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## PRESSURE PARALYSIS.

BY

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Gentlemen:—So recently as November 23rd, I was requested by Dr. C. A. Pease, assistant division surgeon of the Rutland Railroad Company, to come to Burlington and deliver an address on December 15th to the surgeons of the Railroad Company. This invitation I at once accepted, feeling honoured by the request. The subject I have decided to talk about is Pressure Paralysis, and I shall present it under the following heads:—

First—Cerebral pressure, one case.

Second—Spinal cord pressure, one case.

Third—Corda equina pressure, one case.

Fourth—Paralysis of the brachial plexus in adults, seven cases.

Fifth—Paralysis of the brachial plexus in children, six cases.

In the present paper I shall give only a brief description of the thirteen cases of brachial palsies in adults and children, stating mainly the essential features, and shall confine myself chiefly to the three groups just mentioned. In a future publication I shall take up the cases of brachial paralysis more in detail.

The clinical symptoms of pressure paralysis frequently follow railway accidents, and are also not uncommon in general practice. So for that reason I think this subject appropriate to lay before you, who are not only railroad surgeons but general practitioners as well.

Pressure paralysis is a very wide term, but what I intend to speak about more particularly to-night is the result of pressure on the central nervous system, as in cases of depressed fracture, fracture and dislocation of the spinal column, and, lastly, pressure on the peripheral nerves from injury.

I think that it would be just as well to make a hasty sketch of the central nervous system before taking up the subject proper. The central nervous system is made up of motor and sensory neurones. A

neurone consists of a cell body and processes (dendrite and axone). In the brain proper we have, in addition to the motor and sensory neurones, other neurones which make up that part of the nervous system, in which is situated the higher mental faculties and the special senses, such as vision, taste and touch.

Let us first take up the *neurones for motion*. It is seen that there are two distinct systems of neurones, one called the upper the other the lower motor. The cell bodies of the upper motor neurone are situated in the motor area of the cortex round about the fissure of Rolando, their axones or nerve fibres penetrating inwards to the centre of the brain, pass down the internal capsule through the pes, pons and medulla, reach the cord, and end by arborization round about the cell bodies in the anterior horns, either in the cervical, dorsal or lumbar sacral regions of the cord. Some only reach the floor of the fourth ventricle, and do not enter the cord. The cell bodies of the lower motor neurones lie in the third and fourth ventricles and in the anterior horns in the whole extent of the cord. Their axones passing from the brain form the cranial nerves, while the axones of the cell bodies in the anterior horns pass out at the anterior surface of the cord, and are there called the anterior roots; from there outwards in connection with the sensory neurones they constitute the peripheral nerves. Now, let us take up the position of the *sensory neurones*. Like the motor, we have two systems, the upper and lower. The cell bodies of the lower sensory neurones lie in the ganglia of the posterior roots of the cord. Their dendrites stretch from the skin up to the cord, and along with the lower motor axones make up the peripheral nerves. The axones of the lower sensory neurones, after leaving the ganglia, enter the cord at the posterior roots, and, through some processes, arborize around the cells in the posterior horns of the gray matter; some go to the anterior horns of the gray matter, while others ascend in the posterior columns to the medulla, and there ramify around the cell bodies of the upper sensory neurone. The axones of the upper sensory neurones ascend from these upwards to the brain by way of the fillet.

I have just mentioned that there are two systems in the motor and sensory neurones, but in all likelihood there are relays of neurones, interspersed between the periphery and the cerebral cortex, as, for instance, some of the upper sensory neurones pass first to the cerebellum, and from there on to the cerebrum. But for all intents and purposes required in this lecture, or for knowledge to understand the clinical signs of involvement of the nervous system, this will suffice.

Now let us see what are the functions of the upper motor neurones.

Firstly, motion; secondly, inhibitory action or controlling influence over the lower motor neurones. Injury, let us say of the upper motor neurones of the leg-centre in the cerebral cortex, is followed by paresis or paralysis of the leg, and following this, due to the inhibitory control being removed from the lower motor neurone, the tone in the muscle is greatly increased, and this is shown, clinically, by the presence of a rigid or spastic gait. But the tone of the muscle, as already said, being increased naturally, one finds that the deep reflexes are all increased, this being really a mechanical condition, and not due to a true reflex, which will be discussed later on. There is no alteration in the muscles to faradic and galvanic current. Injury or destruction of the lower motor neurone is followed by paresis or paralysis of the leg. On account of the lower motor neurone being the trophic centre for the muscles, a flaccid condition is present, this being an expression of lack of tone. This condition is soon followed by an atrophy of the muscle on account of its trophic centre being destroyed, and along with this we find marked lessening or loss to the faradic current and typical galvanic alteration or degeneration. As we have here a flaccid condition, due to loss of tone, we find that the deep reflexes are lost.

Let us now take up the lower sensory neurone. Destruction or injury of the lower sensory neurone produces a paresis or paralysis of sensation in the leg, giving clinical signs of either objective or subjective sensory disturbances. Following this, certain loss of tone occurs, and the deep reflexes are lessened or lost. There is no alteration to faradic or galvanic irritability in the muscles. Injury or destruction of the upper sensory neurone produces exactly the same symptoms as the lower sensory with this exception, that the deep reflexes are normal, while in the lower sensory neurone we saw that they were absent.

I might here stop for a moment and discuss particularly the ætiology of the deep reflexes, such as the knee jerk, elbow jerk and Achilles' reflex. To obtain a reflex in the lower animals, and even in the monkey, it is necessary for the lower motor and sensory neurones to be intact, so that when tapping the patellar tendon the impulse or stimulus travels up the lower sensory neurones and forward to the cell body of the lower motor neurones situated in the anterior horns. From there the impulse is carried down to the muscle, with the result that we get a knee jerk. In man it is not the same. I will try to explain in as brief a way as possible wherein lies the difference. We know that the lower motor neurone supplies tone to the muscle. The amount of that tone is regulated by the upper motor neurone. Let us say, for the sake of argument, that the normal lower motor neurone gives out 100 per cent. of tone, and, to use a mechanical term, let us call it "*rebound*." Now, though the lower motor neurone gives out

normally 100 per cent. of tone, yet it can give out 200 per cent. The upper motor neurone acts in an inhibitory manner by restricting it, and 100 per cent only is given out, but if this restricting power were removed, the tone would bound up in proportion to the loss of the inhibitory power anywhere to between 150 and 200 per cent. Let us take as a simile a violin, and screw one string up to C. Now, let us allow some dust particles to alight on the cat-gut, and by suddenly vibrating the string the dust particles will jump off, perhaps an inch distant. Let us screw the string up to F, and we should find that in vibrating the string the dust particles would rebound three inches. This goes to show that when the tone is increased or otherwise stretched up by mechanical force, impulse becomes greater. Slacken the string to A, and we should find that the tone is lessened, and the mechanical propulsive power is equally in proportion lessened. So it is in man. When we have the tone of our lower motor neurone normal, which is 100 per cent., and let us compare this normal condition as being equivalent to the violin string when tuned up to F, mechanical striking of the patella with the leg at right angles to the thigh throws the foot forward; in other words, the knee jerk is obtained. But if due to some injury or removal of the controlling influence of the upper motor neurone over the lower motor neurone, the tone of the muscle is increased 150 to 200 per cent., then the knee jerk becomes markedly exaggerated. We saw in the violin that when the string was slackened and the tone thereby lessened the mechanical impulse was also lessened. Now, when we have any disease affecting the lower motor neurone, the function of which is to supply tonic and trophic influences to the muscle, the tone becomes lessened, and we find the muscles in a more or less relaxed state, just as we find when we slacken the string of our violin, and here also we find that when we tap the patella the excursion forward of the foot is lessened or lost in proportion to the diminution in tone. Following this, as the lower motor neurone is the trophic centre, we find atrophy taking place, and also the typical signs of reaction of degeneration to electricity.

Now, let us take up what occurs when we have involvement of the *lower sensory neurone*. But before doing so, let me here state that any neurone, to be perfectly normal, must obtain sufficient nourishment and stimulation; removal of either will produce lessened vitality, with the result that its normal functions are lessened. We know that the axone of the lower sensory neurone enters the cord by way of the posterior roots; here it sub-divides and sends some fibres or collaterals to the cells in the posterior horns; other branches run forwards to the anterior horns, and there arborize around the cell bodies of the lower motor neurones. If by experiment or by disease the connexion between

the lower sensory and lower motor neurone is interfered with, the normal stimuli necessary for the lower motor neurone to act being affected, the vitality of the cell is affected and a certain amount of loss of tone occurs. For the sake of a figure, let us call the normal tone 100 per cent. Now, any diminution in tone, however small, has a marked effect in diminishing the reflexes. This is noticed clinically, as the knee jerk is the first thing to disappear and the last thing to reappear, which shows that this idea is correct, and that the knee jerk and other deep reflexes are simply an expression of tone. Let us take as an instance a case of tabes dorsalis where the knee jerks have been lost for years, supposed to be due to the reflex arc being destroyed. The sensory neurones being completely degenerated, no stimuli can pass along them. Suppose this patient develops a hæmorrhage in the internal capsule. This will partially or completely destroy the upper motor neurones, with the result that the inhibitory influence over the lower motor neurone is removed. This being so, there is an output of tone from the lower motor neurone, and we find all the reflexes greatly exaggerated on this side, while the knee jerk might still remain absent on the other side. If the patient makes a good recovery in time, the knee jerks will be lost. This can be shown again in cases of complete transverse division of the cord in man where we have complete paralysis of motion and sensation, flaccidity and absence of the reflexes. Take a faradic battery, apply two needles to the ends of the wires, place one in the calf muscle, the other in the external popliteal nerve, continue this for half an hour or an hour, and if the division of the cord has been fairly recent, you can get the return of the knee jerk, lasting for a few minutes to half an hour. This is obtained by the increased tone produced by the battery. Similar conditions can be seen in tabetic patients, who later on in the disease develop general paralysis. In this condition the upper motor neurones are affected, and the picture first presented as a true tabetic condition passes into one where the reflexes are greatly exaggerated. I could relate many such cases showing that man and the lower animals are not comparable with regard to the ætiology of the deep reflexes.

As to the result of pressure upon the brain, spinal cord and peripheral nerves, let us begin first by observing what happens when, either by accident or by disease, pressure is exerted upon the peripheral nerves. To illustrate this, let us suppose that we have before us a dog with its sciatic nerve exposed. On this we place a test tube half an inch in circumference containing mercury one inch in depth. In an hour we shall find that the motor paresis begins to develop, while sensation to touch, pain, heat and cold is normal. If this be kept up for four or five hours the paresis becomes more marked, but there is no

alteration in sensation. Now, let us place two inches of mercury in the same tube, and apply it to the sciatic nerve of another dog, and we shall find that motion will be affected in from a few minutes to half an hour, while sensation will become involved in about two hours. At the end of six hours we shall find total paralysis of motion and sensation. If the tube is removed at that time, within twenty-four hours, sensation, subjective then objective, will reappear. It would be six or ten days before motion would return. It follows that if pressure was kept up for a fortnight or more recovery of motion and sensation would be extremely retarded. In all these experiments before motor paralysis or paresis supervenes the reflexes gradually diminish or become lost. All the above symptoms have been brought about simply by the pressure preventing the stimuli or trophic influences from coming down from the cell body to the muscles in the extremity, with the result that the trophic influence being interfered with, secondary changes have taken place in the muscles and paresis or paralysis developed, the reflexes have been lost, and if the condition has been prolonged, atrophy has made its appearance and electrical changes have become pronounced.

Now, let us take up the clinical signs manifested when we have pressure applied to the spinal cord, as, for instance, in cases of fracture, dislocation or pressure from a neoplasm or in pressure following Pott's disease. If pressure is exerted on the spinal column, paresis or paralysis of motion is the first to appear, and as in the peripheral nerves, if the pressure is long continued or severe in extent, the motor paresis is followed shortly by paralysis of sensation. The reflexes at first are greatly increased, and this is due to the pressure exerted upon the upper motor neurones, stimuli being prevented from coming down; the inhibitory influence is removed from the lower motor neurone, with the result that tone is increased in the muscles, and we therefore have increased knee jerks. But if the pressure completely cuts off all the influences of the upper motor and sensory neurones, we have loss of the reflexes, but no alteration to faradic irritability. What is the explanation of this loss of the reflexes? Here we still have the lower motor neurones below the seat of the pressure in a more or less apparent healthy state, and one would expect that tone would be still present, if not increased. The reason for the loss of the reflexes cannot be definitely proven, but Ferrier's theory is, I think, the correct one. He points out that in the lower forms of life the nerve centres are more or less isolated and independent units. We find that the higher we go in the scale the fusion of the nerve units takes place, and the functions become more complex as compared with the simpler forms of lower animal life. Ferrier points out that even in the monkey the animal

next to man, the central nervous system cannot be said to be similar. In the monkey on division of the cord we find a spastic condition and increased reflexes. Extirpation of certain parts of the cerebral cortex in that animal does not give the same symptoms as are obtained in man, and Ferrier shows how in the monkey the nervous system is not all one nervous unit, while in man it is. For the functions of the nervous system to be carried out in the human subject it is necessary to have complete integrity. When a separation of a part of the central nervous system occurs, death takes place, though it may occur very slowly, but function is at once interfered with. Tone can only exist where integrity is present. Of interest in connection with the central nervous system in man, as above stated, it is necessary that integrity be present for the normal reflex function to be carried on. Dr. Beevor reports the case of a child six weeks old, where the spinal cord below the sixth cervical segment was destroyed and possessed no recognizable living nerve element between the two parts. Yet the self action of the centres of the bladder and rectum seemed to be retained. Spontaneous evacuation of the bladder took place resembling periodically and otherwise reflex evacuation. This case shows, I think, that in very young children the nervous system has more resemblance to that of the lower animals. The stimuli not reaching the cell bodies of the lower motor neurones in the anterior horns; "isolation alteration," as it is called by Collier, takes place, with the result that we get secondary changes in the cell bodies, which later on give reaction of degeneration in the muscles.

In the same way isolation alteration takes place in the anterior horn cells when we have the lower sensory neurone involved, as, for instance, in tabes, which gives us an absence of reflexes, due to lessened tone in the muscles; but here we do not find reaction of degeneration in the muscles. Why? Because it is impossible to have all the posterior roots involved, which is necessary before we can get it, while in cord pressure, which is great enough to produce abolition of all the stimuli coming down in the motor and going up the sensory, being equivalent to transverse division of the cord, the stimuli to the anterior horn cells below the site of the pressure is done away with, and we have those cells undergoing isolation alteration changes. If pressure is removed, sensation returns first, then motion, followed by normal response to faradic irritability, and last of all the reflexes.

I shall now deal with Pressure on the Brain from the results of accident or depressed fracture, or Pressure from a Hæmorrhage or a Cerebral neoplasm. The first clinical symptom manifested, especially when the pressure affects the motor cortex, is irritation, as expressed by Jacksonian epilepsy, which is, followed by paresis or paralysis, with increased



reflexes and hypertonicity of the muscles, just the same as is seen when pressure is applied to the cord. This is due to the inhibitory influence of the upper motor neurone being prevented from controlling the output of the lower motor neurone, with the result that tone is increased, producing the symptoms above described. On removal of the pressure, the paralysis disappears, and shortly afterwards the reflexes become normal. We do not find in this latter case any alteration to faradic, to the fact that for the patient to survive a trauma the lesion will in all probability be situated on one side of the cerebral cortex, and more or less limited in extent. The upper motor neurones of the uninjured side not only supply stimuli to the cell bodies in the anterior horns of the opposite side, but also to the horns of the same side, and in this way sufficient stimuli reach the cell bodies to prevent isolation alteration in the cells.

Having now obtained an idea of the aetiology of the symptoms which appear when the peripheral nerves are pressed upon and also of the cord and brain, we can see how absolutely necessary it is to remove pressure at the earliest possible opportunity, so that secondary alteration will be prevented. Having removed the pressure, we must now treat the results produced. What must we do? Knowing the cause and conditions which follow, we have to set about treatment as early as possible. When the peripheral nerves are involved, it is necessary to keep up the tone of the muscles till such time as the stimuli can come down from the cell bodies in the lower motor neurones. This we do by constantly stimulating the muscles either by galvanic or faradic massage. Why do we use the faradic and galvanic battery? If the faradic battery obtains a response, strong current being used, the muscle is stimulated; that is, it causes contraction and increases the tone. If the muscles do not respond to strong faradic electricity, the galvanic form must be used, and this will cause contraction of the muscle so that the muscle is kept in a fairly healthy condition, and when the stimuli do begin to come down from above it will be in a fit state to receive them. Not only do we use the faradic and galvanic battery to keep the muscle as far as possible in a healthy condition, but through the pain occasioned, and also by the action of electricity in stimulating the nerve, impulse may travel up the lower sensory neurone, and by their momentum reach the posterior horns, and from there reach the anterior horn cells producing stimuli which they would not otherwise get, and in this way aid the early return of the normal action of the neurone.

I shall now cite a case:—J. C. C., aged fifty-six, labourer, was brought into the hospital complaining of loss of power and sensation in the lower limbs. He had no serious illness, nor was he unable

to attend to his duties through ill-health. When thirty years old he had syphilis, and was treated for it. Since his youth he has been of intemperate habits, having a spree every two or three months, lasting for three or four days at a time.

On Saturday, November 30th, 1903, he had a spree, and left the public-house at eleven o'clock at night, under the influence of alcohol, with the intention of going home. On Sunday morning he was awakened by some one roughly shaking him and telling him to get up. He attempted to do so, but found he was unable to stand. He then noticed that he was in a stable; he had spent the night there, but was unaware of what had occurred during the interval. He was found lying at the foot of a ladder reaching up to the hay-loft, but whether he had fallen upon attempting to go up or down he did not know. When brought into the Montreal General Hospital, under Dr. Molson's care on Sunday about eleven o'clock, he was suffering from complete motor and sensory paralysis of the lower extremities, with urinary retention. I saw him in consultation with Dr. Molson at twelve o'clock, and it was hard to arrive at the diagnosis. He had a certain amount of ecchymosis and bruising on his back in the lumbar region, but no spinal irregularity. He was in a very nervous state, seemed to be on the "borderland" of delirium tremens, and could give us no help towards diagnosing his case. There were two conditions which might have produced the symptoms, but we were unable to decide between them. One was that he might have fallen from a height and produced fracture-dislocation of the spinal column, causing pressure on the cord. The symptoms pointing to this were pain and the bruising and ecchymosis in the lumbar region. The other condition might have been a thrombosis of some of the spinal vessels, with a resulting softening of the cord. The history of syphilis and alcohol and very marked arterio-sclerosis, which was found to be present generally throughout the body, pointed to the probability that it might be due to this latter condition. A lumbar puncture was made in the hope of arriving at a definite diagnosis. The serum was collected in three different test tubes, and each was found to contain blood-stained fluid. This at once confirmed the idea that trauma was the cause of the symptoms. There was a well-marked motor paralysis and spasticity of both lower extremities, with complete anæsthesia. The reflexes were all exaggerated. There was knee-jerk, rectus clonus, ankle clonus, Oppenheim's, and Babinski's sign. Well-marked girdle sensation was present in the upper part of the abdomen in the region of the eighth dorsal segment. Here also was found an area of hyperæsthesia to heat and cold, about an inch in width; above this point sensation was normal, below the area completely anæsthetic to all forms. Faradic and

galvanic irritability were normal in the muscles of the extremities. As the patient was in such a poor condition, being on the borderland of delirium tremens and his chest full of rales, it was thought inadvisable to have him placed on the operating table and an anæsthetic administered.

On Monday the paralysis of motion and sensation were unaltered, and urinary and rectal retention were still present. The patient complained of a considerable amount of pain in his back and of a girdle sensation. He slept very little during the night, was unable to take nourishment, and there were present symptoms pointing to a pneumonic condition. On Wednesday he was much the same, with this exception, that the reflexes were not so brisk as previously. Galvanic and faradic irritability were normal. On Thursday the reflexes were diminished in the right leg and absent in the left. On Friday all the reflexes were gone and the spastic condition less marked. Monday, on examining him, we found that, in addition to the loss of the reflexes, the muscles showed slight alteration to the faradic and galvanic current, with flaccid paralysis. On Wednesday faradic response was completely absent throughout both lower extremities. The surgeon was strongly advised to operate, as the symptoms now seemed to point to a progressive condition, and were more or less typical of complete transverse division of the cord. The patient was taken to the operating theatre, and given brandy and a hypodermic injection of cocain, administered locally. Dr. Armstrong then made an incision over the spines of the seventh, eighth and ninth dorsal vertebrae, cutting down and exposing the bones. The laminae of the seventh and eighth dorsal vertebrae were found to be fractured, but not causing any pressure. On their removal, and opening the dura mater, stimulation of the cord by mild faradic current did not cause any discomfort to the patient. It was decided that there was pressure further up. On exposing the sixth dorsal, it was found that the laminae were also broken, and pressed forward lying upon the cord. They were removed. The dura mater was opened. No blood clot was found, nor was the cord severed, but a certain amount of flattening had taken place where the laminae of the sixth dorsal vertebra had lain upon it. On stimulation in this region the patient was at once conscious of pain. The wound was closed up, the patient put in a plaster jacket and removed to the ward. Throughout the operation he bore up better than was expected.

