solution. This child was given hypodermically $\frac{1}{32}$ grain of morphine on an average every six hours for nine days. She recovered slowly. After leaving the hospital the child gained strength, got fat and strong, and seemed for months to be quite well. She

afterwards died rather suddenly of what was probably an acute obstruction. I did not see her during the last illness and no autopsy was performed, but, from what the attending physician told me, I have little doubt that the cause of death was ileus.

Case III. F. L., aged 10 years, was admitted on the 23rd March, 1900, with general peritonitis resulting from a perforative appendicitis. Temperature $103\frac{4}{5}^{\circ}$, pulse 160, respirations 44. In this case opium was administered without apparent benefit. The temperature gradually rose to $105\frac{4}{5}^{\circ}$, and she died eight hours later. In this case it is possible that if I had been satisfied with a small incision under cocaine, instead of a more perfect cleansing of the abdominal cavity under a general anæsthetic, the results might have been different.

Case IV. J. E., aged 14, was admitted on the 2nd November, 1900, suffering from general peritonitis from perforation of appendix, and in a condition of collapse. An incision was made under cocaine, and death occurred ten hours later. Opium in this case had apparently no beneficial effect, except to relieve pain and it gave mental rest and quiet.

Case V. P. F., aged 9 years. General peritonitis had occurred from perforation of the appendix. Temperature $100\frac{4}{5}^{\circ}$, pulse 134, respiration 42. Operation performed under ether anæsthesia, appendix removed and small intestine area cleaned with swabs and normal saline solution. Morphine was given hypodermically every three hours during the first three days. The dose was alternately 1-16 and 1-8 of a grain, and during the following three days about 1-8 grain was given every eight hours, when it was stopped altogether. The abdomen was soft, free from tenderness, the bowels had moved freely and nourishment was taken in considerable quantity by the mouth and well borne. The child was bright, played with books and talked of going home. On the evening of the sixth day the child vomited and complained of severe headache. It gradually became comatose, developed strabismus, and died apparently of acute meningitis. The abdomen remained soft and free from tenderness. So far as could be discovered, death was not due to any abdominal condition. Death occurred forty-eight hours after the onset of the head symptoms.

Case VI. J. J., aged 23 years, was admitted to hospital at 5 a.m., on 16th November, 1900, suffering from general peritonitis from acute perforative appendicitis. The temperature on admission was 97° F., pulse 100, respirations 24. Operation was performed under ether anæsthesia eight hours later, the temperature being then

100 3-5° pulse 124, respirations 32. This man received 1-4 grain of morphine every four hours for five days, then 1-16 grain for one day, when it was stopped. He made a perfect recovery.

Case VII. W. D. A., aged 26 years, was admitted 2nd September, 1901, with general peritonitis from a perforated appendix. The pelvis and small intestine area contained quantities of sero-pus giving mixed bacilli on culture. There was acute inflammation and thickening of a portion of the omentum. On admission the temperature was 101 1-5° F., pulse 100, respirations 20. For two days he received morphine grain 1-4 every twelve hours, and one dose on the third day and one on the fourth. A moderately severe attack of bronchopneumonia developed, but he made an excellent recovery.

Case VIII. M. J., aged 20 years, was admitted on the 18th September, 1901, with general septic peritonitis from a perforated and gangrenous appendix. There were areas of superficial sloughing over the base of the cæcum, and the abdomen and pelvis were filled with a large quantity of greenish pus. On admission the temperature was 99°, the pulse 100, and the respirations 28. Operation was performed about four hours after perforation had occurred. Pus from the abdomen was found to contain apparently a pure culture of the colon bacillus. Stomach lavage was performed while on the operating table and he was given, during the 48 hours immediately subsequent to operation, 1-4 grain of morphine every four hours. On the third day he received only 1-4 grain of morphine, and the same on the fourth. He made a most satisfactory recovery.

I have given only a brief outline of these cases. The toilet in all of them was as thorough as circumstances permitted. They were given little or nothing by the mouth and were fed at regular intervals by nutrient enemata.

I do not claim that any of these cases that recovered would have died if morphine had not been administered. These cases, however, eight in number, were of that class that give a high rate of mortality; yet of the eight, five recovered and three died, a mortality of 37½ per cent. I am of the opinion that without the aid of morphine the death rate would have been larger. I think we would do well to use morphine more than has been the custom of late years.

The points in treatment that I wish to emphasize are:—

A careful selection of cases for operation under general anæsthesia and a more frequent employment of local anæsthetics.

Exclusively rectal feeding, and

A judicious use of morphine after operation, or after symptoms of

perforation of appendix, typhoid or gastric ulcer, while preparations for operative relief are being carried out. In some of these cases it would almost appear that opium acted as an antidote to the poison developed in general septic peritonitis. The evidence of this action are the increased tolerance, and the fact that in some of these cases the bowels moved freely on the fifth or sixth day without the administration of any other medicine.

GENERAL GONORRHOEAL INFECTION WITH ILLUSTRATIVE CASES.*

BY

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During the last ten or twelve years much time has been devoted to the study of the gonococcus and to gonorrhœa, and, from the consideration of a local infection with its acute manifestations and more chronic results and complications of a local character, attention has been turned to the general infection with its manifestations even yet more important, and in many instances quite as permanent. Scarcely more than two years ago the subject of gonorrhœa was before this society for discussion. It was dealt with from the surgeon's standpoint, acute and chronic urethritis with its local complications; from the standpoint of the obstetrician, from the ophthalmologist's standpoint, and from the standpoint of a yet more generalized infection, when a comprehensive review of forty-eight cases of gonorrhœal arthritis was presented from the records of the Royal Victoria Hospital. The discussion two years ago had the result of quickening the writer's interest in this subject and since that day clinical observations have been carefully made upon several patients thus affected. It is a matter of regret that cultures of the blood were not made at the same time that cultures of the fluid effused into the serous and synovial sacs were being tried. The cases reported in these notes are chosen from among those not included in previous reports.

General gonorrhœal infection takes place in a large majority of cases from the male urethra, and from metastases secondary thereto and yet localized, as in the prostate. There remains yet a difference of opinion upon the occurrence of gonorrhœal vaginitis, not a few claiming that it is exceedingly rare; while all agree that the cervix, the urethra, and Bartholini's glands are favorite parts for early infection in the female. As in the male a general invasion may follow almost immediately upon the primary infection, but it would appear that widespread infection *i.e.* general, is not so common as in the male. It may be that a greater resistance is offered to the general extension of the infection in the uterus, adnexa and pelvic peritoneum, thus protecting the female against a general infection or gonorrhœal septicæmia or toxæmia.

* Read before the Montreal Medico-Chirurgical Society, Jan. 17, 1902.

While the uro-genital tract is primarily infected in the great majority of cases it is now well recognized that a generalized infection may follow gonorrhœal ophthalmia. Poncet, in 1881, observed two attacks of arthritis follow inoculation of the conjunctiva for the cure of granular ophthalmia. Joint affections secondary to purulent ophthalmia in infancy and childhood have been reported in considerable numbers since 1885. Twenty-three such cases have been collected, eighteen of which were in the new-born, while five were found in older children. It was noticed in several cases belonging to the former class that ophthalmia developed upon the third day and was followed by arthritis in from the second to the third week. According to the conclusions based upon three series of cases reported by Besnier and Julien, Gresolle and Gricolle, a generalized gonorrhœal infection results in from 1.5 to 2.8 per cent. of cases; while from a review of the literature upon the complications of gonorrhœa, it appears that from the skin to the endocardium no tissue of the body enjoys immunity.

The surgeon has to deal chiefly with the acute local disorder, then with periurethral abscess, prostatitis, urethral stricture, cystitis, pyelitis, surgical kidney, not to mention lymphangitis and adenitis. The gynaecologist sees the infection manifest in vaginitis, cystitis, adenitis, salpingitis, and peritonitis. The obstetrician finds abortions and post partem septicæmias following as a result. To the ophthalmologist, conjunctivitis, iritis and optic neuritis appear in the wake of such an invasion; while the general physician deals with arthritis, pleurisy, endocarditis, etc. Dermatologists have been pleased to attribute to a general gonorrhœal septicæmia certain erythematous and hæmorrhagic eruptions. The neurologist finds an occasional explanation for sciatica, multiple neuritis, meningo-myelitis, and meningitis, in previous gonorrhœal infection; while the muscles and bones, with no clinical aspirant to mark them out as his special study, are frequently the seat of intense pain though but rarely of the products of visible inflammation. Yet, as Ullmann has recently shown, gonorrhœal osteomyelitis must be recognized; and the combined evidence of Eichhorst, Treves, Ware and others, upon gonorrhœal myositis must be regarded as conclusive. With this evidence before us of such widespread infection, we turn to the pathologist for an explanation of these complications which in the degree of severity and frequency scarcely take second place to those of typhoid fever. We are told that there may be:—

- (1) A direct infection with the gonococcus itself,
- (2) A toxin—the gonotoxin,

(3) A mixed infection of gonococci and other pyogenic organisms, to account for the symptoms and results.

With respect to the first, direct simple infection with the gonococcus, it may be said that, owing to the many unsuccessful attempts to demonstrate the organisms either in the blood or in the exudate in the affected joint or pleura, it remained for some time a matter of doubt as to their relations to the pathological changes. However, with improved methods and more suitable media, there is now sufficient evidence to show that gonococci circulate in the blood. Since 1898, Panichi, Ghon and Schlagenhauser, and Thayer and Blumer have found gonococci in cultures taken from the blood, and in some cases after death in the heart lesions.

The second part of the pathologist's answer points out a factor in the pathology of the disease which plays an important, if not the most important, part in the production of the general symptoms. On good authority it is stated that "this irritating toxin produced by the gonococcus in the process of its growth in the human body is the direct cause of all the symptoms of the disease" (referring to the generalized infection). This statement is based upon experiments made upon animals with the toxins which resulted in local and general reactions characterized by inflammations, malaise, rise of temperature, and loss of weight. There is an interesting theory concerning the action of the toxin, which may be briefly set forth here. Podrez in 1885, and Drobney in 1898, observed that those cases of gonorrhœa in which the gonococci were within the white cells or pus cells, ran a milder course than when the organism was free. It is claimed, partly on this ground, that the toxin inhibits phagocytic action and thus affords an opportunity for widespread invasion. This view finds further support in the experiments of Christmas, by which he showed that the gonococcus when injected into human beings and guinea pigs died within forty-eight hours.

Concerning a mixed infection with pyogenic organisms, it may be said that, as attempts to produce abscesses by inoculations of gonococcus cultures were unsuccessful, it was thought that pus was rarely if ever produced by this organism alone, and thus when so found in gonorrhœa it was concluded that pyogenic organisms must have produced it. Up to 1893 this view obtained more generally than at present, for since the work of Lang and Paltauf in 1893, and Bujivid in 1895, Jundell in 1897, and Young since that date, pyogenic properties have been ascribed with good reason to the gonococcus.

The following cases have served as interesting clinical studies from time to time during the past two years, and illustrate many of the features which characterize the course of a general gonorrhœal infection.

Case I. Male, aged 23, was admitted complaining of "rheumatism." He had been in good health up to six months before admission, when he became infected in the urethra. Three weeks after infection he developed pains in the right ankle, which, becoming swollen and hot has been permanently affected. Shortly after, the right knee became involved, and a few days later the right shoulder. One month later almost all the joints of the body were attacked including the temporo-maxillary and the sterno-clavicular articulations. Thereafter his condition remained about the same throughout the six months, at times better and then again much worse. About the same time that the joints became affected, both eyes became red, painful, and lachrymose, and a purulent discharge, sealing the lids together in the morning, was present.

In the past history of this patient there is no evidence of rheumatism of chorea, nor of previous venereal affection.

The condition, on admission, was one of extreme emaciation, the extremities showing a most marked atrophy of muscles, making the joints appear abnormally large. There was partial ankylosis of the jaw, with tenderness and swelling over the sterno- and acromio-clavicular joints. Some of the smaller joints of the hands were swollen and tender. The vertebral articulations were painful on movement. The right eye was free, while the left eye showed an iritis.

Urine. There was urgency and frequency with pus on examination. An examination under ether resulted in the diagnosis of vesiculitis, cystitis, and posterior urethritis.

The patient had no other complications, and under treatment,—both local and general, made satisfactory progress, gaining upwards of twelve pounds in two weeks. Throughout his stay in the hospital, which extended over eight weeks, his temperature was rarely above normal.

This case presents the features of general gonorrhoeal infection as manifest in polyarthritis, in which the smaller as well as the larger joints were involved, and in which, too, those joints more rarely infected were involved, such as the temporo-maxillary, sterno- and acromio-clavicular. It shows as well, early iritis with conjunctivitis recurring throughout the course of the disease.

Case II. C., male, aged 33. This patient also complained of "rheumatism." However, this resolved itself into more definite complaints of pain and stiffness between the shoulders, in the lumbar region and in the heels and neck. In his personal as well as in his family history acute inflammatory rheumatism was frequently found. He had two attacks of inflammatory rheumatism previous to 1894, when he was first

infected in the urethra. After this his left knee was inflamed and swollen. In 1897 a similar attack of urethritis was followed by another arthritic attack, when the left knee and the shoulder and the back were involved. In 1899 he had another rheumatic attack. In 1901 a third attack of "rheumatism" was largely confined to the back, left knee and heels, and remained very obstinate in the back, heels, in the lumbar region, the neck and both shoulders. In his attack of rheumatism in 1894 he had iritis of the right eye.

While a man of 33, his appearance was that of a man of many years older. He was stooped and quite unable to take an erect posture and walked limpingly through the wards. He had signs of aortic endocarditis (regurgitant). Under treatment in the hospital he improved considerably, was somewhat less troubled with pain, and increased in weight. His temperature was subnormal throughout a stay of two and a half months.

The chief interest in this case lies in the fact that with fresh gonorrhoeal infection in a rheumatic subject, the arthritic manifestations were present, while the fascial involvements were most marked.

Case III. B., aged 31, male. He became the subject of urethritis about July 1, 1901, and about six weeks after he was the subject of severe pain about the hips and of weakness. He was in the hospital for about three weeks in September and was somewhat improved, but on going out he became rapidly worse. The hips, the left knee, and the ball of the right foot were painful, and there was considerable soreness in the calf muscles. He was readmitted towards the end of September in this condition, but still afebrile. About two weeks after admission the back of his neck became painful and his left knee was swollen and tender with considerable distension of the synovial sac. At this time, for about five days, the course of the temperature was irregular with excursions from 97° to 99.5° and once to 100° F. Thereafter it remained normal throughout a subsequent stay of five weeks in the hospital. The knee joint was aspirated and cultures made by Dr. Bruere of the clear fluid withdrawn, with negative results.

This patient illustrates, among other points in this disease, how slight may be the febrile disturbance even in the presence of active synovial inflammation. Of the frequent negative findings in cultures made from joints affected in gonorrhoeal infection, one also finds an example here.

Case IV. B., aged 21, male, showed signs of arthritis on November 17, 1899, about two and a half weeks after urethral infection. He had never had acute rheumatism. Sketching the course of this patient's

disease as briefly as possible, it may be said that he was the subject of a polyarthritides showing involvement of the larger as well as the smaller joints, *e.g.*, wrists, knees, shoulders and smaller joints of the hands. He had suffered conjunctivitis and iritis of the right eye followed by iritis of the left. His temperature curve was irregular, but during the height of joint manifestations it rarely reached a point above 100° F.; occasionally 101°, once 102.3-5°, is the maximum.

Ten days after admission the heart sounds, which up to this time were clear and distinct and without murmurs, became somewhat changed in the muffling of the first sound and a slight accentuation of the pulmonary second. Then an apical systolic murmur was heard, indefinite in character, but after the lapse of a few more days with definiteness. Simultaneously with the alteration of the sound and the development of the murmur, the accentuation of the pulmonary second sound became more pronounced. These symptoms, together with a slight cardiac enlargement, persisted throughout.

