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THE CAUSATION OF THE HEART-BEAT
AND OTHER PROBLEMS IN CARDIAC PHYSIOLOGY.

By T. Wesley Mills, M.A., M.D., L.R.C.P., Eng.,
Professor of Physiology, McGill University, Montreal.

Until very recently, nearly all investigations on the physiology of the heart were made on mammals. This was the case even in scientific Germany, and is explicable by the fact pointed out by Professor Carl Semper, that physiologists being mostly connected with the medical faculties of the universities were led to regard the chief, if not the sole purpose of physiological study to be the advancement of clinical medicine ; consequently their investigations were confined to the mammalian heart, as the one most likely to throw light on the cardiac physiology of man. To this statement the heart of the frog is an exception. It has long been studied by physiologists in all countries ; but even so late as six years ago very little was known of the hearts of other animals from the physiologist's point of view.

It has generally been found that science best ministers to man's material wants in the end if left free to develop itself, as science, totally independent of immediate practical application. It will in such case fall into the hands of the most competent and reliable investigators.

To commence the solution of cardiac problems with the most complex of all hearts—the mammalian—was a most unphilosophical proceeding, especially in this day of evolutionary light. If mammals have been derived from lower forms of life, it follows,

at least as the very strongest probability, that their hearts are ancestrally represented in the hearts of lower forms; if so, then plainly the study of the mammalian heart should begin with that of antecedent and simpler developments.

I hope to be able to show that the researches of the last few years have not only thrown a flood of light on cardiac physiology and anatomy in general, but brought us incomparably nearer to a correct appreciation of the complex workings of the mammalian heart itself than we were even three years ago.

The work for the mammalian heart along the new lines of departure in investigation is still in great part to be done. The problem I wish especially to attack in this paper is the cause, or rather causes, of the heart-beat. These have now been fairly well determined for the lower vertebrates. In the light thus afforded, what may we consider as the probable solution of the question for the mammalian heart? The study of this problem will involve, incidentally, that of many others.

When one considers the evolution of the heart morphologically, we are brought back to its beginnings, in connection at least with a nutritive fluid, in contractile tubes, as in the worms among invertebrates; and it would appear that most, if not all, kinds of hearts may be considered as dilations and differentiations of this simple form of pulsatile organ.

Passing by the pulsating vacuoles of the Infusorians as of doubtful significance, the contractile tube seems to be the primitive representative of the heart; and it is very significant that the earliest form of the heart in the embryo of the highest vertebrates is a pulsating tube, the after-changes in which give an epitomized history, to a large extent we may suppose, of the evolution of the vertebrate heart from lower forms.

Moreover, in that lowest of fishes (?), the Amphioxus, the heart is represented by pulsatile vessels. Now in these pulsatile tubes, so far as I know, nervous elements have not been found. The heart of the chick beats on the second day of incubation, when no nervous structures are to be found in it any more than in an Amœba.

Englemann has shown that in the ureter (or a portion of it),

and Luchsinger in the veins of the bat's wing, there is automatic contraction of muscular tissue in the entire absence of nervous elements.

Ransom has been unable to find in the heart of the snail (*Helix*) any ganglion cells. This investigator's work on the heart of the Poulp (*Octopus*) has, it seems to me, thrown great light on the whole subject of cardiac physiology. A brief notice of it in this place may be instructive.

The heart in this creature belonging to the most highly developed class of mollusks, the Cephalopods, consists of: (1) a pre-branchial or venous portion, and (2) a post-branchial or arterial portion. The former includes the vena cava, kidney veins, and branchial heart; the latter the auricles and ventricle.

The pre-branchial system collects blood from the veins and drives it through the gills. Two large nerves known as the visceral, and representing the vagi, are given off to the heart. On the auricles, the branchial heart and the gills there is a ganglion connected with the main nerves. The muscular tissue of the ventricle is finely striated; of the auricles, smooth. After the most careful microscopic examination, Ransom asserts the entire *absence* of nerve cells in the substance of the heart of this mollusk. He considers that the ganglia lying on the heart have nothing to do with originating nervous impulses that might serve to cause cardiac pulsation. He believes that they have a co-ordinating influence over the various parts of the cardiac system, and probably act reflexly; after their excision, the heart still beats, but not in normal fashion.

The contractile kidney veins are composed of smooth muscle cells, devoid of ganglia anywhere in their substance.

Long since Bernstein, and more especially Bowditch, showed that the lower two-thirds of the frog's ventricle do not possess the power to contract *automatically*. It has, however, been shown that if this portion of the ventricle be tied upon a perfusion cannula, and some fluid, if only weak saline solution, be passed through it, this quiescent apex will commence to beat when the pressure within it has reached a certain point.

Ransom points out that in the Poulp the heart, and especially the regulative part of the cardiac muscular machinery, the

ventricle in this instance, is remarkably sensitive to changes in intra-cardiac pressure.

In my own papers on the Fish and Menobranchus, attention has been called to the readiness with which the heart, especially of fishes, is influenced by even slight changes in intra-cardiac pressure.

Some years ago Roy showed that the work of the heart of the frog is largely dependent on the action of the auricles.

This, taken in connection with other facts more recent, seems to point to intra-cardiac pressure as *one* determining cause of the beat, especially of the ventricle, even in the mammalian heart.

Gaskell has shown that in the Chelonian heart there are circular rings of fibres between its different divisions, and points to these as evidence of structural continuity, explaining the physiological continuity of the beat of the different parts of the tortoise heart.

That the Chelonian heart beats for a time fairly well in the absence of all fluid shows that the intra-cardiac pressure is not an absolutely *essential* factor in this form of heart.

But I have pointed out that a hæmorrhage which would affect but little the beat of the Chelonian heart *arrests* that of the fish. It will thus appear that a factor which may be of the greatest importance in explaining the beat in one form of heart may be of little consequence in others.

Again, Ransom has shown that the different parts of the heart of the Poulp are not structurally continuous as regards muscular tissue, but that between the main divisions of the heart there are zones of connective tissue. But one of the most remarkable examples of both physiological and structural continuity is to be seen in the shark and ray tribe of fishes. As I have pointed out in my paper on the heart of the fish (*Journal of Physiology*, Vol. VII), there seems to be no limit to the ease with which a reversed rhythm may be set up by a slight stimulus to the contractile bulbus.

The heart of the fish seems to be by far the most *sensitive* heart among vertebrated animals, as I have shown in various ways. This heart is often completely and, indeed, permanently arrested

by a highly *venous condition* of the blood ; and again and again have I been surprised at noticing the ease with which the whole cardiac machinery can be restored to good behaviour when thus arrested, on giving the fish a fresh supply of oxygen by placing the gills in water.

This, then, brings us to another factor in the causation of the cardiac beat—viz., the character of the nutritive fluid ; and here once more we find the greatest difference in various forms of heart as to the influence of this factor—indeed, differences in individual animals of the same species. What would but little affect a Chelonian heart would suffice to arrest that of the fish ; and the same I have shown to hold for Menobranchus (our Canadian water newt.)

The old notions of the influence of the nervous factor in the causation of the cardiac beat having been greatly disturbed, it remains to inquire what views we are justified in adopting in the light of recent advances. We have seen that intra-cardiac nerve cells are not essential to the heart-beat *per se*, for in some hearts no such cells are found.

Leaving these ganglionic cells for the present, we may inquire what relation the *nerves* distributed to the heart bear to its normal beat. The recent extensive researches on the influence of the vagus nerve on the heart, in the frog by Heidenhain and by Gaskell ; on the land tortoise by the latter ; and on the Terrapin and Sea-turtle by myself, have put the vagus in an entirely new light. To these results some previous reference has been made in this JOURNAL (Jan. 1886 .

It has been shown that whatever may be the constant action of the vagus, it can, under stimulation, greatly modify the heart's action—always in the way of final augmentation or improvement of rhythm ; and I have myself shown that the degree of its beneficial action is *directly proportional to the heart's needs.* This seems to apply to almost all, if not all, the animals as yet examined that have a vagus or closely analagous nerve. It holds, *e.g.*, for the visceral nerve of the Poulp.

Various theories have been from time to time proposed to account for the action of the vagus.

Heidenhain spoke of depressor and augmentor fibres. Gas-

kell rejected this explanation and held to a " trophic " action of the vagus, entering into a very elaborate explanation of the relation of the inhibitory phase and the after augmentation phase of the heart's action. Later, he has shown that in the frog there are two sets of fibres with different action, and that these fibres are respectively inhibiting fibres proper, which are medullated, and sympathetic fibres which are non-medullated.

Gaskell thought that in the *Crocodilia* he had found a vagus that was a pure depressor; but this I have shown in my paper on the Alligator (*Jour. of Anat. and Phys.*, Vol. XX) to be an error. The vagus in the crocodile tribe is similar in action to that in the Chelonians, etc.

I believe I was myself, however, the first to call attention, in a published paper, to general physiological resemblances between the main sympathetic chain in which the cardiac accelerators run, and the vagus. I pointed out (paper on Terrapin) that stimulation of this chain led to results similar to those obtained by stimulation of the vagus itself, and, indeed, that the same law applied—the worse the cardiac rhythm the more marked the influence. I also called attention to some after-effects (in some cases primary effects)—viz., irregularity or brief stops of the heart which were then difficult to explain. We know now that the two kinds of fibres, inhibitory proper and sympathetic, have in some respects an opposite action on the heart.

Throughout I have maintained that we must look finally for an explanation of these effects in chemistry, in tissue metabolism. Ransom proposed a problem which has since been, in part at least, solved—*i.e.*, solved up to the crucial point. He says:

" If it could be shown that the true vagus fibres of a tortoise or frog in any way tend to increase constructive metabolism, while the sympathetic favored the destructive processes, a step would already be taken in harmonizing the phenomena presented by mollusca and vertebrata and in forming a general interpretation applicable to all."

Gaskell now thinks he has facts which lend strong support to such a view, though I find no mention in his latest paper of this conception as Ransom's; nor, indeed, any notice taken of the work of others, that has served to correct certain of his own

previously published views which have later been exchanged for different ones; or that such later views had been previously announced by other investigators.

The most recent explanation in regard to the action of the vagus may then be put thus: The vagus nerve in many animals, possibly in all vertebrates, is in reality the vago-sympathetic. It contains sympathetic fibres which are motor, or whose action is associated with increased muscular contraction, followed by exhaustion; while the inhibitory fibres bring about an arrest of activity, followed by repair of function. We may express the same idea from another point of view by saying that the sympathetic fibres are functionally linked with katabolic or destructive metabolic processes, while the inhibitory fibres modify anabolic or constructive processes. Such a theory is broad, readily grasped, and from many points of view fascinating; but it is open to some objections.

I have shown that the heart of both the Terrapin and the Sea-turtle may be kept inhibited for hours by continued stimulation of the vagi nerves; in one case recorded, inhibition lasted for *six hours*. Now it is difficult to believe that so unstable a thing, as all our knowledge of protoplasm leads us to consider it, could remain in one phase of the metabolic process for six hours. I feel quite satisfied myself that the explanation of nervous and all other vital action must come largely through chemistry; but it would, perhaps, be premature to assume that the chemistry can be reduced to the simplicity indicated by the above theory. One thing is perfectly clear, the vagus and the general welfare of the heart cannot be disassociated, at least in the more complex forms of this organ.

Eichorst and Zander noted degenerative muscular changes following section of both vagi. Similar changes follow section of the nerve of a skeletal muscle. It is certain, therefore, that whether the nerves of the heart are immediately concerned in the causation of the beat or not, they are inseparably connected with the general nutritive processes of the organ. That nerves are not directly concerned in the cardiac pulsation is evident from the fact that the heart beats perfectly well when all its nerves are severed. When we have learned exactly how the

nutrition of a skeletal muscle is dependent on nervous connection, we shall probably also have the explanation for the heart muscle; possibly, also, new light thrown on many forms of cardiac disease.

The functions of the cardiac ganglia at present may be considered undetermined. Are they concerned in origination of motor impulses? Are they co-ordinative of muscular action? Are they regulators of nutrition? There seems to be almost no evidence as yet for any of these views; but there is abundant evidence that the cardiac nerves can act on the heart-muscle *directly*.

We must certainly believe that the nerves of the heart, amid the ever-varying conditions which this great central pump must meet, are in almost constant action. We must also believe that this action in health is beneficial, both because were it not so, such could never have originated in the evolution of the more complex forms of heart; and because we find that when such influence is not exerted (as after section) the heart tissue degenerates. I have called attention to the fact that stimulation of the vagus at intervals, in a tortoise heart in which only a few fibres were seen pulsating, has led to a beat of the whole organ in a short time. Now if these few fibres could have been made to pulsate without nervous influence, would the same general result have followed? I believe it would. The very proximity of quiescent muscle fibres, with strong tendency to beat, to others still pulsating suffices to originate in the former processes which are temporally suspended.

Gaskell has shown that if a strip of muscle from the ventricle of the tortoise be placed in a moist chamber, and a weak, interrupted current be sent through it, it will in time begin to beat and continue to do so after the stimulus is removed.

I take it that the infecting power which protoplasm of one kind has over the same or even different kinds seen in disease has its correlative in health, and that this plays a great part in the causation of the heart-beat.

Nerve is but specially modified protoplasm, and the axis cylinder is, at all events, of such a nature that its state in activity, however we conceive of that, has power to initiate or modify

another condition of protoplasm in a muscle. It has been shown that in the sartorius of the frog there are two areas, one at each end, to which no nerve fibres are distributed, yet these ends contract with the rest of the muscle. Such a result is in harmony with the view I offer as to the power one protoplasmic unit has to originate in other protoplasmic units a similar condition.

Again, Roy has shown that the changes in calibre of the capillaries cannot be explained by changes of blood-pressure alone. No nervous elements have ever been found in them. Why, then, do they contract? By virtue of influences either from the lymph direct, acting chemically, or owing to altering conditions in the surrounding tissues. Here, again, one kind of protoplasm influences another by contiguity, if we may so speak. Each capillary cell is a representative in some sense of the Amœba changing under its varying environment.