This case illustrated to me the value of operating without putting the patient under the influence of a general anæsthetic in all these cases of fracture-dislocation, for the reason that we were able to tell at once whether we had reached the seat of pressure by the patient being able to tell us whether or not he felt the stimulation of the battery.

On the following day electrical treatment was given to the extremities, and this was more or less regularly applied for three weeks. Ten days after the operation the patient began to complain of subjective sensations in his extremities. On the 11th day he was aware of the catheter being passed, and a few days later he was able to tell the orderly that he felt feces passing through the rectum. At this time the knee jerks reappeared, and a week later a well-marked ankle and rectus clonus were present. About the same time faradic irritability to strong current returned in his muscles, the galvanic responses were normal. December 10th, the patient complained of involuntary spasms in the lower extremities. From that time very little progress was made in his condition.

At the present time the patient still suffers from complete loss of motor power, sensation having but slightly returned. Rectal and vesical retention is still present. He is able to sit up in bed, and his general health is markedly improved. Had electrical treatment and massage been carried out, I have no doubt that to-day he would have had a return of motor power, but for many reasons this could not be done.

The history of the course of events in the case just related is interesting in that it resembles very closely the experiment related in the first part of this lecture, namely, pressure being applied to the sciatic nerve of a dog. Here we have first of all a motor and sensory paralysis due to the pressure inhibiting to a large extent the motor and sensory impulses from passing either up or down. The reflexes were increased, due to the inhibitory influence of the upper motor neurone being interfered with. Later on, as the pressure was still being applied, all impulses coming down or going to the brain were completely cut off, just as we would have if the cord was cut through. This was shown, clinically, by the flaccid motor and sensory paralysis. Still later on, isolation alteration had taken place in the cells of the lower motor neurones in the anterior horns below, the seat of the pressure, with the result that we got marked loss of tone and typical reaction of degeneration to the faradic and galvanic battery. The removal of the pressure was followed within a week by the return of the reflexes, then a spastic condition, and later on by the normal response of the muscles to electrical current. Though no discontinuity or severance of the cord was found, no doubt a considerable molecular change and separation had taken place in the axones and myelin sheaths of the neurones of the spinal cord. In the experiment with the sciatic nerve we found sensation was the first to return, later, motion. Now, had the muscles in the lower extremities been kept in good condition by electrical treatment and massage, till such time as regeneration had taken place in

those upper motor neurones that had been injured, the patient might have had considerable locomotive power to-day. No doubt the history of specific disease and alcohol and his age all help to hinder a good recovery.

In this case it is of interest to know whether the results were due to the immediate effects at the time of the accident or to the steady and prolonged pressure on the cord producing a progressive development of a condition which at the 10th day pointed clinically to the symptoms of transverse division of the cord. It is no doubt possible that the fracture and displacement of the laminae of the dorsal vertebrae might have impinged on the cord with such force as to produce marked molecular separation of the constituents of the motor and sensory neurones, and yet not produce a macroscopical alteration in the cord. Immediate operation with the removal of fragments might even then have failed, if the above had taken place. The history of this case rather points to the reverse, it being due to a more prolonged and continuous pressure than from the immediate results of the accident, as shown by the progressive steps in the progress of the case. This goes to show how advisable it is to operate early in all these cases in the hope that little molecular damage has been done, and to prevent by any continuous or prolonged pressure the development of more serious symptoms.

Cerebral Pressure and Laceration:—J. S., aged twenty-eight years, a mechanic in the Canadian Pacific Railway workshops at Hochelaga. Patient while at work was struck on the forehead by a piece of machinery and knocked down, receiving an incised wound on the left side of the forehead. He was unconscious for about half a minute, and was at once brought to the Montreal General Hospital by an ambulance, arriving there at 10.30 a.m. in a semi-comatose condition. When seen shortly after entrance he was suffering from the results of the concussion, and still in a more or less semi-comatose condition, but by talking loudly to him he gave his name and address, and a few facts concerning the accident. The wound was thoroughly washed out by a house surgeon, and no depressed bone or fracture was visible. A few stitches were inserted and the scalp dressed. Dr. Armstrong saw him about 12 o'clock, but no alteration was found in his condition, except that the stuporose state was a little more marked. At 1.30 p.m. Dr. Armstrong found the patient in a very marked state of stupor, and noticed that the limbs were becoming rigid, especially those on the right side. Drs. Blackader, Lafleur and myself were requested by Dr. Armstrong to see the case, as he was inclined to think that the condition of the patient pointed to the likelihood of a fresh hæmorrhage taking place. On examination at this time, the patient, though in a

semi-comatose condition, could be aroused when spoken to loudly, and gave us his name and address. The extremities were not paralyzed, but there was present a certain amount of rigidity, the right side being more affected than the left. No ankle or rectus clonus was present. Plantar flexion was present. Knee joints were normal. Pupils were equal, and reacted to light and accommodation. Pulse at entrance 60, an hour afterwards 45, and at the time of examination 65, full and regular. Blood pressure 175, bladder empty. Patient lay on his back. On admittance he had a hæmorrhage from the nose and vomited blood. No discharge from the ears. Dr. Armstrong diagnosed the case as a probable fracture of the anterior fossa of the cranium. On applying a cloth saturated with ammonia to the patient's nose, sense of smell was seen to be present. On pricking any part of his body with a pin, he resisted and moved about saying, "Leave me alone." Dr. Armstrong said that from his experience in cases where coma became deeper after the patient's entrance to the hospital, a grave prognosis was probable. He wished to have our opinion whether it was wise to carry out a trephine operation and ligature of the middle meningeal artery. With Drs. Blackader and Lafleur, I was of the opinion that, as there were no definite clinical signs pointing to the need of this, it would be advisable to delay for a short time. I suggested that there was a point which might aid us in arriving at a diagnosis, namely, that a lumbar puncture be made to ascertain if blood was present in the cerebral spinal fluid. This was done, and the serum was drawn off into three different test tubes. Blood of a bright red colour was present in equal proportions in each of the tubes. This at once proved that some cortical laceration was present. If the middle meningeal, which is sub-dural, was alone involved, the blood would not likely be present in the cerebral spinal fluid.

Half an hour afterwards, while Dr. Armstrong was showing me a case on the opposite side of the ward, we were hurriedly called across by the nurse to see our patient in convulsions. It was a condition of bilateral epilepsy. Tonic and clonic spasms, well marked with retraction of the head and eyes to the left side and pupils markedly dilated. Ten minutes after this fit, a well marked external squint was seen in the right eye, this probably being due to the irritation of the cortical sixth nerve.

The above symptoms pointed to the need of immediate operative procedure. The patient was taken upstairs and put under chloroform. He had four attacks between the first fit and the time of reaching the operating table. After he had been prepared for operation, a large wound was found penetrating down to the pericranium, starting about one and a half inch above the inner canthus of the eye, and three-

quarters of an inch internal to it, extending upwards, backwards and outwards for a distance of two and a half inches. At the bottom of this a fracture was detected in the bone. A small trephine operation was made over the region of the head and eye centres, that is, the posterior part of the mid-frontal convolution. The dura mater was opened, but no pronounced bleeding was seen, except a general slight oozing. The bone was not replaced, but the scalp was sutured, the head dressed and the patient returned to bed.

The operation was carried out more for the relief of pressure than in the expectation of finding a large bleeding point, for the localized symptoms, retraction of the head, neck and eyes, the rigidity of the right side and the external squint on the left were not altogether sufficient signs in themselves to give a definite localization where it would be advisable to operate. A small trephine operation was carried out, as recommended by Coker and Cushing, in the hope of relieving intercranial pressure, and thereby arresting the hæmorrhage.

The patient made a good recovery from the anæsthetic and operation, slept well that night, and had no return of the convulsions. Next day he was perfectly conscious, the rigidity of the limbs disappeared completely, and in ten days he left the hospital.

The interesting points in this case were that the patient, after being three hours in the hospital, did not show any particular symptoms pointing to a serious cerebral injury more than the semi-comatose condition, the hæmorrhage from the nose and mouth, and the slight rigidity. As the pulse and respirations were good and paralysis absent, one hesitated in recommending an operation. Dr. Armstrong's probable diagnosis was that of fracture of the anterior fossa of the cranium, associated with possible hæmorrhage in the middle meningeal artery, giving the deepening coma as his reason for the latter hypothesis. The lumbar puncture revealing the presence of blood in the cerebral spinal fluid pointed to cerebral laceration being present. The second point of interest was the obtaining of blood in the lumbar region in such a short interval after the accident, which shows the rapidity with which the blood can pass from the cerebral cortex to the lumbar region. Third, the remarkable relief of symptoms upon the removal of a small circular piece of bone and opening up the dura. Fourth, marked improvement in the conditions within a few hours and the drop of the blood pressure—which was never very high—from 175 to 120. Fifth, this case, like the other I have discussed, points to the advisability of operating early for the relief of pressure; for we see, as mentioned in the early part of my paper, how, if pressure is allowed to continue long, degenerative changes take place in the neurones, with the result that recovery is protracted, and last but not least, the tendency is,

where laceration has taken place and pressure is considerable, for inflammatory foci to be induced and followed by more or less serious consequences.

Case of Pressure on the Cauda Equina:—J. M., aged thirty-seven years, sailor. On November 22nd, 1904, patient fell a distance of thirty feet into the hold of a ship, producing fracture dislocation of both ankles. At the time of the accident he did not lose consciousness. He was seen by a doctor, and given an injection of morphia for the removal of pain, and immediately brought to the Montreal General Hospital in the ambulance, and placed under Dr. Hutchison's care. On admission, it was found he had fracture-dislocation of both ankles, with motor paralysis of both legs. He complained of a considerable amount of pain around his waist and down both lower extremities. He had to get morphia for the relief of this pain. Nine hours after entering the hospital the patient was catheterized and seven ounces of fluid was drawn off. Retention, if present, was probably due to the morphia, as he was deeply under its influence. For four or five days he complained of considerable pain starting at his waist and shooting down his legs. On the 27th of November the shooting pains only reached his knees, and for the last two days he has had none. Constipation was a feature at the onset but since the morphia has been stopped, for the last three days, his bowels have opened regularly. He has had no urinary trouble unless as mentioned on the day of admittance. On December 1st Dr. Hutchison requested me to see the patient. I found him lying on his back with his legs widely adducted, and flexed at the knees with rotation outward of the feet. He stated that when lying in this position he imagined his legs were adducted, his knees flexed and the soles of his feet resting on the bed. He is perfectly normal mentally. Over the region of the lumbar spine is a soft fluctuating hæmatoma about three inches long by two and a half broad, which was aspirated three days ago. There is considerable bruising and ecchymosis over the lower dorsal and lumbar regions, extending out on both flanks. On pressure one can detect a depressed fracture in the region of the third and fourth lumbar spines. There is present a marked flaccid paralysis of both lower extremities. Knee jerks, plantar excitability, and cremasteric reflexes are gone. The reflexes in the lower abdomen are indefinite, but in the upper quadrant of the abdominal wall they are well marked with a tendency to be increased. There is no band sensation. Sensation to touch, sharp and blunt point, heat and cold seem to be fairly normal as compared with sensation in the upper extremities; but on the plantar and dorsal aspects of the feet sensations are considerably diminished, this being probably due to the result of the fracture dislocation of the ankles causing pressure on the



nerves. Faradic battery of medium strength, which gives contraction in a healthy individual, fails to elicit any response in the muscles of the lower extremities. With full current, no response is obtained in the left leg, while on the right there is a feeble contraction of the calf muscles with a fairly well marked but slow contraction of the quadriceps. Electrical sense: full current not detected below the knee of the left leg; but as we proceed up the thigh sensation becomes apparent, and about two and a half inches below Poupert's ligament sensation is extremely hyperæsthetic. On the right leg there is no sensation below the knee, but just above sensation begins to appear, increasing in extent to become very apparent at the same level as the opposite side, with this difference, that electrical sense is more marked on the right thigh than on the left. One-half current can be tolerated all over the scrotum; at the base very little sensation, if any, becoming painful near the root of the penis. There is no muscular contraction of the scrotum. There is a bed sore on each heel and a small one on the great toe of the right foot. This is due probably to the pressure of the pillow splints, which were on for several days after entrance, but are not now being used. There is some œdema from the knees down, and slight trophic disturbances in the skin of the feet.

1. An interesting fact is that the probable explanation for the presence of active sensation in the front of the thighs is that the ilio-inguinal, genito-crural and iliohypogastric leave the spinal canal via the foraminæ in the region of the first and second lumbar vertebrae, and the seat of the pressure being in the region of the third and fourth, they have escaped.

2. The absence of any rectal or sphincter trouble.

3. The incompleteness of sensory paralysis going to show that pressure caused motor paralysis, reaction of degeneration, absence of the reflexes, and a flaccid state, yet was not sufficient to produce any great loss of sensation in the limbs from the ankles upwards.

4. The electrical sense being better marked on the right than the left, I have frequently found this condition present where the lower motor neurone is involved, yet not to such an extent as to give typical reaction of degeneration to the faradic and galvanic current. I have also seen cases with the loss of electrical sense, without any electrical changes in the muscles or alteration to sensations of touch, pain, heat and cold, showing in a few days following the typical reaction of degeneration.

5. In this case had we not the fractured dislocation of the third and fourth lumbar vertebrae with the non-involvement of the ilio-inguinal, genito-crural and iliohypogastric nerve, it would be hard to make a differential diagnosis between this and multiple neuritis of the peripheral nerves of the lower extremities.

Pressure Paralysis of the Brachial Plexus in adults, of which six cases are now under treatment at the Montreal General Hospital. [Case I.] A.S., piano player and tuner. He was brought into the Montreal General Hospital under Dr. Hutchison's care, suffering from a simple fracture of the tibia and fibula. The patient is about 5 feet 10 inches in height and weighs 200 lbs., fair complexion and of average intelligence. He has been a constant imbiber of alcoholic liquors, but never remembers having been drunk. The fractured limb was put up in a cast, and about a week later the patient was sent home. He was able to move about a little with the aid of a crutch; eleven days after his return home he began to complain of subjective discomfort down his right arm. On the following morning he woke up to find his arm completely paralyzed. He returned to the Hospital and Dr. Hutchison requested me to see him. I made an examination of the patient five days after the onset of the symptoms and found a complete paralysis of the musculo-spiral nerve of the right arm. There was "wrist drop" with ulnar deflection. He was totally unable to extend the wrist or the fingers, and had great difficulty in raising his arm to the level of his shoulder. Considerable paresis was made out in the triceps, as shown by his inability to extend the arm against the resistance of my forefinger. Power of flexion at the elbow was considerably diminished. The supinators, long and short, were paralyzed, which accounted for the paretic condition of the flexors of the elbow joint and the inability to supinate the arm. The flexors of the wrist and fingers were also affected. The right hand registered 15 on the dynameter, the left 80. The scapular humeral and acromial reflexes were present. Elbow jerk absent. A flaccid condition of the limb was present. Sensation to sharp and blunt point, heat and cold was diminished over the sensory distribution of the musculo-spiral nerve, but in comparison with the extent of the paralysis it was very slight, fairly complete and sharply limited. Subjectively the patient complained of prickling and slight numbness in the tips of the thumb and index finger. The reaction of degeneration in the muscles was positive but not well marked. The electrical sense was considerably diminished to a strong electrical stimulation as compared with stimulation with a pin or pointed instrument.

He has been treated with electricity and electrical vibrations and has been given hypodermic injections of nitrate of strychnin, the arm being kept in a splint, with the result that a rapid progress towards recovery is taking place. The interesting point in this case is the crutch pressure in a patient of intemperate habits leading to the above condition. Prognosis is good.

Pressure Paralysis of the Brachial Plexus: [Case II.] A. D., aged 60

years, labourer, French Canadian, recommended by Dr. Reford. The patient came to my neurological out-door clinic at the Montreal General Hospital, October 20th, 1904, complaining of pain and loss of power in the left arm, with epileptic fits.

*Family History:* Grandfather had cerebral hæmorrhage; has one sister living, mother took alcohol to excess.

*Personal History:* Married three times. Has always been a hard drinker, taking from 10 to 12 glasses a day. No serious illness till five years ago, when he had his first epileptic attack. Was going to a grocery store with his wife when he fell down and lost consciousness; two years afterwards the second fit appeared; does not know when he had the third, but during the last twelve months he has had three; during a fit he always lost consciousness, bit his tongue and voided urine. He is mentally deranged for a day afterwards, but no motor paralysis follows the fit. *Present Illness:* He was perfectly well till Wednesday, October 19, 1904, when, upon getting up in the morning, he had an epileptic seizure, lost consciousness, bit his tongue and voided urine. He states he was unconscious all that day. On Thursday he drank a bottle of brandy and does not remember much of what occurred that day. On Friday he was seized with a pain in the back, and in the evening the pain began to radiate down the arm to the hand. He also noticed that he was losing feeling in his arm. When he awoke the next morning he had lost the sense of position of his arm and had to look around to see where he was. He called in a doctor who prescribed morphia, and three days later he came to the clinic.

*Present Condition:* On examination the arm was found to lie flaccid and absolutely motionless by his side, with the exception of a certain amount of limited movement in the fingers, and this could be seen only when the hand was lying upon his knee. Sensation deficient to touch, pain, heat and cold in the palm of the hand, while above that extending from the wrist to the shoulder it is hyperæsthetic. There is marked arterio-sclerosis present, the pulse feeling like hard shot. Pupils equal. Knee jerks active. No rectus or ankle clonus. Achilles' tendon active. Mentally the patient is very excitable and jumps on the slightest provocation. Faradic irritability was slightly reduced, galvanic cathodal closing showed marked excitability (reaction of degeneration).

November 4th. Faradic irritability considerably diminished requiring a very strong current to produce contraction in any of the muscles. Very marked atrophy is now apparent in all the muscles, but particularly in the deltoid and muscles of the upper arm. Electrical sense is much diminished throughout and absent in the upper arm. Touch, pin prick, heat and cold are felt the same on both arms. Sensation

to wool is only slightly diminished in the palm and back of the fingers, otherwise normal throughout the extremity. Sense of position in the joints of the extremity normal.

November 18th. Pain still present, accompanied by burning sensation. Sensation to touch, pain, heat and cold markedly diminished throughout the whole left arm.

December 2nd. Well marked flaccidity and atrophy of the left arm, with a certain amount of vaso-motor disturbances, particularly in the fingers of the hand. Sub-luxation of the shoulder joint. The deltoid is so much atrophied that it can hardly be made out. Slight movement of the fingers when the wrist is supported, none at the shoulder or elbow joint. Complete anæsthesia to electrical sense, full current, while sensation to touch, pain, heat and cold is only partially affected. Full current of the faradic battery does not reveal to the eye any contraction of the muscles in the left upper extremity, except over the inner front aspect of the forearm below the elbow joint where a slow and sluggish contraction takes place, producing flexion of the wrist.

*Treatment:* Patient's arm is supported in a sling. He is getting galvanism and vibratory massage to the extremity, and along with this, local hypodermic injections of nitrate of strychnin. The prognosis is not favourable, seeing that there is such a complete paralysis of the brachial plexus associated with the rapid appearance of marked atrophy, that the patient is advanced in years, and vascular degeneration is such a prominent feature.

The interesting points in this case are: First, The appearance of an epilepsy in a man of his age, idiopathic epilepsy never appearing at such a time. The onset of epilepsy at this age is often due to cerebral neoplasm or associated with arterial alteration, the latter being the cause in the case. Second, The early disappearance of electrical sense to strong current, when other sensations to pain, touch, heat and cold were more or less normal, and associated with this the marked motor paralysis. Third, As the condition advanced, anæsthesia to all forms of sensation made its appearance in the order one would expect, touch being the last to become affected, as illustrated in the experiment in the early part of my paper.

Paralysis of the Musculo-Spinal from Trauma: [Case III.] J. W., aged 38 years, carter, French Canadian. On November 18th, 1904, he was sent to my Neurological Clinic at the Montreal General Hospital, by Dr. Springle, complaining of inability to raise his arm.

*Personal History.* He has had fits since he was 12 years of age, the attacks coming on usually about once a month. He has no warning. The fits are more frequent if he indulges in alcohol.

*Present Illness* occurred on September 23rd, when he fell from his cart during an attack of epilepsy, and became unconscious. A friend who was driving with him at the time reports that the patient was struck by the horse's hoof and the wheel of the vehicle passed over his left shoulder. The accident occurred at Verdun, about 11.00 a.m. He was at once taken by the ambulance to the hospital. He regained consciousness about an hour after admittance, but was not able to move his arm. He remained in the hospital for twenty-four hours.

On examination at the clinic it was found that there was a paralysis of the musculo-spinal nerve affecting the extensors of the elbow, wrist and fingers. Little objective sensory disturbance was detected. Subjectively he complained of a good deal of numbness and "pins and needles" pains. Elbow reflex absent. Considerable weakness in the flexors of the elbow and wrist. Dynamometer registered 15 L., 50 R. hand.