Each knee joint became distended with fluid and was aspirated, several cubic centimetres of somewhat turbid fluid being withdrawn from each. Cultures were made by Dr. Bruere which, with the exception of the staphylococcus epidermidis albus in one culture, were negative.

This case showed such a chronicity and intractableness that one was tempted to experiment with antistreptococcic serum, on the supposition that mixed infection was aggravating the condition, and so three such injections of 10 cc. each were given. Whether any good effect can be ascribed to this treatment or not must remain an open question, yet the temperature showed a much more regular course even after the first injection, and after the third settled to about an average of 99.2-5° F. with signs of improvement about the joints.

Polyarthritides, conjunctivitis and iritis, with mitral endocarditis following so closely upon a urethral infection, clearly mark this as a case of generalized gonorrhoeal infection.

Case V. F. L., aged 34, male. Eight weeks after urethral infection and after exposure to cold, this patient became afflicted with inflammation of the right ankle, the left thumb joints, the left wrist, the right knee, and the eyes became inflamed. On admission to the hospital his temperature was about 101°, his left wrist and right knee and both ankles were greatly swollen and very tender, with almost complete limitation of movement in these joints, while deep inspiration constantly aggravated the pain felt over the posterior portion of the left lung. On physical examination there was some evidence of left-sided pleurisy.

His stay in the hospital, which extended over thirteen weeks, was marked by temperature curve rarely above 100° , persistent pain for many weeks in the left arm and shoulder (over the left scapula), with tenderness in the muscles and marked wasting, so that by actual measurement the left arm was from 1 to 1 1-8 inches smaller than the right. Conjunctivitis recurred frequently throughout his stay in the hospital. No definite areas of induration occurred in the muscles indicating myositis, and it seemed to us who saw much of this patient that the atrophy was not unlike that following neuritis. It may have been, in part at least, due to the disuse, incident to the arthritis of that side.

Case VI. L. H., aged 24, female, was admitted complaining of a amenorrhœa for two months, with pain in the pelvic region and some morning sickness, headache and nervousness. She had occasional "cramps" in the stomach, and sneezing or coughing was painful. She had never had rheumatism or chorea. Admitted on the 7th, she aborted on the 10th of March. The discharge from the genital tract showed diplococci characteristic of gonococcus. On the third day after the abortion she began to complain of pain in the right shoulder and the right side of the chest. The temperature, which on admission was subnormal, rose gradually on the second and third days to 99° , and on the third and fourth days abruptly to 102° , when it fell again to subnormal. Emaciation was rapid, sweating was profuse and irregular in its occurrence, sometimes in the morning, sometimes in the afternoon, and sometimes in the early evening. There were no chills. A careful examination of the pelvic viscera revealed no evidence of retained products of conception, of abscess, or of widespread cellulitis.

Her case was regarded as one of generalized gonorrhœal infection and from the course of her illness this diagnosis was amply confirmed. She had signs of pleurisy in both right and left sides. From the right side on April 5th a small quantity of blood-stained fluid was withdrawn, and on the 11th yet more fluid was withdrawn from the same side, clear in character.

There were recurring and most distressing symptoms giving evidence of peritonitis, *e.g.*, severe abdominal pain and vomiting, dorsal decubitus with knees drawn up and extremely rigid abdominal walls, pinched countenance and thready pulse.

On the 7th of May, a mild attack of arthritis began; the left shoulder and elbow became painful and somewhat hot; on the morning of the 8th pain was felt in the left ankle; on the 9th, pain in the right wrist, and in the metacarpo-phalangeal joints, in both shoulders, in the left ankle, and in the outer side of the right knee. On this day also nu-

merous red papules were observed on the hands and arms. On the 14th the temperature, which during this period had averaged about 99.15° , dropped to 97° , and thereafter remained afebrile. The arthritis subsided and gave but slight reminders of its presence during the next two weeks, when the patient was discharged, after a three months stay in the hospital.

If this case-picture has been faithfully drawn, you will have seen already how a double pleurisy and recurring peritonitis, with profound constitutional symptoms, followed by polyarthritis, enter into and give it its prevailing color.

Of the six cases there were five men and one woman. The generalized infection became manifest in from three to ten weeks after the primary invasion by way of the genito-urinary tract. The complication of endocarditis occurred in one case, peritonitis in one case, pleurisy in two cases, iritis in two cases, and double conjunctivitis in three cases. A neuritis of the nerves supplying the muscles about the left shoulder and upper arm seems probable in one case; while the joints were involved in all the cases.

The treatment in all these cases, in addition to meeting the indications for the relief of pain, has been both local and general. Already, when the patients came under our care, the toxæmia was established, and the chief indications for treatment were to lessen the toxæmia and increase the patient's resisting power. To carry out the first indication attention was given to the urethra and vagina, in the use of mild irrigations and injections. In the case of vesiculitis, cystitis, and posterior urethritis, massage of the prostate, lavage of the bladder, and urethra with boracic acid solution, and post-urethral injections of solutions of nitrate of silver. In the case last reported hot vaginal douches were given for several days.

Elimination was aided by hot air in its effects upon the skin, while occasional mercurial or saline purgatives were administered.

To increase the patient's resisting power, good food was supplied. Most of these cases were on the full diet or restricted diet with extras of milk and eggs.

On purely theoretical grounds, some claim for quinine a large place in the treatment of this affection; but while it has been used in a few cases, nothing can be said definitely concerning it beyond the fact that as a bitter tonic it stimulates the appetite and thus increases the resistance of the patient, through increase of food taken and assimilated.

The chief indication, however, when once the toxæmia is established is to lessen the toxæmia by every possible means. The irrigation of

accessible involved mucous tracts or surfaces, and, in severe cases, the opening of joints and all metastatic areas and cleansing them by the same processes, seems rational and has been very effectual in many cases.

In closing I must express my indebtedness to Dr. Bruere for cultures, and to Drs. Turnbull, Ballantyne and Goodall for watchfulness and care in observing these cases and keeping the hospital records.

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PICTOU CATTLE DISEASE.*

BY

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In the summers of the years 1894-95 I was deputed by the Minister of Agriculture to investigate the remarkable localized zootic affecting more especially cattle in a limited area of the north of Nova Scotia, extending, roughly, from Pictou on the west to Antigonish on the east, known as *Pictou Cattle Disease*. The results of my investigation were published with some little detail in the Report to the Minister for the year 1895. I further communicated a description of my findings to the pathological section of the British Medical Association at its meeting in Montreal in 1897, of which brief abstracts appeared in the *British Medical Journal* and the *Lancet* of that year. Owing, however, to the loss of certain notes, and more especially to the difficulty I found in devising a method for demonstrating in the tissues the bacteria described by me,† I have not so far published the whole results of my research, nor have I ever regarded it as being definitely concluded. Add to this that I could not feel that my discoveries adequately explained all the features of this peculiar disease.

The main effect in the organs occurring in this disease as shown at post mortem, is the development of an extreme condition of cirrhosis of the liver; that is to say, of replacement of large portions of the liver tissue by fibrous connective tissue. My findings led me to observe whether anything similar was to be made out in connection with cirrhosis of the liver in man, and since 1895 I have, when the opportunity occurred, carefully examined into the bacteriology and the microscopical appearances in connection with this latter state.

The results of my observations and those of workers in my laboratories upon the same subject have been published in a series of papers in the MONTREAL MEDICAL JOURNAL, *The British Medical Journal*, the *Lancet*, the *Journal of Experimental Medicine* and the *Journal of Hygiene*, etc. I have been led by these observations to study a much wider field, namely, that of the presence of bacteria in the organs of

* By the kind permission of the Hon. Mr. Fisher, Minister of Agriculture, this abstract from the Annual Report of the Pathologist to the Agricultural Department is here printed in advance of the publication of the Report of the Department for the year 1901.

† Or more correctly for gaining a permanent stain, so that I could forward the specimens to pathologists at a distance.—J. G. A.

the body in general, more especially of bacteria derived from the intestines. As these observations have materially modified my views with regard to the nature of Pictou Cattle Disease, it is but right that I should here briefly refer to them and note other observations which have been made more directly in connection with the disease in question.

It will, in the first place, be necessary to say a few words with regard to the leading features of Pictou Cattle Disease, and this more particularly because I learn that the edition of the Report to the Minister for 1895 is completely exhausted. Pictou Cattle Disease is only found in Canada in a district spread along the northern coast of the Nova Scotia peninsula, a tract of country extending about 40 miles along that coast and stretching from 5 to 12 miles inland. In this district it has been noted for some forty years, now at one end of the area, now at the other. Cattle are in the main affected, but cases are on record in which sheep and even horses have shewn symptoms of the disease. The disease would seem to be very chronic and all the cattle upon a farm are not affected simultaneously, but it has been generally found that in the course of three or four years most of the cattle of a given herd will, one after the other, be affected. It would not seem that the disease spreads directly from animal to animal for there appears to be no special incidence of the cases following upon the long winter sojourn of the animals in the byres. The gradual extension of the disease from farm to farm through any given district, seemed also to some extent to be related to the fact that each farm had at the back a piece of woodland into which the cattle roam during the summer. These belts are badly fenced off from each other and the animals when seriously diseased, are liable to wander off into the woodland and there die in hiding. This, together with the fact that one or two cases are on record in which the disease has broken out in a neighbourhood after the body of a cow affected with the disease had been washed down one of the streams and stranded upon the farm lands, appeared to give some considerable support to the conclusion that the disease was of infectious origin. Indeed, for a time the Government Regulations which demanded the destruction of the diseased animal and the burning of the carcase or burying it in quicklime, seemed to have a deterrent effect upon the spread of the disease. During the first few years in which these regulations were carried out the number of cases occurring annually sank from 150 to under 30.

Of late years, since 1898, despite these regulations, the disease has

become somewhat more frequent, so that doubts are naturally being cast upon this theory of the infectious origin of the disease.

With regard to the symptoms, the first to be noticed is that the milk acquires a peculiar bitter taste and has a distinctly acrid odor upon boiling; following upon this, within a few days, the animal becomes dry, is found to be weak and restless, the coat stares, the limbs are dragged, the bowels loose, some swelling of the abdomen is recognizable, the eyes project and are staring, and the conjunctivæ of the eyes have a slightly yellowish tinge. This weakness deepens and in general the animal dies in a condition of complete muscular weakness and exhaustion, but in some few cases the symptoms are more acute and death is preceded by a period of intense excitement, almost maniacal in character, the animal rushing about blindly charging various obstacles, and after a few hours falls into a condition of exhaustion or paralysis followed rapidly by death.

During the two years that I examined this district I made post mortem examinations upon some thirty animals, the majority of which I killed in the advanced stage of the disease, and I found, as Dr. Osler and Dr. Wyatt Johnston had previously noted, that the main lesion is an extreme condition of cirrhosis, the fibrous tissue not only being along the vessels between the lobules (periportal), but extending in between the individual cells, the organ being enlarged somewhat and having a smooth or finely granular surface more rarely. In addition I noted the abundant production of thin bile, and almost without exception, the gall bladder was found very full and the fæces well stained. The lymphatic glands at the root of the liver and the abdominal lymphatic glands were in general large and succulent, and there was a moderate amount of ascites and the fluid in the abdominal cavity was, however, particularly clear and limpid. With this there was a remarkable condition of gelatinous œdema of the mesenteries and walls of the intestines so that these walls were much thickened. A further constant lesion was the presence of numerous follicular ulcers in the fourth or the true stomach. These, save in very acute cases, were found to be in a cicatrized condition giving strongly the impression that the earliest lesions in the case were gastric and that the disturbance of the abdominal lymphatic system and in the liver was secondary to this. The spleen was large but not markedly so. As noted first by Dr. Wyatt Johnston in the cases killed apparently in the early stages of the disease, the most noticeable features in the liver are the fatty degeneration of the liver cells together with great congestion of the vessels of the liver. This stage appears to give place to a rapid destruction of many of the liver cells and replace-

ment of the same by delicate new connective tissue and which still remains very vascular and also contains abundant lymph channels and lymph spaces, for almost without exception abundant thin fluid made its way into a canula or pipette when this was pushed into the liver substance.

Dr. Wyatt Johnston and I also, by employing the more usual method of trying to obtain cultures of bacteria by means of sterilized platinum needles, gained negative results, but when, instead of making the inoculations upon the spot, I employed a series of sterilized glass pipettes in which I collected relatively large amounts of the juice of the various organs, ascitic fluid, blood, etc., I then, after some hours inoculated this juice upon various media, and was able constantly from the lymph of the abdominal glands and from the liver juice, and more rarely from other organs and fluid, to obtain in each case growths of what seemed to be a characteristic micro-organism. These growths in general developed slowly, often not being present until the end of 48 hours at the body temperature, and in each case they showed themselves to be a small polymorphous organism at times appearing as a diplococcus, at other times as a stumpy bacillus or diplobacillus. This, by its polymorphous character, gave me a considerable amount of trouble, until I noted that in the earlier stages of growth the diplococcus form was the more frequent, but later this gave place to a more bacillary form. The constance with which I found this organism in the liver and in the abdominal lymphatic glands seemed in itself at that time to indicate very clearly that this bore some relationship to the disease, more especially when, as I have already mentioned, I obtained this organism from the bodies of animals which I had myself killed and had immediately proceeded to examine. This microbe proved itself to be pathogenic for rabbits, guinea-pigs and mice, the rabbits dying in some 15 to 25 days, and the guinea-pigs in from 30 to 35 days as a general rule. As I pointed out in my previous report, I was, however, unable in these inoculations to produce a condition of cirrhosis in the animals inoculated with a pure culture and to this extent the organism did not fulfill Koch's postulates, and it was left open whether this truly had been the cause of the disease. I should add further that upon examining the sections of the liver which had been stained by particular methods, I was eventually able to recognize similar little diplococoid bodies in abundance in the liver cells, and in great abundance also in the abdominal lymphatic glands, and in the liver these were mainly within the cells. When I inoculated rabbits with the pure cultures I obtained the same intracellular appearance of minute diplococci.

From these observations it would seem clear that the development of the Pictou Cattle Disease is but slow and that there is extensive involvement of the liver before any of the symptoms show themselves. Our experience with the development of fibrous connective tissue in man indicates that this is a matter of weeks and months rather than of days.

Shortly after my return from Pictou the first case of human cirrhosis which came to post mortem presented a condition which resembled greatly those seen in the Pictou Cattle Disease. The fibrous change in the liver, it is true, was further advanced, and the liver was small and hobnailed in appearance, but there was the same enlargement of the mesenteric and retroperitoneal lymph glands and those at the hilus of the liver, and the same curious gelatinous oedema of the mesenteries and walls of the intestines, a change which had not been noted in connection with this condition in man, although since then I have frequently found it present. This has led me during the last two years to study the bacteriology of human cirrhosis.

More than one form of human cirrhosis is recognized, 1st, the so-called hypertrophic biliary cirrhosis of Hanot, which has for long been regarded by Hanot and the French school in general as of infective origin, brought about by the inflammation of the bile ducts. 2nd. by far the most common form is the atrophic or portal cirrhosis, in which the new fibrous tissue is laid down primarily it would seem along the sheaths of the branches of the portal vein within the organ. This form most commonly occurs in those giving an alcoholic history so that alcohol has long been regarded as the main cause, indeed, the condition has been known as the "gin-drinker's liver." But now those who have studied the subject are practically agreed that while alcohol may be and probably is an exciting cause, it is not the essential cause. Many cases are on record in which no alcohol has been taken, and again feeding animals with alcohol, in the great majority of cases leads to no cirrhosis, while thirdly, a systematic examination of the livers of confirmed drunkards, shows that cirrhosis is the exception rather than the rule; the fatty liver is the common alcoholic condition.