The question of *spontaneous rhythm* seems to me to throw much light on the principal problem of this paper. I have carefully studied this subject in the Terrapin, the Sea-turtle (three species), the Fish and Menobranchus. In one fish of great vitality I found a remarkable power of spontaneous rhythm in every part of the heart when isolated by ligature. As regards the Chelonians, there are marked variations in different species and even individuals, but in none was there in the ventricle a very marked capacity for pulsation independent of intra-cardiac pressure, feeding or other stimulus. I am satisfied that Gaskell's statements give a highly exaggerated notion of this whole matter. But what was very striking throughout was the fact that an extremely weak stimulus sufficed to cause pulsation in parts of the heart thus isolated; and this throws much light upon the causation of the heart-beat.

Reviewing the case, which can be but inadequately discussed in one paper, it will appear that there must be various factors entering into the causation of the heart-beat in the case of the more complex hearts of higher vertebrates.

As before intimated, the cardiac physiology for mammals is yet to be worked out along the new lines ; but for reasons before given, it is likely we shall find the same factors entering into the

causation of the beat. In the case of each genus of animals, one or other of the factors may be more or less prominent, as has been shown.

In the light of our present knowledge, perhaps some such statement of the case as follows may be provisionally accepted :

(1.) The factors entering into the causation of the heart-beat of all vertebrates as yet examined are : (*a*) a tendency to spontaneous contraction of the muscle cells composing the heart ; (*b*) intra-cardiac pressure ; (*c*) condition of nutrition as determined directly by the blood and indirectly by the nervous supply of the organ.

(2.) The tendency to spontaneous contraction of muscle cells is most marked in the oldest parts of the heart ancestrally considered. I have shown (*Jour. of Anat. and Phys.*; Vol. XXI) that in the Sea-turtle the last segments of the ventricle to pulsate are on its extreme right ; while the right auricle outlasts the left and the sinus and great veins beat much longer still. The same has been noticed in several other groups of animals. The most recently acquired parts of the heart always are the first to lose functional activity. These are but extensions of Harvey's observations, seen in the light of evolution.

(3) In all hearts examined, intra-cardiac pressure is a factor of considerable importance ; in some, as that of the Fish, Menobranchus, etc., it is apparently the controlling factor. The same may be said of the molluscan heart.

(4) The power one contracting cell when in action seems to possess of initiating a similar state in others is of great significance.

(5) The influence of the nerves of the heart appear more and more as we ascend the animal scale. They seem only indirectly concerned in the causation of the beat by their influence over nutritive processes ; but as the heart is being so frequently modified in its action, their influence in highly developed hearts becomes an almost constant factor, and of a degree of importance which our knowledge of the relation of nerve to muscle enables us but inadequately to appreciate, but which the pathological changes ensuing on nerve section illustrate.

(6) It almost follows from the above that one part of the

heart having contracted the other parts must follow. This is probably the explanation of the rapid onset of the ventricular after the auricular systole in the mammal. It will be remembered, too, that even in the mammal contraction begins in the great veins entering the heart.

The basis of all these explanations is found, in reality, in the *natural contractility of protoplasm*. A heart in its most developed condition still retains, so to speak, the inherited but modified Amœba in its every cell.

It seems likely to be shown that in the causation of the beat of the mammalian heart all the above-mentioned factors enter.

In conclusion, I would express my conviction that our present explanations of heart disease are of too mechanical a character; the nervous and the other factors indicated should more largely enter into the reckoning in the cardiac pathology of the immediate future.

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POST–PARTUM PELVIC ABSCESS.

By T. Johnson Alloway, M.D.,
Gynæcologist to the Montreal Dispensary.

Case I.—*Large Pelvic Abscess opened by lumbar incision in front of Quadratus Lumborum muscle.*—The subject of the following interesting case was a lady 22 years of age, and of very fine physique. Two months prior to her first confinement her husband confided to me the fact of his having contracted an attack of gonorrhœa some short time previously, and that he was afraid he had conveyed the disease to his wife. She had at this time a profuse vaginal discharge, with some evidences of acute inflammation. Vaginal injections were recommended, as the patient would not permit local applications to be made. She was confined in May 1884 with forceps under chloroform. Sublimate vaginal irrigations were used up to the tenth day. On the fifteenth day she had a chill followed by an attack of pelvic inflammation which lasted five days and then subsided, leaving no after ill effects. This looked exceedingly like as if the vaginal washings kept the gonorrhœal disease in abeyance, and on being discontinued absorption of ptomaines generated by the so-called gonococcus took place. At the delivery it was

noticed she had a somewhat contracted pelvis, the conjugate diameter being a little below the average. The baby in a few days showed symptoms of a very violent purulent ophthalmia of both eyes. The nurse, mother, a lady friend visiting at the house, and her baby some six months of age, also became attacked in a minor degree with ophthalmia. In fact, every one within reach except the delinquent husband himself.

I was again engaged to confine this lady, January, 1886, and shortly before the expected time her husband again became anxious as to his condition. He stated he had either a renewal of the old gonorrhœa or a fresh attack. He certainly had a profuse discharge with symptoms of subacute disease, and he was strongly under the impression that his wife had again contracted the disease from him. During her confinement she was in labor for twelve hours without making much progress. It was a vertex presentation, with occiput to the rear. The cervix was freely dilatable, but the head would not engage. The forceps was now applied, and after about twenty-five minutes' careful traction the head descended, was allowed to rotate forwards, and delivery completed without injury to the perineum. There was some free hemorrhage for a few minutes from a left lateral laceration of the cervix, but it soon ceased. During the following twelve hours she was well, and it was not until the sixteenth hour after labor had been completed that she began to feel a change. She now experienced a severe chill, headache, fever, and severe pain in the left inguino-ovarian region. It is necessary here to bear in mind that there were no vaginal injections given as yet, the patient not having been visited since the completion of labor. Knowing, however, the probability of her passages containing germs of infection, I felt somewhat disappointed that I did not use *almost* constant irrigation from the first. Vaginal examination now discovered nothing worthy of note beyond the left cervical laceration, which extended apparently into the parametric tissue at base of the broad ligament. A hypodermic of morphia (gr. $\frac{1}{4}$) was given at once, hot linseed poultices to abdomen, and hot vaginal irrigations of very weak sublimate solutions to be repeated every two hours. These irrigations were continued until the following day, when plain hot

water was substituted, given every hour, and the sublimate every night and morning. During the following few days, the pain in left region became so intense and unremitting that she had to be kept under the influence of large doses of morphia. This pain would especially become severe when the bladder filled, some relief being obtained, however, when emptied with the catheter. Vaginal examination at the end of the third day gave evidence of the pelvic cellular tissue of left side becoming rapidly filled with exudate. The left broad ligament and that side of uterus were fixed, the left fornix was obliterated, and the pelvic floor of that side had descended and was rigid, hot and tender. The corresponding parts of the right side were free from exudation, freely moveable, and painless to pressure. This condition was very interesting from a point of the etiology. External or bimanual palpation discovered a hard, tender ridge felt deeply in the left iliac fossa, but was some distance at this time from the surface. It seemed to be in a line with and directly over the middle part of the ileo-pectineal line. The only internal treatment the patient received up to this stage was one drop of tincture of aconite every hour to relieve high temperature. This state of affairs continued fairly constant until the tenth day, when, coincident with a profuse vaginal discharge of very foetid pus, all pain disappeared, temperature came down to 100°F., and morphia was discontinued. This discharge evidently came from the cellular tissue of the left side of pelvis, the site of the original phlegmon, and had discharged itself through the laceration of cervix before referred to. At 10 P.M. of the eleventh day she was seized with very sharp pain in *right* iliac region, requiring gr. $\frac{1}{2}$ of morphia hypodermically. Temperature and pulse now ran up again, and fearing that there might be septic matter in the uterus, it was washed out with sublimate solution and iodoform suppositories introduced. Hot vaginal irrigations were again resorted to, and repeated every hour. Morphia in large doses to relieve pain. An occasional dose of quinine (gr. xx) to relieve very high temperature, and hot poultices to abdomen. On the following day vaginal examination gave evidence of the right side of pelvis having become infiltrated; it assuming the same physical conditions as the left at beginning

of disease. On the sixteenth day of disease there occurred a distinct series of chills following closely upon each other, and which seemed to annoy the patient very much all of that day. On close examination, the hard mass before mentioned in each iliac fossa was still there, that on the left side was more diffused, softer, and fluctuating. There was also noticed a tumor about the size of half an orange situated over the anterior fibres of the latissimus dorsi muscle of the left side where they leave the crest of the ilium. This tumor was soft and fluctuating, and by palpation a continuous wave could be obtained between it and the formation in the corresponding iliac fossa, establishing its nature beyond a doubt. On the following day Dr. Shepherd saw the case with me and under ether an incision several inches long was made downwards, beginning one inch above the crest of the ilium at the edge of erector spinæ muscle, going through the superficial structures and lumbar fascia in front of the quadratus lumborum muscle. When the abscess cavity was reached by a grooved director and the finger, an enormous quantity of the most fœtid pus imaginable welled out. Pressure now being brought to bear upon the collection in the iliac fossa, thick creamy pus in great volume was forced both from the vagina and the opening in the loin. This pressure was continued until we had expressed over two pints. The parts were now sponged, and a half-inch rubber drainage-tube eight inches in length was passed down into the pelvis through the lumbar opening, and fixed there by suture. (*Fig.* 1.) The wound was then dressed with subli-
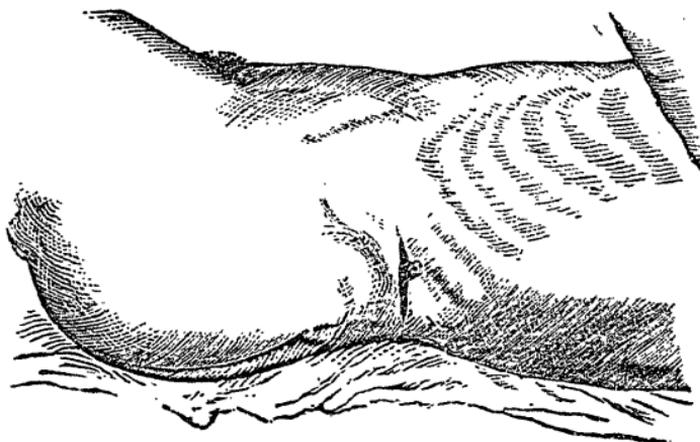

FIG. 1.—Showing position of incision and drainage tube.

mate jute and iodoform.   On the following day, pain and fever were much reduced and the patient felt fairly comfortable.   On the fifth day following the operation the drainage-tube was removed, but it soon became evident that pus again began to collect.   The tube was therefore reinserted a few days afterwards, somewhat shortened.   Suddenly the patient was seized with very severe pain in the region of left hip-joint.   The parts over the trochanter were exceedingly sensitive to pressure, and it was thought necessary to cut down and examine them.   A negative result was obtained, the tissues being found quite normal.   The incision, however, had the effect of relieving the pain which did not afterwards return.   All went well during the next few days and the patient complained only of severe neuralgic pain down left thigh and an inability to straighten the leg, it having become flexed across the opposite thigh and rigidly fixed there as she lay on her right side.   She was very much emaciated and altogether presented a miserable appearance.   On the eleventh day after the operation she again experienced a chill and elevation of temperature to 102°F., with corresponding increase of pulse.   To explore the abscess cavity in the pelvis through the vaginal opening seemed now indicated, as it seemed probable there might be some burrowing pus-pockets in the cellular tissue which could not obtain proper drainage.   Under ether, and with extreme care, a long uterine probe was passed through the vaginal opening forward and upwards until, unopposed, it entered into what appeared to be the abdominal cavity to a point somewhere about $3\frac{1}{2}$ inches above the pubic bone. The point of the probe could be made to travel about freely in any direction desired directly under the abdominal wall, and could be followed by the examining finger outside.   The sound was now withdrawn, and must confess I felt somewhat uncertain for a few moments as to where the sound had been moving about so freely.   On consideration however, we concluded that the instrument had passed up *behind* the peritoneum, which had been dissected from the wall of the pelvis by the abscess, and that the point of the sound in this way easily approached the anterior wall of the abdomen without entering the peritoneal cavity.   Considerable discharge of purulent matter followed this probing,

and the result was so satisfactory that the patient continued to convalesce rapidly. Her troubles, however, did not seem as yet at an end. When walking about her room a few days after being out of bed she was seized with acute agonizing pain in her left wrist-joint and arm. I found the hand and wrist much swollen and painful. She had her arm resting in a sling. She was feverish, and had a rapid pulse. There was no assignable cause, such as cold, and I was therefore forced to fall back on that of septicity, probably of a gonorrhœal nature. She was placed on gr. x salicylic acid every two hours, and was, after several other joints had become affected, well in ten days. Probably it was rheumatism.