December 2nd. Examination showed a more pronounced paralysis. Flexion of the elbow against my finger was impossible. Extension of the elbow against the same resistance also impossible. Patient can now raise his arm vertically above his head. The biceps and deltoid are performing their functions well. Supination of the hand is impossible. Subjective complaint is numbness in the thumb, none elsewhere. Faradic irritability is considerably reduced, in the triceps and extensor muscles of the forearm as compared to the right side. Electrical sense is considerably diminished and there is also partial anæsthesia to touch, pain, heat and cold. Knee jerks are very active.

*Treatment:* Same as foregoing patient. Prognosis is hopeful. The patient is younger and the atrophy is not marked. The alcoholic habit will somewhat retard his recovery.

[Case IV.] F. C., aged 29, mill spinner, French Canadian, November 18th, 1904, complains of loss of power in the left wrist. About five weeks ago the patient fell from the third story of the factory to the ground. In falling he caught the railing of the veranda on the second story with his left arm, which was severely lacerated and bruised. He was laid up for a week, at the end of which time he returned to work. He had to discontinue in a few days as he found the left arm was becoming weak. This case is very markedly similar to the other, with this difference, that it is not so severe in type. The prognosis is in every way hopeful.

[Case V.] C. G., female, aged 65 years, Scotch, widow, November 25th, 1904, complains of loss of power in the right arm. This case is also typical of a musculo-spinal paralysis, but here there is no history of trauma or alcoholic habits. The onset has been slow and there has been

both muscular and sensory paralysis with reaction of degeneration in the muscles. After a careful examination we failed to detect any ætiological factor for its production, except the history of frequent attacks of rheumatism.

[Case VI.] A. B., female, age 34, seamstress, patient of Dr. Lafleur's, October 7th, 1904. I saw the patient in consultation in the ward with Dr. Lafleur and she later on attended my clinic. The patient has been of very intemperate habits for the last eight years. After a severe drinking bout, she woke up to find that her right arm was paralyzed, she having slept with it under her head all night. She was brought into the hospital, and when I saw her ten days after admittance, she showed typical symptoms of motor paralysis of the musculo-spiral nerve. No objective sensory disturbances could be detected. Faradic and galvanic irritability were normal. The reflexes were present and exaggerated. In some points this case might have been mistaken for a functional condition. Ten days later she appeared at my out-door clinic, considerably under the influence of alcohol. On this occasion the reflexes were lost. Complete motor paralysis was present. There was considerable anæsthesia to all sensations. Electrical battery, full current, caused no discomfort. Typical reaction of degeneration in the muscles supplied by the musculo-spiral nerve was detected.

An interesting point in this case was that when first we saw her, the increased reflexes, absence of any objective sensory disturbances or electrical changes pointed to the early stage of the disease and mildness of the attack, though the loss of voluntary power was very considerable. On the second visit the advance of the disease was well shown by the motor and sensory paralysis, the marked loss of electrical sense and the reaction of degeneration.

Brachial Palsy. [Case VII.] A. S., aged 38 years, locomotive engineer, February, 1904. The patient came to my clinic at the Mary Fletcher Hospital, Burlington, complaining of complete motor paralysis of the right arm. The history of the case is that seven months previous he had been thrown from his engine a distance of about eight feet, alighting on his shoulder. Otherwise he did not receive any serious injury. When he got up he at once perceived that his arm was paralyzed, but was able to walk to the nearest station, a distance of a couple of miles. On examination, complete flaccid motor paralysis of the right arm was detected. The reflexes were lost. Sensations to touch, sharp and blunt point, heat and cold were normal, being equal to the arm of the opposite side. Typical reaction of degeneration was present in the different muscles of the arm.

Here I first learnt that electrical sense may be completely absent and

other sensations perfectly normal. I had been applying the faradic battery, full strength to the paralyzed arm, without causing any muscular response or discomfort to the patient. In a moment of thoughtlessness I placed the electrodes on the other arm with the result that it caused the most excruciating pain, the patient not only objecting verbally, but using physical force, telling me that the pain was intolerable and that I had "better not try it again."

Birth Palsies due to Pressure on the Brachial Plexus. [Case I.] C. P., aged 5 weeks, was brought to my out-door clinic at the Montreal General Hospital, April 22nd, 1904, with loss of power and sensation in the right arm from the shoulder down. This had been present since birth. Chloroform was used, but the use of instruments was denied by both mother and grandmother. *Present Condition.* There is no apparent movement of the upper extremity on the right side. An abnormal enlargement, about the size of a small walnut, approaching a bony construction was made out on the left side of the neck, running the course of the sterno mastoid muscle. There is a marked enophthalmos, with contraction of the pupil on the right side. The child was put under an anæsthetic and examined by the X-rays to ascertain if there was any trouble in the shoulder joint. Nothing was detected. On application of strong electrical current, no contraction could be made out in any of the muscles of the right or left arm. Treated with galvanism and electric massage, with local hypodermic injections of nitrate of strychnin twice a week. On April 23rd there was no difference. On May 3rd, upon stimulating with the faradic battery, the deltoid and pectorals major contracted sluggishly, as did also to a slight extent the biceps. The child was able to raise the arm and forearm off the mother's lap, but not the hand. This was the first time this movement had been observed. Electrical sense markedly blunted, battery not seeming to cause any discomfort in the injured arm, but when applied to the normal side the child decidedly objected.

June 7th. Slight improvement has taken place, right pupil markedly smaller than the left. July 15th. Mother states that the baby grasps her fingers when placed in its hand; before, it was absolutely paralyzed. July 22nd. There is distinct movement in the arm, forearm and fingers. Elbow and forearm reflexes absent. August 16th. Movement in the forearm and hand much stronger. September 23rd. Faradic irritability still absent in the muscles of the forearm and hand; 7 mm. galvanic current produced contraction, which did not occur before. The bony thickening in the sterno mastoid muscle has now disappeared. October 4th. No change in the eye, but considerable improvement of motion in the arm.

An interesting point in the above case was that when the child was first examined, under an anæsthetic—when it was five weeks old—we were unable with a strong current to produce a contraction in any of the muscles of either the right or left arm. This might have been due to the considerable amount of fat present in the extremities. It also illustrates the fact that in young children the myelin sheaths of the nerves are not as a rule fully developed, and when this is so, response to faradic current is not obtained. Another point of interest was the enophthalmos in the right eye pointing to a probable involvement of the anterior roots of the first dorsal and eighth cervical. The prognosis of the case is favourable. The average duration of a case of this severity would be from a year to eighteen months, and probably considerably over that time if proper treatment is not applied.

[Case II.] O.F., aged two and a half years. On September 17, the patient was sent to me by Dr. Shepherd, with paralysis of the left arm, which had been present since birth. At the time of delivery, the doctor informed the mother that there was a cross-presentation and that the birth of the child would be extremely difficult. At birth the left arm was limp and motionless, and it was thought that there was a dislocation.

Dr. Shepherd saw the child a short time before it came to me, and pronounced the condition as pressure paralysis of the brachial plexus. The mother states that at the time of birth and for months afterwards the arm hung limp by the side and that there was little if any sensation to pain in the limb. She also noticed that the palpebral fissure of the left eye was smaller than the right. *Present Condition.* The child was put under an anæsthetic and an X-ray examination was made. Nothing abnormal was detected. Electrical examination: strong faradic current failed to produce any contraction in the muscles of the left arm, while the same current produced an active response in the right arm. There was marked shortening of the humerus, an inch and a half as compared with the healthy side. Well marked "wrist drop," with ulnar deflection and paralysis of the extensors and flexors of the elbow and fingers. October: Patient has been under treatment since the day above mentioned, and considerable improvement has taken place. There is marked recovery of power in the arm, the patient being able to abduct it from the side and raise the forearm to the level of the head. Paralysis of the wrist and fingers is still present, Sensation in the arm to touch, pain, heat and cold is apparently normal, that is as far as one can judge of it in a child of this age. Elbow jerk absent. Electrical sense is markedly diminished. Very little contraction in the muscles supplied by the musculo-spiral nerve takes



place to strong faradic current. November 15th. The child now cries when given the hypodermic injection. Before this there did not seem to be any painful sensation to the child when it was administered. Stiffness in the wrist and elbow are markedly diminished. Altogether the progress of the case is in every way satisfactory. The interesting points in this case are the history of difficulty at birth, the enophthalmos, the absence of the faradic irritability and electrical sense while other sensations were more or less present. Prognosis is good.

[Case III.] G. K., aged 18 months, Scotch, November 10th, 1904. The mother consulted me on account of her child, who was suffering from a paralysis of the right arm, dating from birth. Family of two, the eldest is two years old and has been able to walk only the last five months, supposed to be due to dislocation of the hip, which occurred at birth. Both the children were born with the assistance of chloroform and forceps. At the time of birth or soon after the mother noticed that the right side of the child's forehead was bruised, and she also states that the right arm was dislocated at the shoulder. About this time she also noticed the difference in size of the pupils, the right pupil and palpebral fissure being smaller than the left. There has been no history of convulsions. *Present Condition:* Mentally the child is bright and the three other extremities are well developed. The right arm shows a flaccid paralysis with well marked "wrist drop" and hyperextension of the carpo phalangeal joint. There is considerable atrophy of the whole limb, and also shortening of the humerus fully half an inch in extent. There is a fair amount of movement in the deltoid and biceps. Examination under chloroform: Faradic battery, mild strength, gives fair contraction in the deltoid, biceps and flexors of the wrist, with very little if any response in the triceps and extensors of the hand and wrist. Sensation to pain and touch more or less normal. An interesting point in this case is the eye involvement, the presence of enophthalmos, which is due to pressure on the anterior roots of the first dorsal and lower cervical; and the considerable motor paralysis and poor development of the bone and little disturbance, if any, to sensation.

[Case IV.] A. G., aged five months, March, 1904, English Canadian. The child was recommended to me for consultation by Dr. Finley. It presented a flaccid paralysis of the whole right arm with "wrist drop" and ulnar deflection, and a considerable amount of rigidity at the shoulder joint, giving the impression that dislocation of this joint might be present. The paralysis has been present since birth. There are two of a family, and at their birth a considerable amount of difficulty was experienced on account of deformity in the mother's pelvis. Had the child examined by X-rays, but nothing abnormal

was detected in the joint. Full current faradic battery failed to produce any contraction in the muscles of the right or left arm. Sensation seemed considerably blunted.

[Case V.] C. C., aged four months, October, 1904. I saw the patient with Dr. G. H. Brown. There was present a well marked paralysis of the musculo-spiral nerve. The doctor informed me that he had considerable difficulty in the delivery of the child on account of the breadth of its shoulders. He was aware that a considerable amount of pressure was applied to the axilla. Twenty-four hours after birth paralysis of the right arm was detected. On examining the child I saw the paralysis was more or less confined to the extensors of the elbow, wrist and fingers and the supinators. Sensations were considerably blunted. There were no eye symptoms and to-day the doctor informs me that, with treatment, very satisfactory results have been obtained. The chief difficulty lies in its inability to supinate the hand.

[Case VI.] B. M., aged three months, Irish, recommended by Dr. Rourke, July 29th, 1904. Complaint is made of paralysis of the right arm. History of difficult labour necessitating traction on the right shoulder; three days after it was noticed that the child had a considerable amount of hyperæsthesia in the right arm, and when touched cried a great deal. On examination by Dr. Rourke marked motor paralysis was present in the right arm with a suspicion of some shoulder joint trouble. On closer examination no joint affection could be detected. A week later a well marked "drop wrist" developed. The child weighed 14 lbs. at birth, September 13th. At this time the biceps, triceps and deltoid have made a good recovery, but there is still present a well marked "drop wrist," with a tendency of the fingers to go to the ulnar side. Flexion and extension of the fingers seem to be fairly good, but there is very little extension of the wrist.

The prognosis of these cases of brachial palsies is in the main good. Where there are considerable nutritive changes with motor and sensory paralyzes of the whole plexus and eye changes, complete recovery may not take place; but for all that, a useful arm is likely to be obtained. Two or three years may elapse before the above results are reached. In the milder forms, where the paralysis is confined to the motor neurones; the prognosis is very good, recovery occurring in from nine to eighteen months. When one thoroughly appreciates the secondary changes that occur in the muscles and nerves of an extremity where the brachial plexus has been injured sufficiently to produce a severe molecular change in the constituents of the neurones, if indeed continuity has not been completely interrupted, the necessity for keeping those muscles and nerves in as perfect a state as we can is obvious till

such time as regeneration occurs. This can be done by means of support to the extremity as by splints, by massage and electrical treatment. This is, of course, much harder to carry out in the young than in the adult, but, fortunately, in the young regeneration is much more lively. Electrical treatment is not so well tolerated in the young as in the adult, and in children galvanism should be used. Begin at zero, afterwards, the poles being put on, it can be run up to 8 or 10 M.M. In others a sedative or even chloroform has to be administered to allow of a proper treatment being carried out. Many an arm has been irretrievably lost partly by the mother's and partly by the physician's hesitation to cause the child so much discomfort as occurs when applying treatment. I saw a case where marked improvement took place in an arm that was supposed to be hopeless. The surgeon returned the flesh of the fingers and elbow to the child's chest so as to establish complete immobility. At the end of four months the arm was freed and the results were very satisfactory.

In the majority of young children faradic battery is of little use, so the galvanic must be used. In this way contraction is produced and tone of the muscle is kept up. Not only this, but the sensory nerves are stimulated, and in this way help the early return of sensation. In children where sensation has returned, or where it has not been absent, faradic and galvanic battery when applied with sufficient strength to cause contraction of the muscles very often gives the child so much pain that it is impossible to carry out this treatment. In such cases I would recommend that the child be placed under an anæsthetic at least twice a week and a very active and energetic treatment given. In some cases it is advisable to use needle electrodes so as to apply electricity direct to the muscles and nerves of the extremity. Along with this I always recommend the local injections of nitrate of strychnin. One can see at once the results of this remedy. I have noticed on several occasions that if the injection of strychnin be given a few minutes before the application of electrical treatment, a motor and sensory response is obtained with a smaller current than would be required if strychnin had not been given. Fortunately in the group of cases which I am treating at the present time the children bear the treatment wonderfully well, one only requiring an anæsthetic.

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During 1904, 15,090 copies of Gould's Medical Dictionaries were sold, making the total sales to date 181,173.

# ON CERTAIN PROBLEMS OF THE NERVOUS SYSTEM, MORE ESPECIALLY NERVE GRAFTING AND THE NEURONE CONCEPT.

BY

WESLEY MILLS, M.A., M.D.,

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During the past few years I have made a certain number of experiments on nerve grafting in its various forms, and as the union of divided nerves is of both theoretical and practical interest, I thought the members of this Society might be interested to know the present position of the problem. In treating it, I shall refer more especially to the work of others, because some of it is more recent and much of it more extensive and authoritative than my own.

The experiments on the union of severed nerves extends back to the time of Fluorens, 1828, since when a long line of investigators has been at work on this subject. The experiments of Schwann and others show that afferent and efferent fibres do not unite. As stimuli do not pass backward through motor cells, one can only learn whether there has been union of sensory and motor fibres by an examination of the nerve endings, and ascertaining whether they are of normal character or not. The more modern experiments have made it clear that certain precautions are absolutely necessary to avoid fallacious conclusions. It is very necessary to allow a long period of time after section before inferring that functional union may not take place. So strong is the tendency for the central to unite with the peripheral end of a divided nerve that, if this is to be prevented, special care must be taken, such as cutting out a considerable portion of the nerve between the two ends, turning the latter away from each other, and even suturing them to adjacent structures.

Among Continental investigators holding views that by many are considered extremely radical on the subject of nerve regeneration must be particularly mentioned Bethe, and perhaps most conspicuous among those of correspondingly conservative tendencies, especially as regards the neurone concept, is Langley, Professor of Physiology at Cambridge University. To his work and that of his colleague, Dr. Anderson, and to the researches of Bethe, I shall make special reference throughout this paper.

Langley and Anderson united the central end of a main muscle nerve with the peripheral end of a skin nerve and noted the results. To cite an instance: The central end of the crural was sutured to the peripheral end of the internal saphenous nerve. Seventy-two days later stimulation of the internal saphenous nerve at the knee caused contraction of the thigh muscles and extension of the leg. When the

internal saphenous was cut at the knee, stimulation of the upper end gave the effect as before; stimulation of the lower end was without effect. Langley and Anderson attribute the result to what they term an "axon reflex"; that is, they considered that there was in this case stimulation of nerve fibres, one branch of which was in the internal saphenous and the other in the muscle nerve. It is known that fibres which grow out from the central end of a nerve may divide, and it is conceivable that one branch may, in this case, have joined the muscle nerve, and that the other branch may have united with the internal saphenous nerve; or, that the central efferent fibres had grown more than seven cm. down the sensory nerve.

Bethe has experimented with similar results on mixed nerves. The reflex he obtained was explained by him on the assumption that there had been a direct union of the peripheral nerve fibres; that is, that afferent fibres of one branch had made connection with a large number of efferent fibres in the other. He concluded that there had been no connection between the central nervous system and the peripheral ends of the nerves; and he was of this opinion because there had been no body reflex on stimulation of the peripheral nerves. But, as Langley and Anderson found an absence of such reflex in spite of a central connexion having been established, they considered the result inconclusive.

Bethe and others have demonstrated that cross union may take place, and that nerves may be artificially lengthened. He shows, for example, that the sciatic of one side may be united functionally with the sciatic of the opposite side, and Langley and Anderson united the peripheral end of the sciatic of one side in a rabbit, with the chief muscular branch of the crural, and found that after 398 days the crural on stimulation caused contraction of the upper part of the gastrocnemius. As the fibres of the crural are not long enough to reach the gastrocnemius, Bethe and Langley and Anderson concluded that short fibres are able to make functional connexion with long ones. In a rabbit a few days old the central end of the internal saphenous nerve was sewn to the peripheral end of the sciatic; 403 days later the sciatic was cut centrally of the first point of section and the peripheral end stimulated. Reflex body movement resulted, but there was no contraction in the muscles supplied by the sciatic nerve. A reflex was obtainable from the posterior tibial nerve at the ankle, so that it appeared that the different fibres of the internal saphenous nerve had united with the afferent but not with the efferent fibres of the sciatic.

In experiments on union between the spinal accessory and the sympathetic, it has been shown that the central end of the spinal accessory united indifferently with the peripheral end of the sympathetic, which Langley and Anderson interpret as indicating that the size of

nerve fibres may have a determining influence. In this case it would appear that small nerve fibres can more readily unite with large ones than large ones with small. As the result of numerous experiments on cats, lasting in one case over a period of 476 days, it has been found that the pre-ganglionic fibres of the cervical sympathetic, i.e., fibres central to the superior cervical ganglion, will not unite with post-ganglionic fibres. This shows clearly that the effects on the eye produced on stimulating the cervical sympathetic are brought about by the final neurones, which begin in the superior cervical ganglion; so that once again we have an illustration of the advantages of the neurone concept in comprehending and in teaching. Nevertheless the fibres of such a nerve as the phrenic can unite with the pre-ganglionic fibres of the cervical sympathetic.

#### SUMMARY.

The results of various experimenters, notably those of Langley and Anderson, may be stated briefly as follows:—

All agree that no functional union can take place between the central ends of two nerves.

Bethe believes that functional union of the peripheral ends of two-limb nerves was demonstrated to have taken place in puppies, but Langley and Anderson could not get such union in rabbits and cats.

According to Langley and Anderson, when the central end of a limb-nerve has an opportunity of joining with two peripheral nerves, stimulation of one peripheral nerve, after complete severance of the joined nerves from the central nervous system, may cause contraction of the muscles innervated by the other. "We consider this to be an axon reflex set up in fibres from the central end, one branch of which has joined one peripheral nerve, and the other branch joined the other peripheral nerve."

When one of the peripheral nerves consists entirely of afferent fibres, an axon reflex may still be produced by stimulating it. Since efferent fibres do not, so far as is known, unite with afferent fibres, the axon reflex obtained supports the view that regeneration takes place by down-growth of axis cylinders.

Nerves may be lengthened by joining them with a corresponding nerve of the opposite side.

The phrenic nerve can unite functionally with the cervical sympathetic and the cervical sympathetic with the recurrent laryngeal, the functional result in all such cases being determined by the peripheral nerve; that is to say, in this case, for example, the result—no matter what part of the united nerve is stimulated—is that proper to the nerve of final tribution. In the case of the union of the cervical sympathetic with

the recurrent laryngeal the movements on stimulation are those that would naturally result from stimulation of the peripheral end; in other words, the movements in this case are due to the laryngeal muscles just as if there had been no division of the laryngeal nerve.

The fibres of the sympathetic in the neck central (inferior to the superior cervical ganglion) cannot, when the ganglion is removed, make functional connexion with those beyond the ganglion; that is, pre-ganglionic fibres cannot make connexion with post-ganglionic fibres.

Afferent fibres cannot unite with efferent so as to give motor effects; that is, afferent fibres cannot really coalesce with efferent fibres.

Whether the regeneration taking place when fibres of the same class are united is due to coalescence or to down-growth is as yet a matter of dispute.