On the other hand there are definite indications of infective or bacillary disturbances in connection with cirrhosis. The ascites which is so common in this condition is not pure but shows evidence of a combined inflammatory disturbance with the development of adhesions and frequent evidence of inflammation around the liver with adhesions to the diaphragm, while in quite a large proportion of cases we obtain a history of a right-sided pleurisy which points to an extension of the inflammation through the diaphragm to the overlying pleura.

In this very first case, above mentioned, studied by me, I obtained evidences of bacteria similar to those of Pictou Cattle Disease, but owing to the fewness of cases presenting, to the great difficulty of staining sections aright, and, I must add, to my own failure to recognize the true relationships of the forms I isolated, it was not until 1898 that I published upon the subject, first in the *MONTREAL MEDICAL JOURNAL*, July, and next in a paper read for me by Professor Osler at the Edinburgh meeting of the British Medical Association (*The Lancet*, Aug. 13, 1898, p. 376), announcing the existence of a micro-organism in association with progressive portal cirrhosis as similar to that found by me in connection with Pictou Cattle Disease. This organism I obtained from the liver juice, the ascitic fluid, the lymph from the mesentery, heart, blood, kidney and mesenteric glands.

The colonies at first were very minute and the organism with its pronounced polymorphism and tendency to change from the diplococoid to the stumpy bacillary form, closely resembled that seen in the Pictou Cattle Disease. Examining a series of sections of twenty cirrhosis livers I found these present in the liver cells as minute diplococcus-like bodies surrounded by a faint halo, so small as best to be studied under a very high power of the microscope, namely, under 1-18th or 1-20th immersion lens. Here the tissues in general had a brown stain, but now, as I pointed out in the paper contributed to the *British Medical Journal*, Oct. 22nd, 1898, further studies throw a very considerable light upon this remarkable form. They showed conclusively that both the form obtained from the Pictou Cattle Disease (as indeed had been suggested by Professor Royce in the discussion upon my paper in Montreal, 1897) and that from the human livers, were at most varieties of the colon bacillus the organism, that is to say, which is the common inhabitant of the lower intestinal tract in man and the majority of warm-blooded animals. They were obviously attenuated and grew more slowly than the typical colon bacillus, they did not cause the same rapid turbidity of broth, while culture outside the body rendered them more active in their growth until eventually they closely corresponded in size and in most of their properties with the group of colon bacilli. Their effects when inoculated into rabbits and guinea-pigs resembled also those seen in connection with the colon bacillus.

I may here add that Dr. Charlton, now Fellow in Pathology at McGill University, has studied the organism of Pictou Cattle Disease within the last year, which we have kept growing for some years in our laboratory, and found that it corresponded in all particulars with one form of colon bacillus described by Dr. W. W. Ford, in his study

of the varieties of colon bacilli isolated from man. This form was isolated by Dr. Ford from the spleen of cases of typhoid in man and has, briefly, the following characters:—It is a stumpy bacillus having a diameter less than 1 mm., motile, forming no scum when grown on broth and causing slight turbidity of that medium. Growths upon agar are smooth and glistening, not very abundant; no liquefaction of gelatin; growth upon potato visible and luxuriant (in the early stages the growth upon this media was but slight); it grew in the closed end of Smith's fermentation tube and best at the body temperature; it can grow in the absence of free oxygen; causes no liquefaction of either gelatin, casein or blood serum; it produces gas when grown in dextrose and lactose broth, but not with saccharose; there is no production of nitrites, but indol is present (originally no indol was present); milk is turned acid and eventually coagulated and there is a slight faecal odor; no production of pigment upon agar; no fluorescence (originally many of the cultures obtained direct from the cattle showed a distinct tendency for the production of a slight yellow color). It grows best in media which are faintly acid and is non-pathogenic for mice (the early cultures of this showed themselves distinctly pathogenic for mice and this I regarded as one of the indications that I was not dealing with the colon bacillus).

It is interesting to note that parallel with this Dr. Charlton studied the colon bacillus obtained from the stomach of a case of pernicious anæmia in man and this gave identical reactions.

It is thus clear on the one hand that the organism of the Pictou Cattle Disease is one of a very large group of colon bacilli, and this alone throws some little doubt upon whether it should be regarded as the specific micro-organism of that disease, because while colon bacilli have pathogenic properties, and, in fact, set up many forms of disease in man, the morbid conditions induced by them are all more generalized and not so specialized a type as that possessed by this disease. But from another point of view, if we are not to regard these as the specific organism of the disease, we are, I think, bound to regard to it as playing some part in the development. For, on the one hand, as pointed out by Dr. Wyatt Johnston and Mr. E. W. Hammond, the blood of cattle affected with this disease agglutinates the micro-organism isolated by them from their livers and this agglutination test is in general regarded as an indication of such relationship between microbe and disease; and secondly, these micro-organisms are present in such abundance in the liver and mesenteric lymphatic glands and that so constantly, that they cannot be regarded as meaningless.

As pointed out in my paper of Oct. 22nd, 1899, yet further study showed me that in a great number of livers having no symptoms of cirrhosis, similar minute diplococoid forms are to be recognized in the cells (although in not such great numbers). While again, as I pointed out at full length in a paper upon the diplococoid form of the colon bacillus (Adami, Abbott, Nicholson, *Trans. of the Assoc. of Amer. Physicians*, 1899, and *Jour. of Experimental Medicine*, 1899, Vol. 3), by inoculating pure cultures of typical colon bacilli into the veins of a rabbit after a few hours one gets similar appearances.*

These observations led me further to study the bacteriology of apparently normal healthy organs and as I pointed out in my address at Chicago, in December, 1899 (*Journ. Amer. Med. Assoc.*, Dec., 1899) we are bound to conclude under ordinary conditions that there is a constant passage in of colon and other bacilli from the intestines throughout life and these diplococoid forms staining badly, and often having a brownish tinge, are present in the abdominal lymphatic glands and in the artery, indicating the constant destruction of these bacteria in these organs. Since then the very remarkable paper of Dr. Ford, late Fellow in Pathology, McGill University (*Trans. of the Assoc. of Amer. Physicians*, Vol. XV., 1900, p. 399, and *Journal of Hygiene*, Vol. 1., 1901, p. 277), has carried on these researches further and has shewn that in at least 80 per cent. of the livers and kidneys of healthy normal animals, bacteria are to be obtained which are capable of development provided the proper culture media be adopted and provided that these organs be cultivated for a sufficiently long time after their removal from the animals used.

How now do these observations bear upon Pictou Cattle Disease and upon ordinary portal cirrhosis in man? As I pointed out in the *British Medical Journal* of October, 1898: "It may be argued that inasmuch as such forms are constantly to be found in the liver, it is clear that the bacillus can, under ordinary conditions, have no power to induce excessive active tissue formation, or otherwise, every living being should suffer from cirrhosis. But there is this to be noticed: In the ordinary liver in which cirrhosis is absent, the forms visible are almost all corpses and even long action of strong carbolized fuchsin will not lead them to become stained. In cirrhosis, on the other hand, while there are many of these non-staining forms, areas can be made out in which diplococcus-like bodies stain deeply. Either they have only recently entered the organ and are just killed, or they are still alive, though in a form so attenuated that it is only with

* Ohlmacher in the last number of the *Journal of Medical Research* has confirmed fully our observations upon the existence and peculiar properties of the diplococoid forms of the colon bacillus.

difficulty that cultures can be grown from the organ. I still cannot but consider that the very great number of these forms found in well marked advancing cases of cirrhosis is ample evidence that there is a direct relationship between them and the process. So also in these advancing cases of cirrhosis my observations show me that the mesenteric glands are crowded with the diplococcus form of the bacillus, just as I found them crowded in cases of Pictou Cattle Disease."

I further suggested that in ordinary human cirrhosis we have almost always a history of subacute enteritis or gastro-enteritis set up apparently by alcohol or some other irritant, and that this inflammation of the bowel by leading to the greater passage out of leucocytes and passage back of these leucocytes containing bacteria, set up a condition of increased invasion of the organism, more especially the colon bacillus as the normal habitant of the intestine, and here I referred to Ramond's observations (*La Presse Medicale*, April 21, 1897), in which he obtained cirrhosis by giving animals by the mouth alternating doses of alcohol and bacterial toxines.

Now, it is interesting to note that the constant lesion in Pictou Cattle Disease is the evidence of ulceration of the fourth stomach. Here it seems to me is the indication of a similar gastritis or gastro-enteritis. According to this theory, therefore, the colon bacillus or modified form of the same, which I have detected in these cases, is not necessarily the prime cause of the disease, but there is a preliminary and primary inflammation of the intestinal tract. This may be brought about by the colon bacillus, but is more likely to be induced by some other cause, either bacterial or toxic, and it still remains to be discovered what is this primary cause.

That certain forms of the colon bacillus under certain conditions are able to bring about cirrhotic changes, has been shewn by Dr. Weaver of Chicago (*Philadelphia Med. Journ.*, Feb. 4th, 1899). He obtained the colon bacillus which he worked with from the body of a female guinea-pig, and like our Pictou Cattle Disease organism, it did not produce indol, while he notes further that it was non-motile and showed no flagella. On the other hand, there was abundant gas formation in glucose agar. Guinea-pigs inoculated with a small amount of the culture, if they did not die within 20 hours, lived from eight to twenty days, and in these animals dying at later periods there was an extensive and early cirrhosis of the liver. Unfortunately after a short period these bacteria lost their virulence so that further transference of cultures could not be made.

These observations, so far as they go, are in favour of believing

that the organisms of the colon group play a definite part in the production of cirrhosis.*

During this last summer, on his return to New Zealand, Dr. J. A. Gilruth, Chief Veterinary Officer, and Bacteriologist to the Agricultural Department of New Zealand, in passing through Montreal, called upon me and brought my attention to the fact that in New Zealand they have encountered a very similar disease affecting horses and cattle. Since then he has been good enough to forward to me the Reports of his Department dealing with this subject. I may here give an epitome of his observations, (Fifth Report of the Department of Agriculture of New Zealand, 1897, p. 35):—

The disease appeared in the Winton District in Southland 14 years previously, and has not been observed in any other part of the colony. While there has been considerable loss of horses, it showed little or no tendency to spread from farm to farm. No particular age or breed was found more susceptible, although the affected animals were mostly aged, the season appeared to be without influence, though possibly spring and autumn were the periods during which the majority of cases were found. Cases observed by Dr. Gilruth showed jaundiced appearance of the mucous membrane of the mouth, eyes and nostrils; want of co-ordination of the muscles of the limbs; with staggering gait; staring condition of the pupils; constipation and general drowsiness. At times the animals would walk straight through an obstruction. In all cases the liver was more or less involved and apparently cirrhotic. Judging from his description the course of the disease is of longer duration than is that of Pictou Cattle Disease.

On microscopical examination the liver showed a variety of conditions, but in the early stage the capsule was normal, the tissue of the gland soft; vessels greatly distended with blood and the liver cells atrophied; thrombi were often encountered in the hepatic veins and a certain amount of pigment was present in the liver. In the later stages the liver is smaller and harder than normal, presenting in one case all the naked eye appearances of the cirrhotic or hobnailed liver. Dr. Gilruth noted also, which was not observed in cattle, namely, appearances of abundant liver cells within the vessels of the liver and other regions.

It is worth while noting that he found that one-half grain doses of strychnine given in powders, one daily, appeared to have a distinct effect in arresting the course of the disease, while purgatives aggra-

* Professor Hektoen (*Journal of Pathology and Bacteriology*) has also been able to induce cirrhotic changes in the liver by inoculations of colon cultures.

vated the symptoms. In this report, Mr. Gilruth calls attention to the constipation and suggests that owing to the want of tone of the intestinal walls, the retained food fermenting leads to the abundant production of toxic substances which, being in their turn absorbed, cause the symptoms of intoxication, etc.

In the Report for 1898-99, are given illustrations showing the close resemblance of the liver disturbance to those seen in our Pictou Cattle Disease. In this second Report, Dr. Gilruth modifies his opinion that the intense congestion is the main condition in the liver and regards this as secondary to the cirrhotic change.

In this Report he gives a case of a farmer who had lost several cows under peculiar conditions with similar symptoms in each case. This also occurred in Southland where the ragwort is very prevalent, and to this the owner attributed the disease. I infer from a paragraph in the Report for 1898 (p. 41), that the Ragwort (*Senecio Jacobaea*) had also been regarded as the cause of the Winton Disease and that this weed is common in other parts of Southern New Zealand without causing any disturbance; hence he denies its relationship. The conditions here were similar to those seen in our cases. The micro-photographs given of a section of the liver might have been taken also from a case of Pictou Cattle Disease. On this farm mentioned the Government Biologist, Mr. T. W. Kirk, had the previous year reported the existence of no poisonous or even harmful plant, but Dr. Gilruth found that in addition to the *Senecio Jacobaea*, to which apparently he attached no importance, the cows had been in the native bush close to the paddock, and that they were all in the habit of stripping the leaves from the trees which were being felled there.

It is, to say the least, interesting that in Nova Scotia the popular view has been to attribute Pictou Cattle Disease to the existence of the ragwort. For myself, I continue to be doubtful as to whether any such relationship does exist, although believing in the existence of some primary cause, not necessarily microbic. I should be glad to find that the irritation caused by the ragwort was of this nature. Nevertheless, the negative results of the experiments conducted under this Department years ago by Dr. Wm. McEachran (when animals were fed for long periods upon dried ragwort), would seem strongly to negative this supposition.*

* Dr. H. Wolferstan Thomas, of Montreal, writes to me within the last few days that he is engaged in Professor Kitt's laboratory at Munich, studying a similar "hepatitis induration" or cirrhosis, very common among the horses in a certain region in Bavaria, known as the 'Schweineberger Krankheit,' which is also locally attributed to poisonous fodder; so far attempts to give the disease by feeding animals with hay, &c., from the affected regions, have been without success.

My conclusions may be summed up thus:—While it is possible that, as suggested by Dr. Weaver's observations, cirrhosis of the liver may be directly caused by one or other of the colon bacillus group, I am inclined to favor the opinion that there is a primary irritation of certain portions of the alimentary tract set up by some other irritant, and that it is this primary inflammation which favors the extensive invasion of the blood and lymphatic vessels of the abdominal area, by bacteria mainly belonging to the group of colon bacilli, which bacilli, by their direct presence in the lymphatic glands and in the liver, and by their toxins set up those cellular disturbances which result in the production of the peculiar anatomical changes found in the Pictou Cattle Disease and in progressive portal cirrhosis in man.

ADDENDUM.

In addition to these abstracts from the Annual Reports of Dr. Gilruth, the following notes of a conversation held with him upon June 6th, 1901, are, I think, of distinct interest:—

The district in which the disease occurs is in the neighbourhood of Winton, and covers a limited area of about 20 by 30 miles. Both cattle and horses are affected, and it is noticeable that on a given farm the horses and cattle are not affected at the same time. The characters of the disease in the cattle seem identical with those seen in the Pictou neighbourhood; in horses the excitement is more marked, the animals rushing into various objects, bursting fences and so on, this state of excitement being followed by exhaustion, paralysis and death. At autopsy in horses there is clear, rather viscid ascites of moderate extent with gelatinous œdema of stomach and intestines, the liver is sometimes enlarged, juicy and tends to be more cyanotic than in cattle. During life he noted evidences of cardiac irregularity and failure, the pulse being intermittent.

He had observed the coccoid and diplococcoid bodies in the liver cells, but could come to no sure conclusion with regard to their relationship to the disease. So far he had not obtained constantly in cultures any one constant form, though he and those working under him had frequently come across colon types. Inoculation had been without results as again had the feeding of animals with large quantities of minced up liver from affected animals.