A point of interest in the foregoing case is—What was the immediate cause of so sudden and extensive an attack of parametritis? It certainly was not due to any act of indiscretion on the part of the patient, as she was most carefully watched. Traumatism plays an important part in the cause of acute pelvic inflammation in this class of patients. The enormous strain which is brought to bear upon the uterine ligaments and structures forming the pelvic floor generally, during labor especially instrumental, must cause rupture of muscular and other structure with extravasation of blood, followed by inflammation of cellular tissue and abscess. This sequence of events would more easily and rapidly take place if laceration of cervical tissue also occurred, and there was a direct infection of the injured tissues from without, as in this case, of a gonorrhœal poison. I last saw and carefully examined this patient four months after her recovery, and though the parts are all adherent to the left side of the pelvis and the laceration shows considerable ectropion, she did not complain of pain nor illness in any way. In time the parts may loosen somewhat through a partial re-development of the cellular tissue, when I will repair the cervix before hypertrophic changes set in in it.*

Through the courtesy of Dr. F. J. Shepherd I have been able

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* A curious incident occurred shortly after the recovery of this patient. The nurse brought me the little girl, aged two years, of the patient, saying that she had a discharge from vagina which was making the child ill. I found a profuse purulent vaginitis. The nurse stated that the child must have taken it from the chamber or from clothing used by the mother.

to embody the following two interesting cases in this paper, reported by Dr. H. S. Birkett, house surgeon, Montreal General Hospital :—

CASE II.—M. F., aged 20, single, admitted to the General Hospital, 11th May, '86, complaining of pains and swelling in the lower part of abdomen. Two months previous to admission was confined, and gave birth to a full-termed child. Two days after confinement patient got up, and soon complained of severe sharp pain in lower part of abdomen, attended with a small swelling in the right side of that region. Immediately took to bed, when the symptoms became less severe, but with each attempt to rise from bed to attend to her duties the symptoms returned, and became aggravated. *Previous history :* Always enjoyed good health ; menstruated at 14 years, menses regular and not excessive ; has suffered from leucorrhœa for many months. At present, complains of severe, sharp and non-continuous pain in right iliac region, and extending down thigh, aggravated by movement, and often so severe as to prevent sleep. *Examination :* Patient is of average height, well nourished, though anæmic ; pulse 86, regular and of small volume ; respiration 18 ; temperature 99°F. In the right iliac fossa a somewhat oval-shaped swelling is found, being about $1\frac{1}{2}$ inches by 1 inch, is tender and very painful, non-fluctuating, skin moves freely over it. By vaginal examination, this swelling is also easily made out. Linseed poultices were applied, and morphia given as required. By 2nd July the swelling had much increased, being then $3 \times 2\frac{1}{2}$ inches, very tender, hot and fluctuating. The temperature for the last week ranged from 100° to 102° at night, and from $98\frac{1}{2}°$ to $99\frac{1}{2}°$ in the morning. On the 5th July, patient being etherized, the swelling was aspirated by Dr. Shepherd, and gave evidence of pus being present. The abdominal wall was carefully incised over the swelling and the abscess cavity freely opened, which gave exit to about ℥iv of white, creamy pus. Thorough examination showed that the cavity was quite localized in the right iliac region. A medium-sized drainage-tube was introduced, properly secured, and the edges of the wound brought together by catgut sutures. Dressings of iodo-

form, gauze and pad of sublimate jute were applied. Two days
after the operation the dressings were removed and found to be
soiled with slight oozing; no purulent discharge; tube was
shortened and dry dressings reapplied. Patient sleeps better;
pain and tenderness lessened; pulse 80, good volume; tempera-
ture $99\frac{1}{2}°$. On the 14th the dressings were removed and found
to be slightly soiled by small amount of sweet pus; sutures and
tube removed, and dry dressings reapplied; temperature $98\frac{1}{2}°$
to 99°. On the 26th, the wound was completely healed; no
abdominal pain nor tenderness; sleeps and eats well; general
condition much improved, and patient has been up for the last
three days. On the 2nd of August patient was discharged, feel-
ing remarkably well and strong.

CATE III.—A. H., aged 31, married, admitted to the General
Hospital, 7th July, 1886, complaining of pain and swelling in
the right iliac region. Six weeks ago patient passed through a
severe and tedious confinement, which was followed the next day
by severe pain in the right iliac region. The patient recovered
from her confinement, though the pain has never left her, but
has continued to grow worse, and was much aggravated by walk-
ing. The pain was sharp and intermittent in character. Patient
was very thirsty, perspired freely at night, had anorexia, tongue
coated, and bowels constipated. On admission patient com-
plained of sharp and intermittent pain in right iliac region,
aggravated by movement, and severe enough to prevent sleep.
Had anorexia, night sweats, tongue coated with white fur, great
thirst, and bowels constipated. Pulse 100, regular, and small
in volume; respirations 22; temperature, 100° in the day-time
and 103° at night. Examination: Small and somewhat emaci-
ated woman; hectic flush over both malars; skin hot and moist.
In right iliac region is a visible swelling, which is somewhat oval
in shape, 3 inches by 2 inches, hard, non-fluctuating, hot, and
excessively tender and painful. Per vaginam, the swelling
cannot be felt; but vaginal roof is somewhat flattened. No
leucorrhœal discharge is present. On 10th July, patient being
etherized, the swelling was aspirated, and giving evidence of the
presence of pus, it was freely incised to the extent of two inches.

This immediately gave exit to about four ounces of yellow creamy pus. The tissues about were found to be much thickened by inflammatory changes, and the cavity was quite localized in the right iliac region.   The cavity was well irrigated with solution of bichloride (1–1500) ; medium-sized drainage-tube introduced ; edges of wound brought together by catgut interrupted sutures, iodoform gauze, and bichloride jute pad applied to the wound.   On the 12th, the wound was again dressed ; only small amount of laudable pus soiled inner layer of dressings. Sutures removed, edges being well united ; tube shortened, and dry dressings reapplied. Temperature 99° to 99½° ; pulse 80 to 90. On the 19th, wound was again dressed ; no discharge ; wound closing in ; tube left out ; dry dressings reapplied. Temperature 98½° to 99° ; pulse 80. Sleeps well ; appetite improved ; no night sweats ; allowed to sit up.   On 5th August patient was discharged ; wound completely healed ; suffers no pain ; sleeps well ; appetite good ; bowels regular ; has gained much in weight and strength.

Pelvic abscess following labor is an exceedingly unfortunate occurrence, and unless in the hands of a special surgeon, is a very unsatisfactory and difficult condition to treat. I have known a number of cases in which the abscess opened into the vagina at the site of a laceration of the cervix. But from the difficulty of having complete and uninterrupted drainage obtained through a small, imperfect and gradually cicatrizing outlet, the intra-pelvic collection continued to burrow and increase over and above what escaped now and then in small gushes. The collection then, as the disease becomes chronic, makes its way in the majority of cases towards Poupart's ligament, and probably still further upwards behind the peritoneum into the loin in the region of the kidney and colon.   Again, there are cases where a laceration of cervix is followed by infection of tissues and abscess, and still no drainage takes place through the vagina. The pus in this case being first noticed appearing at Poupart's ligament ; and instead of pursuing the course of the cellular tissue upward, as before spoken of, it bursts close to Poupart's ligament, or follows the course of the round ligament through the inguinal canal, and endeavors to completely discharge itself through the open-

ing thus made,   But it invariably fails here, as it does in the vagina.   A large interligamentous abscess and a long sinus with branches becomes established, lined with a pyogenic membrane leading up to a small, contracted and cicatrizing opening, which will go on discharging a bland pus for an indefinite period of time.   A case of this nature has most opportunely presented itself to me within the last few days.   The following few notes will give some idea of its nature :—

Mrs. ——, aged 21, married four years ; has had two children, youngest eleven months.   At this last confinement she was about twenty-four hours in labor.   Forceps was not used, but states she lost a very large quantity of blood.   She suffered severe pain, almost directly after delivery, in her left side and left iliac region.   She had severe rigors on the fourth day, followed by headache and fever.   Two weeks after delivery she noticed a " lump" in left iliac fossa, which became gradually soft and red, and was now constantly troubled with chilly sensations and night sweats.   She remained unable to leave her bed for two months after delivery, her chief reason for not attempting to do so being a feeling of intense exhaustion, which was not recognized as a most constant and important sign of a form of chronic septicæmia always seen in these cases.   Five months after delivery the abscess in left groin discharged itself through an opening in the skin, and has been active ever since.

Vaginal examination.—Cervix lacerated on left side up to the fornix vaginæ.   Right side of cervix normal.   Uterus is freely moveable and in normal position.   On left side of pelvis there is a hard, solid tumor about the size of a large orange.   It is freely moveable, and quite separate from uterus, which can be pushed away from it towards the right side of pelvis.   It is not very painful, just a little tender on pressure.   Vaginal pressure, with combined palpation of the other hand outside, causes a most profuse discharge of bland pus to run down the genito-crural notch of that side.   No fluctuation apparent.   Further examination of pelvic organs gave negative result.   On examining the left groin, a small opening, giving passage to smallest size silver probe, was found situated about midway between the anterior superior spine of ilium and spine of pubis,

close to the edge of Poupart's ligament.   The probe passes forwards and downwards (dorsal decubitus) for about three inches, but in no other direction, terminating apparently in a *cul-de-sac*. (*Fig.* 2.)   During the primary examination no other passage

FIG. 2.—Showing position of fistulous opening and direction of sinus before operation.

could be found which would lead towards the large mass felt in the pelvis per vaginam.   Aided by Dr. Shepherd and Dr. John A. MacDonald, on the 29th November this sinus was slit up on a director and found at first to be nothing more than a sinus admitting the little finger and ending abruptly in a blind pouch situated deeply beneath the abdominal muscles.   Being convinced that there must be an outlet to discharge from the deep pelvis, and carefully running a very fine silver probe along the floor of this sinus, it suddenly slipped into a pit, and following it up with the little finger, broke at once into the main pus cavity which was interligamentous, and was the hard *non-fluctuating* mass so distinctly felt by bimanual palpation.   Over a pint of bland pus mixed with blood-debris escaped.   The finger now introduced could feel the intestines through the thin peritoneum (posterior face of broad ligament), but could not reach the

bottom or opposite walls so large was the cavity; probably as large as a child's head. Passing the left hand fingers now into the vagina the hard mass felt but a few minutes before had disappeared and in its place was found a soft, freely-moveable fornix vaginæ. The cavity was now filled with iodoform gauze and the outside wound dressed with sublimated jute and the patient placed in bed. The cavity was treated in this way for five days, when it began to close. A small drainage-tube was occasionally inserted for a period of twenty-four hours and replaced by the strip of iodoform gauze. It would not have been safe to have used a rubber drainage-tube here continuously, as the external iliac artery could be felt pulsating along the floor of the opening and the tube would therefore rest directly upon it. On the 13th of December (fourteen days after operation) the wound was discharging only a thin serum and it was allowed to close. The wound was completely healed in a few days afterwards and the patient perfectly well. I will repair the lacerated cervix about one month hence.

It was very tempting to make a counter opening in this case into the vagina and drain the cavity by means of a T-shaped tube. Experience, however, teaches that it is much better to drain through the abdominal incision and avoid communication with the vagina if possible. An interesting feature in this case was the inability to obtain fluctuation by the bimanual method. This is a feature constantly proven in these deep-seated interligamentous abscesses, and its absence, therefore, does not prove the tumor to be solid.

The extreme rarity of pelvic abscesses bursting unaided through the skin forms an interesting point in this case.

I believe a very large majority of these cases of pelvic abscess are of gonorrhœal origin, and the remainder septicæmic and traumatic with effusions of blood. I speak here only of postpartum cases, non-puerperal cases being chiefly due to suppurating hæmatoceles und suppurating cysts of various kinds. If we will bear in mind the frequent occurrence of laceration of the cervix and of severe instrumental labors, and the infrequency of pelvic abscess, I think the correctness of this assumption will become apparent.

The all-important considerations in the treatment of a pelvic abscess, especially if acute, consists in avoidance of delay in opening it. Unless an abscess is superficial, and points directly into the vagina, it is better not to open into this passage. An incision from without is attended with much better results under antiseptic precautions.* Dr. Imlach of Liverpool states that he has succeeded in following the round ligament with a glass drainage-tube and tapped an abscess in this way. For these abscesses to open into the bowel or rectum is a calamity. A common reason for post-partum abscesses opening into the vagina rests in the fact that they are so frequently connected with a laceration of the cervix and parametric tissue, in their history. These torn tissues become inflamed from the irritation of constant contact with infective matter, and consequently do not heal before abscess formation takes place. In this fact also lies a powerful proof of the necessity for vaginal irrigation immediately after labor and throughout the puerperium with weak sublimate solutions. In connecting lacerated cervices and pelvic abscesses as cause and effect, we have strong evidence of the support of such a theory in the well-established fact that the cervix lesion and the abscess are invariably on the same side, and both occur chiefly in primiparæ.

Under such circumstances, the remarkably large quantity of pus the pelvis will contain, its intense fœtor, the little constitutional disturbance the patient experiences, and the universal freedom from general peritonitis, is very remarkable. So long as the parietal side only of the peritoneum be exposed to the filthiest of pus all is safe, but one drop escaping on the visceral side, *without drainage*, fatal peritonitis is rapidly developed.

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* Pacific Medical and Surgical Journal, February 1886, page 75.

CARDIAC COMPLICATIONS IN THE RHEUMATISM OF CHILDHOOD.

By R. W. Bruce Smith, M.D., C.M., Seaforth, Ont.