At the meeting of the British Medical Association at Oxford this summer, Dr. Kennedy brought the results of his observations and experiments before the physiological section, and by the use of lantern slides of his preparations showed, as he thought, that there had been peripheral or autogenetic regeneration of nerves. His communication was not sympathetically received, and with one accord those who spoke on the subject rejected Dr. Kennedy's conclusions. It was claimed that it had not yet been shown that genuine medullated nerve fibres capable of nervous conduction had been formed in peripheral nerves.

So far as one can see at present, taking all the evidence into account, the truth does not lie wholly on either side. We must seek some *via media* of interpretation, or some new facts must intervene before we shall be able to formulate laws adequate to meet every case.

#### THE AUTOGENETIC REGENERATION OF NERVES.

The question as to the possibility of the regeneration of the peripheral end of a nerve after section, independently of the central nervous system, is an old problem, but it has of late become of more than ordinary interest, because, among other things, of its bearing on the large subject of the essential nature of the relations of neurones. It had to be decided whether, first, a nerve cut away from its central connexion with the spinal cord and its ganglion can reform medullated fibres; and, second, whether such fibres can become functionally active in the proper sense of the word; that is, whether they can become motor in a physiological sense. It has been shown that the peripheral end of a cut nerve, when sewn into the skin or left long amongst muscles, may make connexion with the central nervous system by means of the nerves of the surrounding cut tissues, although it makes no connexion with its own central end.

Vulpian was one of those who, after investigation, concluded against auto-regeneration.

Langley and Anderson express themselves as follows:—"We find that all the medullated nerve fibres which re-formed in the peripheral end of a nerve degenerate when the nerves which run to the tissues near to the cut end are cut near the spinal cord; in other words, in our experiments all the medullated fibres in the peripheral ends of the cut nerves were fibres which had become connected with the central nervous system. If, then, autogenetic regeneration of the fibres had occurred, every one of them had become connected with the central end of some nerve fibre. On the autogenetic theory this seems to us, in the highest degree, unlikely."

Bethe and Langley and Anderson agree that the number of medullated fibres formed in the peripheral end of a cut nerve varies widely, and that there may be none. This seems to be explainable by the naturally variable connexions with the central nervous system, and Langley and Anderson think it is not explained at all by the autogenetic theory. But that this conclusion must follow I cannot wholly agree, as every biological process is a varying one. Bethe claimed that regeneration up to the point of medullation occurred only in young animals.

A number of English observers took special precautions in their experiments that there should not be a central connexion formed. Head and Ham, for example, excised a considerable length of the radial nerve in cats, and found that at no time up to 249 days were medullated fibres formed in the peripheral end. There seems to be agreement on one point, namely, that the re-formation of new fibres takes place more rapidly near the *neurome* or point of section than in the periphery, but it has also been noticed that the connecting fibres between the central and peripheral ends have been made up in large part, in some cases, of non-medullated nerves, and yet the medullated variety may exist in the peripheral part of the nerve. While not admitting autogenetic regeneration, Langley and Anderson concede that "there is some evidence that the cut peripheral end of the nerve exercises a considerable influence on the formation of myelin."

Howell and Huber found that certain peculiar fibres formed during the stage of absorption of degeneration products. These ultimately disappeared, but in some cases it was shown that they might remain for two years or longer, and others have confirmed these observations. Langley and Anderson positively deny Bethe's assertion that in young animals the peripheral end of a nerve separated from the central nervous system may acquire a motor function, and though they admit that medullated fibres may reform in post-ganglionic fibres after excision of their ganglia, they state that these do not on stimulation cause any motor effects. They moreover think that those surgical observers who



have believed in peripheral regeneration have not been careful enough to exclude fallacies, one of which these authors, above all others, have been successful in proving to be real by experimental methods. They have shown that so strong is the tendency of nerves in the neighbourhood to send out young nerve fibres to cut nerves that such a union is only prevented by the greatest care, and that this fact has not been sufficiently reckoned with by such observers as Kennedy, Ballance, Stewart and others.

Inasmuch as so eminent an observer as Van Gehuchten states that he can confirm the results of Bethe, and as the latter are the most serious with which the opponents of the autogenetic theory have to reckon, it may be well to consider the objections of Langley and Anderson to Bethe's conclusions. They are not satisfied that the absence of central connexion, which they so much insist on, has been adequately demonstrated. The evidence for the absence of central connexion is chiefly two-fold: First, the absence of direct effect on stimulating the central portion of the nerve that had been cut; and, second, the absence of reflex effects on stimulating the peripheral end of the cut nerve. The reply made is that some other nerve may have established a central connexion, and, as regards the second objection, the absence of reflex effects, they point out that such were wanting in some of their cases in which an undoubted central connexion had been established, and further, that at a certain stage of union the conductivity of the functional portion is too small to establish the essential functional continuity. They admit, however, that their objections do not furnish an entirely satisfactory answer to Bethe's contentions; but they hold that their own experiments, as far as they go, are against the autogenetic theory.

#### THE NEURONE CONCEPT.

These discussions on the regeneration of nerves bear closely on the neurone concept, and it may be worth while to consider what position one should take in regard to that subject as the result more especially of the histological investigations of the last two or three years. English observers generally do not seem to have occupied themselves with the question of the minute structures of the neurone to the same extent as continental investigators. Long ago Cajal stated that he had assured himself of the correctness of his views on the structure of the neurone, which were based largely on the use of the Golgi method of subjecting the same structures to the test of examination by the use of the methylene blue stain. This fact has given a special interest to the recent work of Turner carried out by the methylene blue method. There has been much difference of opinion as to the meaning of the networks that can be seen around the bodies of nerve cells, and which were described

by Golgi as far back as 1882. Some have held that these networks are nervous in nature; others, among whom is Golgi himself, that they are not, but are composed of neurokeratin, and have an isolating function; some again believe that they are of glial origin, while yet others hold them to be partly nervous and partly glial, a view rendered all the more probable by the recent advances in our knowledge of the structure and relations of glial cells.

If, as now seems clear, we must attribute improved nutrition, as well as supporting functions, to the glial cells, it is highly probable that the networks may be, at least in part, glial. Turner, using the methylene blue stain, believes the network to be glial in origin; others, however, believe that the axones unite with the Golgi nets, which, if true, would favour Held's view, that they may be partly nervous and partly of some other nature.

At the Cambridge meeting of the British Association for the advancement of science, held last summer, a vigorous discussion, opened by Professor Langley, on the nature of nervous connexion, took place. Professor Langley's arguments were largely physiological. He sees in the blocks or delays in nervous conduction that take place in or at the bodies of nerve cells, serious objections to the view of anatomical continuity, whether by networks, fibrils, or any similar mechanism. What impressed me most in this discussion, in which I myself took part, was the extremely conservative attitude of English physiologists towards the views of continental observers as regards the minute structure of the neurone. Dr. Alexander Hill, Master of Downing College, it is true, stated that he had been able to repeat successfully the histological work of Bethc, but he was swiftly borne down by the solid phalanx of opponents, who held by the older conception of cell contact, as set forth by Waldeyer in 1891.

There seems to be among English physiologists a belief in a sort of unlimited proclivity in reagents to produce *artifacts*; but surely, when so many methods have been employed and so many highly competent Continental and other observers agree up to a certain point, to reject all the later conceptions is to carry scepticism to a degree when it ceases to be a scientific virtue, all the more as most English physiologists have not, so far as we are aware, themselves made special investigations on the minute structure of the cell. For myself I can no longer believe the conception of the neurone, as set forth by Waldeyer, to be entirely adequate, and to this state of mind I am brought by a consideration not only of the work of many others, carried out by different methods, but also of the results of my own observations on many different parts of the nervous system, by the use of different methods, and now extending over a considerable period of time.

Here I would like to put forward again a suggestion of mine, made to the American Physiological Society more than ten years ago, that the large, well-equipped laboratories of the various countries of the world might, to the great advantage of science, combine to work together in attacking large problems from different points of view, and by the use of various technical methods. We might also have international co-operation. Till this is realized, much of the energy available for the advancement of science will be more or less wasted. I have noted with great satisfaction that Dr. R. E. McKechnie gave expression to a thought akin to this at the meeting of the Canadian Medical Association in Vancouver last year.

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### AN UNUSUAL CASE OF INJURY TO THE CERVIX UTERI DURING LABOUR.

BY

J. B. BROWNE, B.A., M.D.

My apology for bringing the present case before your notice is that, bearing this instance in mind the accoucheur may be led to detect and correct any similar cases liable to occur in his practice.

Although the process of labour, being a physiological one, should be carried out in a completely physiological manner, that is, without presenting any pathological condition whatever, nevertheless the presence of injury to the maternal parts has become so common-place as to be regarded at times almost in a physiological light. That this should not be the case we all admit, but whether it be the increasing magnitude of the infantile brain-cases, whether it be the diminished proportion of the maternal passages, or whether at times the unskilful management of the accoucheur, this increasing complication warrants some consideration.

This evening we shall confine ourselves to some of the injuries liable to occur to that wonderful mechanism—the cervix uteri. Here the most common are the lacerations of the external os, but I wish to bring before your notice a laceration occurring above the external os brought about by similar forces under modified conditions.

Patient, Mrs. E.—, æt. 23, primipara (a private case), had presented a normal pregnancy up to the time of admission into the hospital, except that on the morning of the day before entrance the membranes had ruptured. Patient entered the Maternity Hospital November 24th, and had not been previously examined. Pains started at 11.30 a.m. At three p.m. a high enema was given, which unloaded the rectum.

Soon after the enema, pains increased in frequency becoming bearing down in character. Child delivered spontaneously at 6.30 p.m., with patient in lateral position. On changing patient to dorsal position a rather profuse hemorrhage occurred for a few minutes, without there being any discernible cause, as the fundus was well contracted and the pulse continued normal. Temperature and pulse remained normal, though the flow continued very free and light red in colour until the second day, when it became moderately red, and continued rather more red than usual until the twelfth day. All went well until the seventh day, when the temperature rose to 100, but pulse remained stationary at 80. On the eighth day ergot was given, and one large blood clot was passed. Ergot was increased to thirty drops four times a day. In spite of this, and with the fundus well contracted, temperature and pulse gradually rose, till on the tenth day temperature was 102 and pulse 95. As lochia remained more red than usual and the uterus was well contracted, the hæmorrhage was assumed to be outside the endometrium.

On the morning of the eleventh day a careful internal examination was made, and the following condition was found:—Perineum intact, discharge in vagina foul, external os patulous, but not dilated beyond the size of a five cent piece. On the posterior wall of the cervix in median line, and well above the external os, a deep, sloughy laceration was felt extending through the posterior cervical wall, and from it slight oozing was taking place. The uterus felt well contracted, both fornices normal. The vagina was packed with iodoform gauze, and the patient prepared for operation the following day.

What had then taken place was that the child and placenta had been delivered through the laceration instead of by the cervical canal.

*Operation, December 6th, 1904:*—Anæsthetic, alcohol, chloroform and ether, changed to ether owing to signs of cardiac weakness. Patient in Sim's position. Catheterized gauze removed from vagina showing bloody discharge with foul odour. Creolin vaginal douche given, and Sim's retractor inserted, drawing back the perineum. Silk-worm gut suture then passed through the anterior lip of the cervix, and left long to draw the cervix down. A second retractor was then used to enlarge the transverse diameter of the vagina giving a good view of the cervix. The cervix was patulous, external os dilated only sufficiently to pass in a large sound. On the posterior aspect of the cervix, beginning 2 c.m. from the external os and extending up to the vault of the vagina parallel to the axis of the cervix, there was a laceration about 5 c.m. in length completely through the posterior wall of the cervical canal, so that a sound passed through the external os appeared through the wound.

The wound was a sloughy, crater-like depression covered with granulation tissue, showing evidence of repair, rather inverted, and when separated the interval appeared filled with new granulation tissue. The edges of the wound were freshened by scissors and curette for one cm. on either side of the wound with special attention to the angles, and the edges coapted by means of five deeply placed sutures. These readily controlled what little hæmorrhage there was. The cervical canal was then explored, and found sufficiently patent to admit a douche nozzle, and an intrauterine saline douche was given, at the same time thoroughly cleansing the vagina, and the patient made comfortable with temporary vaginal drain of plain gauze.

*Explanation.*—In considering why this laceration resulted instead of the usual dilatation of the cervical canal, four factors stand out in relation of cause and effect.

- (1) That the patient was a primipara.
- (2) The presence of dry labour with the absence of the dilating force of the bag of waters.
- (3.) Direction of the force being focussed on the posterior wall of the cervix and not directly over the cervical canal.
- (4) Powerful uterine contractions.

In considering these factors, the first was of some importance in that the patient being a primipara, the canal would be more difficult to dilate. Then, again, had the membranes been unruptured the vis a tergo would have been equally distributed to all parts of the cervix following the law of pressure through fluids and not been concentrated at any one point, as was the case here.

Thirdly, had the axis of the foetal ovoid been directed behind the long axis of the cervical canal, as is liable to occur when the fundus of the uterus is placed more anteriorly, as in pendulous abdomens, or where the lower part of the cervix is drawn up anteriorly from any cause, the force of the presenting parts would fall on the posterior wall of the cervix. This force being continued the posterior wall would be distended, for the longitudinal fibres of the uterus would draw up the anterior portion of the cervix, and distention of the posterior cervical wall become more and more evident leading to distinct capping of the same. That this condition does frequently take place is evidenced by how frequently we find the external os unusually easy to reach with the examining finger when the anterior wall is distended and the posterior wall drawn up. We have all found this to be the case at times. This then would lead to a bagging of the posterior wall and subsequent thinning so as to make laceration here more likely.

Fourthly, violent uterine contractions with these conditions present would be the culminating force resulting in the presenting part of the

head being driven through the posterior wall in this position, the rent extending till of sufficient size to allow of the passage of the head and body of the child. This laceration, then, had extended in the axis of the cervical canal down almost to the external os and upward to the extreme limit of the internal os, whose reinforced fibres evidently prevented its extending directly up into the body of the uterus, and as the peritoneum had been drawn up as the uterus enlarged in the early months of pregnancy, the peritoneal cavity was not opened.

Another question which arises is why was the hæmorrhage not more severe? At no time was it alarming, and scarcely more than is apt to occur in an ordinary case. To answer this we must bear in mind that the laceration was in the middle line. Now, had it been to one side, some of the larger branches of the uterine arteries would likely have been torn, but in the middle line is the spot where these vessels are smallest, as it is here the anastomosis of the smallest terminal ends of the two uterine arteries takes place, hence only these smallest radicals would be torn and little hæmorrhage result.

Are there any lessons to be learned from the above case?

(1) That in every case of dry labour in a primipara with excessive capping of the cervical wall laceration is liable to take place, and this danger may be diminished by early dilatation of the cervical canal.

(2) That every case where fresh hæmorrhage occurs after delivery at all alarming, especially where involution of the uterus is good, should lead to a careful examination of the genital canal to discover some possible source outside the endometrium.

*Prognosis.*—Depends on the amount of scar tissue formed. In this case it was slight. It should warrant careful watching, and, if necessary, aid by dilatation.

Is it not possible that similar instances to the above may occur more frequently than we hear of, and not be detected?

My sincere thanks are due to Dr. J. C. Cameron for his kindness in allowing me to follow up this case and publish this report.

W. W. CHIPMAN, M.D.

I should like to ask whether or not there was any sign of cicatrix at the two extremities of the tear, or any indication that the external os might have been at first involved in the tear, and the subsequent position of the tear have resulted from the fact that the healing of a very deep laceration began immediately in the neighbourhood of the external os. Evidently a tear five cm. in length would not permit the passage of a full-term foetal head; there must have been an almost inconceivable degree of stretching, or a much larger tear, which in part had healed. I should like to ask if there was any special anatomical reason

for the unusual situation of the tear; for example, any abnormal rigidity or malformation about the external os. As I have understood the report, we are told that the child's head had entered the canalized cervical canal, and then, instead of following this canal, had passed backward, forcing its way through the tissue of the cervix. The tear, we are told, did not involve the lower uterine segment, which is structurally the weakest part of the inferior pole of the uterus. It is certainly a very unusual case, and to my mind quite a singular one.

We all know the classical case which is figured in text-books where, in an instance of a very long and rigid perineum, the child's head forsook the vaginal canal and passed directly through the perineum, the child being so delivered, but, as for the head coming down through the posterior wall of the cervix, that is indeed a very singular occurrence.

DR. BROWNE.

I may say this is a patient of Dr. Cameron's, and I only report it here through his kindness. From our own observations, this seems to be an unusually rare case, and we have been unable to come across any similar one. The case came into hospital under urgent circumstances, as mentioned in the history, and no examination could be made before immediate delivery. With regard to the wound not being sufficiently large to admit the passage of the head, a fact to be borne in mind is that no examination was made until ten days after confinement, when almost complete retraction had taken place, a fact which, I think, easily accounts for the small size of the wound. I also think it impossible, from the appearance of the wound, that it ever extended through the external os and had healed. There was a firm bridge of tissue between the external os and the laceration. At the same time there was a foul, sloughy discharge present, and the healing was certainly not akin to anything like first intention, and healing by second intention in such a short space of time would scarcely be likely. There was no sign of cicatrix at the angles of the wound.

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A CASE OF ATRESIA OF THE PULMONARY ARTERY WITH  
TRANSPOSITION OF VISCERA; A SECOND CASE  
OF TRANSPOSITION.

BY

JOHN MCCRAE, M.B.

It is not often that one obtains such a rare specimen. It is a combination of two rarities, transposition of the viscera and an anomaly of the heart. First, to deal with the heart anomaly; of all anomalies, it is fairly well known that the commonest is a stenosis or an atresia of

the pulmonary artery. Of these two, atresia forms about one-sixth of the combined cases; of all atresias again, perhaps one-seventh show the condition here present, namely, that the pulmonary artery is reduced to a mere fibrous cord having no lumen. Of all these cases, the common condition is that the septum ventriculare is open, that the foramen ovale is also open, or the septum deficient. This case has a closed septum ventriculare. Vierordt, who wrote the section on the congenital heart diseases in Nothnagel's System, finds 12 cases of this, and 8 of these had been already collected in 1869 by Peacock. Of all the cases with this peculiarity it is observed that the large majority have lived less than a week. Hare's case, in 1852, lived 9 months, the present case lived 7 weeks, another lived 6 weeks and all the others of the 12 lived only about a week or less. If we add to this condition the fact that an entire transposition of the viscera occurred, I presume the rarity reduces itself to be, not one of 13, but absolutely unreported hitherto. Two cases are reported, one by Ollivier, the other by Wardrop Griffith, in which transposition occurred with a congenital heart lesion, but these two differ in their particulars considerably from the present case.

As to the history of the case, it was the 15th child of a 46-year-old mother. She was of low intelligence, and had a hare-lip; otherwise nothing particular was noted. Before delivery, Dr. Evans demonstrated to the students that there was present a systolic heart murmur in the foetal heart. (This was verified after birth, and continued during its life. It was born a "blue baby" and remained so, being particularly blue just after feeding. It died of broncho-pneumonia on the 49th day. The heart is practically, though not morphologically a fish heart, that is, there is only one article and one ventricle for working purposes, and all its chambers are reversed.

With regard to the other organs, they are all reversed with the exception of the gall bladder which lay upon the right side of the suspensory ligament of the liver. From the deformities in the heart, though the heart itself was transposed, the apex beat was in its normal place to the left of the sternum.

As to the Situs Inversus, it, of course, is in itself a rather unusual condition. Dr. Fry presented a case in 1903 before this Society, which also had some congenital lesion of the heart, probably a relative stenosis of the pulmonic vessel. It is probable that there are about 300 cases of Situs Inversus on record, but it is not by any means common. Arneill, in 1903, sent out circulars to 34 of the foremost physicians in America, and in the replies, 37 cases had been noted by these men, 31 in life and 6 after death. Some had seen no case at all, though their



experience had extended over many years. In April, 1904, I did a rather hurried autopsy at the Montreal General Hospital on a female patient aged 40, who died of pneumonia a few hours after entering. This was a case of complete transposition of abdominal and thoracic viscera. On account of the short time given us for the examination no photographs could be obtained, nor could organs be removed for preservation. While a house surgeon in the Toronto General Hospital, I saw a case which was evidently one of transposition. It was in the living subject and the heart and liver were certainly transposed, so that it was probable that there was complete transposition of all viscera.

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### A CASE FOR DIAGNOSIS.

BY

JAMES BELL, M.D.

Professor of Clinical Surgery, McGill University, Surgeon to the Royal Victoria Hospital.

The patient is a young man, aged 31, of good family and personal history. He had been perfectly well up to March last when pain began over the lower part of the sternum, radiating from above downwards. This passed away, and on June 20th he consulted a physician, who found only some slight tenderness over the sternum. On July 9th he again consulted the doctor, and by this time three separate little hard nodules had appeared in the skin over the lower part of the sternum. On August 15th enlarged glands were discovered in the axilla, and on the 25th the physician found a marked prominence along the lower border of the right pectoral muscle, and the little nodules were now ulcerating. A band of dilated venules ran across the lower part of the chest. The doctor then sent him to me with a diagnosis of probable malignant disease. I sent him into hospital on the 29th of August, and at that time no other lesions were found except those already described, save that the nodules were superficially ulcerated. I was satisfied that the condition had begun in the skin in these small nodules, from which, after ulceration, infection had extended along the lymphatics.