The farms in the neighbourhood resembled ordinary Scotch farms, are well kept and grassed with English grass. The cattle are not fed upon hay, but chopped oats and maize which form the winter diet. The animals stray into the bush during the summer, but he noted that the disease also affected those kept during all the year round the farms.

Senecio Jacobœa is very abundant over the district, but horses will not eat this, as again feeding animals with the ragwort has led to no results. Further, many farms outside this district are infested with the senecio, and the animals upon them do not present a sign of the disease.

Dr. Gilruth most suggestively compares the disease to alcohol intoxication; he noted that the horses kept in the stables and fed sparingly did not manifest the symptoms of excitement. Animals escaping into the open have a voracious appetite, eating dried leaves and anything which could serve as fodder, and, after this, become wildly excited, staggering about. He was thus of the opinion that for the production of the disease there must be a double factor—some primary lesion of very chronic development followed by gastro-intestinal intoxication.

This being but the notes of a conversation, after some consideration I did not insert them in my report to the Government, more especially as the distance from New Zealand prevented me obtaining Dr. Gilruth's permission to quote them. Upon further consideration, the notes appear so valuable and exhibit so well Dr. Gilruth's powers of careful observation, that I think I may venture to quote them here even in the absence of definite permission.

THE INFLUENCE OF SCHOOL LIFE ON CURVATURE OF THE SPINE.*

BY

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In a series of examinations, covering a period of four years in the Montreal High School, of boys varying in age from 13 to 18 and averaging a little over 15 years, I have been struck by the number that presented some marked irregularity of growth, and on tabulating them I find that 20 per cent. of all those examined have a marked lowering of the right shoulder, 3 per cent. have the left low, scoliosis was found in 2 per cent. lordosis marked in 5 per cent. and round shoulders in 3 per cent.; while the habitual standing position of 30 per cent. approaches more or less closely to what Bernard Roth has aptly named, the "gorilla type"—abdomen protruded, chest flat and head shoved forward.

These defects are found, not among school boys alone, for out of 500 college students of the athletic class examined at McGill, 12 per cent. showed these same defects, varying from slight unevenness of the shoulders to marked scoliosis. In an examination of 54 students of the Royal Victoria College for Women during the past year, I found 19 presenting some marked deviation from the normal, 11 having right shoulder low, and in four others well marked scoliosis—eight girls complained of persistent backache.

With such a great prevalence of defects and deformities among high school and college students who are in a supposedly normal condition, does it not seem worth while to attempt its prevention if the scientific, hygienic regulation of the hours of school life can be used for that purpose?

Perhaps an enquiry into the condition of the spine during the years of childhood will show better than anything else the way in which ordinary scoliosis, or as I prefer to call it, "fatigue scoliosis," is brought about—and I may say in passing that the great bulk of cases are of that class—the other causes such as rickets, paralysis, etc., are responsible for but very few cases in comparison.

In infancy the spinal column is straight or bent from hips to head in an even backward curve, the bones are not yet ossified and present a mass of cartilage with small deposits of bone. Between the vertebræ the discs are very soft and compressible, and the ligaments pliant and easily stretched. Immediately on assuming the upright position cer-

* Read before the Montreal Medico-Chirurgical Society, February 7, 1902.

tain changes take place. A sharp forward curve develops in the lower lumbar region continued up into the dorsum, so that the infantile curve is reversed, and the lower part of the back is hollowed. Gradually a compensatory curve develops in the dorsal region and increases until a well marked backward curve of the back is the result, and by the time adult life is reached a third has developed in the cervical region in the same direction as the lumbar.

It is while these curves are forming that the child's school life is passed. The formation of the first or lumbar curve is helped greatly by muscular action—the great mass of the erector spinæ muscle pulling back on the vertebræ of the lower part of the dorsal region acts like a bow string, while the powerful psoas muscles springing from the front and sides of the vertebræ and going down to the thigh, further help in the formation of the curve forward by being on the stretch when the child is in the standing position. The other curves are undoubtedly compensatory in character. The muscles that act on the spinal column are most intricate and numerous, the superficial layers consisting of long strands passing, some to ribs, but mostly from spinous process to transverse process of the vertebræ. The deeper layers are shorter and the deepest pass only from one bone to its next neighbour. Gray describes five distinct layers each containing from 3 to 12 muscles. This apparent redundancy and unnecessary complication is after all the best means we have in preserving the upright posture for any continuous length of time.

We know that if we hold the arm out at right angles, the fatigue and pain at the shoulder soon become intolerable, and few can stand the test as long as five minutes. The main strain falls on the deltoid, which has no relief from continuous action. The same condition would result in the back without this system of small muscles that keep working in relays, each slight movement brings into action a new set relieving the tired ones. Without this ingenious arrangement the erect posture would be an impossibility, and anything that will interfere with this intermittent action of the muscles will hasten the oncome of fatigue and collapse.

The constant desire for movement is the most striking quality of young animal life; the play instinct so wonderfully understood by Froebel, and so sapiently applied in the games of the kindergarten to the development of the best physical powers of the child. But with his introduction to regular school life the child's physical troubles begin. He is made to sit still from 3 to 6 hours, with but momentary rests at long intervals, the play instinct expressed by continual restlessness has to be sternly suppressed by the teacher for the sake of discipline.

The rapid fatigue of the undeveloped muscles and the irregular compression of the growing bones is enough to encourage and fix faulty postures, but if we analyze the writing posture we can easily trace the progress from the normal to collapse in the position of pronounced scoliosis or skewed back. I quote from Dr. Fahrner, whose description is so terse that to change it would be but to paint the lily:—

“Before writing begins the children sit perfectly upright with both scapulae thrown back equally. As soon as writing begins all the children move their heads slightly forward and to the left. Soon head after head drops with a rapid jerk from fatigue of the neck muscles, in a short time the back also collapses so as to hang from the shoulder blades supported by the upper arm. The two types are seen, depending on the part of the book they are at. Those writing on the upper part support themselves on both elbows, and let the chest sink forward against the desk, and the back becomes curved forward—the round back. The eyes are three or four inches distant from the desk, and the support is from three points, the left elbow, the chest and the right forearm slightly. When at the bottom of the book they lose their third support and have the left elbow alone; and add to these faults of position a twisting or skewing of the back toward the right. The head is bent toward the left shoulder, the right arm with the scapula standing out like a wing, rests anywhere and lightly, and the eyes are too close to the paper.”

This is the process of collapse or tiring out the spinal muscles as you tire out an arm by holding it at right angles, and scoliosis as the writing position becomes fixed.

The evils of this “confinement with hard labour” are notably increased and made more dangerous by ill-fitting desks and seats. This subject has been taken up so fully by more able and better informed observers, such as Scudder and Hartwell in America, Cohen in England, and Fahrner, Eulenberg and Bach in Germany, that I will do little more than mention the defects usually found, and name the remedies that have already been found efficient in combatting these evils:—

The seat may misfit in three ways: it may be too low, bringing the weight on the hip bones and cramping the knees; it may be too high, leaving the legs suspended in the air from the knee—a position that interferes with the circulation in the legs and causes rounding of the back; or, the seat may be too deep and the back is thus prevented from reaching the back rest, with rounding of the whole back as a result.

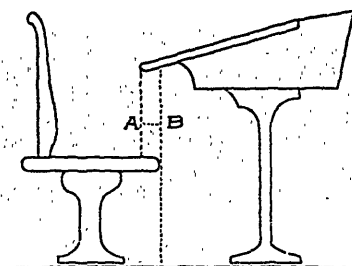
The desk may misfit in five ways—when too low, the pupil must bend forward and round the shoulders; when too high, the book is

brought close to the eyes and the shoulder must be raised and the back skewed in writing; when the desk is flat, or but slightly sloped, the head must be brought too far forward in reading. In the placing of a fixed desk, too great a distance between it and the seat results in some of the same defects as in a low desk; the forward bending and stretching in writing, while if too near, the chest is cramped and respiration interfered with.

With so many errors it would seem a delicate matter to steer clear of them all and get the ideal desk, and if children are to spend five or six hours a day in their seats before their desks, it is surely a matter of the gravest moment that, added to confinement and fixity of position, evils in themselves, there be not added the crime of misfitting desks and seats, to accelerate weariness and hasten the production of the fixed scoliosis of fatigue.

The problem is to have a seat whose length and breadth is proportional to the under surface of the thighs and buttocks of the sitter. To place it at such a height that the sitter's feet may rest flat upon the floor when the legs are bent to a right angle, and to provide a rest that will support the sitter's back whether quiescent or actively engaged. The desk must be of the right height and slope. The under surface must not cramp the knees, and above all, it must not be placed so far forward in relation to the seat as to require undue leaning forward in the sitter.

The last defect is shewn in the normal dimensions given by Eulenberg and Bach, but was probably a concession to convenience as permitting the pupil to get in and out more easily. A vertical line dropped from the edge of the desk cover to the chair seat is called the "difference" while the space between this line and the edge of the seat is called the "distance." If the desk overhangs the seat, the distance is said to be minus, if not, it is said to be plus. Remembering these two technical terms, it is easy to explain the points of a well fitting desk.



- A = difference = elbow top to seat.
 AB = distance = 2 inches, desk slope = 1 to 6.
 B = undersurface of knee to foot sole.

The "difference" should be equal to measurement from the elbow tip to the seat, the forearm being bent at right angles and elbow to the side. The "distance" should be minus two inches, but if adjustable for distance so much the better.

The desk slope is best at one in six inches. The seat height should equal the measurement from the under surface of the bent knee to the sole of the foot. The depth of the seat should enable the back to touch the back rest throughout. The back rest should have a projection for the loins, and should sweep backward to follow the natural curve of the back, and give the figure a slightly reclining pose.

If, in the furnishing of a school-room, the furniture cannot be made adjustable throughout, some at least in every room should be so made, and the others constructed on the model just laid down, the result of years of experiments and thought by skilled observers.

Even with well fitting seats and desks the present writing position is such as to favour to a marked extent the formation of fatigue scoliosis or the permanent skewed back. Vertical writing has been spoken of as a panacea for the "skewed back." It has been so strongly recommended by Cohen of London that he says, "with the slanting script one never knows whether a pupil has sat upright or not, with the vertical script he must have sat upright while writing." Dr. E. R. Shaw has pretty clearly shewn this to be fallacious, but the fact remains that its adoption would tend to lessen the frequency of fatigue scoliosis, especially if care were exercised by teachers to keep the pupils rested and in good condition.

The third point that tends to produce faulty posture, the starting point of lateral curvature, is bad lighting of the school-room. If insufficient, we have at once the rounded back and stooped shoulders in the pupil who cannot see clearly. The same effect is produced when the windows are so arranged that the pupil sits in his own light. The windows should be placed high up and the light should fall over the left shoulder and never directly from the front or back.

Every school system should have a medical officer as adviser. His duties should be, in brief, somewhat as follows:—

1st. He should give advice in the construction of school-houses, in matters of general hygiene but more particularly in the lighting and seating of the school rooms.

2nd. He should inspect the room from time to time during school hours, to see that the pupils are not misfitted in desks or seats.

3rd. He should make a careful examination of the muscular system and heart and lungs, etc., in all pupils before taking part in the

rougher games, such as football and basket-ball, and keep a record of these examinations.

4th. He should be consulted by teachers in all cases where they observe a tendency to curvature or weakness, or dullness of any of the senses, and they should then be examined carefully and a record kept. These cases should be followed throughout their school life and the teachers informed of their defects, and where necessary the parents should be warned and advised.

The school should be the place for the detection and prevention of faults in growth, but the gymnastic treatment of these cases, if undertaken at all, should be confined strictly to what Dr. Sargent has called "straight work," in which both sides of the body are equally used, and it does not fall within the province of the school to specially treat them any more than it would to prescribe glasses for astigmatism. Such work is therapeutic and requires special individual medical treatment which the instructor, when one is available, has not the time to give, even if he could. It is in such cases that the value of an adviser is apparent, for even those unfortunates that have passed unheeded through the plastic first stages of scoliosis till the faulty posture has become habitual, may, by corrective treatments, be restored, in part at least, to symmetry and comfort.

A SIMPLE METHOD FOR BACTERIOLOGICAL EXAMINATION OF MILK SAMPLES.

BY

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University, Montreal.)

We desire to report briefly some observations we have made with a view to simplifying the technique for the bacteriological examination of milk so as to permit of this very useful and important test being more generally used than is the case at present.

The method commonly recommended for the bacteriological examination of milk is to estimate the number of bacteria growing on gelatine plates. This gives information of great practical value, for one can readily recognize milk in good condition from that which is bad. We know that a rigid observance of the most scrupulous care in the care of the animals, in milking, storing, airing, cooling and shipping the milk as well as proper precautions as to cleanliness of the utensils and the hands of the milkers are all necessary to keep the number of bacteria in fresh milk below 10,000 per cubic centimeter at the time of delivery.

The importance of this is only now beginning to be realized by the health boards and the medical profession. We have, in fact a ready means of controlling the milk supply, sufficiently simple to be carried out by a medical man, or by the head of the family, or the milkman himself, and capable of being popularized, as in the case of the taking of samples of blood, sputum or throat exudate.

The method of making cultures for this purpose as usually carried out is by diluting 1 cc., or a fraction of $\frac{1}{4}$ cc., of milk taken in a sterilized pipette with 500 or 1,000 times its volume of sterilized water in order to obtain a convenient number of colonies, for counting, in the plate culture. This can only be conveniently carried out in a laboratory, and, as the number of bacteria in milk tends to increase rapidly, delay in transmitting to a laboratory is a serious source of error.

It has been found by those occupied with the bacteriological examination of milk that the use of a wire loop gives sufficiently ac-

* Read before the Montreal Medico-Chirurgical Society, January 7, 1902.

curate results to enable the dilution to be dispensed with. This plan appeared to us to be the one most suitable.

A series of comparative tests with the loop and dilution methods gave the following results:

Loop method.	Dilution method.
27,000	33,000
37,000	36,000
139,000	160,000
187,000	194,000
48,000	54,000
480,000	460,000
164,000	172,000
546,000	530,000
83,000	61,000
134,000	169,000

It will be seen that while the dilution method is somewhat more uniform the difference is slight, and the loop method gives results near enough for the work in question.

We have found that a wire of No. 25 gauge when formed into a loop which fits closely over a knitting needle, size No. 18, furnishes a loop which takes up with great constancy 1-1,000 cc. of milk, which we have found the most convenient unit to work with. This may only apply to the materials we have personally tested, as the gauge both of wire and needles varies somewhat, and it is necessary to calibrate them.

The outfit used is extremely simple. The following is taken from the card giving instructions to those making use of the test.

BACTERIOLOGICAL DIAGNOSIS OF MILK.

Directions for Use.

1. Melt the gelatine by warming it just enough to make quite fluid; do not heat it strongly.

2. Inoculate the melted gelatine with one loopful of milk by means of the wire loop. Take care to avoid contaminating the loop by contact. Shake up the vessel containing the sample. Avoid taking the sample from the surface cream or from the sediment.

3. Distribute the milk uniformly throughout the gelatine by sharply rotating the bottle without actually shaking it. Let the bottle lie on its side till the gelatine is quite firm. Take care that no gelatine reaches the cotton wool stopper. Cooling may be hastened by laying on any cold surface.

4. Fill the stoppered tube with a sample of the milk for control. Return the wire loop with the outfit.

5. Fill out the card and transmit the outfit to the Laboratory of the Board of Health, Province of Quebec, 76 St. Gabriel Street, Mont-

real. Take care that the outfit is not exposed to a temperature above 70° F. or below 35° F. so as not to melt the gelatine or destroy the bacteria by freezing. A report will be made as a rule on the second or third day.

N.B.—In case of pasteurized milk 10 loopfuls to be taken.