The opinions of our best authorities vary greatly as to the frequency and extent to which rheumatism may exist in the years of 'childhood. While some older, but perhaps no more important, diseases are being diligently studied in the light of bacteria and micrococci, it may be profitable to call attention to a well-known affection in which no bacillus has been found, but which, nevertheless, is continually and too often hopelessly crippling children for life in such an insidious form as to be constantly overlooked. Some of our oldest writers in medical literature thought that rheumatism was seldom or ever met with before puberty, but more recent authorities acknowledge its existence at earlier periods, but do not refer with sufficient clearness to the frequency with which we meet with the disease in general practice. Jacobi, Meigs, Pepper and J. Lewis Smith have lately in their more recent works argued that rheumatism is frequently met with in children, and deserves careful attention, not only on account of its frequency and peculiarities, but also on account of its marked tendency to cardiac complications and of its recently established relations to chorea. Smith says that rheumatism was formerly supposed to be rare in children, but more accurate observations show that it is scarcely less common during childhood than in adult life ; it is frequently overlooked, especially under the age of six or eight years. Dr. Howard of Montreal, in his excellent article on acute rheumatism in Pepper's " System of Medicine," states that acute articular rheumatism is *par excellence* an affection of early adult life, although no age is entirely exempt. Most authors, however, while of the opinion that youth and early adult life are the periods most frequently attacked, are not inclined to consider the affection as comparatively very frequent during childhood. Yet I believe that if any general practitioner in Canada will carefully review the cases that have come under his observation, he will find a large number of these cases were those of children who had not attained

puberty. About five years ago a well-marked case of acute rheumatism in a child of five years drew my attention to this subject, and since that time I have kept careful notes of all cases of rheumatism occurring in children in my practice. I have to-day the notes of seventeen well-marked cases occurring at different ages, the youngest being not quite two years of age, and the ages of the others covering all the years of childhood. I believe Henoch furnishes us with the record of acute rheumatism in an infant of ten months, complicated with broncho-pneumonia. Senator states that Wiederhofer observed the disease in a baby twenty-three days old, and Stäger met with it in an infant four weeks old. The large number of cases seen in a clinic devoted to diseases of children has no doubt furnished these men with facilities for observation not enjoyed by those of us who labor in the field of general practice. My youngest case, as I have said, was in a child 23 months old. In this case, the first symptom calling for attention in a previously very healthy child was the swollen and inflamed condition of one of the ankle-joints; next day the knee became involved. The appearance of the joint was exactly like that observed in the case of adults. In this case, as in my other cases under six years of age, there was no cardiac complications. The family lived in a low and imperfectly drained part of the country, and surrounded by all the influences of a malarial region. The mother of the child has been frequently, during the past three years, treated for subacute rheumatism. Recovery took place in eight days. I have the notes of the other cases, but will not dwell on these at present, but hasten to deal more directly with the subject of the paper.

The absorbing interest in connection with the study of the rheumatism of childhood relates to the heart. As to why the heart is affected in children more often than in adults I have so far failed to find a clear and satisfactory explanation. The noduli, Jacobi's narrowness of the aorta, and other anatomical points of difference between the child's and the adult's heart have disappeared before the age at which rheumatism is frequent. Vernay has found that of twenty-two cases between the ages of 14 and 20, only one escaped endocarditis. D'Espine and Picot found in forty-seven cases of rheumatism in children only ten cases in

which the sounds of the heart was perfectly normal. According to Senator, the younger the patient the greater the risk of the heart becoming affected, as this organ is implicated in fully one-third of all the cases occurring before puberty. In the cases, the notes to which I have previously referred, although, fortunately, I have failed to detect any cardiac lesion in such a large proportion of the cases as the foregoing, I have in the seventeen cases found six with organic valvular disease of the heart, four of the cases had distinct mitral regurgitant murmur, in one case the murmurs were double aortic, and one case presented all the symptoms of endocarditis. I believe, however, that we often have slight attacks of endocarditis in children recovering from rheumatism. There may not be sufficient exudation to produce a bruit, and the palpitation and wandering pains over the cardiac region are allowed to pass without notice. In the case of endocarditis to which I referred, the heart sounds were normal until the acute symptoms had subsided, and the lad was brought to my office the following week complaining of pain over the heart. The loud systolic murmur at the apex led to a diagnosis of acute endocarditis. This lad has enjoyed the best of nursing and the bruit is disappearing, and the strength and health of the patient warrants me in the opinion that within a year the heart's sounds will be nearly, if not perfectly, normal.

Acute endocarditis in children certainly causes less local and constitutional disturbances than in adults, and on this account is much more likely to be overlooked. In those cases in which I found valvular disease, the cardiac lesions in all four cases came on after repeated attacks of rheumatism. It appeared as if the heart finally succumbed unable to resist repeated attacks, just as one joint after another will yield to the disease. In one little girl, the rheumatism had evidently been troubling her for some time—with pains in the ankles and knees on exertion. She was, however, compelled to walk to school, a distance of two miles, being told by her parents that those were only " growing pains." Two months afterwards, I was hastily summoned one evening, and found the child suffering greatly from dyspnœa. Death from heart failure and œdema of the lungs relieved this patient after a few weeks' suffering. Frequently we find chorea

associated with the rheumatism of childhood, and in treating these cases the practitioner is often forced to conclude that there is a striking analogy between these two diseases.

From the light of my own limited experience, I must state that I am convinced that there is often an intimate relation between these two affections. Probably the same morbid condition predisposes to both rheumatism and chorea in children, and they may, indeed, be but manifestations of the same affection. Soltman, in his article on Chorea, quotes Ringer, who thinks that chorea and rheumatic affections of the joints, and heart affections, are members of one and the same pathological condition. Often the chorea is primary and the heart affection secondary, or *vice versâ*, or the heart affection and chorea appear at the same time. Again, the chorea may appear first, then the rheumatism, and, lastly, the heart affection ; but, generally, the rheumatism is first, next the chorea, and the heart affection afterwards. In several of my cases I have found a connection with chorea, but the chorea always followed some short time after the rheumatism. I am convinced that rheumatic children are extremely liable to develop chorea. During the past year I have had under my care a case of a child, aged seven years, suffering from chorea, associated with mitral disease. The father of this girl is a clergyman, who, about nine years ago, had a very severe attack of acute articular rheumatism, which has left him with an irregular heart action sufficient to give in the most unmistakeable manner a loud murmur at the apex, indicating the incompetency of the mitral valve to perform its function. Three years after birth this child developed suddenly symptoms of acute rheumatism, but the attack was only a slight one, and she was better in a few days. Two weeks after this, the characteristic twitchings of chorea were noticed, and the child was taken to a physician, who detected a mitral lesion associated with well-marked chorea. Rest and appropriate treatment did much for this child, and the chorea disappeared, but returned each year during the wet, damp weather of April. Examination would always reveal slight irregularity in the heart's action. For four successive springs the chorea returned, and each year during the attack of chorea the heart symptoms would, as you would natu-

rally suppose, be much aggravated. In April of this year the child was brought to me in a much worse condition than I had previously seen her. At times the dyspnœa was most distressing, and this, with the dropsical condition of the patient, indicated that her sufferings were nearly over. The choreic movements still continued, and the little one was in the greatest distress. There was at that time slight abatement in the symptoms, but they seemed to return again after a few days with redoubled force, until death relieved the little sufferer during the last week in May. In this case we notice a father who had suffered from a severe attack of acute rheumatism; its appearance in the form of a slight attack when the child was three years old, and this followed by chorea associated with the mitral disease.

Within the past few weeks I had a case of chorea in a boy of eight years, in which I looked upon the chorea as a nervous manifestation of the rheumatism, and treated it with excellent results from repeated doses of salicylate of soda.

I know that it would be most erroneous to suppose that rheumatism is the cause of all chorea, but I am firmly of the opinion that there are oftentimes, as I have said, intimate relations between the two affections.

The cause of the rheumatism of childhood may, I think, most reasonably be ascribed to their improper care in diet and dress. The acid theory itself explains the rheumatism of children. The two principal sources of the collection of acid in the system are (1) lactic acid fermentation of certain kinds of food within the intestinal tract and (2) the formation of sarco-lactic and ethylene-lactic acids in muscular tissues as a result of their functional activity. As a matter of fact, most rheumatic children are imperfectly fed either in quantity or quality, and suffer from acid dyspepsia; also, the action of the skin, the principal emunctory of lactic acid, is checked by cold from insufficient clothing. While the truth of this theory *may not have been proven*, it affords to us the most satisfactory working basis for treatment. Lactic acid appears to be very readily found in early life from indigestion and during the first dentition, and results, according to good observers, in the production of rachitis, the incipient

stage of which is extremely common. It is not unreasonable to suppose that the same irritant produces the fugitive pains of rheumatism in older children.

A few words as to treatment of these case. The greatest importance is to check the first tendency we notice to an appearance of rheumatism in a child. Inquire whether there is any hereditary tendency to the disease. All forms of indigestion and acid fermentation of food must be prevented. The condition of the skin with reference to warmth and normal activity must receive the needful attention. I always commence medicinal treatment by administering a small dose of common Rochelle salts, followed by soda salicylate sometimes combined with oil of wintergreen. The greatest precaution must be shown in examining the heart, and if there is any evidence of a bruit, the most absolute and continuous rest in a horizontal position must be enjoined. In this way, and in this way alone, a permanent and fatal mischief may be avoided. We cannot put this fact too strongly to the parents of the child. *Absolute rest must be taken*, otherwise degeneration of the heart-muscle, dilatation of its cavity, and crippling of the valves will be most likely to ensue. Goodhart asserts with commendable pertinence and force that " it is not too much to insist upon prolonged rest when the future of a just-opening life depends upon it. The surgeon treating a diseased joint makes light of a year of rest; yet who has not seen a child after acute pericarditis skipping about at the end of a month or six weeks as if nothing had been amiss." There is evidence that if the heart can be rested for several months in every possible way, permanent lesions may sometimes be averted after the endocarditis of children. And even when valvular disease is apparently confirmed in children, vigorous measures should be made to curtail and, if possible, overcome the difficulty. In addition to the most careful hygienic oversight, the child should be put upon a prolonged course of iron and cod-liver oil, and occasionally I have had very good results from digitalis combined with small doses of nux vomica. Under this treatment, I have no hesitation in saying that more than once I have had distinct cardiac murmurs entirely lost sight of in children. It is certainly reasonable to expect that with healthy

growth and nutrition a slight exudation on the valves may disappear. These cases, I will admit, demand the greatest patience on the part of the attending physician, but I believe the results in many cases will justify and reward all the care and perseverence we can expend upon them.

SECONDARY SUTURE OF THE ULNAR NERVE, WITH RAPID RESTORATION OF SENSATION.

By Francis J. Shepherd, M.D..
Surgeon to the Montreal General Hospital.

Suture of nerves after division, though done by Arnemann in 1826 and Flourens in 1828, has never been performed extensively till within the last few years. Primary suture of the divided ends of nerves is a proceeding which commends itself to every surgeon, but secondary suture has not been so popular, and up to the end of 1885 only some half-dozen cases had been reported in America. In these cases where the wound has long closed, the divided ends of the nerve undergo degeneration, and are generally imbedded in cicatricial tissue. The proximal end is generally bulbous and the distal much atrophied; both ends are often so degenerated that no nerve structure can be found in them. The divided ends are sometimes separated by a long interval, the upper portion of the nerve retracting, and it is often very difficult to bring them together. It was formerly thought that to get union it was necessary to cut the terminal portions of the nerve till healthy nerve tissue was reached; this proceeding, of course, increased the distance between the divided ends and the difficulty of bringing them together. It is, however, now conclusively proved that a mere joining of the freshened ends is all that is needed for purposes of union. Where the divided ends of the nerve cannot be brought into contact, strands of catgut, or fresh nerve tissue from amputated limbs, have been introduced into the interval between the ends of the nerves, and perfect restoration of function has followed. The sooner the operation of secondary suture is performed after the perfect healing of the original wound the better, but good results have been obtained months and years after the division of the

nerve. Mr. Jessop sutured the ulnar nerve with partial success nine years after its division.

Many cases of apparent failure turn out well. Mr. Holmes (*Lancet*, June, 1883) reports a case where the function of the nerve was not completely restored for more than a year after operation. Sensation generally returns before motion, but occasionally the opposite is the rule. In some cases, where sensation was good in the course of a week, motion was not restored for six months. It has been asserted by those who oppose the suture of nerves months after the closure of the wound that the nerves will recover their functions if left to themselves. That they do so in some cases, says Mr. Holmes, is certain, and he gives cases to prove it, but he remarks that such a favorable issue is highly dubious, especially when the distance between the divided ends is great and the proximal end terminates in a bulbous enlargement.

With regard to the method of suturing the nerves, experiments have been made on animals by Rawa, Falkenheim and others. Rawa, in his cases, made the nerve ends overlap, and held them together by an encircling ligature; physiological union took place at end of six to twenty months. Falkenheim united nerves by the direct and indirect method; in the former the suture is passed through the trunk of the nerve, and in the latter the sheaths only of the divided nerves are united. The indirect was found by him to be preferable. It is now the opinion of surgeons that it matters little how the divided ends are held so long as the raw surfaces are firmly secured in close apposition. Horse-hair, fine catgut and silk have been used as sutures, and the ends of the nerves have been cut in various ways—oblique, transverse, etc. It is important that after operation the newly united nerve should be subject to as little tension as possible, and that the union of the wound should be by first intention, for if suppuration takes place the nerve may again become imbedded in cicatricial tissue. The following case of suture of the ulnar nerve is interesting because of the rapidity with which sensation returned :—

John D., aged 50, in the beginning of April, 1885, whilst working at Lake Nepissing, was cut with an axe over the left

elbow, between the olecranon process and the internal condyle. The wound healed rapidly, but he found that afterwards he could not use his arm, and that there was considerable pain in the elbow. He entered the Montreal General Hospital for treatment June 23rd, 1885, some ten weeks after the injury, and then presented the following conditions: Left arm was semiflexed and fixed; on attempting to straighten it the man complained of great pain in the elbow and resisted the movement; the muscles on the ulnar side of arm and hand were wasted, and the little finger and ring finger bent and useless; no sensation in the little and ring fingers and other parts supplied by ulnar, and, in fact, arm was useless and painful; could not separate his fingers. On examining the elbow, a scar two inches long was seen stretching across the space between the olecranon and internal condyle. This cicatrix was excessively tender on pressure. The diagnosis of division of the ulnar nerve was easily made, and next day (June 24th) an operation was performed for the purpose of uniting the divided ends. An incision was made in the line of the ulnar nerve and across the scar, and the nerve reached. The upper end, which was bulbous, was easily discovered and dissected out from the cicatricial tissue in which it was imbedded; half an inch lower down was found the other end, much atrophied, and also imbedded in scar tissue. After dissecting out the divided ends, they were freshened and brought together with a continuous suture of fine catgut, the wound sewed up and dressed with iodoform and dry dressing, a small drain inserted at the lower end, and the arm was put up in the extended position in an anterior splint. Next day when patient was seen he had a tingling feeling in the little and ring fingers, and general and tactile sensibility was good. The wound was first dressed on the sixth day and the tube was removed; union by first intention, except where drainage tube had been. It was firmly healed on July 8th, and gentle movement was commenced in the arm. The sensation was good, but motion was deficient. As his wound was healed he was allowed to go home, with a promise that he would write and let me know how he progressed. He was told that it would probably be some months before he recovered the use of his arm.