Dr. Martin saw the patient with me, and he thought that there was probably slight enlargement of the mediastinal glands beneath the upper portion of the sternum, as indicated by the altered percussion note. It was clearly an infection of some kind, but what it was was hard to say. I carefully investigated the question of syphilis, but there was no history to lead one to that conclusion, and the lapse of time since the appearance of these nodules without any secondary symptoms makes it appear impossible, as also does the further progress of the disease. My next

thought was glanders, but here also there was nothing to indicate this condition; it did not seem to be tuberculosis, and we could easily exclude actinomycosis. On September 10th I excised a gland in the axilla, which was as large as a pigeon's egg, and had it examined by Dr. Keenan, who reported that it contained only inflammatory tissue. On August 30th one of the small nodules was removed and inflammatory tissue only was reported by Dr. Keenan. At this time the patient had a leucocytosis of 21,500. All the organs were normal, he had no fever, was not depressed except for the feeling that he had some very serious disease. On October 3rd I removed a large area, including the three small nodules and the greater part of the right pectoral muscle. It was then found that infiltration had extended into the muscle from the glands. All this time there was no pus. The patient took large doses of iodide of potassium for about a month without any apparent effect, and on October 16th he was discharged. He remained in good health and gained five or six pounds, returning on the 7th of January.

Dr. Martin saw him again with me, and we found evidences of effusion into the lower part of the left pleural cavity. The gland had increased considerably in size, and now other glands had become involved. We decided to remove the more recently enlarged glands in the hope of getting some further information there at this early stage, and on January 9th this was done, together with opening the mass which had developed over the upper part of the sternum since he left hospital. In both these areas pus was found. Cultures from the glands were sterile, the gland substances simply showing inflammatory tissue. Dr. Keenan found a bacillus resembling a form of leptothrix. The patient now had a leucocytosis of 22,000. Injection of the pus into guineapigs gave absolutely negative results.

The whole history has been that of a healthy man with slight pain over the sternum, the development of a few small nodules over that area, apparently in the skin, and from these extension had been apparently along the lymphatics. Now there are several of these nodules, and there is involvement of the glands of the neck and mediastinum. It has been an entirely afebrile condition; there is nothing in the signs or symptoms to lead me to suspect a malignant disease; it seems to be definitely an infective granuloma, but what, I am not prepared to say. There is no tuberculosis, we cannot demonstrate glanders, it is not syphilis, and it is certainly not like actinomycosis; it seems hardly possible that it is a lympho-sarcoma.

I think that the real fact of the matter is that as long as a sarcoma remains encapsulated there is little tendency to spread by the lymphatics, but once it bursts or gets beyond its capsule, extension occurs in this way.

One sees sarcoma of the testicle in young boys where up to a certain point there is no sign of involvement of the lymphatics at all, but in a few weeks one may find a mass of retroperitoneal glands in the neighbourhood of the stomach showing distinct evidences of lymphatic extension. In a case like this, if the limb was amputated early while the growth was still encapsulated, there would be no extension, but, if allowed to go on, the capsule becomes destroyed and extension quickly follows, though there may be an insufficient capsule to begin with in certain tissues.

GEORGE D. ROBINS, M.D.

With regard to glanders, here are certainly some points in its favour, but, on the other hand, there are certainly great objections to making a definite diagnosis of glanders. The superficial, acne-like lesions, very slow in developing, are certainly suggestive, so, too, is the pus from these lesions, which is sterile or nearly so. Glanders is a disease which is contagious in a mild degree, probably only directly so, and the present patient, I believe, has had nothing in particular to do with horses; practically all cases of human glanders are derived from infection by horses, mules or asses, and in this case there is an absence of any history which would suggest such an infection; this is therefore strongly against such a diagnosis. That one has chronic suppurative lesions in glanders is a very common occurrence. The lesions are to be found in the lower extremities first without intramuscular abscesses developing, whereas in the present case they are in the upper extremities. I would like to ask Dr. Bell if mallein has been tried in this case, and if so, with what result.

E. W. ARCHIBALD, M.D.

Dr. Bell very kindly gave me an opportunity of seeing this case last fall. The primary lesion had apparently been intrathoracic. I refer to pain underneath the sternum, which later disappeared. This was partly confirmed by Dr. Martin's finding a dull percussion note over the sternum. The next symptom was the appearance of these nodules in the skin of the thorax, and following that the gradual and progressive development of glands in both axillæ, and finally higher up along the chain of glands in the neck; with all this was an afebrile course. I saw the microscopical sections of the first gland examined, but could make no definite diagnosis. I made a clinical diagnosis, however, to myself, of sarcoma, beginning in the mediastinum, forming metastases by way of the lymphatic communication between the mediastinum and the thoracic wall, and finally spreading thence to the axilla.

To judge from the histological picture, it was apparently not an

ordinary sarcoma, but I thought of it as belonging more likely to those transition tumours which are called by so many various names—Hodgkin's disease, adenia, lympho-sarcoma, etc.—and between which in our present state of knowledge no sharp line of demarcation can be drawn. When the patient returned some months later, and when what looked like pus was found in the swollen glands, it seemed for the moment that this diagnosis had been wrong, and that the case might be one of glanders. However, the absolutely negative results obtained by Dr. Keenan, both bacteriologically and from animal inoculation, proved the error of this last supposition, and it seemed justifiable to return to the first diagnosis. Three years ago I was able to isolate without difficulty the bacillus mallei from the six months old sinuses of a case of human glanders—the one sent in to the Royal Victoria Hospital by Dr. Robins, and also to obtain easily the characteristic lesions in guineapigs. So easily, indeed, that I am convinced that in the present instance, if glanders were present, it could not have escaped Dr. Keenan's careful investigation. We know, on the other hand, that certain cases of progressive gland tuberculosis may give a picture much resembling the present case; and although occasionally we do meet with tuberculous glands, where the ordinary histological signs are quite wanting, still there is nothing in the sections of this case which points that way. It remains then to decide between infective granuloma of unknown causation and malignant disease of a sarcomatous nature. And my reasons for believing that the condition is one of malignancy are these: it is a progressive glandular overgrowth, which has broken through the gland capsule and has infiltrated muscle, which being removed (over the sternum) has promptly recurred in the immediate neighbourhood, one may say locally, and which has been afebrile in its course. If one must give it a name, lympho-sarcoma, to my mind, comes the nearest to defining it. The histological report of "inflammatory tissue" can have no weight against a diagnosis of lympho-sarcoma, for it is often difficult to separate the two. The leucocytosis speaks as much for malignancy as for infection. Finally, the pus-like contents of the glands last incised, in the absence of bacteriological proof, are found as well in soft lymphomata as in infectious granulomata.

C. B. KEENAN, M.D.

We meet with much difficulty when attempting to form a diagnosis from the sections removed from this case. The wall of the ulcer and surrounding tissue showed the changes characteristic of simple inflammation. There was some new formation of fibrous tissue, and much small-celled infiltration, chiefly mono-nucleated lymphocytes. The lining endothelium of the smaller vessels was often swollen so as to

completely occlude the lumen. Cultures and smears showed staphylococci only. An axillary gland removed later resembled closely the histological appearances of a gland in Hodgkin's disease; in other words, the picture of a gland subjected to chronic irritation. There was marked fibrosis and proliferation of the endothelium, and a corresponding decrease in the lymphocytes. There were a few large cells containing two or more nuclei and very many eosinophiles. Sections of the thickened portions along the edge of the pectoralis major gave an appearance more suggestive of sarcoma.

Here one sees a hyaline degeneration of the muscle bundles, and later small areas of small round cells appearing among the muscle bundles. These cells resembled greatly those seen in inflammatory infiltrations. Also the muscle is replaced in places by adult fibrous tissue. There are very many dilated lymph spaces and many large cells resembling endothelial cells. There are very many polynuclear leucocytes and eosinophiles; no bacteria could be made out in the sections.

The gland removed from the neck at the last operation showed to the eye a necrotic area in the centre. Microscopically, one sees degenerated material in the centre, and surrounding this is a zone of degenerated cells with much nuclear fragmentation. Around this again is a zone of young fibres tissue cells and lymphocytes. No giant cells were present, nor were bacteria found in smears or cultures. Intraperitoneal inoculations in male guineapigs gave no result, which excludes glanders. Tuberculosis is excluded on the histological appearances of sections and absence of tubercle bacilli, and actinomycosis on the same grounds. The appearance is not that of any malignant tumour and certainly the histological appearance of the sections conforms in every way to the picture usually supposed to be typical.

As to the question of spread by the lymphatic glands, my experience is exactly in conformity with Dr. Archibald's. Sarcomata do spread by the lymphatic glands, and the round-celled sarcomata are specially apt to do so.

C. K. P. HENRY, M.D.

A case I remember has many points similar to Dr. Bell's. The various glands in the axillæ and cervical regions were removed, and at no time were they of such a nature that a diagnosis could be made. Some of them presented an appearance of sarcoma, whereas most of them were of the simpler inflammatory type, and the larger ones had centres such as are mentioned by Dr. Keenan. In this case arsenic gave rather beneficial results. The patient took it for a long period of time, and at his worst there was a marked improvement following this treatment. He has kept it up, and now when he stops for a short time the glandular

enlargement becomes more acute. Thinking of the beneficial results of arsenic here, it occurred to me that it might possibly be of service in this case of Dr. Bell's.

DR. BELL.

There are some points in the history which I would like to set straight. This patient was sent to me with a diagnosis of sarcoma of the mediastinum, and it was with the knowledge of that fact that Dr. Archibald saw him with me soon after his arrival here. Dr. Archibald was under the impression that the pain was intrathoracic. After the most minute and careful examination, I have satisfied myself that it was not within the chest, but external. I do not think this can possibly be a mediastinal sarcoma, because up to the time of his leaving there was absolutely no interference with the respiratory or circulatory functions; the most that could be found was that the dulness over the upper part of the sternum was a little greater than it should be, suggesting that there was probably extension to the deeper glands, and glandular enlargement in that portion of the mediastinum; even now, although he has suspicious but uncertain evidences of effusion in the base of the left pleura, yet his breathing is good, and there is no marked interference with the respiratory or circulatory systems. Another feature is that these definite foci are limited to the skin.

The question all along has been the question of malignancy versus granuloma or some other infective condition. I have made up my mind that it is not a malignant condition, but it is quite impossible to say what diagnosis to make, as all the evidences are against glanders, actinomycosis, syphilis or tuberculosis. Thus there is nothing to explain it, if it is not a malignant condition, and the evidences in favour of this are indeed small, namely, the infiltration of the infected gland into the muscle substance, but, on the other hand, a definite limitation to the lymphatics of the neighbourhood and a distinct extension from these original foci along the lymphatics seem to make that very doubtful. Mallein has not been tried, nor has tuberculin. A point in opposition to its being glanders is that it is limited to the one chain of glands. The question of access to horses is not so important, though we know these cases are generally found in men who have dealings with horses or other animals which are liable to have glanders. We must admit the possibility of infection through a mediate source not directly from the animal. With regard to the condition of the patient mentioned by Dr. Henry, I hardly think that was an analogous case; there was no lesion except in the superficial glands in all parts of the body, whereas here only the lymphatics of a certain area have been infected, and that infection has extended from a recognized focus.

THE

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## INSANITY AND POLITICS.

The American Medico-Psychological Association meets in San Antonio, Texas, on the 18th of April, under the presidency of Dr. T. J. W. Burgess, Superintendent of the Protestant Hospital for Insane, Verdun, Montreal. This is the oldest Medical Association in America and is the one which met in St. Louis last year, in Washington in 1903, and in Montreal the year before that. Dr. Burgess will be called upon to deliver the annual address. We do not feel especially commissioned by Providence to put words in his mouth, or to invent for a man of his fecundity of imagination injurious language which might be employed against the community in which he dwells. Yet we desire to lay before Dr. Burgess a few facts which may have escaped his notice, and may serve as a text.

Most persons will admit, unless they are incapacitated by congenital

perversion, or political prejudice, that a hospital for the insane exists—pun or no pun—for the purpose of extending hospitality to the insane, and not to the proteges of a political party. In short, it is mental not political degeneracy which entitles an entrance to the enjoyment of such hospitality as it can offer. In Canada, there are to-day eighteen hospitals for the insane, and all but six exist for the combined care of the insane and the politicians. In twelve the present superintendents owe their appointments to influences other than their attainments in psychiatry.

Let us be more specific, and deal first with those six institutions whose superintendents have been chosen from the ranks of the regularly qualified assistants. The most recent instance is the choice of Dr. J. V. Anglin as superintendent of the New Brunswick Hospital. As every one knows, he won his promotion by ten years' service under Dr. Burgess at Verdun. Dr. W. H. Hattie, superintendent of the Nova Scotia Hospital, was formerly assistant in the same institution. Dr. G. H. Manchester, who is now in charge of the British Columbia Asylum, also gained his experience at Verdun, and Dr. Burgess himself was sixteen years in the Ontario service before he obtained his present position. In the Province of Quebec he stands alone in respect of previous experience. In Ontario there are nine institutions for the care of the insane, and in only two have the present superintendents had a regular training in their work. These are Dr. C. K. Clarke in Kingston, who succeeded to the position rendered vacant by the melancholy death of Dr. W. G. Metcalfe, and Dr. N. H. Beemer, of Mimico, who was promoted from London, where he had been assistant.

Turning now to the institutions whose superintendents have been appointed from other considerations than previous training, we shall begin near home. At Longue Pointe Dr. Villeneuve succeeded to Dr. Duquette, after a year's experience as visiting assistant, though he had other qualifications; and at Beauport, in Quebec, the present superintendent is not even in residence. He practises in the city, and merely visits the institution daily. For that service he enjoys a salary considerably larger than many officers receive for entire devotion to their duties. In Prince Edward Island the situation of Dr. E. W. Blanchard, one of the most competent men who ever superintended an asylum, was made intolerable to him, and he resigned, to be succeeded by a recent graduate of a small Ontario school with no experience either in psychiatry or in general practice. At Selkirk, Mr. David Young is an inheritance from the days when a few insane persons were confined in the old Stone Fort, and at Brandon the present superintendent was drawn from the outside ranks. Of the nine asylums in Ontario, only two—Kingston and Mimico—have superintendents who were qualified



at the time of their appointment. In London the late Dr. R. M. Bucke was succeeded by Dr. MacCallum, who up to the time of his selection had practised medicine at Dunnville. Dr. J. Russel practised at Binbrooke before his selection for the control of the Hamilton Asylum. Dr. J. B. Murphy, of Brockville, who died only a few months ago, had been a general practitioner in Belleville. Dr. E. C. McNicholl, who was appointed to the Cobourg Asylum, which was opened only in 1903, had no previous experience. The same is true of Dr. Daniel Clark, Toronto; Dr. A. H. Beaton, Orillia, and Dr. Spohn, of Penetanguishene.

The answer which the politicians make to all protests is that the men who occupy the posts of assistants are not sufficiently qualified to become superintendents. This is partly true, and because it is partly true the case is the worse, because, if there are incompetent men amongst the assistants, it was the politicians who put them there. But the answer is inadequate, because, in spite of the politicians, there are enough good men to fill every vacancy which may occur during this generation. The wonder is that there are any remaining, when they have seen themselves passed over time and again by men whose attainments were unproven. The rewards of the specialty of psychiatry are small enough, and should not be filched away. The injustice is not chiefly to the men who have spent a life-time in acquiring a knowledge of the insane, of their diseases and of their treatment; it is to the wretched insane themselves, who are deprived of that experience which might aid in their recovery.

We yield to none in our admiration of the general practitioner. We are aware of his energy, his resources and his fidelity, but not even the general practitioner will lay claim to a capacity for treating off-hand and to the best advantage grave lesions of the eye and ear or of the more secret parts of the body. He should adopt the same attitude towards the brain. In time it will come to be a shameful thing for a general practitioner to accept a position for which he is not qualified, since thereby he is committing a wrong towards his colleagues and towards his patients.

The ideal service is that which prevails in New York. The superintendent is appointed by the board of management, and he must be selected from men who have served at least five years, and have proven their capacity and instinct for such work. The assistants in turn are appointed by the superintendents, and they obtain advancement according to their merits, no step in advance being made unless the candidate has had previous experience in the specialty, and proved his fitness by passing an examination before promotion. In Canada we have no system—not even a bad one. In view of recent political events which have happened in Ontario, if Dr. Burgess made a protest before the whole profession, it might not go unheeded.

## THE LEPERS AT TRACADIE.

Save when an annual report awakes our interest, we are apt to forget that interesting colony in New Brunswick, of which Dr. Smith has just published the yearly statistics. The lazaretto contained, twelve years ago, eighteen patients, and to-day contains fourteen. In a neighbouring parish Dr. Smith has found one definite and three probable cases. Last year's admissions were three in number, and the deaths in the institution numbered four. It will probably be many years before the need for the settlement passes away, although progress for a long time has been satisfactorily setting in that direction.

One case has actually undergone spontaneous cure, though the results remain. Attempts at treatment have been limited to Chaulmoogra oil, which was introduced into the colony two years ago, and its results are spoken of with much favour, especially because under its use erysipelas and leproic fever have become very rare accompaniments of the disease.

The present fourteen cases consist of nine men and five women, varying from ten to sixty-two years of age. By origin, nine are French, three Icelandic and three English, the total of fifteen including the case above mentioned as cured, who is constantly allowed out on leave of absence. Four of them are blind from ulcerations of the disease or from iritis, but those whose physical condition permits are encouraged to do light work around the institution, and even to enjoy the relaxation of sailing in the harbor.

Had further evidence upon the communicability of the disease by contact been required, it is supplied by the researches into the circumstances of all the cases, which have been made by Dr. Gurth. The disease has spread by failure to segregate lepers, and, when proper segregation has been carried out, it has been checked. The duty of maintaining the institution will lie upon the country for years to come, but in pursuing the present methods it is likely that the shortest way is being taken towards dispensing with it at some future date.

One of the latest governments to face the leper question is that of the State of Louisiana, which has erected a lazaretto, stated to be remarkably complete and modern in its equipment and methods.

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 THE NEW PROVINCES.

A communication signed "W. H. SCOTT, M.D.," has been appearing rather freely in the daily newspapers. As the subject is one of purely professional interest, it might be thought that sufficient publicity could be obtained through the medical journals. The question which is troubling Dr. Scott is the status of medical men in the North-west

Territories, if the autonomy of a province be granted to that important part of Canada. He contends that the new province should not be permitted to manage its own medical affairs, and possibly exclude from practice medical men who are now resident in the older provinces. Dr. Scott appeals for "advice and suggestions," therefore we feel free to say that the new province will be entitled to precisely the same privileges as are enjoyed in Ontario and Quebec.

The objections which Dr. Scott puts forward are that these territories were purchased by Canada as a whole, and that they are inhabited mostly by "foreigners." Those who remember the provincial subsidies which were paid at the time of Confederation will remember that the older provinces were also purchased, and that the inhabitants of the territories have been pretty well taxed ever since to pay the price.

The second objection is conceived in the true Ontario spirit—that the inhabitants are foreigners. Indeed, we in Quebec have frequently been placed in the same category. All of us in Canada at one time or another were "foreigners," but we are none the worse citizens for that. The remedy for the absurdity, of course, is a registration, which is good for the whole Dominion, and if Dr. Scott and his friends would apply their minds to that problem they would be more usefully employed.

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### THE UNION BANQUET.

The dinner which was given on the evening of February 21st, at the Windsor Hotel, by the Montreal Medico-Chirurgical Society and La Société Médicale de Montréal, was an event in the professional life of the community, which in time will be regarded as worthy of remembrance. It was the first occasion in the history of the senior society, now extending over a period of seventy years, upon which both elements in the profession, French and English, came together as one body. That is why we say the event will be memorable when finally French and English come together permanently.

The arrangements were carried out in a large imaginative way. The toast to the English Society was proposed by a Frenchman, who spoke English, and the French Society was proposed by an Englishman speaking in a language which passed for French. Dr. Buller's address was a heroic effort, and it was listened to with the utmost of politeness by English and French alike.

In the absence of the Dean, on account of illness, Dr. Shepherd replied for McGill University, and it could not have been done better. He recalled the early days of the medical faculty, when lectures were given in both languages, especially by his own predecessor in the chair of anatomy, Dr. Bruneau, and he mentioned a rule which is yet in

force, that examination papers may be written in both languages. Dr. Armstrong developed the same theme in the admirable account which he gave of the early history of the Medico-Chirurgical Society. He announced, what was news to many, that it was the custom to employ two secretaries, and that to this day the minutes of the early meetings stand on alternate pages in French and English.

Sir William Hingston, employing both languages, proclaimed that the world of medical science knew no geographical boundaries, no distinction of nationality, of race or of language. Dr. F. W. Campbell spoke in his own inimitable way of the older members of the profession whom he knew, whose names are now becoming a tradition to the younger generation. Dr. Lachapelle presided with his usual grace which has always meant so much to the profession in Montreal, as Dr. Adami was careful to remark in proposing his health.