The loop of aluminum wire (suggested by Dr. L. B. Wilson as a substitute for copper wire which we first used) is furnished sterilized in a corked test tube, also sterilized. This is placed in a small mailing



case together with a flat sided Blake vial containing nutrient gelatine ready for use, a tag to serve as a label and a slip of printed directions for use. For ordinary milk one loopful suffices for the inoculation. In the case of pasteurized milk or milk likely to contain less than 5 colonies per cc. ten loopfuls are preferable. The development of exclusively spore-bearing bacilli is evidence that the milk has been sterilized.

In order to make sure that the result of a low count of bacteria is

not due to the addition of preservatives these can be tested for, if the sterilized tube containing the wire loop is filled with milk and returned with the sample. An amount of 20 cc. suffices not only for this, but also for testing the fat and total solids if desired, or for making a microscopic examination of the sediment obtained by centrifuging. In the case of milk containing large numbers of bacteria the detection of preservatives is less important.

Arrangements have been made by which these outfits are supplied at the request of physicians or milk dealers by the Board of Health of the Province of Quebec. A source of error of which little is generally known is the reduction of bacteria which occurs when milk is frozen, so that this must be guarded against in rigorous weather.

The question of adopting fixed standards for bacteriological purity of milk is one which has recently attracted some attention. It may be conceded that 500 colonies per cc. is about the maximum permissible for pasteurized milk. The explanation which we have had printed on the back of our report is the following:

EXPLANATION OF REPORT.

Class I.—First class milk should not contain more than 10,000 bacteria per cubic centimeter.

Class II.—With 10,000 to 100,000, the milk, while not first-class, may be still usable.

Class III.—With 100,000 to 1,000,000, it is in a decidedly poor condition and had better be pasteurized before use.

Class IV.—Milk having over 1,000,000 has deteriorated to an extent which makes it objectionable as a food.

Milk containing any chemical preservatives is unfit for use. Good pasteurized milk should not contain more than 100 to 200 bacteria per cubic centimeter. In order to keep the number of bacteria below 10,000 limit at the time of delivery, great care must be exercised in milking, stirring, cooling and shipping the milk and failure to secure this result will be found due to the neglect of some essential precaution. At temperatures below 40° or 50° F., very little increase of the bacteria occurs.

This agrees in the main with the classification adopted by the milk commissions of this society: "Milk not pasteurized and not delivered in the city within four hours after milking must not contain more than 30,000 bacteria per cc. at any time of the year. Fresh milk with less than 5,000 colonies per cc. to be classed A.A.; with 5,000 to 15,000 A.; with 15,000 to 30,000, a; above 30,000, B.; above 100,000, C. Milk

not to be considered as germ free unless pasteurized twice. Acidity of the milk not to exceed 0.2 per cent."

This standard has been finally adopted by the city health department for over a year, but it will be noticed that not one of the samples given in the table comes under the heading Class A, or even "a" and that two-thirds of them fall in Class C, although taken in December, at the most favourable time of the year.

We think that the method recommended is so simple that any milk inspector could reasonably be expected to make a bacteriological examination of all samples collected as a matter of routine, and at the same time to give any persons interested in the purity of the milk supply an opportunity of obtaining direct information about any particular milk without expense or unnecessary delay.

REPORT ON THE CASES OF PNEUMONIA ADMITTED TO THE ROYAL VICTORIA HOSPITAL DURING THE YEAR 1901.

BY

MALCOLM MCKAY, M.D., House Physician.

During the year 1901 there were treated in the medical wards of the hospital 41 cases of pneumonia, of which 25 were males and 16 females.

There were in all 6 deaths, a mortality of 14.5 per cent.

The cases may be classified as follows: (1) Thirty-one cases of acute lobar pneumonia, with 4 deaths. (2) Ten cases of acute bronchopneumonia, with 2 deaths.

Etiology. *Age.* The average age was 27 years, the oldest patient being 69 years, and the youngest 7 months. Nine cases were under ten years; from 10 to 20, there were 6 cases; from 20 to 40, 10 cases; and over 50, 4 cases.

Season. Fifty-eight per cent. of the cases occurred during the months of March, April, May and June; while 29 per cent. occurred during the months of October, November and December.

Exposure. In 26 per cent. of the cases there was a history of unusual exposure to cold or wet immediately preceding the onset of the illness.

Infection. One case was received from a family in which the mother was suffering from pneumonia.

Predisposing Causes. Thirteen per cent. were suffering from disease of the upper respiratory passages immediately before the onset. In one case there was a history of alcoholism. Two cases had previously suffered from previous attacks of pneumonia.

Onset. *Chill.* In 39 per cent. chill was one of the first symptoms. In 12 per cent. there were chilly feelings without a definite rigor.

Pain was the commonest symptom of onset. It was present early in the disease in 86 per cent. of the cases. In the majority of cases it was situated in the vicinity of the pulmonary lesion, but in 7 cases it was referred to the abdomen.

Vomiting occurred early in 39 per cent. of the cases.

Cough was present early in the disease in 68 per cent. of the cases. In most of the cases it was hard and painful.

Anorexia, malaise, and feverishness were present from the onset in all cases.

Delirium occurred on the first day in one case. In 7 per cent. the onset was gradual, with malaise and loss of appetite.

Symptoms and Course. The average duration of fever was eleven days, the shortest course was three days, terminating by crisis. The longest course was 59 days, fever persisting until the end of this time, while resolution did not occur until the 42nd day.

Part Involved. The lower lobes were involved in 26 of the cases, and the apices in 19 of the cases. In 13 cases the left lung was involved; in 11 cases the right; and in 7 cases both lungs.

Sputum. The sputum was blood-stained and tenacious in 68 per cent. of the cases. In 7 cases, all children under ten years, there was no sputum.

Cough was present in all cases, and in 90 per cent. was described as severe and hacking.

Alimentary symptoms. Anorexia was present in all cases, constipation in 16 per cent., diarrhoea in 16 per cent., while there was vomiting in 39 per cent. of the cases.

Crisis occurred in 47 per cent. of all cases, and on the average occurred on the eighth day. The earliest crisis was on the third day, and the latest on the fourteenth day. Twenty-five per cent. of the cases terminated by lysis, while a pseudo-crisis occurred in four cases.

Complications. Herpes occurred in three cases, in all of which it was labial.

Delayed resolution occurred in four cases.

One case was complicated by pregnancy (seventh month), and on the third day the abortion took place, when a dead male child was born. The case terminated favourably.

In two cases there were symptoms of meningitis; one died, while the other one made a good recovery.

Otitis media occurred in one case and abscess in the thigh in another.

Mortality. Four cases proved fatal, *i. e.*, 12.8 per cent.

The *first* case was that of a man aged 65. Death took place on the sixth day of disease; the patient had chronic nephritis and died of heart failure.

The *second* case was that of a man aged 36. Death took place on the seventh day of the disease. The patient had pronounced abdominal symptoms, vomiting and tympanites. Death followed acute dilatation of the heart.

The *third* case was that of a child of seven months. Death took place thirteen days after admission to the hospital. Patient had been very ill for a month before entering the hospital, pneumonia having

been diagnosed at the onset of the illness. Fifteen days later the child had a convulsion and had been in a very low condition up to date of admission. The child showed well-marked symptoms of meningitis before death.

The *fourth* case was that of a man aged 69. Death took place on the eleventh day. The patient had arterio-sclerosis and chronic nephritis. He died of heart failure.

Two cases were treated with anti-pneumococcus serum. The first died, while the second made a good recovery.

In the first case the patient, a male aged 36, was admitted on the third day of the disease with the left base involved. Temperature, 104° F.; pulse, 136; respirations, 28. On the evening of the fourth day he had a temperature of 106 1-5; pulse, 140; respirations, 36. At 9.30 p.m., 20 cc. of the serum was injected, and by 9 a.m. patient showed temperature, 100 2-5; pulse, 118, and respirations, 30. Seven subsequent injections were made without much effect. Delirium was noticed on the fifth day and the patient died on the eighth day of the disease. This patient had several cold sponges, thus modifying the temperature and pulse rate.

The second case was a child, aged 6 years. He entered hospital on the seventh day of the disease with the left lower lobe involved and temperature 104 4-5°, pulse 150, respirations 60. The serum was injected soon after admission (7.30 p.m.), and at 8.30 a.m. the patient showed a temperature 100 2-5°, pulse 142, respirations 32. At this time a second injection was given, and after a slight rise, the temperature fell to 99 1-5° at 6 o'clock the next morning. The evening temperature went up to 102 4-5°, but it soon dropped to 99 3-5°. The fever ended by lysis on the twelfth day. Delirium was present from the first day of the disease and was very marked on the ninth and tenth days, when the patient showed symptoms of meningitis.

RETROSPECT
OF
CURRENT LITERATURE.

Medicine.

UNDER THE CHARGE OF JAMES STEWART.

Herpes Zoster.

ROLAND J. CURTIN, M.D. "Herpes Zoster and its Relation to Internal Inflammations and Diseases, especially of the Serous Membranes." *Am. Journ. Med. Sc., Feb., 1902.*

A. VAN HARLINGEN, M.D. "Recent Views of the Nature and Origin of Herpes Zoster." *Am. Journ. Med. Sc., Jan., 1902.*

Curtin reports a series of cases associated with inflammations of serous membranes and disease of internal organs, and suggests the possibility of the existence of herpes of the serous membranes.

Five cases are detailed in which herpes zoster of the side of the chest appeared in association with a plastic pleurisy or pleurisy with effusion. In all of these it appears that the pleurisy preceded the outbreak of herpes. In abdominal disease similar cases are recorded. In a case of catarrhal appendicitis a typical herpes followed the inflammatory trouble, and was situated on the abdominal wall of the same side. In another a localized peritonitis in the right upper part of the abdomen was followed later by herpes in the same site. A case of herpes of the side followed by hæmaturia is recorded in which the zoster preceded the internal disease with a previous history of herpes of the face and hæmaturia. This case is the only one recorded by the writer in which the zoster preceded the internal affection. It may be concluded that the association of internal inflammation and zoster is too frequent to be the result of coincident, and that as the internal affection precedes the zoster it may be regarded as its cause.

(With the exception of the case of hæmaturia there would seem to be no reason to think that herpes in these cases did not result from direct injury to the nerves in the neighbourhood of the diseased membrane, and it hardly seems necessary to regard the primary condition as a herpes of the internal tissue.)

Van Harlingen gives an interesting résumé of the views which have been held on the nature and origin of herpes zoster. The distribution of zoster along the nerve trunks has been recognized for a long time, and it has usually been assumed that there is a disturbance of the trophic functions of the nerve, a theory which explains the pathology of the condition but which lacks actual proof.

A number of cases have been recorded similar to those of Curtin's, of visceral disorders of various kinds associated with zoster. Other cases seem to show a relationship with infective processes. Syphilis has thus been regarded as a cause, its specific agent or toxin acting on the spinal axis. Cancer, apart from the pressure of growth, coal gas and arsenic are all recorded as toxic agents capable of producing herpes.

Wasilewski regards zoster as due to an infectious agent. Prodromata, such as gastric disturbance and fever of sometimes, preceding the eruption, the occurrence of enlarged glands in the neighbourhood are points in favour of this view. Immunity is regarded by Wasilewski as settled, but the numerous cases of recurrence are not in favour of this view.

Up to within the last year or two the distribution of herpes along the nerve trunks has never been questioned, although it has been occasionally noted to not correspond precisely with the nerve territory. Brissaud endeavours to show that the eruption corresponds to embryonic segments (metameres), whilst Abadie believes the eruption follows the arteries and are due to trophic influences proceeding from the sympathetic.

Taking ophthalmic zoster as an example, Abadie asks how it is, if zoster is due to an inflammation of the trigeminal nerve, that in it only occurs (save in the very rarest cases) in the first or ophthalmic branch. As a fact, maintains Abadie, the eruption extends over the area supplied by *supra-orbital*, *frontal*, and sometimes the *nasal* arteries.

The lesions of zoster, says Abadie are due to atrophic influence from the sympathetic nerve fibres, which, in the case of ophthalmic zoster, follow the course of the arteries, just mentioned. The pain and other nervous symptoms, which may or may not accompany the eruptions, are due to some involvement of the sensory nerves, which may be implicated in one case and not in another.

This theory is supported by the form of the eruption in thoracic zoster. This does not occur above the line of the third intercostal space. The arteries supplying the upper three intercostal regions, instead of proceeding from the aorta, are derived from the subclavian artery, and consequently their vascular origin, and that of the vaso-

motors which accompany them, are different from the others which come directly from the aorta.

This theory of Abadie's makes clear, so he says, the apparent anomalies of the eruption which are inexplicable otherwise, but it takes away from the sensitive nerves of relation a part which does not belong to them and assigns it to the great sympathetic. It proves that the latter really commands and regulates nutrition in all the regions to which it is distributed, whether visceral or cutaneous.

Finally Abadie says that quinine is specific in ophthalmic zoster. Now quinine is essentially a remedy which produces a constriction of the arteries.

Head and Campbell in a recent and elaborate paper record a number of post-mortem examinations. They find inflammatory and destructive changes in the posterior ganglia of the cord and in the Gasserian ganglion, and degeneration of the nerves leading to the skin. In mild cases these changes gradually pass away, but in severe ones the degenerated nerve fibres are replaced by fibrous tissue.

Degeneration in the spinal cord occurs secondarily to the herpetic lesion of the ganglion.

Head and Campbell conclude that some agent, the nature of which we are ignorant, selects the posterior root ganglion, producing inflammatory changes, leading to irritative changes in the nerve to which the cutaneous lesions are due. Direct irritation may induce herpes and a case is quoted where it followed the pressure of a lympho-sarcoma on the posterior root ganglion.

Obstetrics.

UNDER THE CHARGE OF WILLIAM GARDNER.

Uterine Inversion.

PINARD, A. "Uterine Inversion reduced by means of the Champetier de Ribes Bag." (Inversion Uterine reduite à l'aide du Ballon de Champetier de Ribes.) *Annales de Gyn. et d'Obstet.*, Oct., 1901.

Two cases of this rare affection were admitted to the clinic Baude-locque within a few months of each other.

The first case was a primipara, aged 34 years, whose health had been perfect during pregnancy, which terminated in a normal labour of six hours' duration. While having an evacuation from the bowel, forty-eight hours later, she felt a tumour between her thighs. The physician who was called recognized the condition, and, after taking antiseptic precautions, attempted to reduce the tumour as gently as possible. He succeeded in returning the mass into the vagina and then had the patient removed to the hospital. Here, attempts to further reduce the mass failed, and a Champetier de Ribes bag was introduced and left over night. Next morning, after examination under chloroform, it was decided to perform a vaginal hysterectomy as the piriform mass in the vagina was completely strangulated at the os uteri and its surface was in places quite gangrenous. The convalescence was prolonged and attended with fever and septic discharges from the vagina.

The second case, also a primipara, aged 24 years, after a normal pregnancy was spontaneously delivered of a female infant by a midwife. The labour was followed by a rather excessive bloody discharge which persisted for several days, when a physician was called, who found in the vagina a tumour mass the size of a foetal head. She was admitted to hospital on the ninth day of her illness. Her general condition was serious, temperature normal, pulse 128. The uterine globe was absent from the hypogastric region. The finger introduced into the vagina immediately encountered a tumour which completely filled it. The vagina appeared to be lengthened. With great difficulty the anterior lip of the cervix could be felt high up behind the symphysis. It was impossible to reach the posterior cul-de-sac. There was no hæmorrhage. A small sized Champetier de Ribes bag was then introduced into the vagina. Ten hours later this was removed. The vagina was empty, the inversion having been partially reduced.

The os was widely dilated and the inverted fundus could be felt within it. Bimanually, a tumour mass could be felt reaching four finger breadths above the symphysis, presenting at its summit a cup-shaped depression.