Not hearing from him, my house surgeon, Dr. Eberts, wrote in January, 1886, and received a reply from Nepissing saying he was fast recovering the use of his arm, and that he had gone back to his work ; and the only complaint he had was a slight burning pain in his little finger.   Since then I have endeavored to hear from him, but cannot find out his whereabouts, he having left Nepissing some months ago.

The rapid restoration of sensibility in this case is the interesting feature.   Surmay (*Archives Gén. de Médecine*, Oct. '85,) reports a case where general and tactile sensibility were restored in twenty-four hours after resection of three-quarters of an inch of the median nerve, and the complete restoration of the other functions occurred after six months.

NOTE.—In May, 1884, Dr. Roddick of Montreal sutured the sciatic nerve in a young man seventeen months after its division. The immediate result of the operation was the healing of two troublesome ulcers on the foot.   Sensation did not return for some time, and motion is not yet completely restored, but he is still improving, and can now walk about without a stick.   The interest in this case lies in the rapid restoration of the nerves of nutrition, whilst those of sensation and motion more slowly resumed their functions.

A POSSIBLE CASE OF SUPERFŒTATION.

BY G. E. GOODING, M.D., BARBADOES, W.I.

On Feb. 2nd, 1885, I was called about 10 P.M. to visit a negro-woman.   On reaching the cabin where she lived about two hours later, I received the following history : She had borne two children previously, and thirty-three hours before my visit had given birth to a healthy male child weighing seven pounds, and in all respects perfectly developed.   The labor had been short and easy, the placenta coming away naturally a few minutes after the birth of the child, and the accompanying hemorrhage being very slight.   The midwife in attendance, after the child was born, noticed that the abdomen still continued unnaturally large ; but as the woman seemed quite comfortable she determined to leave things alone, regarding the swelling as a tumor,

The relations of the woman, however, becoming alarmed at the unusual state of things, decided to seek medical advice, and so I was summoned to her.   Up to the time of my visit there had been an entire absence of after pains, and she seemed quite comfortable, sleeping and taking her nourishment well, and working about in bed with a freedom which to a European would be extremely hazardous, but which seems quite natural among the blacks.

On external examination, the abdomen was found enlarged to about the size of a woman at full term, and fœtal heart sounds could be faintly detected about an inch below and to the left of the umbilicus.   The mother's temperature was 98.5°, and pulse 78.   On vaginal examination, the os was felt dilated to about the size of a fifty-cent piece, and through it, but not protruding, the membranes could be felt. The head was made out to be the presenting part. The look of astonishment and incredulity with which mother and nurse received the intelligence that there was another child yet to come was truly amusing. Not relishing the idea of remaining in the hovel any longer than I could help, I determined to expedite matters by rupturing the membranes. This had the desired effect of bringing on the pains, and the second child was born in about an hour and a half. The placenta quickly followed, and was quite distinct, showing no sign of connection with that of the previous birth.   This child, a girl, was a marked contrast to the first, weighing only three pounds and a half, barely half as much. The body was covered all over with fine down, and the nails were very soft, the tips scarcely projecting.   It had the appearance altogether of a child about the seventh month of gestation.   Some minutes elapsed before it could be got to breathe well, artificial respiration meanwhile having to be resorted to.   In spite of all efforts to save it, the child died on the following day. The mother made an excellent recovery, and the first child is now alive and well. I subsequently made an examination of the mother regarding the possibility of a double uterus, but with negative results.

It would have been very interesting to have allowed matters to take their own course, and to have seen how long the birth

of the second child would have been delayed. Unfortunately, the circumstances of the case scarcely admitted this, as the woman lived several miles away. Judging, however, from the condition of the mother when first seen, I think the birth might have been put off for an indefinitely long period.

This instance raises the vexed question of superfœtation, and to my mind goes far to prove it in its widest sense. The fact of the children being each invested with distinct membranes and placentæ, as well as the difference in their sex, shows plainly that two ova were impregnated ; while the marked difference in the stages of development of the children, and the length of time which elapsed before the birth of the second (which delay, but for interference, gave promise of being indefinitely prolonged), point suggestively to the impregnations having taken place at periods of time considerably distant from one another.

AN IMPROVED NASAL TRACTION SNARE AND ÉCRASEUR, A NASAL SPUD OR DENUDER.

By George W. Major, B.A., M.D., &c.,

Specialist to the Department for Diseases of the Nose and Throat, Montreal General Hospital ; Instructor in Laryngology and Diseases of the Throat, McGill University, Montreal, Canada.

The instrument represented in the accompanying woodcut was introduced into Germany by the writer during the past summer as a modification of Krause's " Modificirter Polypen-Schlingen-schnürer."[*] If we deprive the instrument, as illustrated, of the grooved wheel or pulley (*a*), the milled nut (*b*), and the threaded shank, we have a sufficiently accurate sketch of the traction snare on which as a basis the writer's improvements were founded. It will thus be seen that the fundamental instrument *minus* the additions enumerated is a convenient form of Wilde's original, with the exception that a rigid steel wire loop-drawer has been substituted for the long double length of wire usually employed. This contrivance ("die Drahtstange welche die Schlinge tragt") which the writer has retained, has for its object the prevention of rotation of the loop of wire when in the act of adjustment to the growth. The instrument as proposed by the writer may be

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[*] " Monatsschrift für Ohrenheilkunde sowie für Nasen, &c., &c.", No. 4, 1885.

briefly described as consisting of a straight removable canula, a
closely-threaded steel shank, which is traversed by a broad
milled nut (*b*) capable of pushing backwards the sliding piece
to which the finger-rings are attached.   The steel shank, which
is flattened on its under surface, terminates at its proximal end
in a vertical thumb-ring, while the upper extremity develops a
broad shoulder, in the centre of which is inserted the grooved
wheel or pulley (*a*), before referred to, and over which the
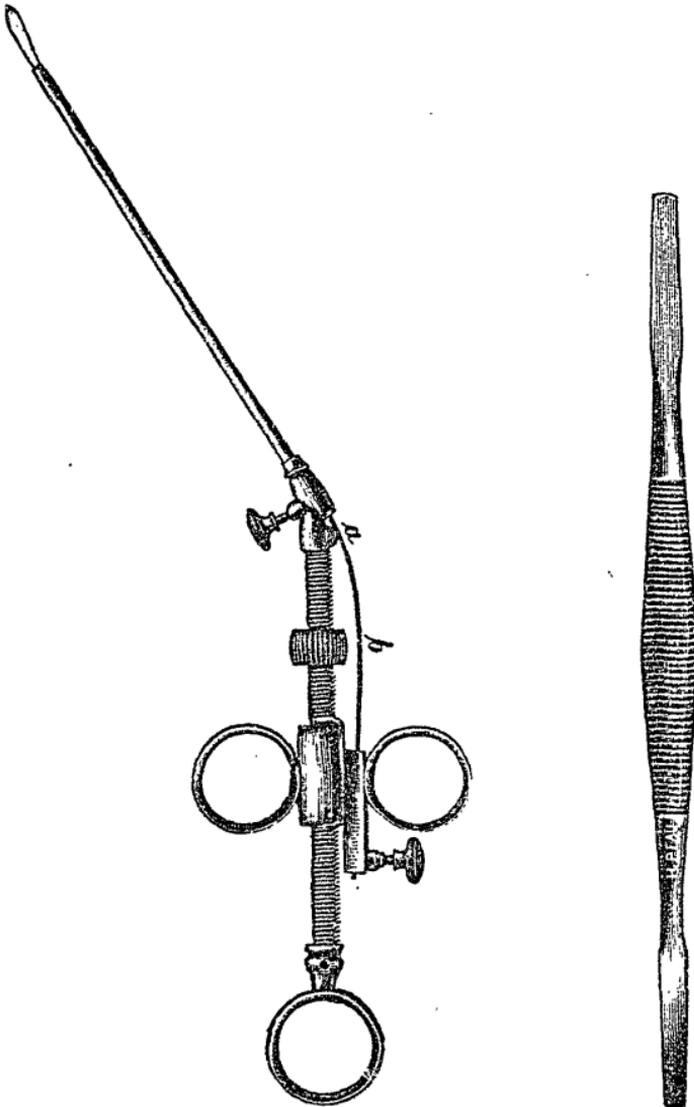
" Drahtstange" or double wire, as the case may be, freely plays.

This " Drahtstange " is flattened at its distal termination and perforated by four openings for the attachment of a short loop of wire. The proximal end, after passing over the pulley and nut and piercing the oblong metal block which surmounts the sliding piece, is secured to the latter by the set screw, as shown in the drawing. The writer has added a bulbous or pyriform end to the " Drahtstange," as used in his modified écraseur-snare to prevent more perfectly, slipping from its fixed point of attachment.

Before the additions above referred to became practicable, several minor alterations were necessary, as, for instance, the shifting of the set screw behind instead of in front of the upper finger-ring as formerly, the prolonging of the sliding piece forwards, and the fixing of the thumb-ring in a vertical position.

The changes specified have converted a finger-traction-snare into a combination instrument that can be used for either traction or écrasement, or for both purposes combined, without impairment of the function of either.

The grooved wheel or pulley (a), applied for the first time in the history of snares by the writer,* strengthens the instrument at its point of greatest weakness, and increases its power without a proportionate expenditure of force by reducing friction to a minimum.

The broad milled nut travelling over the closely-threaded shank, holds in its embrace six circles of threading, increasing thereby its strength and power by the equal distribution of the pressure over a great extent of surface.

The application of the power in a direction parallel to the axis of the shank prevents jambing of the sliding piece, which latter tendency is further diminished by the lengthening of the piece itself.

The sliding piece rides over the shank freely and easily, and is secured in a vertical position by a flat steel spring applied between the under and flat surface of the shank and the corresponding side of the sliding piece, thus obviating a certain amount

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* "Medical Press and Circular," London, Eng., Sept. 8th, 1886, and London "Lancet," Dec. 4th, 1886.

of attrition that would otherwise interfere with the harmonious working of the parts.

This snare affords a clear pull of two inches, far more than is at any time likely to be required. The shank, milled nut, sliding piece and rings are substantially constructed of good steel, and are capable of bearing any strain they are likely to be subjected to.

This snare is available either as a traction snare or as an écraseur. If used with the former end in view, the grip on the pedicle of the tumor may be materially augmented by a few turns of the milled nut, rendering the tendency of the loop to slip downwards during traction much less; or the position of the sliding piece may be simply fixed thereby. When employed for écrasement, the loop may first be drawn home by traction on the finger-rings, and the milled nut be subsequently relied on for cutting purposes by rotation, first with the fingers and afterwards by pliers if necessary. The position of the nut, well in advance of the finger-rings, renders the use of the pliers easy of accomplishment.

Continued use of this instrument in actual practice has suggested some further means of increasing its usefulness and efficiency. Canulæ adapted for the posterior nares and larynx have been applied, as also a straight canula with a flattened distal extremity, as used by Hartmann (Berlin) for preventing rotation of the loop when the instrument is armed with the long wire, for which latter purpose the maker has been instructed to affix a special cleat. The milled nut has been made octagonal on its upper border for the application of a small steel wrench, if preferred to pliers.

This instrument is specially adapted to the purposes of the general practitioner for the following reasons :

The angular disposition of the shank keeps the hand of the operator out of the line of vision. This angle is capable of being further increased without interfering with the efficiency of the instrument, as the pulley will obviate the otherwise consequent loss of power.

The "Drahtstange" also, as already stated, prevents the

possible rotation of the loop of wire to a very considerable extent. This latter difficulty is not often likely to occur in the practice of a skilful manipulator, and for this reason the writer, who personally prefers the long wire loop, decided upon applying additional means for the adjustment of the latter.   As may readily be conceived, the loop formed by a long wire is more graceful and gradual in curve and more pliable in nature than that formed by a shorter length; and, moreover, has the advantage of being capable of being paid out if the size of the body of the growth should demand it.

When a good quality of wire, as Taylor's music wire, is employed, very little trouble from rotation may be looked for. The instrument is sufficiently strong and its traction power equal to cutting through the attachment of any ordinary nasal growth without resorting to écrasement.

THE NASAL SPUD OR DENUDER is a convenient form of instrument for denuding the bony or cartilaginous surface of the nasal septum. One end is straight, while the other is curved on its flat surface, enabling the surgeon to work round an angle, a matter of some importance in operations for the correction of deflections. The absence of some such appliance has often been felt by the writer, and has resulted in the form as shown above. This simple contrivance will be found extremely useful for applying medicated or antiseptic dressings to wounds in narrowed channels where an ordinary probe will not enter.   The ends of this denuder may be obtained fish-tailed if preferred.

The originals of the foregoing instruments were made from drawings and specifications furnished by the writer and under his personal supervision by H. Pfau, Dorotheen Strasse 67, Berlin, during last summer.

Mr. W. F. Ford, of Messrs. Caswell, Hazard & Co., manufacturers of surgical instruments, etc., Fifth avenue, New York, is prepared to supply them with all recent alterations and additions.

Reviews and Notices of Books.

Lehrbuch der Speciellen Pathologie und Therapie der Inneren Krankheiten. Für Studirende und Aertze.—Von Dr. Adolf Strümpell, Professor und Director der Medicinischen Poliklinik, Universität Leipzig. Zweiter Band. Erster Theil. Krankheiten des Nervensystems. Mit 48 Abbildungen. Dritte verbesserte und vermehrte auflage. Leipzig: Verlag von F. C. W. Vogel.