The members of the profession never appeared to better advantage, and in the enthusiasm of the moment the gift of tongues descended in quarters totally unexpected. Prophecy is a dangerous exercise, yet we shall be much mistaken if this friendly meeting does not mark the beginning of a new era in Montreal, in which all will work together in complete unity, in the common cause against suffering and disease.

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The financial statement for the eighty-second year of the Montreal General Hospital does not afford particularly pleasant reading. It shows a deficit of nearly twelve thousand dollars as a result of the year's operations, and the income was nearly ten thousand dollars less than last year. A diminishing income with increasing needs is not a satisfactory situation. The charitable public of Montreal may be trusted wholly, and if the needs of this great hospital are adequately presented we feel sure that there will be a prompt response. It should not be necessary to make the demonstration which was made in 1869, when a portion of the hospital was closed for lack of funds. We take the liberty of making this appeal, though we have not been asked to do so, nor have we been favoured with a copy of the statement in question.

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The Protestant Hospital for the Insane at Verdun has been made the recipient of a most acceptable gift—a residence for the Superintendent, Dr. T. J. W. Burgess. The plans have been prepared by Mr. Robert Findlay, and construction will commence in the spring, so that the house will be ready for occupation next autumn. The new residence will stand upon the east side of the avenue, half way between the hospital and the Lachine road. The material to be employed will be sand-

stone and red brick and the cost will be in the neighbourhood of sixteen thousand dollars. The work will be done under the care of Mr. Lyall, the President. The donor of this handsome gift is Mr. G. B. Burland, an old friend of the institution.

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Dr. Howard Kemp, who has been carrying on the work of treating incipient cases of tuberculosis at Ste. Agathe during the past five years, has proved by results the value of his methods and the suitability of the climate of the Laurentians. Dr. Kemp has now made his first appeal to the profession based upon those results, and offers to them the services of a well-equipped sanatorium of proven value near at hand and easy of access. This institution was begun in a small way; it has been enlarged to meet an increasing demand, and we feel sure that it will be developed still further, if Dr. Kemp receives the support to which he is entitled. There is no reason why the good work of Dr. Trudeau at Saranac should not be duplicated at Ste. Agathe.

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By order of Justice Morrison, the names of Doctors Telford, Vancouver, and Veerhertbrugghen, Kamloops, will be replaced on the roll of licensed practitioners of British Columbia, after being expunged by the medical council for alleged unprofessional conduct. The decision practically limits the powers of the council, and makes the judgments of the council subject to appeal to the courts.

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The next meeting of the American Anti-Tuberculosis League will be held in Atlanta, April 17th to 19th, 1905. Reduced rates will be given on all roads, and hotel rates will also be made special for visitors. Over 1,000 delegates, representing national and state medical societies, have already been enrolled.

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We beg to announce the suspension of publication of the *Canada Medical Record*. Arrangements are in progress for its incorporation with this JOURNAL, and, in the meantime, Dr. F. W. Campbell, the late editor, has joined our staff of collaborators.

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#### OSLERIANA.

*AEQUANIMITAS* With Other Addresses to Medical Students, Nurses and Practitioners of Medicine, by William Osler, M.D., F.R.S., London, H. K. Lewis, 136 Gower Street, W.C., Baltimore, Egerton Y. Davis, 1 West Franklin Street, 1904.

It was a happy thought of Osler—we are grateful to him for it—to rescue from the decent obscurity of medical journals his previous "Happy Thoughts" and give them to us in this well-printed, pleasing.

and, we would add, self-respecting and wholly worthy form. As a matter of instinctive propriety, writing in a medical journal we use the term "decent obscurity"; but that is altogether too polite—sepulchral oblivion more nearly expresses the truth. Your medical journal is a veritable graveyard for addresses on general topics. No matter how stirring the note sounded, no matter how perfect the expression of wisdom gained from peripetetic communion with many men and many books; no matter, in short, how nearly the general address approaches to being a masterpiece, in the medical journal its life is as the life of one of the Ephemeridae; it exists for a day, at most for a week, then it passes hence to be no more seen. Your paper on some moot point in medicine or surgery, or case report, your brief note on some out-of-the-way symptom or rare condition, or on anything however remotely connected with medicine—on the habits of pediculi, for example, or on hysterical vaginismus—that is not lost. It is indexed, and in the course of years it must be referred to again and again, if not by those of your own country surely by some studious German or French student working up his thesis; unless indeed you have labelled it, "An interesting observation," or have given it some other "fool name" that wholly cloaks its individuality. Your general address, dealing as it does, in general, with generalities, is buried; it cannot be indexed. Under what heading, indeed, could one seek for the first of these addresses, that which gives the title to the volume before us, save, happily, under "Osler, William."

"Aequanimitas" indeed we do not remember; it is new to us. It was before our day (we speak here individually and not editorially); but how many old friends we greet in this volume! "Teacher and Student" we read in 1892. The "Leaven of Science" we well remember, delivered as it was at the opening of the Wistar Institute in Philadelphia in 1894, with its tribute to that group of the Quaker City anatomists, Physick, Shippen, Caspar Wistar, Horner and Leidy, and its glowing appeal for men who should be thinkers as well as workers and for the higher life in the University; "The Army Surgeon," too, delivered at the Army Medical School in Washington in the same year, with its broad outlook over the scope and possibilities of the army surgeon's life. We remember wondering with a chuckle what the Lady Superintendent of Johns Hopkins Hospital thought of Osler's sturdy advice in his address on "Nurse and Patient," when he told the nursing graduates that marriage is the natural end of the trained nurse, and that so truly as a young man married is a young man marred, so a woman unmarried, in a certain sense, is a woman undone. And we remember the added request inserted to placate that Lady Superin-

tendent, that nurses should abstain from philandering during their period of working and, as much as in them lay, should spare their fellow-workers, the physicians and surgeons of the staff. Everyone knows—for were not abstracts published in all the daily papers at the time?—the address on “Medicine in the Nineteenth Century,” given to the Johns Hopkins Historical Club in January, 1901. But best of all perhaps, most thoughtful and most brotherly, is that address upon “Internal Medicine as a Vocation,” delivered at the New York Academy of Medicine in 1887; delivered, it is true, to the grey beards of the profession, but written essentially for the young practitioner entering upon his life’s work.

Then there is the long series of addresses, delivered to us here in Canada, which have more immediately stirred and appealed to us. Let us run over them. There is first “Teaching and Thinking,” delivered at the then new Medical Buildings of McGill in 1894. Many of our readers will recall the crowded lecture room with Lord Aberdeen in the Chair—a little uncertain, it seemed, as to who this Osler might be. Do you not remember the reference to the “cross-legged Juno who presided over the arrival of your grand-parents,” where “now sits a benign and straight-legged goddess”? Or the thrust at the clerical love of quack medicines:—“I find that the further away they have wandered from the decrees of the Council of Trent, the more apt are they to be steeped in thaumaturgic and Galenic superstition,” or “The desire to take medicine is one feature which distinguishes man, the animal, from his fellow-creatures,” and its concluding dream that Montreal may become the Edinburgh of America, “a great medical centre to which men will flock for sound learning, whose laboratories will attract the ablest students, and whose teaching will go out into all lands.” Have we more nearly approached to that ideal, we wonder, in the last ten years? There still remains to foster ever more “that undefinable something which for want of a better term we call the university spirit, a something which the rich institution may not have and with which a poor one may be saturated. . . . which comes insensibly, with a loyal devotion to duty and to high ideals, and without which *Nekushlon* is written on the portals of any school of medicine, however famous.” Then there is that brave address, and memorable, before the British Medical Association in 1897. That too is here, with its eulogy of British Medicine, its reference to the three portraits above the fireplace in Sir Henry Acland’s library, and its masterly *Uebersicht* over the development of medicine, not merely in Great Britain, but in the British Empire and wherever the British tongue is spoken. Here, too, is the address we published but a few years since when Osler came

back to us to recall the days when twenty-five years ago he first rose to the professoriate in Montreal. We dare not dip into it, nor into that other Montreal address upon "Chauvinism" given to the Canadian Medical Association in 1902. Last, and not among the least, is that other reminiscent and exhortatory "Master Word in Medicine," spoken at the opening of the new buildings of the Medical School of Toronto in 1903.

Laden with golden grain from which, mindful of our humanity, care has been taken not to remove all the chaff, it is, in short, a notable, friendly and cheering company of good words and high ideals that Osler brings before us; a book that should be near at hand in the library of every practitioner on this continent; a book delightful to dip into here and there, if only to wonder how one small head should carry all he knows—in the matter of quotations,\* not to mention Medicine and Pathology, and certainly not to mention treatment by drugs!

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### Reviews and Notices of Books.

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A PRACTICAL MANUAL OF DISEASES OF WOMAN AND UTERINE THERAPEUTICS FOR STUDENTS AND PRACTITIONERS. By H. MACNAUGHTON-JONES, M.D., M.Ch., Master of Obstetrics (Honoris Causa), Royal University of Ireland, formerly Professor of Midwifery and Diseases of Women and Children in the Queen's University, etc., etc. Ninth Edition. London: Baillière, Tindall & Cox, 1904. Canadian agents: Chandler & Massey, Toronto; Carveth & Co., Toronto.

Though this is the ninth edition of an English treatise on gynæcology, we believe it to be comparatively little known on this side of the Atlantic. The author calls it a book for students and practitioners, but its voluminous character—over one thousand pages—and almost encyclopædic compass of the subject render it, we believe, quite unsuitable for the student. However, the fact that it has already reached a ninth edition since 1884 must be held to prove its popularity with the English profession. The distinguished author made his reputation in Dublin, but now lives in London, where he has practised for several years. Whilst embodying his own ripe experience, opinions and

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\* We have made a rough calculation that there are 650 examples of the *quotatio recta* in the less than 400 small octavo pages of good sized type; while as for the examples of the *quotatio obliqua*—the "tags" and reminiscences of browsings among well-loved books, the words and phrases that in a flash bring to mind the inspirations of great men, and what our fathers in literature have declared unto us—their name is legion; they are not to be counted.



methods, the author has not failed to include the experience and opinions of others, and always with full and generous acknowledgment. After a full consideration of the anatomy and physiology of the organs and parts concerned, the author discusses certain important clinical matters. Then come case taking and examination of patients, to be followed by operating room equipment and technique. The various operations of gynecology are all minutely described and copiously illustrated, so are all the instruments and appliances of all distinguished operators and inventors of instruments. So numerous are these that a complete catalogue of all gynecological instruments, with illustrations, may be said to be contained in the book. Many of these the expert operator will consider unnecessary or useless. The author himself, in referring to some of them in a foot-note, rather aptly uses the word "toys."

The illustrations of every department of the work are copious, complete and most valuable. Many are original, but many are copied from the works of other authors, ample credit always being given to the source, text-book, treatise, monograph or journal article. There are 637 ordinary illustrations in the text and 122 plates, a few beautifully coloured. While the surgery of gynecology is most fully treated, no department has been omitted. The medical aspects of gynecological therapeutics are much more fully discussed than in most books, and a chapter on electro therapeutics has been appended. A fairly complete examination of the work leads to the conclusion that the author's views are sound and based on large experience and careful observation, and that his book is the most complete recent treatise on gynecology in the English language.

A TEXT-BOOK OF LEGAL MEDICINE. By FRANK WINTHROP DRAPER, A.M., M.D., Professor of Legal Medicine in Harvard University; Medical Examiner for the County of Suffolk, Massachusetts. Octavo volume of 573 pages, fully illustrated. Philadelphia, New York, London: W. B. Saunders & Company, 1905. Cloth, \$4.00 net. Canadian agents: J. A. Carveth & Co., 434 Yonge Street, Toronto.

Designed alike for the medical student and the practitioner, Dr. Draper's book seems to be an excellent one, for it departs from a recital of the stock cases that have appeared in book after book for generations, or at least deals with them only by passing reference; and there is a strong flavour of individuality about the whole book that can be present only when the writer has a large personal experience from which to draw. The chapters with reference to evidence, the giving of evidence, and the preparation of cases in which evidence is to be given are very

practical; the author properly insists at some length upon the modes of observation, and the necessity for the closest noting of all circumstances connected with a medico legal case. It is true that all the citations of the law are from the Massachusetts statutes, which, the author states, he regards as "the most progressive and most intelligent expression of modern jurisprudence."

To test a book of legal medicine, one naturally turns to such a subject as the serum test for human blood. Dr. Draper maintains a neutral position with regard to its usefulness, and refuses to accord it, as yet, the value it may possibly have hereafter, observing very properly that in a case where a man's guilt lies upon such evidence, the evidence must admit no doubt.

It might be said by way of criticism that several plates illustrating wounds are not of very great value, though it might be admitted that wounds are notoriously unsuitable for definite illustration.

Especially useful are many paragraphs dealing with the relation of patient and physician, privileged communications, malpractice and death certificates; the practitioner will find much clear statement that will tell him precisely what he wants. Altogether, Dr. Draper's book deserves to attain a good place among text-books of legal medicine.

THE DISEASES OF SOCIETY AND DEGENERACY. By G. FRANK LYDSTON, M.D., Professor of Genito-Urinary Surgery, University of Illinois. J. B. Lippincott Company, Philadelphia and London, 1904.

This is a book upon a sad subject, and the author displays no high degree of wisdom in dealing with the deeper aspects of it. As diseases of society are closely bound up with morality, they are usually treated according to the standard of morality which prevails in the community where they exist. The standard which Dr. Lydston adopts is the Chicago standard, and it differs in some respects from that which prevails in the Province of Quebec. The ideas expressed in the section upon matrimony are, we think, subversive of good order. There is also a lack of reticence, which is not in good taste. The book is largely an expression of belief, and we take leave to dissent from much of what is said upon questions of private and public morality. The writing, as a whole, is wild and incoherent. There is also much misstatement, of which one example will suffice:—"Cromwell was a sickly neuropath, who was a confirmed hypochondriac, his morbidity often approaching melancholia. All his life he was dominated by a vision, in which a spectral woman of gigantic stature foretold his coming greatness—a phantasmic reflection of his own hypertrophic ego." This comes peculiarly near being nonsense.

THE INFLUENCE OF GROWTH IN CONGENITAL AND ACQUIRED DEFORMITIES. By ADONIRAM BROWN JUDSON, A.M., M.A., formerly Orthopædic Surgeon to the Out-Patient Department, New York Hospital. Illustrated. William Wood & Company, 1905.

The author of this book adopts a new point of view. In ten chapters he takes a survey of orthopædic surgery, and demonstrates the importance of growth as a factor in the treatment of deformities. The main idea is that the patient should be so equipped that natural growth may be permitted to assist in recovery. This principle is entirely sound, and the author illustrates it by the results which may be obtained in such conditions as congenital club-foot, infantile paralysis and tuberculous disease of the various joints. A plea is made for early treatment by exercise and by appliances, all of which are well figured and described. The recital of cases gives a sense of reality to the work, and the results are encouraging to those who are engaged upon this special and humane part of surgery. There is much pretty sentiment in the book, which the present reviewer fails to comprehend adequately. Of such is the following:—"The combination in their young lives of childish and heroic qualities suggests a fantasy in which birds and wild flowers act a tragedy and improve the precepts of stoic philosophy."

THE DIAGNOSIS AND MODERN TREATMENT OF PULMONARY CONSUMPTION with special reference to the Early Recognition and the Permanent Arrest of the Disease. By ARTHUR LATHAM, M.A., M.D. Oxon., M.A., Cantab, F.R.C.P., Lond. Second Edition, 224 pages, 5 shillings net. London: Baillière, Tindall & Cox. Toronto: J. A. Carveth; Chandler & Massey. 1905.

This comprehensive title indicates the scope of the work under consideration, and the name of the author is guarantee that it is well done. Dr. Latham's teaching is specific and minute, and the book is a compendium of the best which is known of the treatment of consumption. It should be owned by every physician who is called upon to deal with this disease, and if patients are bound to have a book, they could not have a better one. The treatment, public and private, indoors and out of doors, appears to us to be correct and the tone of the book is hopeful.

INTERNATIONAL CLINICS. Edited by A. O. J. KELLY, M.D. Volume IV. Fourteenth Series, 1905. J. B. Lippincott Company, Philadelphia; Charles Roberts, Montreal.

This volume contains a coloured plate showing the mode of reproduction of the *Entamoeba dysenterica*, fifty plates and thirteen figures. The contributors to "Treatment" are George Hayem, Adolphe Javal, Myron Metzenbaum and F. Lejars. The contributors to "Medicine" are

J. H. Watson, Solomon Solis Cohen, Sir Dyce Duckworth, II. Senator Alexander Crombie and Robert Dawson Rudolf. The contributors to "Surgery" are E. H. Bradford, Wisner R. Townsend, John Lincoln Porter, James K. Young, W. Arbuthnot Lane, Anthony A. Bowlby and Ernest Gallant. Neurology is dealt with in an important article by Daniel R. Brower; and Pathology by Alexander Scott Warthin and Charles F. Craig. We note an article by Dr. Lockhart on Post-Climacteric Hæmorrhages. The volume is admirable in choice of subjects and arrangement.

**BACTERIOLOGY AND SURGICAL TECHNIC FOR NURSES.** By EMILY M. A. STONEY, Superintendent of the Training School for Nurses, St. Anthony's Hospital, Rock Island, Ill. Second Edition, thoroughly revised and much enlarged by FREDERICK R. GRIFFITH, M.D., Surgeon, Fellow of the New York Academy of Medicine. 12mo volume of 278 pages, fully illustrated. Philadelphia, New York, London; W. B. Saunders & Company, 1905. Canadian agents: J. A. Carveth & Company, Toronto. Cloth, \$1.50.

This is the second edition of a book which we had occasion to mention with commendation at the time of its previous appearance.

**THE DOCTORS' RECREATION SERIES.** A Book about Doctors. By JOHN CORDY JEAFFRESON. The Saalfield Publishing Company, Akron. New York and Chicago, 1904.

This is the fourth volume of this unique series, and is, as its name implies, a book about doctors, their habits and peculiarities. The book is a mine of quaint knowledge and amusing incident. It may be opened at any page and read with interest for so long as time will allow.

**TRANSACTIONS OF THE AMERICAN SURGICAL ASSOCIATION.** Volume XXII. Edited by RICHARD H. HARTE, M.D. William J. Doran, Philadelphia.

**ESSAYS IN PURITANISM.** By ANDREW MACPHAIL, M.D. T. Fisher Unwin, London, 1905. 257 pages; six shillings. Houghton, Mifflin and Company, Boston, March, 1905. 340 pages; \$1.50.

**ANNUAL REPORT OF THE SURGEON-GENERAL OF THE UNITED STATES, 1904.**

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During January last 449 patients were treated at the Hotel Dieu. Admitted 138 men and 130 women; discharged 121 men and 97 women; died during the month, 12 men and 5 women.

## Medical News.

### MONTREAL GENERAL HOSPITAL.

The eighty-second annual meeting of the Montreal General Hospital was held on the 21st February, 1905.

The total number of patients who have been passed through the wards of the hospital during 1904 were 3,144, against 3,066 in 1903.

The outdoor patients were, in 1904, 38,922, against 35,984 in 1903, showing an increase during the year of 2,938.

During the past year 19 nurses graduated and received their diplomas and medals, making a total of 233 since the establishment of the school.

The report of the secretary gave the general statement: Ordinary income, \$83,589.41; ordinary expenditure, \$95,508.88; excess of expenditure, \$11,919.47. Legacies amounting to \$19,590 had been received from various estates and the sum of \$25,000 had been added to the endowment fund during the year.

The secretary's report gave in detail the record of the hospital work. The total number of indoor patients treated to a conclusion were 3,144, an increase of 78 over the previous year. Of this number 3,156 were admitted during the year and 201 remained at the end of the year. Those discharged numbered 2,893, and there were 251 deaths. The percentage of mortality was 7.98, or 4.9 exclusive of deaths occurring within three days of admission. The average number per day in the ward was 189.1. The average number of days spent in the ward by each patient was 22.05, and the aggregate number of days in the hospital of all patients was 69,213, an increase of 1,775 over the previous year. The average cost per patient daily was \$1.38, as against \$1.56 last year.

Of indoor patients treated to a conclusion there were 1,973 males and 1,171 females, making a total of 3,144. The religious denominations were represented as follows:—Protestants, 1,549; Roman Catholics, 1,412; others, 183. There were 2,618 citizens of Montreal, 435 strangers, 77 sailors, and 14 immigrants. The Canadians numbered 1,835, British Islands, 767, Americans, 186, and 100 Italians.

In the outdoor department 38,922 consultations were held, and the ambulance had been called out 1,511 times. Two hundred and forty-five autopsies were performed and 1,374 examinations were made for the attending staff.

The medical staff was re-elected for another year.

### ROYAL VICTORIA HOSPITAL.

The following is the report for month of January:—Patients admitted, 256; discharged, 211; died, 13; ambulance calls, 62. Outdoor

Department—Medical, 523; surgical, 307; ophthalmological, 291; gynaecological, 83; laryngological, 398—total, 1,602.

The new wing of the Woodstock hospital was formally opened on the 13th February. The new wing includes an operating room, a department given up entirely to private wards, a recovery ward and accommodations for the nursing staff.