A full sized bag was then introduced and dilated to its full extent. (Whether this bag was simply introduced into the vagina or into the dilated os uteri is not definitely stated). The next morning on removing the bag the inversion was found completely reduced. The after treatment consisted in the administration of quinine sulphate, antiseptic intra-uterine injections, and saline enemata. There was a moderate degree of fever for some days but the patient made a good recovery.

In commenting on the cases Pinard draws attention to the fact that the inverted uterus escaped from the vulva between the patient's thighs in the first case. On examination the surface of the tumour gave evidence of its gangrenous condition, hence the selection of hysterectomy.

In the second case, though the condition had been present for a longer time, the mass had never protruded from the vulva. The mucous membrane was of a normal colour and the uterine wall fairly firm throughout. There was neither infection nor gangrene present; hence the adoption of the more simple method of treatment. He believes that in such conditions these bags have a more efficacious action than the other means usually recommended.

Slough of the Uterine Wall.

VINEBERG, HIRAM N. "Partial Hysterectomy ? for Puerperal Sepsis." *Amer. Jour. of Obstet., Sept., 1901.*

The following interesting case is reported by Dr. Vineberg. The patient, aged 22 years, a few days subsequent to a miscarriage of the third month, was attacked with high fever and pain in the right iliac region. Bimanual examination revealed a large and rather tender uterus with moderate fulness of the left broad ligament. These symptoms persisting for ten days the abdomen was opened. The left ovary was found enlarged, œdematous, and firmly adherent to the posterior aspect of the left cornu and fundus. On detaching the ovary from the uterus some thick pus escaped from the tissues of the uterus. On examination a slough in the fundus the size of an English walnut was located looking like an ordinary carbuncle. It was excised thoroughly and the wound touched with pure carbolic acid. The patient made a good recovery and has since been delivered of a child at full term.

The author, in commenting on the case, considers that it is import-

ant to differentiate a localized slough of a portion of the uterus from the uniformly infected organ of puerperal sepsis. He considers that the diagnosis can only be established by opening the abdomen. If the former condition is found the slough may be excised, but in the latter the organ should be totally removed or else left alone,

Cæsarean Section and the Indication for Craniotomy.

DE LEE, JOSEPH B. "Three Cases of Cæsarean Section and a Consideration of the Indication for Craniotomy." *Amer. Jour. of Obstet.*, 1901.

In the first case delivery by the natural passages was impossible on account of general contraction of all the diameters and asymmetry of of the inlet of the pelvis. The child was at full term and larger than normal. The patient was in the first stage of labour with the membranes intact. The patient and her husband selected the Cæsarean operation after all the facts had been laid before them. Mother and child left the hospital after the twenty-fourth day.

In case two there was a generally contracted, flat, rachitic pelvis with a conjugate of 7.5 c.m., the lateral diameters being decidedly contracted. After thirty hours the head failed to engage and she was removed to hospital, on reaching which the foetal heart tones were found to have disappeared and there was external hæmorrhage. Axis traction was unsuccessfully attempted. Craniotomy was then performed, and the patient made a good recovery.

A year later the patient entered hospital, being again about term. At the onset of labour she insisted on the Cæsarean operation, which was successfully performed, both mother and child leaving the hospital in good condition.

In the third case, a IV-para, aged 37, a large semi-solid tumour, springing from the left sacro-iliac joint, completely obstructed the pelvic cavity. The child presented by the breech. Three attempts at taxis had failed before the author saw the case. The patient was in poor condition, but extraction of the after coming head on craniotomy being considered inadvisable, it was determined to perform a Porro operation with intraperitoneal treatment of the stump. The child was delivered alive, but the mother died on the fourth day from sepsis.

Dr. DeLee then considers the question of craniotomy from the standpoint of religion, sentiment, and humanitarianism, with which aspects of the question the physician has, in his opinion, nothing to do, these being left to the consideration of the husband, family or community.

With regard to the legal side of the question, he points out that, in

the eyes of the law, the child is *pars viscerum*, an integral part of its mother, being only severed from her at birth. This principle apparently gives the woman a right to say what shall be done with the child when her life is endangered by it, as if it were a neoplasm. Thus the mother has the right to preserve herself at the expense of the infant, and may morally, sociologically, and legally refuse to incur a little danger for the sake of her infant. The physician, therefore, is bounden to abide by her decision or that of her representative; and it is his duty to disclose the situation fully and impartially.

Considering the medical side of the question, he quotes the views of several authorities, and says that in his opinion Professor Cameron gives the most rational view of the situation when he says that "at present it is premature to say that embryotomy is never justifiable; that Cæsarean section and embryotomy are seldom pitted against each other as electives, and when they are, Cæsarean section is generally the choice; when they are the last resorts, embryotomy is usually the choice."

He points out that craniotomy is now an operation with a mortality of zero as far as the mother is concerned. He considers that "when the patient has been in labour more than twenty-four hours, when she is presumably infected, when operations have been attempted by unskilled hands, Cæsarean section and symphysiotomy should be prohibited; the child should be sacrificed."

Abdominal Hysterectomy for Puerperal Infection.

DEMELIN AND JEARMIN. "A Case of Puerperal Infection from Intra-uterine Fœtal Putrefaction, Abdominal Hysterectomy, Cure." *Bull. de la Soc. d'Obstet. de Paris, Nos. 5, 6, 1901.*

The patient, aged 37, an VIII-para, entered hospital in labour. The membrane had been ruptured for two days. The abdomen was tense and distended. On palpating the uterus crepitation was obtained. The child, presenting by the breech, was dead. Descent was arrested in the pelvic cavity. During extraction of the child quantities of offensive gas escaped from the vagina along with a putrid discharge. The placenta was green and necrotic. Delivery was followed by intra-uterine douching with peroxide solution. Four days later the patient was in a profoundly septic condition, chills, high temperature, rapid pulse, accompanied by bad facies in spite of curettage and frequent intra-uterine douching. Under ether anæsthesia, after disinfection of the genital tract and skin of the abdomen, an abdominal hysterectomy was performed with the patient in the Trendelenburg position. A mesh of gauze was passed from above into the cavity of the vagina.

The patient made a good recovery and left the hospital three weeks after operation. Cultures were taken from the uterine cavity at the time of labour, and from the uterine wall just below the peritoneal covering at the time of the operation. The cultures proved extremely rich in anaërobic bacteria, practically no aërobic bacteria being present. A bacillus and streptococcus tenuis predominated.

The reading of this paper led to a long and interesting discussion on the place of hysterectomy in the treatment of puerperal infection. The general opinion seemed to be that local treatment, curettage, douching, etc., gives on the whole better results. Cases recovering after hysterectomy are the exception rather than the rule, Tessier's figures showing 18 deaths out of 20 cases operated on in Paris. It was conceded that in cases of localized gangrene of the uterue, hysterectomy might prove successful; but the difficulty remains of diagnosing this condition.

D. J. Evans.

Canadian Medical Literature.

UNDER THE CHARGE OF KENNETH CAMERON.

[The editors will be glad to receive any reprints, monographs, etc., by Canadian writers on medical or allied subjects (including Canadian work published in other countries) for notice in the department of the JOURNAL. Such reprints should preferably be addressed to Dr. Kenneth Cameron, 903 Dorchester street, Montreal.]

Received up to February 10th, 1902.

The Canadian Journal of Medicine and Surgery.

January, 1902.

1. National Physical Development. J. N. Hutchison.
2. Address to the Graduating Class of the Training School for Nurses, Toronto General Hospital. A. Primrose.

February, 1902.

3. Treatment of Laryngeal Tuberculosis. J. Price-Brown.
4. Chronic Ulceration of the Stomach Simulating Cancerous Disease, Relation of a Case of Gastro-enterostomy with Murphy Button, Recovery. J. F. W. Ross and E. B. O'Reilly.
5. Vaccinal Protection against Small-pox. P. H. Bryce.
6. Is Vaccination What it Should Be? A. J. Harrington.

1. HUTCHISON discusses the causes which have produced, and are producing, an alarming degeneracy in a large portion of the population. To produce a strong race, physically and mentally, we must have healthy mothers, and he points out that the present system of education does not recognize the peculiar demand for growth and development of the reproductive organs or the establishment of their periodical function. He advocates intermittence, periodicity of exercise and rest; work three-quarters of each month and remission, if not total abstinence, the other fourth, with physiological interchange of the erect and reclining postures. There should also be given by duly qualified practitioners lectures to boys and girls about the age of twelve on the subject of sex. The great causes of degeneracy are alcoholism, syphilis, tuberculosis, epilepsy and insanity, and to a certain degree gonorrhœa. The only rational solution of the problem to check the degeneration of the race is to deny the right of marriage to these de-

fectives. If their disease be curable, they have no right to remain a source of danger to mankind, and if they are incurable, they have no right to perpetuate their infamy or weakness. It is in accordance with the spirit of medicine, it is, in fact, self-defence.

3. PRICE-BROWN describes the various methods that have been employed in the treatment of laryngeal tuberculosis, and advocated the use of intra-tracheal injections, from the fact that they are applicable both to pulmonary and laryngeal disease. He employs 1 to 2 per cent. of menthol in albolene, the amount injected varying from 4 to 8 c.c., repeated every one or two days. The injections may be given without using cocaine at all, as the patients scarcely feel the entrance of the fluid, but towards the latter part of the inhalation, the contact of the oil within the bronchial tubes produces a slight cough, though of only slight duration.

4. ROSS and O'REILLY report a case which illustrates the difficulty of making a differential diagnosis between chronic ulceration and cancerous-disease of the stomach. The patient, a woman of 28 years, presented all the signs of severe gastric disease, she was extremely emaciated, had rigidity of the right rectus muscle and an indefinite thickening in the epigastric region. The symptoms pointed to obstruction of the pyloric end of the stomach, and it was not possible to say whether this obstruction was due to the presence of cancerous growth or to some other cause. The symptoms had extended over such a period that they pointed to the presence of an ulcer, but the thickening led to the belief that malignant disease had been grafted on the former condition of ulceration. The abdomen was opened and the stomach drawn out. A large growth was found at the pyloric end. The perigastric lymph glands were enlarged, and the whole stomach wall looked exactly as it does in cases of cancer. The case was looked upon as hopeless and gastro-enterostomy was performed with Murphy's button. The patient made an uninterrupted recovery and twelve months afterwards was the picture of health, her gastric symptoms had completely disappeared, and there was no mass to be felt in the abdomen.

Dominion Medical Monthly.

January, 1902.

1. Tuberculosis of the Skin. Graham Chambers.
2. Report of the Physician-in-Charge, Muskoka Cottage Sanitarium. J. H. Elliott.

Canada Lancet.

January, 1902.

Tuberculosis Number:—

Etiology and Early Diagnosis of Pulmonary Tuberculosis. D. Gilbert Gordon.

Acute Military Tuberculosis. James Third.

Tuberculosis of the Pelvic Organs in the Female. Thos. S. Cullen.

Tubercular Disease of Bones and Joints. Hadley Williams.

Tuberculosis of the Alimentary Tract. R. J. Dwyer.

Genito-Urinary Tuberculosis. Geo. A. Bingham.

Glandular Tuberculosis. Herbert A. Bruce.

Tuberculosis of the Larynx. J. Gibb Wishart.

Tubercular Disease of the Middle Ear. Charles Trow.

On the Disposal of Tuberculous Sputum. J. H. Elliott.

Relations of the Tuberculous and the Public. J. T. Fotheringham.

Tuberculosis—Some Needed Regulations. John Ferguson.

Statistics of Tuberculosis in Canada. Charles P. Lusk.

L'Union Medicale du Canada.

Janvier 1902.

1. Les Sinusites Aiguës. R. Boulet.

2. L'Approvisionnement de Lait de la Ville de Montréal. J. E. Dubé.

3. L'Œuvre de la Goutte de Lait. S. Boucher.

1. BOULET contributes an exhaustive article on the symptoms and various methods of treatment of suppuration in the accessory cavities of the face.

2. DUBÉ describes a plan that has been suggested for the improvement of the milk supply of the city of Montreal. To every deserving milk dealer who asks for it, will be given a coloured card with the arms of the city and the words:—"Certified Milk," with the name, address of the dealer, and the number of the license upon it. Before this can be obtained the stables, the animals, the food and water for the cows, the utensils for holding the milk, the dairies, the method of carriage and delivery, are all rigidly inspected. The writer quotes, at length, from the *New York Medical Journal*, upon the work of the committee who investigated the best means of obtaining good milk supply for the city of New York.

3. BOUCHER gives the statistics of the milk dispensary that under the name of "L'Œuvre de la Goutte de Lait," has been supplying a suitable milk for babies since July 5th last. From that date to the

24th of November, 40,372 bottles, representing 12,073 pints of milk, and 1,269 pints of gruel, were distributed to 155 infants. The milk is collected with every care and modified to suit the different infants. Those who can pay for the milk do so, but the very poor are supplied free of charge. A pamphlet entitled "Hygiene de la Première Enfance," had been prepared and distributed to those who attended the dispensary. The writer considers that the work has been a great success, and hopes that it will be extended.

Le Bulletin Medicale de Quebec.

Janvier 1902.

1. Méningite Pneumonique. Thomas Savary.
2. De l'Apomorphine contre les Attaques d'Hystérie, d'Hystéro-Epilepsie et de Epilepsie. P. V. Faucher.

1. SAVARY reports a case of pneumonia complicated with meningitis.
 2. FAUCHER considers that the administration of apomorphine hypodermically is one of the most valuable remedies for epilepsy, hystero-epilepsy, but above all for hysteria. The prick of the needle, the vomiting, and the subsequent depression has a marked effect upon the nervous system. Several cases are cited in which it was used with great success.

La Revue Medicale.

1 Janvier 1902.

1. Analgesie Obstetricale par la Cocaine en Injection Spinale de la Région Lumbaire. J. C. S. Gauthier.

8 Janvier 1902.

2. Une Nouvelle Position pour l'Examen Gynécologique. M. T. Brennan.
3. Rapport d'une Cas d'Anevrisme Arterioso-Veineux à l'Hotel-Dieu. D. Hingston.

15 Janvier 1902.

4. Un Cas d'Hydrosalpinx. François de Martigny.

1. GAUTHIER urges the use of spinal anæsthesia by means of cocaine during the later stages of labour. Experience shows that women who have been delivered after having received a spinal injection of a centigramme of cocaine offer less resistance to general anæsthesia, the soft parts are less liable to rupture, the uterine contractions are more vigorous and more frequent, the dangers of hæmorrhage from uterine inertia

are reduced to a minimum, and involution is more complete. He quotes the observations and statistics of Doleris upon the subject.

2. BRENNAN describes with an illustration, a new gynæcological position which he has employed with the greatest advantage. The patient sits in a position varying from an angle of 45 degrees to almost vertical. The seat rests upon a support, the legs are flexed upon the thighs and the thighs upon the abdomen, the lower limbs resting upon leg-supports. In this position there is complete relaxation of all the abdominal and pelvic muscles and of the lower limbs. To obtain the position, attachments can be easily made to an ordinary chair or to the examining table.

3. D. HINGSTON reports a remarkable case of thoracic aneurism. A man had been suffering from severe pain in the region of the 13th dorsal and 1st lumbar vertebræ. Symptoms pointed to psoas abscess, and an incision was made above the iliac crest, and an inch behind the axillary line. when the operator came upon a mass of coagulated blood, and the patient died the same night of hæmorrhage. At the autopsy, just under the diaphragm was found an arterio-venous aneurism of the aorta and a large vein situated on the right side of the vertebral column probably the displaced vena cava. The last dorsal and first lumbar vertebræ were eroded, and formed the posterior wall of the aneurismal sac. There were large hæmatomata beneath the sheath of the psoas on the right side and in the substance of the muscle on the left side. The communication between the psoas muscles and the aorta was made through the insertion of the muscles into the carious vertebræ.

Reviews and Notices of Books.