Prof. Strümpell, lately appointed director of the medical clinic in the University of Erlangen, is well known as one of the ablest of modern German physicians. His System of Medicine, of which the work under review is the first part of the second volume, occupies the same place in Germany at the present day as did the great work of Niemeyer ten or fifteen years ago. There is a great similarity in the writings of Niemeyer and Strümpell. They are equally characterized by their philosophic depth and scientific character. Although Strümpell is essentially a general physician, his chief work up to the present has been in Neurology. We owe to him in a great measure our present knowledge of the importance and frequency of inflammatory changes in the peripheral nerves. It is only within very recent times that we have been able to separate multiple neuritis from poliomyelitis, and still more recently has our knowledge been obtained of the important part played by alcohol, when taken continuously and immoderately, in causing changes in the peripheral nervous system. Formerly these cases were described as spinal paraplegia. We now know that the great majority of them are due to multiple neuritis.

Prof. Strümpell has published observations showing that there is a primary combined " system disease" of the spinal cord, where the pyramidal columns (both lateral and anterior), the cerebellar tracts and the columns of Goll (postero-internal fibres of the posterior columns) degenerate. The degeneration commences in the pyramidal columns and involves them principally. The significance and import of these changes are not as yet fully understood. Elsewhere, in the present number of this Journal,

we make reference to Strümpell's publications in relation to the essential causes of tabes dorsalis.

The volume under consideration opens with a description of the diseases of the sensory nerves. The account of the different varieties of neuralgia is full, clear and scientific. Following the diseases of the sensory nerves, we have those of the motor nerves, and the vaso-motor and trophic neuroses. The description of the different diseases of the spinal cord is very full and accurate, as far as our present knowledge of them goes. The author accepts the view first advanced by Westphal, that Landry's acute ascending paralysis is essentially an acute infectious disease, having for its local lesion changes in the motor parts of the nervous system. Reference is made to a case where Baumgarten found in the spinal cord bacilli closely resembling those found in splenic fever. The diseases of the medulla and cerebrum are described with that thoroughness which is characteristic of all Strümpell's work.

The concluding part deals with those diseases of the nervous system which have no definite pathology or anatomical substratum, such as epilepsy, chorea, tetanus, tetany, hysteria, Thomsen's disease, etc.

Electrolysis, its Theoretical Consideration and its Therapeutical and Surgical Applications.—By ROBERT AMORY, A.M., M.D., Member of the Massachusetts Medical Society; Fellow of the American Academy of Arts and Sciences; Fellow of the American Academy of Medicine, etc., etc. Octavo, 314 pages. Illustrated by nearly 100 fine wood engravings. Supplied only to subscribers for " Wood's Library of Standard Medical Authors," for 1886 (12 vols., price $15.00), of which this is Vol. VIII. New York: Wm. Wood & Co.

The application of electrolysis to the treatment of various diseases has recently been so much extended and improved that the publishers of " Wood's Library of Standard Medical Authors" have done good service to the profession in issuing a work which up to the time of its publication well represents our knowledge

of this subject. Dr. Amory is evidently well qualified for the important task assigned him. Recognizing the fact that it is principally owing to the lack of a sound knowledge of the principles of electricity in general and of electrolysis in particular that so few practitioners use this powerful therapeutical agent, the author gives a very full and accurate description of this difficult but essential subject. The use of electrolysis in various diseases is discussed. Only a short reference is made to its use in stricture of the urethra. Here electrolysis promises to be of the greatest service. Since the introduction of the absolute galvanometers we are able to measure the resistance so accurately that there is no danger of doing any injury to the mucous membrane. Previously electrolysis was, in stricture of the urethra, a very dangerous procedure. Newman of New York was the first to show that the change to be brought about in stricture must be a gradual alteration of tissue, and not of total destruction by the galvano-cautery. The use of electrolysis in nævi, goitre, and hypertrichosis and other diseases is fully described and illustrated.

A Manual of Dietetics.—By J. MILNER FOTHERGILL, M.D., Edin., Physician to the City of London Hospital for Diseases of the Chest (Victoria Park), &c., &c. New York: Wm. Wood & Co.

Dr. Fothergill is one of the greatest book-makers we have in the medical profession. He writes works that are, however, not only entertaining, but useful. The present one is eminently useful. Considering the great importance to the profession of a sound knowledge of this subject, it is surprising how little has been done to make the knowledge that we possess of it common property. With the exception of Pavy's work, which is now old, there is no work in the English language to which a practitioner can go for information. Dr. Fothergill has brought his work on a level with our present advanced knowledge of the physiology of digestion. After describing the various forms of food and the manner of their digestion, he proceeds to discuss the methods of preparing the different forms of food. Condi-

ments, stimulants; fluid, preserved and canned foods, and the use of artificial digestive agents, are dealt with in the author's well known racy style. The second portion of the volume is taken up with the consideration of the foods best suited for different ages and in certain diseases. The chapter devoted to "Food in Phthisis" will especially repay careful and thoughtful perusal.

Massage as a Mode of Treatment.—By WM. MURRELL, M.D., F.R.C.P., Lecturer on Pharmacology and Therapeutics at the Westminster Hospital; Examiner in Materia Medica in the University of Edinburgh and to the Royal College of Physicians of London. London: H. K. Lewis.

In a cheap, neat and handy volume, we are told all that is probably worth knowing of the usefulness of massage as a mode of treatment.

Books and Pamphlets Received.

How to Treat Wounds To-day. By Robert T. Morris, M.D. Second edition. New York and London, G. P. Putnam's Sons.

A Manual of Obstetrics. By A. F. A. King, A.M., M.D. Third edition. Philadelphia, Lea Brothers & Co.

Outlines of the Pathology and Treatment of Syphilis and allied Venereal Diseases. By Hermann von Zeissl, M.D. Second edition, revised by Maximilian von Zeissl, M.D. Authorized edition, translated, with notes, by H. Raphael, M.D. New York, D. Appleton & Co.

Transactions of the American Surgical Association. Vol. IV. Edited by J. Ewing Mears, M D. Philadelphia, P. Blakiston, Son & Co.

A Manual of Practical Therapeutics. By Edward John Waring, C.I.E., M.D., B.S., Lond. Fourth edition. Philadelphia, P. Blakiston, Son & Co.

Society Proceedings.

MEDICO-CHIRURGICAL SOCIETY OF MONTREAL.

Stated Meeting, Oct. 22nd, 1886—*Concluded.*

J. C. CAMERON, M.D., PRESIDENT, IN THE CHAIR.

Aortic Aneurism.—The PRESIDENT called on Dr. M. C. McGannon of Brockville, who was present, to give the history of an interesting specimen of double aneurism of the arch of the aorta shown by him to the Society.

DR. McGANNON said that the patient was well six months ago. First symptoms were those of a severe bronchitis. Resonance was complete on both sides, but absence of breathing on right side. Patient at that time had no pain, temperature and pulse were normal, and heart-sounds slightly accentuated. Later, a pulsation could be discovered to the right of the sternum, temperature went up, and the lungs became consolidated. Patient lost appetite, cough with expectoration increased, but at no time was there any peculiarity of the voice or any signs of pressure, except on the bronchi.

In reply to DR. SMITH, DR. McGANNON stated that the patient died from exhaustion.

DR. ROSS asked if there was any tugging at the trachea perceptible. Dr. McGannon replied in the negative.

DR. JOHNSTON said that the specimen showed that both aneurisms were of very rapid growth, and in neither was there any signs of lamination in the clot.

PATHOLOGICAL SPECIMENS.

DR. GARDNER exhibited the following pathological specimens obtained during the previous ten days :—

1. *A submucus myoma,* removed by enucleation. The patient was the mother of several children, the last born five years ago, and had suffered from uterine hemorrhage ever since. After dilating the uterus, the capsule was slit up, the tumor grasped with a vulsellum, separated by the finger, and dragged from its bed. The shreds of capsule were trimmed off, the cavity well douched with hot water, and Churchill's iodine freely applied. No drainage or irrigation was practised. Patient made an easy and rapid recovery.

2. *Cystic tumor of the labium.* A cyst of the left labium magus of five years growth and the size of a hen's egg. It was easily enucleated entire. This was probably a degenerated gland of Bartholini.

3. *Extirpation of a cancerous uterus.* A cancerous uterus from a patient aged 49 years. Patient had intense pelvic pain and the other usual symptoms of malignant disease of the uterus. Examination before the operation proved that neither the broad ligament nor the pelvic glands were seriously involved. The removal was performed by the vaginal method. The patient being placed in the lithotomy position, and so retained by Clover's crutch, the uterus was drawn downwards and forwards to the pubes and the vaginal mucous membrane incised all round the cervix. Then the base of each broad ligament was ligatured by transfixion with a curved needle carrying strong silk ; next, the posterior cul-de-sac was opened into the Douglas pouch and the bladder separated completely. The uterus was then retroverted through the posterior cul-de-sac. After this, the broad ligaments in their upper parts were clamped on each side with Terrier's clamps for the purpose, and the amputation of the uterus completed. Some bleeding points were secured, and the operation completed by a T drainage-tube laid in the Douglas pouch. The clamp forceps were removed at the end of three days, and the drainage-tube a day later. The patient recovered without a bad symptom.

4. *Ovarian cystoma.* A multilocular ovarian cystoma removed from a lady of 68 years. In this case, 48 hours after the operation, the patient developed a pleurisy of the right side, which extended to the left two days later. The pulse reached 175 per minute, and was irregular and intermittent. This was promptly checked by 10 min. doses of tincture of digitalis every four hours. No symptoms referable to the operation appeared, the alarming chest complication soon amended, and rapid and complete convalescence took place.

5. *Ovarian cystoma.* A multilocular ovarian cystoma from a young lady of 22. There were some adhesions and troublesome bleeding from a rent in the broad ligament ; as oozing continued after application of a continuous suture, a drainage-tube was used for 48 hours. The second ovary was found cystic and removed. Dr. Gardner remarked that Schröder formerly saved any portion of the second ovary not seriously involved, but of late had discontinued the practice. Dr. Schröder cites a case where pregnancy took place after removal of one ovary and part of the second.

Discussion.—DR. TRENHOLME, referring to Dr. Gardner's method of extirpation of the uterus, stated that his method of procedure usually consisted in retroversion of the uterus and,

after ligation, removal of it piece by piece, separating the anterior wall from the bladder with the finger. As the disease returned in two cases this year in his practice after removal of the uterus, he has lost faith in the operation of extirpation of the uterus for malignant disease.

DR. KENNEDY thought that cutting through the posterior cui-de-sac shortened the operation, and that the Terrier's clamp would greatly simplify it. He asked Dr. Gardner for statistics of the operation.

DR. GARDNER, in reply, stated that the mortality after total extirpation of the uterus was not more than 10 to 12 per cent. on the continent, but it was to be remembered that, in France especially, the uterus was frequently removed for other causes, *e.g.*, incurable prolapsus, etc.

Stated Meeting, Nov. 5th, 1886.

J. C. CAMERON, M.D., PRESIDENT, IN THE CHAIR.

Abscess of the Brain.—DR. PROUDFOOT exhibited specimens from a case of abscess of the brain, and gave the following account of the case :—

This patient, female, aged 20, was admitted to the Western Hospital, under Dr. Perrigo, July 4th. At the time of admission she was suffering from intense pain in the head and distressingly loud tinnitus aurium, with discharge of pus from the meatus. There was also constant retching and vomiting, the patient being unable to retain any food upon the stomach. Dr. Perrigo examined the patient, and finding a large polypus blocking the meatus transferred her to my care. The polypus was removed under ether, and the tympanic cavity thoroughly cleansed by a stream of warm water, there being a large perforation of the membrane through which the polypus passed. The polypus was the ordinary mucous variety. The after-treatment consisted in syringing the ear with warm water every two or three hours and a 4-gr. solution of zinc sulph. dropped into the ear; and as there appeared a slight redness of the skin over the mastoid process, a small bag of ice was kept over that part. There was no vomiting after the removal of the polypus, and on the following day the patient seemed much better and was able to take some food, although the appetite was not good. All redness and tenderness over the mastoid process had entirely disappeared, but the pain in the head was still complained of, though not so severe as at first: the pain was always referred to the base of

the skull on the affected side. There was no irregularity of the pupils, and their mobility was fairly good. The pulse remained about 60 and the temperature never above 100°. The discharge from the meatus was profuse. On the 9th the patient complained of increasing pain in the head, and there was considerable uneasiness. She was put upon potass. bromid. grs. x every four hours, but still appeared to be getting gradually worse, and on the 13th I determined to remove the whole of the mastoid, if necessary, in hopes of giving some relief, although I was convinced from the first time I saw her that the brain had already become affected. She died suddenly at 6 o'clock the following morning. The nurse had syringed her ear and gone from the ward; when she returned in a short time she found the patient had drawn the bedclothes over her head and died without making the slightest sound. Previous to her admission into the hospital she had been treated by a physician for syphilis, and her breath had the mercurial fœtor. I also found that she had complained of pain in the head and had been unable to retain anything upon her stomach for about two weeks before I saw her. It was therefore more than probable that the abscess of the brain had started before her admission to the hospital. The abscess was a large one, containing a large amount of fœtid pus, and extending from a perforation in the posterior part of the petrous bone, close to the semi-circular canals, right across the lobe of the brain, until it finally pressed upon the medulla, accounting for the sudden death of the patient. I am convinced that no surgical procedure would have saved her life.

DR. JOHNSTON exhibited a specimen of *colloid cancer of the rectum*, which involved the whole circumference of the gut for five inches above the anus. Infiltration most extensive in anterior wall, and involved the prostate gland. Inguinal glands on both sides infiltrated by colloid cancer. Retro-peritoneal glands uninvolved. One small cancerous nodule in lung, and an extensive acute softening tuberculosis.

DR. SHEPHERD exhibited a *kidney with tubercular pyelitis;* also a large *calculus*, extracted with great difficulty from the pelvis of kidney. Weight of calculus 4 ozs. 7 drs. Patient doing well at date, one week after operation.