The Berlin Röntgen Society (Röntgen Vereinigung zu Berlin) has arranged for a congress in commemoration of the first decennial of Röntgen's discovery to be held April 30th to May 3rd, 1905. The secretary is Herr Dr. Immelmann, Berlin W., Lützowstrasse 72.

The Sherbrooke hospital has received a donation of a thousand dollars from the retiring president, Major Wood. There were admitted to the hospital during the year 282 patients. There were seventeen deaths. Of the patients 111 were residents of Sherbrooke and 171 came from other places.

Dr. R. M. Riddell, of Winnipeg, died on the 29th of January of typhoid fever. He was a graduate of Manitoba Medical College.

## Retrospect of Current Literature.

### SURGERY.

UNDER THE CHARGE OF GEORGE E. ARMSTRONG.

CHARLES L. SCUDDER, M.D. "An Operation For Inguinal Hernia." *Annals of Surgery*, January, 1905.

This article contains the writer's interpretation of the essential details of Bassini's operation, and is illustrated by nine drawings made from studies of the anatomical findings at such operations. He sees no reason to excise the veins of the cord, and though the cord has been usually transplanted he considers it of comparatively little importance and is more and more inclined not to transplant it. When the sac extends into the scrotum—in acquired cases—it is first separated from the cord at the proximal end and then divided transversely, and the proximal end alone is dealt with, unless the sac is thick and extensive when the distal part is excised. He has never seen a hydrocele or cyst follow this method of treating the undissected distal portion. The two advantages would seem to be the lessened disturbance to the cord and shortening the time of operation. The neck of the sac is thor-

oughly freed from surrounding structures, pulled well down, and closed by a continuous suture of chromic gut. Other points regarded as important are an ample cutaneous incision; absolute hamostasis at time of operation and subsequently a hand splint is applied for 24 hours to prevent flexion of the knee since, when the thigh is flexed, a spica exerts no pressure over the groin; an anatomical dissection of the parts concerned so that every structure is clearly recognized; the complete emptying of the sac of both adherent and non-adherent contents; the suturing of the hernial sac at the level of the peritoneum of the anterior abdominal wall; the exact suturing of the abdominal wall superficial to the peritoneal sutures including always one or two sutures placed over and above the sutured sac; and the minimum of trauma to the cord. The patient thus operated upon is kept in bed for two weeks, on a bed-rest the third week, up the fourth, and a spica bandage worn for a month subsequently.

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JAMES G. MUMFORD, M.D. "Gastro-Enterostomy." *Boston Medical and Surgical Journal*, January 26, 1905.

The object of this preliminary communication is to urge an operation which the author has practised of late, an operation elaborated out of the well-known procedure of Chaput. The latter's operation consisted of posterior gastro-enterostomy with the long loop, with entero-enterostomy and section of the afferent loop between the two anastomoses. The disadvantages of this operation are that a vicious circle may follow, the pylorus may resume its functions, the new gastric stoma may close. The writer advocates the further step of section of the pylorus. It adds nothing to the risks, vicious circle is impossible, and the duodenum, now side-tracked, becomes a mere continuation of the common bile duct.

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EDWARD SANDERSON, M.D. "Acute Post-Operative Thyroidism." *American Medicine*. February 4, 1905.

This interesting article consists of the report of such a condition occurring in a young woman of 20, operated upon for chronic appendicitis, and cites five other cases from literature in which the condition developed after operation. His conclusions are that acute post operative thyroidism is rare, all cases cited proved fatal save his own and one other, the use of cactus grandifloris, never before recommended in this or similar cases, seemed to be of great aid in bringing about a favourable termination, the peculiar pigmentation following the turgescence and being different on the two halves of the body is of interest.

and such a complication should make the surgeon ever on his guard to recognize the presence of a condition, which, if lighted up, will produce acute thyroidism.

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HOFRATH PROFESSOR VON MOSETIG MOORHOF AND B. SEYMOUR JONES,  
F.R.C.S., Eng. "Experiences With Iodoform Bone Plugging."  
*Lancet*, January 21, 1905.

So far as we know this is the first time that a description of Professor Moorhof's bone plugging procedure has appeared in English, and the article is warmly recommended to the readers of the *Journal* for perusal as a mere synopsis would not do justice to its excellence. Professor Moorhof has used his method in more than 220 cases without a single failure, has never noticed any ill-effects, such as intolerance of the plugging and subsequent necessity for its removal, nor symptoms of iodism, although in one case more than 200 grammes were used. Dr. Armstrong has used this method in four cases, one on osteomyelitis of the sternum, and an incision of the ankle joint, and a case of osteomyelitis of the tibia. All these cases up to the present time of reporting are progressing most favourably.

W. L. B.

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DR. PAUL KLEMM. "Contribution to the Question of Skin Sterilization." *Dent. Zeit. f. Chir.*, Dec., 1904.

In a rather long article, Klemm gives us much common-sense but little that is new. It has been too much the custom, he says, in testing the results of any given method of skin disinfection, to scrape or cut the skin with sharp instruments, or pull a strand of silk violently to and fro under the nail, and inoculate the material thus obtained upon media. All this is not natural, and he adopts instead the original method of Kümmell, that of pressing the fingers into agar or other solid culture media. In this way the mode of infection from the hands during operating is most closely imitated. Klemm's experiments, carried out in this way, concern mainly details in the ordinarily accepted routine of hand disinfection. Some of his conclusions are as follows:—Bacteria are never found in the sweat-gland ducts, and very rarely in the sebaceous-gland ducts; normally they infest the spaces between the upper layers of the epidermis, yet they lie so deeply that no method yet known of disinfection produces an absolute skin sterility, but only a relative one. Sublimate never penetrates deeper than the second cell layer of the epidermis. This he proved by microscopical sections. As for alcohol, its bactericidal power is hardly worth considering; a thin layer of *staphylococcus aureus* upon a cover-slip was exposed to 70 per cent. alcohol for various periods, and the bacteria were found not to be



killed under 12 minutes as a minimum. The value of alcohol is, nevertheless, a very real one, but consists chiefly in its contracting and caking influence upon the skin, thus covering over the bacteria which remain. This effect he found to last for a good three-quarters of an hour if the hands remained dry. If hands, during operation, must be kept wet—with blood or solutions—he advises frequent renewal of washing in alcohol. Klemm examined the silk sutures that were removed from clean wounds, and found them practically always infected with bacteria; on the other hand, he could prove that, when first left in the wound, they were free of bacteria. No doubt inhibition plus the normal presence of *staphylococcus albus*!

As to technique, he believes strongly in removing fats with sulphuric ether after the usual washing with alkaline soap; then follows sublimate, and finally alcohol 70 per cent.

After all this comes the italicized conclusion, that "implantation-infection (that is, from material necessarily left in the wound; catgut, silk, etc.) through normal skin bacteria is the one weak point in wound treatment, inasmuch as we possess at the present time no means whereby an absolute sterility of the operation field can be obtained.

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## MEDICINE.

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

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PIERY and NICOLAS. Valeur Pronostique du Syndrome Urinaire de la Pleurésie Tuberculeuse. *Arch. Gen. de Méd.*, Dec. 20, 1904.

Recent researches have established two facts regarding urinary elimination in tuberculous pleurisy—(1) At the period of absorption of the exudate there is a crisis of polyuria with hyperchloruria; (2) this crisis is constantly accompanied by albuminuria.

The authors show that these urinary changes occur only in benign cases of tubercular pleurisy. The grave forms have a urinary formula of their own, which can be utilized in the study and prognosis of such cases.

Fifteen cases were carefully observed regarding the total urinary excretion, the quantities of chlorides and the albumin and urea excreted. The tubercular character of the disease was established by cytological examination, by inoculations and by sero-diagnosis.

The cases were classified in three groups—(a) grave cases terminating fatally, (b) a middle class marked by a prolonged course, (c) benign cases of short duration, leaving but slight adhesions.

Four cases fell in the first group. One died from miliary tuber-

calosis, the second from asphyxia, resulting from pleurisy of the opposite side, the third from pulmonary and probably peritoneal tuberculosis, and the fourth from syncope. In these cases the urine was uniformly diminished during the period of increase of the exudate. The chlorides were diminished or normal (in one case).

In the ultimate stage the urinary curves presented a uniform character. The charts, which all along showed a diminished excretion of urine and chlorides, presented a uniform and progressive fall at the approach of death. There was a uniform and strictly parallel diminution of the four elements—diuresis, chlorides, urea and solids. The only exception was in the case of cardiac collapse, where these signs only appeared the day before death. Albuminuria was present in all except the last case.

In the second group, or those of moderate severity, including five cases, the following variations occurred during the periods of increase, arrest, and diminution of the exudate.

*Period of Increase.*—The urine was no longer constantly diminished. Diminution in amount was noticed twice; once it was normal, and once it increased progressively from one to three litres. The chlorides and urea were either increased or diminished, and albumin was present in three of five cases.

*Stationary Period.*—The urine increased in all the cases, in comparison with the preceding period, amounting to a true polyuria in three cases. Albumin existed in two cases, and chlorides corresponded with the urinary excretion. Urea and solids were normal or increased.

*Period of Resolution.*—At this stage the urinary formula of polyuria, hyperchloruria and albuminuria was constant, but was not so marked as in benign cases. The polyuria was slight and transitory in two cases; hyperchloruria was constant; the elimination of urea and solids was normal or increased; albumin was present in four or five instances.

In the third group, that of benign cases, six in number, the following changes were noted.

*Period of Increase.*—At this stage a diminished amount of urine was present in two cases, and normal in a third. Hyperchloruria was present in one and normal in two. Urea and solids were normal or slightly diminished, and albumin existed in a third of the cases.

*Period of Arrest.*—At this stage the urine was normal or increased, whilst hyperchloruria was constant. Albumin was present only in one of four cases.

*Period of Resolution.*—At this point the urinary crisis was well marked. The urine and hyperchloruria showed a rapid or progressive increase, and albumin was almost constant. Urea and solids were

normal or diminished. The second and third groups of cases thus correspond closely at this period, but in the latter the hyperchloruria is more pronounced.

In studying the urinary curves in all three classes of cases in the three stages of the disease, the urinary formula presented certain general characters.

During the period of increase the urine showed a decrease, but most constant in the grave cases. In the two severer types of the malady the chlorides were increased. Hyperchloruria in benign cases, on the other hand, presented a normal excretion of chlorides in two-thirds and an increase in the other third.

The elimination of urea and solids was diminished or normal, and the variations bore no relation to the gravity of the case. Albuminuria present in 60% of all cases, was constant in grave cases, was present in 66.6% of the middle class, and only found in 33.3% of benign cases.

In the period of arrest the grave cases are excluded, as this stage is absent or not apparent. In the two milder types the urine was relatively or absolutely (polyuria) increased. Hyperchloruria was present in both classes, but was more constant in the severe cases. Albuminuria was notably diminished in frequency, amounting to 40% in the middle class and 25% in the benign forms.

In the period of resolution the differences between the three groups were most pronounced. Here the oliguria of the grave cases contrasts with the polyuria of the other groups. The urea, solids and chlorides show a graphic and corresponding fall in the grave cases, a more or less rapid rise in the others. Albuminuria was most frequent in the grave, and least frequent in the benign types, and in the latter it appeared especially during the period of resolution.

The albuminuria of pleurisy is essentially intermittent and small in quantity, and usually ceases rapidly as convalescence is established.

Albuminuria occurred, as already stated, most frequently in the grave cases, when it was constant, excluding the case of cardiac collapse. In the middle and benign forms it was present in 66.6% and 33.3% respectively.

The effect of paracentesis was noted in seven cases. The results always showed an increase in urine and chlorides, and once of urea and solids as well.

The influence of the injection of salt was tried in seven cases. The exudate increased in three, was unaffected in three and in one the result was doubtful. In half the cases therefore an increase in the exudation was produced. The urine showed an increase in all cases, and a gain in weight of the patients was also constant.

Certain points bearing on the prognosis of tuberculous pleurisies (and these include almost all cases of acute pleurisy) can be deduced from the results of urinary examinations.

During the period of increase an increase in quantity, with normal or slightly diminished chlorides, indicate a curable pleurisy, whilst oliguria with hyperchloruria suggest a grave form.

During the second period of the disease, that of arrest, an increase of the urine and chlorides indicate a favourable issue, whilst a decrease indicates a fatal termination.

A milk diet is recommended as most likely to provoke diuresis and hyperchloruria. The application of blisters derives some support from the fact that diuresis was induced by their application, whilst thoracentesis has a similar effect, and tends to prevent extensive adhesions.

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W. S. THAYER, M.D. "Analysis of Forty-Two cases of Venous Thrombosis occurring in the Course of Typhoid Fever." *Trans. Am. Phys. XIX.*

Out of 1,463 cases of typhoid treated at the Johns Hopkins Hospital there were 39 instances of venous thrombosis, or 2.6 per cent. In five of the 39 cases there was a fatal result, and in two instances embolism was the direct cause of death.

The seat of the thrombus was in the lower extremities in 40 cases, in one in the upper and one in the pulmonary artery. The left side was affected in 26 cases, the right in five and both in nine. The femoral vein was involved in 21 instances; the popliteal and iliac and calf veins five each; the internal saphenous, three, and the axillary, pulmonary artery, and common iliac and pulmonary artery together in one each.

The third and fourth weeks are the periods at which thrombosis is most frequent, but it may occur in the first and second, or as late as the thirteenth week.

In most instances thrombosis occurs during the fever, but in a third of the cases the temperature was normal at the time of onset. Chills occur before or about the period of onset in 28 per cent.

Pain is the first definite symptom of onset, its site being in the region of the affected vein. In one instance of iliac thrombosis the pain and abdominal pain was so severe that perforation was suspected and laparotomy performed. Oedema was always present, the temperature was raised and there was often redness over the affected vessels.

The leucocyte count was over 10,000 in more than half the cases, and in the case of iliac thrombosis, in which laparotomy was performed, it amounted to 24,864.

Cultures were only recorded in two cases, one showing a pure culture of typhoid bacillus.

More or less permanent disability resulted in ten cases which were followed up. Edema and persistent enlargement of the affected leg was constantly present, sometimes pain or cramps, and once weakness of the limb when it was used too much. Varices were marked, frequently resulting in ulceration, and in thrombosis of the femoral vein a greater or less quantity of blood is carried up the iliac vein of the opposite side, the current crossing the abdomen through anastomoses in the hypogastrium, resulting in a characteristic triangular area of varicose veins.

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CHARLES G. STOCKTON, M.D. "Abdominal Pain from Unsuspected Irritation at the Internal Inguinal Ring." *Trans. Am. Phys. XIX.*

Stockton calls attention to a form of abdominal pain which has been mistaken for chronic appendicitis, nephro-lithiasis and questionable affections of the colon. The condition occurs in adult males, usually of relatively active life. The pain is chiefly confined to the lower quadrants of the abdomen, but occasionally appears in the upper quadrants as well. In some instances the pain is colicky in character, in others continuous, and sometimes burning, suggesting irritation of the peritoneum. There is rarely localized tenderness, although it occasionally occurs. The symptoms are usually relieved in the recumbent posture, and exercise or straining efforts commonly cause aggravation. The symptoms may be persistent or intermittent, and, like other abdominal affections often give rise to much apprehension on the part of the patient.

The anatomical basis depends on an overpatulous condition of the internal ring, so that a slight bulging is detected on any straining effort. The symptoms may occur even when the inguinal canal is of normal size. Relief is at once obtained by the application of a carefully adjusted truss. A synopsis of twelve cases is presented.

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### Society Proceedings.

SOCIÉTÉ MÉDICALE DE MONTREAL.

*Meeting of January 24, 1905.*

DR. O. F. MERCIER, PRESIDENT, IN THE CHAIR.

The PRESIDENT announced that Dr. L. P. Normand, of Three Rivers, had accepted the invitation to attend the Society's second meeting in February, and deliver a lecture.

The banquet of the medical profession was strongly brought before the meeting, and the members were asked to strongly endeavour to make it a success.

DRS. DUBÉ and BOULET, delegates to the Buckingham meeting of the Medical Association of the County of Labelle, reported a large attendance, practitioners coming from over 100 miles to assist.

DR. ROBITAILLE, President of the Medical Society of the County of Labelle and Dr. D'Amour, its Secretary, proved to be able delegates in discussing scientific questions and affable hosts. They reported that Dr. Paquet, of Hull, had read a very interesting paper on tuberculosis, the question being treated from a hygienic point of view.

Dr. Aubry, also from Hull, read a paper on the management of purulent pleurisy, which convinced his hearers that he had reaped something from his own personal observation and experience. Mr. Henri Bourassa delivered an address on the Roddick Bill, providing for inter-provincial reciprocity throughout the Dominion. Dr. Hervieux reported a case of Monstrosity sent by Dr. Biron of l'Assomption. A paper on "Hygiene in Churches," by Dr. A. Naveau, of St. Joseph de la Beauce, was read by the Secretary, and the meeting adjourned.

*Meeting of February 7, 1905.*

DR. O. F. MERCIER, PRESIDENT, IN THE CHAIR.

DRS. HAYWOOD and ETHIER reported on two cases of Casarian Section, and the patients were brought before the members.

DR. MERCIER reported two interesting cases of strangulated hernia.

DR. J. N. ROY reported a case of Polypus of the Larynx—ablation with Wais forceps.

MONTREAL MEDICO-CHIRURGICAL SOCIETY.

The eighth regular meeting of the Society was held Friday, January the 20th, Dr. J. A. Macdonald in the chair.

F. G. FINLEY, M.D.—A case of Polyarthrits in a child.—Still's Disease. This affection usually comes on early in life before the second dentition, and, apart from this, there is no special cause recognized. The disease commonly begins by swelling in the knees and by stiffness in the cervical spines. The joints are very considerably swollen, fusiform in shape, and there is often a great deal of effusion. The ankles, elbows, wrists and the small joints of the fingers are affected. These never present any bony enlargement, and the cartilage is not eroded, so it differs from rheumatoid arthritis, which is occasionally seen even in children. The glands and the spleen show a certain amount of enlargement, and the glands affected are said to be somewhat related to the joints affected. There are occasionally exacerbations of the dis-

case, in which there is a certain amount of fever with increased enlargement of the glands and the spleen. There is very little pain, and little or no tenderness. Later on, there may be flexion, and the child may be bed-ridden.

The case I have to record is that of a boy, 11 years of age. He had scarlatina, followed by nephritis, at five years of age. When convalescing he fell from a gallery and hurt his wrist and shoulder. About this time the mother noticed swelling of the joints, especially the wrists, hands, ankles and knees. On May 15th last, he complained of pain in the right knee-joint, and next day it was much swollen, red and hot. He remained in bed two weeks, and the joint returned to its usual size. In October, rapid swelling of the knees came on, the left two weeks after the right, yet, on handling them, there is practically no tenderness, and the boy has complained all through of very little pain. Slight fever has been present since admission. There is no deformity in the bony parts, as shown by the diagram. The lymphatic glands almost all over the body show slight enlargement, some the size of an almond. The spleen is palpable on deep inspiration. The boy shows a slight degree of anæmia, and Dr. Gordon found the red cells 5,000,000 and hæmoglobin a little over 60 per cent. The eosinophiles showed a marked increase at the expense of the polymorphonuclear cells as follows:—Eosinophiles, 16; large mononuclears, 15; lymphocytes, 29; transitional, 3; polymorphonuclear, 37 to 100.

This condition has been looked upon as an infection, and in favour of this it has been urged that the lymph glands and spleen are enlarged, but no definite bacteria have been described. Dr. Gillies examined some fluid from the joints, and found a Gram-positive diplococcus in the smear preparations, but no growth in cultures. This disease has often been described as rheumatoid arthritis in childhood, but it differs from that, in that there is little pain or tenderness about the joints, and there is only a very slight deformity of the fingers and no osteal outgrowths. The enlargement of the lymph glands and of the spleen gives the disease its distinctive character.

DR. W. F. HAMILTON.—In the medical wards of the Royal Victoria Hospital we have had two cases of children of six and eleven years showing multiple arthritis of rather a chronic type. If I remember aright, these cases were reported in the Journal by Dr. Nicholls. No observations were made upon the lymphatic glands at the time, and there was no mention of splenic enlargement. It would appear that the interpretation of these enlargements affords strong support to the view that the infectious nature of rheumatism and multiple arthritis is associated with micro-organisms in the blood.

DR. FINLEY.—There certainly is a form of polyarthritis in childhood in which there is no enlargement of the lymph glands or spleen, apparently a progressive disease, and accompanied by more or less ankylosis.

Dr. Laphorn Smith reported three cases of repair of injuries to the ureter. He said:—There are three principal ways in which the ureter may be injured so as to give rise to a urinary fistula. First, by being compressed between the child's head and the pelvic wall during prolonged labour with impaction of the head; second, by being caught between the blades of the clamp during vaginal hysterectomy for cancer, and third, by being accidentally cut during the removal of a large abdominal tumour, especially when the latter occupies one of the broad ligaments, in which case the ureter is displaced far from its proper anatomical relations. The proportion of frequency of these three ways, as shown by a paper by Fergman, who collected sixty-eight reported cases, was as follows:—Parturition, twenty-five cases; vaginal hysterectomy, twelve cases; abdominal section, three cases. I now beg to report three cases of repair of injury due to prolonged labour to the ureter, caused in each of these ways respectively. The first one, read before the Winnipeg meeting of the Canada Medical Association, August, 1901, has already been reported in the Philadelphia Medical Journal, October 5, 1901, but the other two cases are now reported for the first time.