SYPHILIS AND OTHER VENEREAL DISEASES. By H. DE MERJIC, M.R.C.S.E., Surgeon to the French Hospital, London, etc., etc. London, Bailliere, Tindall & Cox, 1901. Demy Octavo, 132 pages. Price, 3 shillings net.

The author gives a somewhat curtailed statement of his views on syphilis, gonorrhoea and other venereal lesions. He thinks soft or simple chancres are always multiple and that hard chancres are often single. The pathology of the soft and hard sore is discussed and an effort made to account for the peculiarities of each variety. It is admitted that a differential diagnosis is sometimes most difficult. In the treatment the author recommends mercury for syphilis and iodide of potassium for the effects produced by syphilis. Yet, while this general rule is given, it is at the same time pointed out that the iodide is under certain circumstances a most useful adjunct in syphilis. The proto-iodide is generally preferred. Inunctions and hypodermic injections of mercury are reserved for use when a rapid effect is desired. The book deals with a most important and useful class of diseases and for that reason is worthy of perusal. *G. E. A.*

A TEXT-BOOK OF OBSTETRICS. By BARTON COOK HIRST, M.D., Professor of Obstetrics in the University of Pennsylvania. Third Edition, thoroughly revised and enlarged. Philadelphia and London, W. B. Saunders & Co., 1901. Canadian Agents, J. A. Carveth & Co., Toronto, Ont. Price, cloth, \$5.00 net.

The fact that a third edition of Hirst's *Obstetrics* has been necessitated in the short interval that has elapsed since the first appearance of the work three years ago, is ample evidence that the author has produced a most acceptable and valuable treatise on the subject. The third edition gives evidence throughout of very complete and careful revision. Additional matter has been added to nearly every chapter without materially increasing the size of the book. One notes the employment of the decimal system in this edition, in every instance both methods being given.

In the chapter on the diagnosis of pregnancy a valuable addition is that dealing with the differential diagnosis of pregnancy from other tumours of the abdomen. The illustrations here are particularly satisfactory. In the chapter on puerperal sepsis one notes that Dr.

Hirst considers the bacteriological examination of the uterine contents in these cases, while being of interest, of little practical value from a diagnostic point of view.

The author's remarks on the serum therapy of puerperal sepsis are very interesting, as he has evidently given the subject most careful consideration. His final judgment is against it; and he states that he has discarded it "after a personal trial extending over three years and embracing some twenty cases."

The literature of obstetrics has been carefully reviewed and the most important references since the last edition have been added to this. More than 50 new illustrations, including three coloured plates, have been introduced. All that was said in favour of the first edition in these columns can be applied with added emphasis to this revised edition.

D. J. E.

A TEXT-BOOK OF THE PRACTICE OF MEDICINE. By JAMES M. ANDERS, M.D., Ph.D., LL.D., Professor of the Practice of Medicine and of Clinical Medicine, Medico-Chirurgical College, Philadelphia. Fifth Edition, Thoroughly Revised. Octavo, 1297 pages, fully illustrated. Philadelphia and London: W. B. Saunders & Co., Canadian Agents, J. A. Carveth & Co., Toronto, Ont. Price, \$5.50 net.

This is one of the most popular of the American text-books, as evidenced by the fact that it has gone through five large editions in less than four years. In the present volume the information has been kept well up to date. The most thorough changes have been made in the group of infectious diseases. The articles on malaria and yellow fever have been revised in the light of the recent researches of Ross, Manson, Carroll and Reed, in regard to the transmission of these diseases by the mosquito. The illustrations are mostly good and the numerous diagnostic tables are of distinct value. The style is on the whole pleasing, although here and there it might be more lucid.

What strikes one most is a certain fussiness, so to speak, in regard to the conditions discussed and their classification. Thus, for instance, sections are given upon cardiac thrombosis, intestinal infarction, streptococcus pneumonia, fatty degeneration of the liver, bovine tuberculosis, interlobular emphysema, hæmorrhage into the mediastinum; conditions which with more propriety might have been relegated to works on pathology, inasmuch as they can hardly be susceptible to clinical diagnosis. It is scarcely necessary, either, to make special sections for pneumonia and secondary pneumonia. Besides this there are certain vagaries of classification. Chronic articular rheumatism is classed under "Infectious diseases of unknown etiology," "Glass-blower's mouth" is discussed under "Diseases of the salivary glands."

Large white kidney and "secondary" or fatty and contracted kidney are classed together when they might with advantage have been treated separately.

Certain opinions are given which are open to serious question. Thus a quotation from a text-book upon the pathogenic bacteria is introduced on the subject of the transmissibility of tuberculosis, that "the bovine bacillus infects animals, and probably also man, with great readiness." The latter portion of this statement will hardly be admitted by most pathologists. The propriety of introducing prescriptions into a work of this class is open to discussion, but it seems to us that all that is necessary is to indicate the broad lines of treatment, leaving the finer details to special works on therapeutics. Any other course is liable to inculcate a too implicit reliance on drugs and to render the volume unnecessarily bulky.

Apart, however, from these objections, which are perhaps after all mere refinements, the work is a very readable one and, from the wealth of information and experience afforded, thoroughly deserves its popularity.

A. G. N.

THE PRINCIPLES OF HYGIENE. A Practical Manual for Students, Physicians and Health Officers. By H. D. BERGEY, A.M., M.D., First Assistant, Laboratory of Hygiene, University of Pennsylvania. Philadelphia and London: W. B. Saunders & Company, 1901. Canadian Agents, J. A. Carveth & Co., Toronto. Price, cloth, \$3.00 net.

Dr. Bergey has given us a text-book which is both valuable and readable, not too common a combination. The arrangement of the contents can be judged from the relative amount of space allotted to the various branches of the subject, *viz.*, air 5, ventilation 4, heating 2, water 7, sewage 5, garbage 1, food 12, exercise, clothing and personal hygiene 4, industrial hygiene 4, schools 4, military 4, naval 3, habitations 2, infectious diseases 8, disinfection 5, quarantine 16, and statistics 2.

The subject matter is well brought up to date, recent reports of commissions and special public health committees being often cited instead of the views of individuals, and in place of the author's personal opinions. It is not clear why one-sixth of the total volume should be devoted to giving the full text of the United States quarantine laws and regulations. This method is not followed in such matters as the regulation of schools, dairies, prisons and industrial establishments, in all of which the regulations might be introduced into local public health by many of the readers of the book. It falls to the lot of comparatively few to introduce an entire system of national quarantine.

The tables and illustrations are well selected and executed and the letter press clear. It should occupy in relation to American text-books on hygiene a position similar to that of Wilson's well known English text-book, which it resembles in scope and method of treatment.

W. J.

THE PERITONEUM. By BYRON ROBINSON, B.S., M.D., Chicago, Ill. Author of "Practical Intestinal Surgery," "Landmarks in Gynecology," etc. Second Edition, Part I. Histology and Physiology, With 247 Illustrations. Chicago, Chicago Medical Book Company, 1899.

The author has collected the results of a great many of the foremost research men and placed them before the reader in this volume in a very plain and simple style. This is not all, however; Dr. Robinson has himself done a great deal of original work on the abdomen and peritoneum. He is, therefore, in a position to discuss opinions and views on the histology and physiology of the peritoneum.

A short chapter entitled "Historical Sketch" is most interesting and outlines the gradual evolution of our present knowledge of this important tissue. Then follow in order chapters on the "endothelium of the free peritoneal surface, sub-peritoneal tissue, blood-vessels of the peritoneum, lymphatics, nerves and physiology of the peritoneum." One can hardly enter into a detailed criticism of these chapters, but it can be said that they all give evidence of care in preparation; they are all instructive and interesting. The volume closes with a chapter on technique.

The book deals with a most important tissue. It throws light upon the physiological and pathological processes of the peritoneum with which all medical men are concerned, and it is to be highly recommended to our readers.

G. E. A.

A TREATISE ON SURGERY. By American Authors; for Students and Practitioners of Surgery and Medicine. Edited by Roswell Park, A.M., M.D., Professor of the Principles and Practice of Surgery and of Clinical Surgery in the Medical Department of the University of Buffalo. Third Edition, enlarged and thoroughly revised. Lea Brothers & Co., New York and Philadelphia, 1901.

The demand for a third edition two years after the second is certainly complimentary to the authors. Among the list of contributors are such names as Maurice H. Richardson, C. S. Bull, Bradford, Burrell, Matas, Nancrede, Bevan, Parmenter, and Roswell Park, the editor. These names are a guarantee of quality. The matter as a whole is good and well arranged. Due importance is given to bacteriology and the development of the subjects of auto-intoxication and the se-

quelæ of non-surgical diseases. The chapter on the surgical pathology of the blood is carefully written and may be said to fairly express the present knowledge on this important subject.

On some subjects the matter is open to criticism. One might reasonably expect a more full, concise, and detailed account of the recent work done in the treatment of lupus and cutaneous epithelioma with the Finsen light and the Röntgen rays. In the treatment of fractures, too, but little space is given to the employment of massage with or without immobilization, as advocated particularly by Chaponnier. The book is well printed and well illustrated. *G. E. A.*

AMERICAN TEXT-BOOK OF PATHOLOGY FOR THE USE OF STUDENTS AND PRACTITIONERS OF MEDICINE AND SURGERY. Edited by LUDWIG HEKTOEN, M.D., Professor Pathology, Rush Medical College, and DAVID RIESMAN, M.D., Professor of Clinical Medicine, Philadelphia Polyclinic; 443 illustrations, of which 66 are in colors. Philadelphia and London: W. B. Saunders & Co., 1901. Canadian Agents, J. A. Carveth & Co., Toronto, Ont. Price, \$7.50.

No such full text-book of pathology as this has as yet appeared in the English language, and on the whole the work is deserving of very high commendation. As the editors say in the preface, pathology has made such enormous strides in recent years that it is almost an impossibility for one man to make himself fully conversant with an entire full knowledge of this important branch of science. We go farther and say that it is a complete impossibility for one man to be fully conversant with the whole subject. Thus, wisely, this work has been distributed among some nineteen contributors. The introduction is written by Professor Lewellys F. Barker, now of the University of Chicago, and is so clear and so judicial that we wish it had been much longer, more especially as it contains the only general paragraphs upon the causation of disease. Dr. Hektoen, the editor, discusses the general morbid processes and it is needless to say that this portion is thoroughly up to date. Dr. Ohlmacher is responsible for the chapter on tumours, and this subject is so large and important at the present time that, although some 60 pages are taken up in this consideration, we cannot help feeling that even more space might have been given to it. What is said is put in a very conservative and cautious manner. The same author is also responsible for the pathogenic micro-parasites and gives a very clear account of these organisms. We cannot help feeling now that pathogenic bacteriology has become so specialised a subject, that a description of these organisms should not be included in the ordinary text-book of pathology, the most to be given being a general discussion of the effects of bacteria in setting up one or other form

of disease. Nevertheless, we welcome the chapter upon pathogenic protozoa, in which a most valuable summary of our knowledge of the sporozoa, including the organism of malaria, is to be found in very clear language. Professor L. J. Mitchell, of the University of Illinois, treats briefly but clearly of the animal parasites, while the chapter upon intoxications has wisely been given to Professor Victor C. Vaughan, of Ann Arbor, and forms a most authoritative discussion on this subject. Professor Carter, of the University of Texas, discusses the general pathology of fever, and Dr. H. T. Lewis, of Chicago, has an interesting and well-written chapter upon teratology.

Coming now to special pathology, the article upon the blood is by Dr. R. C. Cabot, of Boston; it is needless to say that this is well and authoritatively written. Dr. A. A. Stevens, of Philadelphia, contributes the chapter upon the circulatory system, which is admirably illustrated. The nervous system is taken by Dr. Joseph Collins. We have, however, not been able to study this completely, but so far as we have seen it, it appears to us to afford a very adequate, if condensed, account of the main pathological facts at present in our possession. The article on bones is again contributed by Professor Hektoen, while that upon the muscles, tendons and bursæ, is from the hand of Professor Warthin, of Ann Arbor. Dr. A. G. Nicholls, of Montreal, contributes a chapter upon the digestive system, and by dint of very considerable condensation, Dr. Nicholls has managed, not merely to give the main details of the special pathology of the alimentary canal, the liver and pancreas, but to preface each section with a useful outline of what it is now the fashion to term pathological physiology, of digestion and the digestive organs. What strikes us as particularly good is his study of the pathology of appendicitis, of pancreatic disorders, and of cirrhosis of the liver. Professor McFarland, of Philadelphia, deals with the respiratory system; Professor Hektoen, with the ductless glands; Professor Riesmann, the other editor, has a well-written and well-illustrated article on the urinary organs. Other sections upon the female genital tracts, the breasts, skin, the eye and the ear, are from the pens of H. D. Beyea, of Philadelphia, J. Collins Warren of Harvard, F. H. Montgomery, of Rush Medical College, Ward A. Holden, of New York, and Jas. A. Spalding, of Portland, Me., respectively. Although the book is of large size, with no less than 1,245 pages, yet, when each section is studied, it is found that in order to give the leading facts in regard to each organ, there has been extensive condensation. But I have little doubt that the work will take its place as an indispensable text-book for those on this Continent who desire more than a mere outline of the facts of pathology.

T H E

Montreal Medical Journal.

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

EDITED BY

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VOL. XXXI.

FEBRUARY, 1902.

No. 2.

THE RETIREMENT OF DR. ROBT. CRAIK.

It is with sincere regret that we announce the retirement of Dr. Robert Craik from the Deanship of the Medical Faculty of McGill University. Dr. Craik succeeded the late Dr. R. P. Howard at the latter's death in 1889, and has thus held the position for more than eleven years—eleven years of uninterrupted progress and prosperity, due in no small measure to his administrative ability, indefatigable energy and careful supervision. His heart was always in his work. During Dr. Craik's term of office many reforms and improvements have been instituted; the course has been lengthened and many new subjects have been introduced, the buildings have been enlarged, and especially have commodious laboratories been added for State medicine, pathology, histology, physiology and pharmacology.

The opening last autumn of the new buildings given by members of the family of Lord Strathcona was a fitting close of a most successful, progressive and eventful administration. Dr. Craik's last public act as Dean was to read an address at that Royal function, giving a short history of the Faculty, before the Prince declared the new buildings open.

Although Dr. Craik has left the Faculty, his interest in it is still active and his appointment as one of the Governors of the Royal Institution will enable him to influence in no slight degree the future conduct of the Faculty.

To his successor, Professor T. G. Roddick, M.P., we offer our congratulations, and we feel sure that under his guidance the cause of medical education will be much promoted and the Medical Faculty of McGill University will be known in the future as in the past as a progressive institution.

THE CANADIAN FIELD HOSPITAL.

The 10th Field Hospital, Canadian Army Medical Corps, sailed on the S.S. Victorian for Cape Town under the command of Lt.-Col. A. N. Worthington, a graduate of McGill University, who has already earned credit and distinction as surgeon to the Brigade Division of the Royal Canadian Artillery, which served in Africa in 1900. Its other officers are men who have had some experience in the Canadian Army corps, and their position in the profession coupled with the prevailing good class of the non-commissioned officers and men, is a very hopeful indication of the work that the hospital will perform.

Apart from the political aspect of the case it is a good thing that, side by side with regiments for service, Canada should send a representative of the medical corps. We not only give service thereby but we obtain an education which we can get in no other way. It is an unequalled opportunity that Canada along with the other colonies has had, whereby she has been enabled to give practical war experience to some thousands of men, who should be a considerable leaven to her militia; and the Canadian Army Medical Corps should be a gainer because of a number of medical students in the ranks of the 10th Field Hospital, who, returning after a year's experience, should be able to hold commissions with credit and advantage to the service.