DR. KENNEDY exhibited the *tubes and ovaries* which he had removed from a patient in the Western Hospital. The woman was 27 years old, and gave the following history: She was married at 18, and shortly afterwards became pregnant; at the

same time had an attack of gonorrhœa. So far as could be ascertained, both conditions were coincident. She miscarried at the fifth month, was very ill and confined to bed for weeks afterwards, and has never been well since. Her husband's death obliged her to follow the occupation of saleswoman, which aggravated the condition. Menstruation became frequent and painful, so that ultimately, at these periods, she was compelled to keep her bed and use narcotics. During the interval the pelvic pain was continuous. After some years she again mar-, ried, but found sexual intercourse painful. She had for years sought relief, and being advised to try change of climate, had gone to Australia, and lately had come to Canada. About a year ago she applied to Dr. Kennedy, and various remedies were tried in vain. Local examination did not reveal anything positive beyond apparent enlargement of both tubes and extreme sensitiveness of the pelvic organs. As the patient was becom· ing a confirmed invalid, and the history and symptoms indicated diseased tubes, an operation was suggested and acceded to. On October 9th she was operated on, and the tubes and ovaries removed. The tubes are enlarged, with thickened walls, and perfectly occluded at the free extremity from agglutination of the fimbriæ ; cystic degeneration had also commenced in both ovaries. This patient could not possibly have again conceived. No pelvic adhesions were found, the uterus being freely move-able and smaller than normal. The patient progressed favorably, and is now fully convalescent.

DR. WM. GARDNER read a paper entitled " Glimpses of Abdominal Surgery in Europe during the past Summer," which appears at page 257 of the present volume of the JOURNAL.

DR. R. P. HOWARD thought the account of the two cases of laparotomy in puerperal peritonitis of extreme interest. He thought that physicians ought to be far less reluctant than at present in adopting this means of treatment. He also asked for Tait's treatment of peritonitis after operations.

DR. HINGSTON had witnessed recently Keith of Edinburgh operate. His operation contrasted with those mentioned by being a slow one. He divides pedicle by actual cautery, and waits for all oozing to cease. His incision is a free one.

DR. CAMERON wished to know if anyone would, in his opinion, be justified in neglecting antiseptic precautions in operating.

DR. GARDNER, in reply, said that Mr. Tait attributes much of his success to the avoidance of opium, as it tends to bring about adhesions by keeping bowels quiet, and also makes con-

stipation more difficult to overcome. For symptoms we are accustomed to recognize as those of commencing peritonitis, viz., abdominal pain, tympanitis and vomiting, he gives a saline cathartic and turpentine enemata of strength of one teaspoonful to 4 ozs. soap and water. Tait insists on absence of all fluids from the diet for 24 to 36 hours. Muller washes out abdomen in peritonitis with ¾ per cent. solution of common salt. One secret of Tait's success was doubtless the wonderful rapidity of operating and the consequent short anæsthesia, the use of drainage-tube to avoid delay in case of hemorrhage, frequent washing out during operation in case of hemorrhage and to remove the contents of burst cysts, and also to his after-treatment. He did not agree with Tait as regards avoiding the use of the nail-brush and the use of unboiled water.

Dr. Hingston mentioned that recently, in the case of a burst cyst, he had, from urgency, been compelled to wash out the abdomen freely with common water from the tap. The patient had recovered without a bad symptom.

CHATHAM MEDICAL AND SURGICAL SOCIETY.

Stated Meeting, December 2nd, 1886.

The President, Dr. Rutherford, in the Chair.

(*From our own Correspondent.*)

Rupture of the Heart.—Dr. McKeough related the following history :—A farmer, aged 56, previous to the past summer, had almost perfect health ; but for some months subsequent to his death, suffered from low spirits, general malaise, was easily fatigued upon exertion, and complained of some pain in the precardial region, which at times was very severe. Pulse was always accelerated when examined, seldom below 100, and the slightest exertion markedly increased its frequency. An examination of the heart revealed no appreciable enlargement, and no murmurs. After a slight effort on the day of his death, having previously been lying upon a sofa, he complained of severe agony in the region of his heart ; his lips, ears, and to a slight degree his face and hands, were observed to become blue, and in less than ten minutes he ceased to breathe. Permission was obtained to examine his chest. On opening the pericardium, it was found full of black semi-fluid clots and blood, and an irregular rupture about three-fourths of an inch in length was noticed upon the anterior surface of the right ventricle, near the

apex. The walls of the right ventricle were everywhere thin, at the place of rupture not thicker than blotting paper, soft, and tore easily ; the walls of the left ventricle were thicker than normal. The valves were healthy, and there was no evidence of malignant endocarditis. Dr. McK. thought the diseased condition was due to some obstruction in the coronary artery supplying the parts affected.

Poisoning by Ptomaines.—The PRESIDENT reported having recently been called to two cases, man and wife, suffering from symptoms of violent irritant poisoning—pain, vomiting, purging and collapse. Both, however, subsequently recovered. The treatment was morphia and stimulants. They had both eaten freely of head-cheese about an hour before symptoms manifested themselves.

The members of the Society present supposed that the symptoms were due to the development of poisonous alkaloids in the head-cheese. Dr. McKeough was subsequently called to two cases in which symptoms very similar developed after partaking of head-cheese obtained from the same sources as the President's cases.

Cerebritis—Abscess of Brain.—DR. HALL briefly related the history of a post-mortem held to-day, in which softening of the entire brain, with an abscess in the occipital lobe of the right hemisphere, was found. The patient, a man aged 60, was ill only a few weeks. Symptoms, when first seen, were mental dullness, embarrassment of speech, and uncertainty of gait, with a subnormal temperature. Symptoms of general paralysis, more marked in the lower extremities, soon supervened, and finally somnolency, coma and death closed the scene.

Chronic Constipation.—DR. BACKUS read a paper upon this subject. In relating the numerous causes of chronic constipation, he headed the list with carelessness and neglect. A hurried and imperfect performance of the act of defæcation, necessitating an incomplete emptying of the lower bowel, is mischievous. Change of residence, of occupation, of diet, or an attack of some severe illness, may be the orgin of the disease. Deficient secretion from the mucous membrane of the large intestine, or an excessive drain upon the fluids of the body, as in diabetes, render the fæces hard and less easily moved by the peristaltic action of the bowels. Anæmia and other enfeebled conditions of the system frequently give rise to constipation, etc. The result of continued constipation is often pernicious—the blood is burdened with effete material, mental depression, melancholia, dyspeptic

conditions, a sallow complexion, often persistent and severe pains referred to the back, hips, etc., may follow. Sciatica may be due to constipation. Referring to the treatment, Dr. B. divided it into hygienic, dietetic, medicinal and mechanical. Under hygienic, he spoke of exercise, walking and riding, massage of the abdomen and general massage in persons unable to take active exercise, and bathing, as conducive to a permanent cure. Under dietetics, he forbade the excessive use of meat or a too nutritious diet, and advised more vegetables, fruit, and coarse breads. Some people took too little fluids, and a more liberal supply of water frequently relieved them. In the medicinal treatment of these cases, he thought usually a combination of drugs in small doses acted better than a single one. He enumerated succinctly the indications for the more important purgatives. He had found, in some of the most obstinate cases of constipation in children, cod-liver oil act with great satisfaction. He had not found cascara sagrada to be a specific. A pill he found useful in many cases is one containing sulphate of iron, aloes, colocynth, nux vomica and belladonna. Under the last heading he noticed the various enemas and suppositories useful in constipation. In all cases, patients must be urged to solicit a motion of the bowels at the same hour daily; the persistent practice of this rule would cure the majority of cases.

Discussion.—DR. TYE said many cases were due to general debility, and required general tonic treatment. He did not think it was necessary or natural for every one to have a daily evacuation, but considered it important for the rectum to be kept emptied, and found a pill of aloes and soap a most useful article. Small doses of sulphur was a useful laxative in his experience.

DR. HOLMES endeavored, in treating constipation, to ascertain the cause. If due to neglect, remedy that by proper means. If due to debility of coats of bowels, give nux vomica, electricity and exercise. If there was defective circulation, massage was beneficial. It might be due to some local physical condition, such as fissure of anus. In many cases of constipation, an examination of the rectum was advisable.

The PRESIDENT mentioned a case of peripheral paralysis of left leg cured by an active purgative. Had treated cases successfully by the persistent use of electricity. Had found a simple, but effectual, remedy in an enema of cold water at bedtime. A formula he often resorted to with success was equal parts of bitart. pot., senna, sulphur and ginger ; a teaspoonful two or three times a day as necessary.

HÆMODYNAMICS AND BLOOD-PRESSURE.

The conditions under which the physicist and the physiologist work are so different, the nature of the mechanisms they investigate so radically unlike, that a very dissimilar mental attitude and habit of thought result.

Unless a man has become pretty thoroughly saturated with the conception of the great variability and instability in all parts of living organisms he is not prepared to apply with safety the principles of physics to such organisms. The cases that arise in physiology are so much more complex, so much less susceptible of exact estimation, that solutions mathematically exact must not be expected; and, indeed, from our not knowing or being able in the nature of things to ascertain one or more values required for the solution of certain problems, the final result in some cases must of necessity be only approximative. But even were this not the case, the whole of the physics necessary for such solutions is not yet forthcoming; and the physiologist has often to work out both the physics and the physiology together.

A very long and valuable paper has been recently published by De Jager of Utrecht, in which are embodied the results of his own numerous researches and those of others up to date. He has not relied upon à priori reasoning, but has submitted his problems to experimental tests. This renders his results invaluable; for we have come to this ourselves, that we would not be inclined to accept any conclusions of physics in complicated cases in the realm of physiology except when verified by actual experiment, no matter how plain the cases appeared from the physical standpoint. De Jager has investigated the flow of fluids

in rigid tubes, in elastic tubes, and finally in the complicated system of elastic tubes of the circulation in the mammal. Space will only permit of a statement of the results without the details of the methods by which they are reached being in general given.

Some standard text-books, as shown by Donders and De Jager, are not free from errors. Thus, it is not true, as represented, that the blood flows from the arteries to the veins *because* of the lower pressure in the latter. They show that the pressure at a point further from the source of flow may be higher than at a nearer point. The difference of pressure is not the cause of the flow, it is " only one of the most constant phenomena,"—but in general, the above case must be an exception, because there are not usually sudden widenings in the vascular system. " *In a wide cylindrical or fusiform aneurism it may, however, very well occur that the pressure is higher there than in the vessel which conveys the blood to it* "; that is to say, the pressure in an aneurismal dilation may be greater than in the stronger part of the vessel on the cardiac side of it. So far as we know, this has never been before pointed to as a factor in the *rupture* of aneurisms.

The chief value to the organism of a system of *elastic* tubes is the diminution of shock from the cardiac pump, and the constancy of the flow; notwithstanding it must be borne in mind that there is an accumulation or storage in the veins during the heart's pause, the consequence of which gathers importance in connection with cardiac disease. Such is, of course, owing to the negative pressure in the large veins during diastole giving way to a reverse condition just after it has ceased. The flow from the veins near the heart is not then absolutely constant.

The importance of the *resistance* in the capillaries is made very clear by an experiment which demonstrated that the blood continued to flow after the heart had ceased fifteen seconds, owing to the tension in the arterial system. Rollett has asserted that the flow may continue in the capillaries for half an hour or more after the heart ceases. In estimating venous pressure, the presence of the valves preventing reflux must be borne in mind; hence on cessation of the heart-beat there remains a posi-

tive pressure in the veins. Positive and negative always have reference, of course, to the atmospheric pressure.

The following result is very instructive : Animal tracheotomized, artificial respiration, curare given previously, thorax and abdomen opened, both vago-sympathetic nerves cut, apnœa induced, the *inferior vena cava compressed*, and the blood-pressure registered in the jugular and carotid. It was found that the pressure fell in both. This is owing to the great dilation of the veins on the peripheral side of the compression resulting in putting so much of the venous system out of the circulation. It is equivalent to removing from the vessels in which the blood still circulates a certain quantity of blood. Of course, in an animal in a more normal condition compensation by the heart, alteration of calibre of vessels through the action of the nervous system, and anastomotic flow would take place. It is such compensation that so often surprises the thoughtful physician who sees these results in diseased states,—that is if he has the physiological eye.

The capacity of veins placed low is greater than that of veins placed high ; at any given moment the quantity of blood present *for the moment* will be greater in the former than in the latter. The elevation of an extremity would have little or no influence on the heart and on the blood-current if the blood-vessels were not elastic. Hence we have the explanation of the fact that the hand becomes empty of blood if placed high enough. It is a case of internal pressure being less than the external atmospheric pressure ; and if the vessel walls be thin enough, they are compressed and their lumen even obliterated. Considerations of this kind explain why, when the body is suddenly changed from a horizontal to a vertical position, cerebral anæmia may arise. Hence the bearing on *sudden death* arising from a change of position, especially with greatly weakened heart.

In such cases as those discussed above, leaving the cardiac variations out of account, as a current is flowing through the vessels it is only the *lumen* which has influence on the current. Resistance is the key to the situation in most cases as regards blood-pressure. It will also follow that high arterial pressure will be associated with low venous pressure in many cases.

With regard to the temporary and periodical variations in blood-pressure consequent on respiration, certain considerations are of great moment.

1. The negative pressure in the thorax during inspiration forms but a small subordinate part of the cause affecting the aspiration of the heart (suction-pump action).

2. The capacity of the pulmonary vessels bears an inverse ratio to the systemic arterial pressure—*i.e.*, the greater that capacity the more blood is withdrawn from the systemic vessels and the blood-pressure must be lowered, and *vice versâ*.

3. increase of resistance in the pulmonary vessels causes a fall in the arterial pressure, and *vice versâ*. Blood is withheld from the systemic circulation.

4. An increased resistance in the pulmonary vessels, occasioning a fall in the arterial blood-pressure, must cause a rise in the venous blood-pressure. It is found, experimentally, that the respiratory curves of arterial and venous pressure in the carotid and jugular run counter to each other. But variations in the capacity of the pulmonary vessels exercise the same influence on arterial and venous blood-pressure ; *e.g.*, increase in capacity will effect a fall in both arterial and venous pressure by lessening the tension all over the vascular system.