Case I.—Mrs. J. B., 34 years of age, married, came to me at the Montreal Dispensary on July 1, 1901, giving the following history:—She began to menstruate at 14, was always regular, and the flow was painless. She was married at 31, and had one child at 32 whilst living at Vancouver, B.C. I afterwards learned from her doctor that he had been called to see a woman fourteen miles in the country without knowing what it was for, and on arriving there he found the head impacted in the pelvis. He drove back to town for his forceps, and returned next day and delivered her with great difficulty. A few days later large pieces of sloughing mucous membrane came away from the vagina, and it was noticed that she had incontinence of urine. It soon became evident that the vagina and ureter had been destroyed to some extent by the prolonged pressure. In Fergman's cases, of the twenty-five following parturition, sixteen were due to using the forceps too soon, and nine to using them too late. After remaining in this pitiable condition of always being wet from dribbling urine for two years and seven months, her friends made up a collection to send her to England to try to have the injury repaired. About a year and a half before coming to me she went to London, and spent three months in one of the best hospitals, during which time three plastic operations were performed without success. She then became discouraged, and insisted upon returning to Vancouver, and had made up her mind to bear her misery



as best she could. While passing through Montreal on the way back a friend induced her to come to the Montreal Dispensary. I found the vulva ulcerated and the thighs excoriated, and I could see the urine trickling from a small opening in the right vaginal fornix. I sent her into the Western Hospital, and after a long and absolutely accurate investigation of the condition, with which I will not weary you, I did a plastic operation, which failed, because the stitches cut out of the scar tissue, which had replaced a large extent of the mucous membrane in that locality. I tried once more by passing a silk-worm-gut purse-string suture far above the mouth of the fistula, hoping to reach healthy tissue. But this also failed. Then I obtained her consent to try implantation of the ureter. This consists in opening the abdomen, finding the ureter, cutting it off above the injury, and implanting it into an opening made in the highest or nearest point in the bladder. As Howard Kelly lost one case by septic infection from the urine, my patient was carefully prepared by giving her seven and a half grains of urotropin three times a day for a week beforehand to render the urine aseptic. Van Hook's method was employed, except that I did not follow his example of introducing the main traction sutures right into the cavity of the ureter and bladder, because I feared the formation of a calculus by deposition on the silk. I went through the muscular layer only of the ureter and bladder. These main stitches were reinforced by many chromicized catgut ones, stitching the mucous membrane of the ureter to the mucous membrane of the bladder, and the muscle of the ureter to the muscle of the bladder. I was able to do nearly the whole operation without opening the peritoneal cavity, but owing to some unforeseen difficulties, I was obliged to open it for a few minutes. A drainage tube was introduced to the site of the implantation in case it should leak, and a glass catheter *à demeure* was left in the bladder for a week. There was not a drop of leakage, and she made a good recovery, and went home and has remained so ever since.

The second case, a Mrs. H., 29 years of age, mother of one child, which was dragged out with instruments twenty-one hours before the natural completion of labour. A year later she went to a doctor, who told her she had a badly lacerated cervix, and treated her with tampons, which gave her great relief for the time. But getting worse again soon, she went to Dr. Reddy, who diagnosed cancer of the cervix, and urged her to have vaginal hysterectomy at once. He kindly called me, and I removed the uterus within a few days of his first seeing her. As it was difficult to draw the uterus down, I employed the clamp method, and unfortunately caught the right ureter in the clamp. For two days afterwards, on removing them, there was a slight trickling of urine from the vagina. Transplantation was performed in the same way, as in

the previous case, but was not at first successful, because the traction was too great owing to shortness of the ureter, although the bladder had been detached from the symphysis so as to bring it an inch nearer to the end of the ureter. It only partially pulled out, in about one quarter of its circumference, and a month later a second operation completely cured it, and she is now perfectly well.

The third case was a woman with a large, broad ligament cyst, extending up to the liver. As it had dissected up the posterior layer of peritoneum, it required a great deal of tying and cutting in order to get it out at all. In one of the many bands holding it down was the left ureter, which was carefully avoided until near the end of the operation, when it was picked up without being recognized until the scissors had gone three-quarters through it, when the mucous membrane of the ureter showed what had been cut. It was carefully sowed with two layers of black silk sutures, the first row interrupted and the second continuous. As it was then found impossible to extract the last portion of the cyst from the depths of the pelvis, where it was imbedded among arteries and veins, I resorted to the old plan of marsupialization, that is, cutting the tumour off at the level of the abdominal wall, and sewing the edges of it to the peritoneum. One drainage tube was put in down to the bottom of the cyst and another to the cut in the ureter. There was no leakage from the ureter, and the tube was removed in two days, and the cyst drainage tube was removed in a week, when it ceased to be required. The patient made a good recovery, and is now well.

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The ninth regular meeting of the Society was held Friday evening, February 3rd, Dr. J. A. Macdonald, President, in the chair.

DR. BELL.—This specimen of hypernephroma was removed from a young married woman, aged 37 years, on January the 19th. She had always been healthy, was the mother of three children, and had first noticed a small lump about two years ago, when she was in the third month of pregnancy. There had been practically no symptoms, and never any hæmaturia, though at times there was frequency of micturition, and lately a little pain and some tenderness. On examination, this specimen was reported by Dr. Adami to be a lipoma of the kidney.

In this connexion I wish to show these plates of a similar tumour which I removed in the General Hospital in 1890. The specimen itself, which was in the museum, has unfortunately been lost. The patient was a French Canadian woman, aged 39 years, the mother of seven children, with a tuberculous family history, suffered from a septicæmia, which had extended back to the previous December. She was admitted to the hospital on September 15th, and operated on in the

beginning of October, 1890. From the onset of the septicæmia, beginning in the previous December, there had been fever, night sweats, loss of flesh, etc. A tumour was also felt in the right lumbar region anteriorly, and while it was thought to be a kidney tumour, I could not help thinking that it had something to do with her symptoms. The kidney was therefore removed, but she died sixteen hours later from some septic process, without any accident or cause attributable to the operation. The tumour was very carefully studied at the time by the late Prof. Wyatt Johnston, and reported in the Montreal Medical Journal for February, 1891. He made a diagnosis of alveolar adenoma.

Hypernephroma is a term which was applied by Bireli-Hirschfeld in 1896 to a class of tumours which were thought to have their origin in the tissues of the suprarenal gland, either in the gland itself or in the so-called rests of adrenal tissue. Grawitz, in 1883, promulgated the theory that a large class of kidney tumours had their origin in the suprarenal gland tissue. He especially included tumours which had been previously called renal lipomata, and also gave to the class above mentioned the name *Struma lipomatodes aberrata renis*. Now, while the term hypernephroma implies the origin of these tumours from adrenal tissue, it does not follow that such tissue can always be demonstrated in the fully developed, and much less in the degenerated tumour; and, besides, there is great diversity of opinion among pathologists as to whether such tumours do originate in adrenal tissue or not. In fact, the pathology of these tumours is far from being settled. Clinically, however, we recognize a class of kidney tumours which are sometimes benign, sometimes malignant, and which, while sometimes apparently at first benign, suddenly develop the characters of malignancy later on, and probably at times such tumours undergo degenerative changes, which alter their original characters entirely. These tumours are distinctly differentiated by clinical history and gross morbid anatomy from all other kidney tumours—tubercular-carcinomatous, etc. This distinction was pointed out by Billroth in 1891. These tumours have been described as lipomata, sarcomata, adenomata, angiomatica, angio-sarcomata, adeno-sarcomata, myxomata, endotheliomata, and various other combinations, such as *struma sarcomatodes adrenalis aberrans* (a case which I brought before this Society in 1898). Since the introduction of the term hypernephroma, tumours of this class have been described clinically by nearly all surgeons who have reported cases as hypernephromata, and the various terms above mentioned have been practically dropped.

J. G. ADAMI, M.D.—Criticising the employment of the term hypernephroma to designate the tumour brought forward by Dr. Bell, Dr. Adami defined the term hypernephros as merely a translation into Greek

of the term suprarenal, from which it follows that a hypernephroma is a tumour formed of adrenal tissue. Such a tumour may occur either in the adrenal itself or, according to Grawitz, in the kidney, a certain group of kidney tumours being best explained as being derived from aberrant rests of adrenal tissue. If this be so, the term is only rightly to be employed in connexion with the kidney, when there is adequate evidence that either the structure is that of an adrenal tumour or that it corresponds with other tumours, which those who have made a particular study of this subject think are satisfactorily demonstrated to be of this nature, even though the appearance of the tumour depart considerably from those of adrenal tissue proper. In the case under discussion the main component is simply fat cells, by which is meant cells of the signet ring type, distended or infiltrated with fat. In his opinion, therefore, the tumour ought to be regarded as a lipoma. He pointed out there are two types of fat-containing cells, which are frequently confused, fat cells proper having the signet-ring type, and cells having the appearance of fatty degeneration, cells containing throughout their protoplasm numerous small fatty globules. Now, even in a healthy adrenal, it is very common to meet with cells having the appearance of this second type, though recent observers have shown that the contents of these cells are not true fat. And in adrenal tumours this fattily degenerated appearance of the cells is singularly common; in fact, the pale greyish appearance characteristic of the hypernephromata would seem in the main to be due to fatty change. So far as he had seen, neither in the normal adrenal nor in the hypernephromata proper did one ever get true fat cells. While connective tissue cells could take up fat and become fat cells proper, he did not believe that adrenal cells could do this; nor, in reviewing the literature of the condition had he come across any cases where this could be definitely stated. The nearest he had found to such a transformation was in the case referred to by Albarran and Imbert, in which one part of the tumour was of the adrenal type, the other composed of fat cells proper. Albarran and Imbert regard this as being a mixed tumour, and to explain the development of such they point out that the embryonic kidney is deeply lobulated, and suggest that in this early period a small portion of aberrant adrenal tissue became enclosed between two of these lobules, so also there might be enclosed a certain amount of surrounding connective tissue, and as the lobules fuse in the process of development, both tissues might have become included, and might have truly taken upon themselves this active growth, a hypernephroma developing from one tissue, a lipoma from the other.

In his opinion, it was still a matter of doubt as to whether the group of tumours now included as renal hypernephromata were all of adrenal

origin. There is more and more a tendency to describe these as endotheliomata, or more exactly as peritheliomata, as overgrowths, that is, either of the endothelium of the vessels of the part or of the adventitial tissue round about these vessels, and it was no sound argument to say, because these peritheliomata may develop in the adrenal, that when they occur in the kidney they are of adrenal origin. There is no justification for supposing that the vascular structures of the kidney cannot themselves develop peritheliomata. It was worthy of note that in the present case there were areas that suggested endotheliomatous or peritheliomatous structure, and in which various stages could be made out between cells of the actively proliferating connective tissue type and developing fat cells. Dr. Bell had based his use of the term upon the practice of two able and greatly respected American surgeons, but he would again protest against the tendency now being shown, more particularly on the other side of the border by his surgical confreres there, to use terms in a careless and slipshod manner.

C. B. KEENAN, M.D.—The correct class in which to place the tumour under discussion is difficult to determine. First, as to whether it is benign or malignant. One finds here three tumours. There is the one very large tumour and two much smaller ones.

The larger tumour is very fatty, while the smaller ones show almost no fatty change; but, save for this secondary change, the tissues of all three are identical. None of these tumours are encapsulated.

On these grounds, I judge the two smaller masses to be metastases from the larger, and so think this to be a malignant tumour.

The minute histology shows briefly vessels with hyaline, thickened walls, and in other spots a single layer of endothelium. Around these vessels are cells resembling somewhat those of a spindle celled sarcoma. Further away from the vessels these cells become larger, clearer and polygonal in shape.

Appearances suggesting fat infiltration are seen in places, but possibly also suggesting to me a fatty degeneration going on to complete destruction of the cell. This condition was well described by Grawitz in 1883. The arrangement of cells here undoubtedly suggests an endothelioma or a perithelioma more than an adrenal tumour, but all observers are agreed that from the histological appearance alone one cannot separate the hypernephroma from the endothelioma; therefore, I would term this a Grawitz tumour, in which the fatty changes were more marked than ordinarily.

E. W. ARCHIBALD, M.D.—Having studied the gross and microscopical appearances of the tumour under discussion, I have come to conclusions which differ somewhat from those already expressed; and I would like

to discuss briefly the histological diagnosis of the case. The actual existence of hypernephroma in the sense that Grawitz gave to it is now generally accepted as proven, in spite of the contention of some (de Paoli, Driessen) that it is in reality an endothelioma of the kidney. The main points, histologically, in a hypernephroma are that it is a tumour situated underneath the kidney capsule, composed of large cells arranged in columns or clumps within alveoli, so as to recall in a general way the structure of the adrenal cortex; that the cells have a very large amount of clear protoplasm, which usually shows considerable fatty degeneration; that these cells have a very close connexion with the vascular endothelium; and, finally, that the vascular supply, mainly capillary, is abundant. Minor points concerning glycogen, lecithin, pigment, giant cells, etc., possess no serious diagnostic value, although they may become important in confirming a diagnosis. What, now, do we find histologically in the present growth? We find that it is a complex tumour containing those main elements: the fatty, which largely predominate; the vascular, consisting of numerous thick-walled vessels, often showing perithelial proliferation and often, also, a hyaline degeneration, together with many capillaries; finally, the cellular, to be described later. It is true that the large preponderance of what looks like fat tissue suggests at first sight unequivocally the diagnosis of lipoma, and indeed it would be difficult, if not impossible, to disprove that conclusion. Nevertheless there are appearances in this tumour which, to my mind, point strongly towards a diagnosis of hypernephroma. These are, first, the presence here and there of clumps of cells, which, with their large clear cytoplasm showing vacuoles of all sizes, and their arrangement in a fine reticulum, and their proximity to the vessels, resemble those found in the proven hypernephromata. Further, these show transition stages in the matter of fatty degeneration between the typical "clear" cell and the one which is entirely transformed into fat; while, again, in the midst of what looks most like ordinary fat tissue, there are fat cells with a well-staining nucleus in the centre, and not at the periphery.

Secondly, the large admixture of the vascular element, as above described, would seem to be less characteristic of the true lipoma than of a more complex tumour which has undergone fatty change, especially considering the perithelial proliferation and the hyaline degeneration, which are frequently mentioned in descriptions of hypernephromata. Thirdly, the very complexity of the tumour speaks somewhat against the diagnosis of lipoma, which is usually very simple in construction. One may mention, further, in a general way, that lipomata in the kidney are extremely rare, only six or seven cases being recorded, whereas hypernephromata are relatively frequent. One other point, which is

certainly rather open to discussion, concerns the finding in the centre of the growth of small masses of tissue, which to me look very like unstriped muscle, but which others consider fibrous. If muscular, the fact might speak rather for an adrenal origin than for true lipoma, considering the presence normally of unstriped muscle in the adrenal cortex. It must be confessed that the above considerations are insufficient probably in the present state of our knowledge for a definite diagnosis of hypernephroma; nevertheless I believe that they are valid enough to suggest that diagnosis strongly. What they do very decidedly indicate is the necessity of further study along the lines of fat production in hypernephroma.

B. D. GILLIES, M.D.—I saw three or four of these Grawitz tumours, and one I studied microscopically in Vienna. With regard to the clinical side, I may say that Kolisko was able to demonstrate, from the urine of one or two persons, the presence of a Grawitz tumour from the blood clots where hæmaturia was present. There were endothelial cells round the clots, and he called it an endothelioma or perithelioma. Clinically, he said they might be rapid in their course, moderately rapid, or extremely latent. In the tumour that I examined myself, I may say that macroscopically it was an irregularly shaped kidney with masses of fatty tissue, inside of which there was degenerated tissue, which seemed to be darker in colour, and seemed to me clotted blood, thus accounting for the hæmaturia which was present. Microscopically, the sections showed cells in columns, but in other parts they showed cells in masses, which were extremely large and clear. One would have great difficulty in differentiating them from simple fat cells. The structure is that of an organized tissue, not simply fat tissue. There are certain parts in this tumour under discussion where we have large vessels with thick walls, due apparently to increase in endothelial tissue about the lumen, which makes one think that we have not to do with a simple lipoma; but whether it is an endothelioma that has degenerated or whether we have to do with a hypernephroma I am not able to say. Endothelioma and perithelioma were used indiscriminately in the clinical teaching at Vienna. In tumours of adrenal origin we are especially liable to error, for in microscopic appearance they may little resemble the organ from which they spring.

DR. BELL.—I quite agree with Dr. Adami with regard to the use of this term. If we take the word in its literal meaning or the meaning given to it by Birch Herschfeld, of course we should not call any tumour a hypernephroma if it does not show evidences of having originated in adrenal tissue; but is it always possible to find evidence of this? In this particular tumour I do not think you can exclude the possibility that such evidence may be concealed in the large quantity

of pure fatty tissue. If this tumour does not contain adrenal tissue, of course the term is a misnomer, but I think the term lipoma is equally so. It is true it is fatty tissue, but that is regarding it only from a tissue point of view, and it has nothing in common with the lipomata we see elsewhere. In the other case the diagnosis was an adenoma, and yet in its history and gross morbid appearances it is indistinguishable from this tumour, and I think that this term is equally a misnomer.

The important fact, however, is that we now recognize clinically a group of tumours of the kidney which have certain characters in common, and for which we have no generally accepted name, except that the names "Grawitz's tumour" and hypernephroma are coming into more general use by surgeons in designating such tumours. And moreover it seems to me that we may perhaps extend this class in two directions, so as to include, first, those cases of hæmaturia, which, even after an exploratory operation, cannot be explained—the explanation probably being that they are due to small hypernephromata, in which development is arrested, and which never reach the stages of a tumour formation; and, second, at the other end of the list, some of those large chronic cysts of the kidney, which are generally diagnosed as chronic hydronephrosis, and in which, even after operation, we find no evidence of obstruction in the ureter and none of the essential characters of urine in the cyst contents.

Geo. H. Mathewson, M.D., presented a living case showing spontaneous dislocation of a cataract. Dr. Mathewson pointed out that spontaneous dislocation of the lens was not of common occurrence, and, naturally, it was still more unusual to see this accident in a lens which was the seat of cataractous changes. On August 4th, 1904, the patient consulted Dr. Mathewson at the Ear and Eye Clinic of the Western Hospital in the hope that he might have some operation performed to improve his eyesight. It was found on examination that the right eye was quite blind. The left eye showed a cataract of brownish colour, while the pupil was widely dilated and the anterior chamber unusually deep. Patient could see "finger moving" in front of left eye, but was unable to count fingers so held. He volunteered the information that he had not seen well with the left eye for many years. Projection of light was fairly good.

While the case did not promise a brilliant result, it was decided to yield to the patient's request, and remove the cataract. It was first necessary, however, to cure a severe chronic conjunctivitis which was present, and would have rendered any operation on the eyeball very hazardous. Suitable treatment was therefore prescribed, and the patient was told to report in two weeks' time.

On August 18th the conjunctival disease was found to be very much



improved, and he was directed to continue the treatment. At his next visit, on September 8th, the cataract was not to be seen, and on closer investigation it was discovered lying in a horizontal position in the vitreous. It had fallen backwards so that the anterior surface now looked up, while its posterior surface looked down. Its lower edge was nearly in its normal position, while its upper (originally) edge lay deep in the vitreous. This is exactly what the ancients attempted to do when they performed the operation of reclinatio by means of a needle hundreds of years before cataract extraction was devised.

While our patient has a clear pupil, totally free from obstruction, he unfortunately has had but slight improvement of vision, in that he can only see enough to count fingers at four feet. It was found that he had still four dioptries of myopia, so that he must have had about twenty-two dioptries when the lens was in situ, and as an accompaniment of this high degree of myopia, there was an extensive degeneration of the choroid and retina in the macular region, which accounted for the poor-ness of vision.

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In the death of Magdalena Gelly the students of the Viennese hospitals have lost a valuable clinical subject as well as a teacher. This woman had acquired by practice a singular control of the muscles of the pharynx. She was able to undergo prolonged laryngoscopic examinations without reaction of the vocal cords, could produce at will spasmodic contraction of the Eustachian tube, and owing to a special sensitiveness of the mucous membranes, she was able to tell students when they were at fault in properly catheterizing the tube. She would even introduce foreign bodies into the respiratory passages and allow the advanced students to practise their removal. She made her living in this manner charging two florins for each clinical session.—*New York Medical Journal*.

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E. O. Jordan has been investigating the causes of the Winnipeg typhoid epidemic for the municipal authorities, and reports that the lack of sewer connexion, the exposed privies, the partial use of unfiltered river water and the careless handling of the patients in the homes, to be responsible for the larger part of the epidemic. The condition of the outhouses he finds particularly bad. Contagion was easily transferable by flies, household pets and children playing in the alleys near unprotected outhouses. He emphasizes the need of remedying all the conditions enumerated. A full account of his investigation appears in the issue of the *Journal of the American Medical Association* for February 18th, 1905.