It is to be hoped that the equipment will be in all points an efficient one. To outfit the hospital with Canadian waggons was undoubtedly a good move. In point of endurance and lightness the American wagon is ahead of all waggons, and the British ambulance is the clumsiest vehicle known to modern times. An attempt was made to supply an X-ray machine, but a suitable one could not be obtained, and the hospital's efficiency is not lessened by its absence as there is not the least likelihood that they could have carried it on the field.

A number of Canadian nurses have also been despatched by way of England; the majority of the six or seven sent were in Africa with the First or Second Contingents, and made an excellent name for themselves. Of course it will be understood that they, like all the Army

Nursing Sisters, are employed at the base hospitals and at no time are allowed with any of the field hospitals or bearer companies in the actual field of battle.

To the uninitiated it may be stated that the field hospital and the bearer company are two separate units which work in conjunction; "first aid" falls to the bearer company, all the subsequent treatment to the field hospital until the latter can hand over the patient to the base hospital, which is a large permanent institution capable of treating as many as 1,500 patients. It has hundreds of tents, an ample staff of surgeons and nurses, and is situated in almost all cases close to the railway line.

Perhaps the most efficient of all field hospitals in the war have been those sent by Australia. Officered by surgeons of more than average ability, manned by an excellent class, they have again and again called forth favourable comparison with the Imperial hospitals, and there is no doubt that our field hospital, now on service, can be depended upon to make for itself a reputation as good as theirs.

THE JOURNAL OF OBSTETRICS AND GYNÆCOLOGY OF THE BRITISH EMPIRE.

We most heartily welcome the first number of this new journal. It is now twenty years since, after the issue of eight annual volumes, the *Obstetrical Journal of Great Britain and Ireland*, died a natural death. Since then, in the whole British Empire, there has not existed more than a single special journal devoted to obstetrics and gynæcology, while in Germany and France, besides other European countries, numbers of such periodicals have for many years thriven. Besides the larger journals, such as the *Archiv*, *Zeitschrift*, and *Monatschrift*, Germany has supported for a considerable time the very flourishing weekly *Centralblatt*. Such a state of things as just alluded to has many times been felt to be most discreditable to British medicine. Hitherto, save in the *British Gynæcological Journal* and the *Transactions of the Obstetrical Society of London*, the authors of papers and other communications have had to resort to the general medical journals to appear before the profession.

The new journal is edited by Mr. Alban Doran, aided by Drs. Berry Hart, F. W. Kidd, and W. J. Sinclair, and there is a representative editorial committee of some of the most prominent gynæcologists of London, Edinburgh, Dublin, Glasgow and Birmingham. Besides these names, there is a long list of collaborators representing every important city and town in the empire. The list for Montreal includes Drs. William Gardner, J. Chalmers Cameron and F. A. L. Lockhart.

The first number contains a most interesting and valuable list of papers, by Drs. Cullingworth, Peter Harrocks, and Professors Sinclair and Murdock Cameron. Dr. Berry Hart appears in a paper which he entitles "Obstetrics at the beginning of the Twentieth Century; an Attempt at an Appreciation." This is a most interesting historical review of progress in obstetrics during the last century. Dr. Arnold W. W. Lea furnishes "A Critical Essay on Anæsthesia by Subarachnoid Injections of Cocaine in the Lumbar Region; its use in Gynæcology and Obstetrics." This paper will be a valuable guide in this matter as the experience of a great variety of workers, Continental, European and American, is drawn upon to throw light upon the subject. A full and interesting review of current literature, bearing on obstetrics and gynæcology and one book review, close the number.

The vacancy in the position of Assistant Laryngologist to the Montreal General Hospital has been filled by the election of Dr. George K. Grimmer, after a very close contest, three good men having applied for the position.

Dr. Grimmer is a native of St. Andrews, New Brunswick, and obtained his early education at the University of New Brunswick at Fredericton, where he graduated B.A. in 1887. After graduating M.B., C.M. at Edinburgh University in 1892, Dr. Grimmer spent six years in general practice before taking up the study of Laryngology. Since that time he has devoted himself exclusively to the study of his specialty. In 1900 he received the degree of F.R.C.S.E., and in 1901 on presentation of a thesis the degree of M.D. with honours from Edinburgh University.

GRADUATE MEMBERS OF THE ALPHA DELTA PHI FRATERNITY.

G. E. Bayfield, M.D., '98, who has been practicing in Annapolis for the last three years has settled in Portage la Prairie.

H. M. Kinghorn, M.D., '94, is practicing in Saranac Lake where for a time he had charge of the Adirondack Cottage Sanitarium.

W. W. Lynch, M.D., '98, is practicing at Sherbrooke, P.Q.

L. N. Murray, M.D., '00, is settled in Halifax, N.S.

R. R. A. Shore, M.D., '99, has returned from London, where he took his M.R.C.S. and L.R.C.P. degrees, and has settled in Toronto, Ont.

T. F. Bayfield, M.D., '01, is Assistant House-Surgeon in the St. John General Hospital.

R. U. Patterson, M.D., '98, has joined the United States Army Medical Service and is now stationed at Fort Meyer, Washington.

Proceedings of the McGill Medical Society of
Undergraduates.

LONGEVITY.

BY

D. W. McKECHNIE, '03.

Longevity is a term that may be used to express either the length of life of any organism or the prolongation of life to an advanced age. Of these two meanings the first is the more scientific, since it may be applied to the duration of life, although that duration may be relatively short; for example we may contrast the longevity of the mould, which lives only a few hours with that of the forest tree, which survives centuries; on the other hand the second meaning is the more common as when very advanced age is spoken of as an example of great longevity.

Our information regarding the natural duration of life in the lower forms of plants and animals is very limited, and it can scarcely be asserted that here there is a natural period of life. A simple organism composed of cells, or even one more complicated but still having the vital organs constructed upon a simple type, may continue to live and grow so long as external conditions are favourable. The tissue of the organism shows no tendency to decay and life is prolonged until a change in external conditions so affects the processes of nutrition as to make the continuance of life impossible.

Leaving out the lower forms of plants, the duration of whose lives we know nothing, the higher plants may be classed into annuals, which grow up in spring and die in autumn, biennials, which die at the end of the second year, and perennials which may last from four to thousands of years. It is interesting to note that strongly scented plants have often a longer duration of life than those destitute of smell, also that soft-wood trees like the fir, birch, and horse-chestnut, grow rapidly and have a comparatively short life, while hard-wood trees, such as the oak, maple and hickory, grow slowly but live long.

According to Hufeland, a distinguished German physician and writer on medical subjects, the chance that a plant has of attaining a great age, depends on the following conditions:—

It must grow slowly, it must propagate slowly and late in life, it must have a certain degree of solidity and hardness, it must be large

and have a considerable extent of surface, and finally, it must rise well into the atmosphere.

In the animal kingdom, there is great variety as regards the duration of life, but no very accurate data have yet been collected; however, it is highly probable that cold-blooded animals such as fishes, frogs, toads, etc., in which tissue change goes on with extreme slowness, may live for many years. Pike and carp have been ascertained to live 150 years, the tortoise 100 years, and it is said by natives of India that the crocodile may live at least 100 years.

Amongst mammals, the elephant is supposed to attain the greatest age, reaching above 100 years, the camel generally lives to 50 years, and may reach the age of 80, the horse does not live more than 40 years, the deer 30 years, and the ox 15 to 20 years.

Prof. Owen is the authority for the statement that in many cases certain relations undoubtedly exist between the degree of longevity enjoyed by an animal and the time of its development in utero, but to this statement there are, of course, many exceptions. Again, it would appear that the sooner an animal attains maturity, the sooner it propagates, and the shorter will be the duration of its life. The reproductive act may be regarded as the culminating act of the organism, requiring the highest degree of vitality and involving the largest expenditure of energy; this act will therefore be performed when the organism has reached maturity, which condition is reached in some animals later than in others, but in all, the period of maturity may be taken as about a fifth part of the whole duration of life.

The question of longevity, however, probably presents the greatest interest in its relation to man. It is still a popular belief that the earliest inhabitants of the world possessed an incredible strength, were of an enormous stature, and lived to a very great age. The ages of the patriarchs before the flood are often taken literally, although the conditions making such long lives possible are at variance with those of human existence at the present day.

In ancient history, there are instances given of heroes who attained the age of several hundred years, but these must be regarded as mythical; however, the following cases of extreme longevity have been placed on record:—Margaret Patten, 137; the Countess of Desmond, 145; Thomas Parr, 152; John Rooin, 172; and Peter Torton, 185. There can be little doubt that the ages of these persons have been exaggerated, for they lived at a time when no accurate records were kept, and the dates of occurrences were fixed by comparing them in the memory with other events believed to have happened about the same time. Still they were instances of prolongation of human life far be-

yond the usual limits, and there is no reason for doubting that these persons lived till they were upwards of 100 years of age. Taking one case, that of Thomas Parr, who was said to be 152 years old at death, Hufeland in his "Art of prolonging life," makes the following interesting note:—

"Thomas Parr, a native of Shropshire, England, was a poor farmer's servant and obliged to maintain himself by daily labour. When 120 years of age, he married a widow for his second wife, who lived with him 12 years, and who asserted that during that time he never betrayed any signs of infirmity of age. Until his 130th year, he performed all his usual work and was accustomed even to thresh. Some years before his death his eyes and memory began to fail, but his hearing and other senses continued sound to the last. In his 152nd year, his fame had reached London, and as the King was desirous of seeing so great a rarity, he was induced to take a journey thither. This in all probability shortened his existence, for he was treated at court in such a royal way, and his manner of living was so totally changed, that he died soon afterwards at London in 1635. He was 152 years and 9 months old, and had lived under nine kings of England.

What was most remarkable in regard to this man was that, when his body was opened by the celebrated Dr. Harvey, his internal organs were found to be in the most perfect state, nor was the slightest symptom of decay to be discovered in them. His cartilages were not even ossified, as is the case in old people, and the smallest cause of death had apparently not yet settled in his body. He died merely of a plethora or excess of blood, which condition was brought about by his being too well treated."

The average duration of life in Europe, is about 35 years which falls far short of the possible longevity, a circumstance chiefly to be accounted for by the great mortality in the early years of life.

Laplanders live to an advanced age, men of from 70 to 90 years being common among them. The American Indians have apparently as long a life on the average as the white men, and it would appear to be the same in the case of the negro, although a census taken of the State of New Jersey, gave one negro centenarian in every 1000 of population, but only one white centenarian in 150,000.

The manner of life and nature of the occupation apart from hereditary and special causes have a most important influence on the duration of life. Few emperors or kings have attained the age of 80; and of more than 300 popes only six have exceeded 80 years. It would seem that brain work is not unfavourable to long life, it being almost proverbial that statesmen and judges often reach an advanced age.

Many men famous in literature and science have lived long lives, thus from 50 to 60 we have Tasso, Virgil, Shakespeare, Dante, Pope, Horace, and Demosthenes; from 60 to 70, Galvani, Aristotle, Milton and Rousseau; from 70 to 80, Dryden, Locke, Swift, Roger, Bacon and Charles Darwin; from 80 to 90, Thomas Carlyle, Plato, Goethe, Franklin, Newton and Voltaire; and from 90 to 100, Sophocles, Michael Angelo and Titian.

Physicians are often long lived as—Haller, Darwin, Jenner and Galen died between 70 and 80 years of age; and Harvey, Pinel and Margagin, between 80 and 90, while the father of medicine, Hippocrates is credited with 109 years.

The question naturally arises, what are the physiological conditions in the human being that determine longevity?

In the first place there is the influence of heredity. Certain peculiarities of tissue, transmitted from parent to offspring, determine whether or not that tissue will remain for a lengthened period of time in a normal condition, or whether it will quickly yield to external influences and degenerate. As the life of the body is really the sum of the lives of its constituent parts, or in other words, of the cellular elements composing it, it is evident that anything affecting the healthy action of these cells, will affect the life of the body as a whole.

So it is that in some individuals the tissues have, what may be termed an hereditary taint, and consequently they readily pass from a normal into an abnormal condition, which, of course, is unfavourable to longevity.

In the next place, even healthy tissues capable of resisting ordinary influences may be unable to resist long continued unfavourable conditions. In the course of time slow changes begin in these tissues, which will in turn affect the organ in which the tissue exists, and that organ by improperly performing its functions will bring about injury to the whole system.

Thus it is that habitually breathing an impure atmosphere, eating improper food, saturating the body with alcohol or with drugs, over-exerting the nervous system by excitement or prolonged brain-work, and sexual excesses, debilitate the body by working slow but sure changes in the tissues, which will inevitably tell upon the longevity of the individual.

But even under the most favourable conditions, there seems to be a limitation to the healthy action of tissues, and old age comes on. Whether this is, or is not, the result of long hereditary transmission, is still a debatable question. However, it is a state of things all flesh is heir to, and if it be hereditary, as is highly probable, there is the

satisfaction of knowing that such states can be slowly influenced by individuals living in the best possible conditions and transmitting the influences of good moral and physical hygiene.

Thus a race which has a low degree of longevity may acquire, by persistent attempts to live in the best conditions, a long average duration of life, and this is also true, though to a less extent, of an individual.

Each tissue has a life of its own, it is developed, reaches maturity, declines and dies. It may be replaced by successive generations of similar tissues, but its power of reproduction becomes weakened, and by slow degrees it may disappear or may become so altered as to be quite unlike what it was at first. By these tissue-changes, functional changes of great importance to the body are brought about. Thus, as age comes on, the blood becomes poorer, respiration is less active, the vital capacity of the chest, that is, the working quantity of air, is diminished; the temperature of the body is slightly increased, so that the aged are more sensitive to cold; the digestive organs are less vigorous; the walls of the arteries become hardened by earthy matter, and lose their elasticity; the veins become dilated, and the circulation is not efficiently performed; the teeth decay, and disappear; the cartilages become calcified and hard; the skin is shrivelled and dry and cutaneous respiration and excretion are less perfect; the hair whitens or falls out; and the stature and weight generally are diminished. By and by, muscular movements are less energetic and less precise, and there is a tottering gait. The cartilages of the larynx ossify, the vocal cords lose their elasticity and the voice becomes a shrill treble.

Then the involuntary muscular tissues are affected, so that the bladder is less powerful and peristaltic action of the stomach and intestines, feeble. The transparent media of the eye become dimmed, the near point of vision is pushed back so that the old become presbyopic or far-sighted, and the power of accommodation is entirely lost; the delicate mechanism of the drum and bones of the ear is impaired and deafness results.

Slowly the intellectual faculties become weakened, the emotions blunted, and the memory by degrees becomes less trustworthy, and at last vanishes. Much of the time is now spent in sleep and unless some intercurrent disease snaps the thread of life, there is a slow ebbing of existence into natural death.

In the first half of man's age, an active life is conducive to longevity, but in the later half a life that is peaceful and uniform is more favourable. However, if the constitution be sound, life may doubtless be prolonged for many years by moderating the passions and by temperance.

That so complicated a machine as the human body, so delicate in its mechanism, and so exquisitely formed in all its parts, should continue for years to perform its various functions, even under the most prudent conduct, is not a little surprising; but that it should do so to an advanced period under all the rude shocks it meets with, is still more truly miraculous. But all the long livers did not pursue one uniform course of life, for some of the most noted ones were frequently guilty of great irregularities in their manner of living.

However, let not this encourage the thought that excesses of any kind can go hand and hand with longevity.

On the whole it may be said, that all extremes are unfavourable to long life. Excessive heat enervates the body, extreme cold renders it torpid; sloth and inactivity clog the mechanism of the human machine, while incessant labour soon wears it out. On the other hand, a temperate climate, moderate exercise, pure country air and strict temperance, together with a prudent regulation of the passions, will prove to be the most efficient means of extending life to its utmost limits. And so, it may be explained, why the cultivation of philosophy, music and the fine arts, all of which manifestly tend to humanize the soul and calm the ruder passions, are so highly conducive to longevity.