5. During normal respiration, the capacity is increased and the resistance lessened during inspiration and the reverse during expiration. Exactly the contrary of all this holds for *artificial* respiration.

6. As the results of compression of the abdomen, *per se*, with other interfering factors experimentally removed, it is found that the curve of both jugular and carotid pressure rises. This is owing to the narrowing of the small veins in the abdomen, a lessening of their capacity ; hence a portion of blood is expelled from them, causing a rise in both arterial and venous pressure, as measured in the carotid and jugular respectively. This is De Jager's explanation, but it seems to us capable of another ; in fact, it is just one of those cases that it would be quite impossible to decide independently of experiment.

It seems to us these facts must have an important practical bearing in cases of straining. Owing to the presence of valves

in the veins, and the alternating increase and decrease of pressure in abdomen and thorax, the venous blood-current is promoted by respiration.

De Jager has also investigated the influence on blood-pressure of respiration of condensed and of rarefied air. The oscillations in the jugular and carotid run in opposite directions, as in normal respiration.

As the result of a comparison of different methods of respiration, it is emphatically stated that *the normal respiration is the most favorable to the circulation of the blood*, a matter of great practical moment in cases of suspended animation.   Distension (*i.e.*, over-stretching) of the lungs must prove injurious.   With moderate degrees of condensation or rarefication of the air the effect on the mean blood-pressure is not very marked.   When both inspiration and expiration occur in condensed air the mean pressure falls in the arteries and rises in the veins, probably owing to increased resistance in the pulmonary capillaries. When both acts of respiration are performed in rarefied air the reverse effects on the blood-pressure follow—if any change at all takes place.   When an animal is made to breathe first condensed and then suddenly rarified air, the mean arterial pressure will on the transition greatly rise and the venous fall.   It may be laid down as a general rule that *however we cause the condensed air to act during respiration it will never be favorable, but always detrimental to the blood-current.*   If with certain degrees of condensation no effects appear to follow owing to increased *cardiac* action, this expenditure of energy must be taken into account.

These conclusions really follow in great part from what has previously been stated in regard to the general influence of respiration on blood-pressure.   That there are *dangers* in the use of condensed air will readily appear.   A weak heart and consequent feeble circulation are contra-indications, for diastole is obstructed, not to mention increased strain in systole.   But the application of rarefied air may be favorable to the circulation. It should be used during expiration only—it favors the latter, but impedes inspiration.   Williams' apparatus is not in harmony with these principles.   In Valsalva's experiment there is a large

fall in the arterial and a large rise in the venous pressure, owing to obstruction in the lung capillaries from increased intra-pulmonary pressure ; little blood is returned to the heart, much kept back in the veins, and the quantity passed on into the arteries is so lessened that the blood-pressure must fall in them while the veins are over-full, giving rise in them to a higher blood-pressure.

It will be borne in mind that the results stated in this paper are founded on experiment ; they are facts. It is possible that other explanations may supersede those now offered ; though De Jager has devoted himself for years to these studies, and seems to be not only a physiologist but an able physicist. Of course many of these results are not new to science ; some are verifications. It must also be borne in mind that in most instances possible compensations are not considered. The subject becomes in such case highly complex.

RECENT STUDIES UPON THE NATURE OF SUPPURATION.

There is no department of pathology in which recent investigations have been so satisfactory or led to such conclusive results as in this one.

We still find in all text-books the statement that suppuration is a stage of inflammation—*i.e.*, that the onset of suppuration records a certain degree of *intensity* in inflammation ; yet this view must now be quite altered, since it has been proved with absolute certainty that suppuration indicates, not intensity, but merely the presence of a certain factor among the causes of the inflammation, namely, bacteria, and it has been shown that without their presence no irritant, be it ever so intense, can cause the formation of a single particle of pus.

This view, originally advanced by Lister, and further developed by Hueter, had till now to be accepted with a certain amount of reserve. For though from clinical experience in the success of the modern antiseptic system of treating injuries made it appear probable, yet, experimentally, it lacked complete proof. On the one hand, certain abscesses occur in which no bacteria can be detected ; on the other, certain irritants, notably turpentine,

croton oil and metallic quicksilver, applied so as to exclude
apparently the access of bacteria, still caused suppuration. This
latter objection has now been met. G. Klemperer of Berlin
recently, by prolonged exposure of the irritants to heat and then
application subcutaneously under stringent aseptic (not antisep-
tic) precautions, injected these irritating bodies in a series of
over one hundred experiments without causing any suppuration,
thus completing this portion of the evidence. The exudation
was always serous or fibrinous, never purulent.

The significance of the absence of bacteria in an abscess is
explained by the study of abscess formation. The organisms
must have been present, as at an earlier stage the purulent exu-
dation is largely a conservation process, having as its object the
annihilation and absorption of the bacteria by the exuded leuco-
cytes. At the same time the question has been studied from
another aspect—What bacteria cause suppuration and under
what conditions can they bring it about? Modern bacterial
methods have given a mathematical precision to these researches.
In thousands of abscesses now examined, only about ten species
of bacteria have been observed. These are chiefly micrococci,
and of these, five species alone cause about nine-tenths of all
occurring abscesses. The remaining thousands of bacteria
existing in certain parts of the body and in its surroundings are
not pyogenic.

With regard to the conditions necessary to enable these few
bacteria to cause suppuration, the conditions vary widely ; some
suffice by their mere presence to set it up, in others a weakened
condition of the tissue is necessary. Injected into the blood, for
instance, these would be harmless unless the system is injured
or irritated at any point, as by the injection of the already men-
tioned chemical irritants, say into the peritoneum or the seat of a
fractured bone. In the first case, a purulent peritonitis (Grawitz),
in the latter a suppurative osteomyelitis (Ogston), is the result.

Other local conditions may affect the result, subcutaneously
or in the peritoneum the direct injection of pyogenic cocci will
cause neither peritonitis nor abscess unless injected in such
numbers or diluted to such bulk as to preclude their rapid ab-
sorption and assure a prolonged contact with the tissues. This

point is of extreme interest, as showing the *rationale* of drainage of wounds.

We have, then, simple inflammation, either serous or fibrinous, and purulent inflammation, two entirely distinct processes, and not simply one process passing gradually into the other. It is very satisfactory to note that the daring, though logical, deductions maintained from the first by Lister and his followers, that there can be no pus without bacteria, have been now fully substantiated. With regard to the chemical processes which bring about the prominent features of pus, especially its fluidity, we are still in the dark as to whether it is caused by the direct influence of the bacteria themselves upon the exudate, or by some product formed in the course of their life processes.

SYPHILIS AS A CAUSE OF TABES DORSALIS.

Ever since Fournier, in 1876, pointed out the frequency of a history of syphilis in cases of tabes dorsalis, the relationship between these two diseases has been a subject to which a great deal of interest has been attached. The attention of the profession was not, however, pointedly directed to this subject until three years later, when Gowers and Erb gave the result of their experience. This was to the effect that in fully 75 per cent. of tabetics a distinct syphilitic history was obtainable. From very numerous observations published since this period, it is plain that any doubt on this intimate relationship must be discarded.

We believe we are safe in saying that there is a distinct history of syphilis in at least 75 per cent. of patients suffering from tabes dorsalis. The reason why the connection between these two diseases has not found more general acceptance is two-fold. First, the lesion in tabes is entirely different from what we find in syphilis. It is a pure degenerative process and what results from such degeneration. There is never found the gummatous, new formations, or the small round cellular infiltrations characteristic of the direct effects of syphilis. Secondly, owing to the negative results of antisyphilitic treatment in tabes, many have concluded that the alleged causal connection is merely a coincidence.

If we are to accept the intimate relationship of these diseases, which is inevitable, in view of the facts before us, it is plain that we must extend our views of the damages that syphilis is capable of producing. In the 19th number of the *Neurologisches Centralblat* for the year 1886, Prof. Strümpell of Erlangen contributes an able paper, which gives a probable clue as to the way in which syphilis brings about degenerative changes in the posterior columns. For a long time it has been known that certain definite nervous troubles follow many of the infectious diseases. The causal connection between the latter and the former is undoubted, although there is no similarity between the induced disease and the original malady. One of the best known examples of this is the nervous troubles that follow diphtheria, often weeks after the complete disappearance of all traces of the latter. These changes have their seat for the most part in certain definite peripheral nerve districts, and are for the most part of a simply degenerative nature. They have no resemblance to the original diphtheritic throat affection. They cannot be the result of the diphtheritic bacillus. Strümpell looks upon them as being produced by some chemical poison which originates from the diphtheritic poison. Accepting this hypothesis, he proceeds to argue that in all probability tabes dorsalis is brought about in a similar way,—it is the result of the development of a chemical poison from the syphilis, which attacks a certain definite area of the nervous system (the posterior columns and the peripheral nerves).

In this comparison between the after-effects of the diphtheritic and syphilitic poisons two objections naturally arise, one being the great difference in time in the two cases. Diphtheritic paresis sets in a few weeks at the longest, while tabes does not show itself after syphilis for many years. Another objection to this analogy is the steady progressive character of the tabetic lesion as compared with the curable changes seen in the nervous system after diphtheria.

In answer to the first objection, it may be urged that syphilis is an extremely chronic disease. How frequent do we find even the direct symptoms of the disease delayed for many years. It is not surprising, then, that the supposed poison to which it gives

rise may be many years in forming. In the multiple neuritis which sometimes set in during the course of chronic tuberculosis we have an example of the very slow changes induced by a chronic infectious disease. We also see the same chronicity in leprous neuritis. The second natural objection is easier answered than the first. Peripheral nervous changes tend naturally to recovery, while the opposite is true of central changes. That the generation of some poison (chemical?) is the probable cause of tabes is borne out by the fact that similar changes are induced in the posterior columns by the use of ergot. Degenerative changes occur also in the lateral columns from the use of lathyrus.

It is not at all surprising that antisyphilitic treatment has no influence over tabes dorsalis once the degenerative process is fully established. Such treatment cannot regenerate degenerated nervous tissue. There is, however, good reasons for believing that it can to a certain extent prevent the progressive character of the process. The great point, however, in Strumpell's hypothesis is that it holds out ground for hope that by an early and thorough use of mercury we may be able to prevent tabes. If we can prevent the development of the poison caused by syphilis, then we prevent tabes dorsalis. If Strümpell's apparently very reasonable hypothesis is true, then the above statement is true. It is certainly very refreshing to have even an hypothesis to work on in these, hitherto considered, hopeless cases.

RETENTION OF PLACENTA AFTER ABORTION.

La Semaine Médicale contains an abstract of a paper read by M. P. Budin before the Academy of Medicine, Paris, upon the treatment of retained placenta after abortion. Hæmorrhage and septicæmia are the two chief dangers, and to avoid them many authorities recommend the manual or instrumental removal of the placenta. He considers such a course justifiable only if the following two propositions can be proved :

1. That the retention of the placenta is really a frequent cause of accident.

2. That digital and instrumental interference are free from danger.

In reply to the first, he gives his own statistics at the Charité and Maternité Hospitals. In 210 cases of abortion, the placenta was retained 46 times ; slight hæmorrhage occurred in only one case, septic trouble was almost absent, and not a death occurred. He condemns operative interference as unnecessary and often harmful. His plan of treatment is expectant, with rigid antisepsis. In simple cases he uses antiseptic vaginal injections, and waits for the placenta to separate and come away spontaneously. For hæmorrhage, he uses the tampon with antiseptic precautions ; for septicæmia, he uses vaginal injections (sublimate 1–2000 or carbolic acid 3 per cent. solution) every two hours, or every hour if necessary. In severer cases, intrauterine antiseptic douching. Internally quinine should be given.

MESMERISM.—For some weeks past a certain travelling " Professor " has been drawing crowded houses in this city by giving exhibitions of so-called mesmerism. Surely, in the light of our present knowledge, such means of drawing money from the ever-credulous multitude should be prevented. It should be illegal to have such public exhibitions. Very few of the gaping and laughing crowd for a moment think that the pleasure they derive from the antics of the victims on the stage may possibly be at the great expense of the latter. The induction of the mesmeric or hypnotic state is a very serious matter, and may do great injury, especially if frequently repeated. In certain diseases of the nervous system its induction may not only be justifiable, but beneficial. To bring it about, however, for the sake of private gain and public amusement is simply scandalous. There is nothing occult or supernatural in the phenomena of hypnotism. They are all, or nearly all, explainable on physiological grounds. What little remains obscure will no doubt be soon made clear with the advances of cerebral physiology.

—Dr. Gunning of Rio Janeiro, the donor of the Jenny Geddes tablet for St. Giles Cathedral in Edinburgh, has made a very handsome gift to the university of the latter city. It takes the form of a scheme of Victoria jubilee prizes in the faculty of medicine. There are eleven prizes of the value of £50 each. Each of these prizes is to recur triennially. The prizes have received names which commemorate previous professors of the

University of Edinburgh. They are as follows : Munro, Gregory, Bell, Forbes, Balfour, Black, Christison, Lister, Thomson, Alison and Simpson. They will be awarded for special essays or graduation theses, or for original research, and are open to graduates of the University of Edinburgh of not more than three years standing.

MEDICAL DINNER.

The annual dinner of the Undergraduates in Medicine of McGill University was held in the Windsor Hotel, on the 2nd of December. Among the guests were : Sir Donald A. Smith, Sir William Dawson, Dr. Anderson (American Consul), Mr. Andrew Robertson (President of the Montreal General Hospital), Richard White, J. S. Hall, M.P.P., Dr. Kennedy (Bishop's College), and Dr. Beers. Representatives of the sister faculties and of the medical schools in Canada were also present.

The chair was ably filled by William Hall, a fourth year student.

After the usual preliminary toasts were disposed of, Dr. Roddick, in a very happy speech, proposed the health of " The Mayor and Corporation." This was responded to by Mr. Richard White, the acting Mayor, in a neat and pointed speech.

" Our University " was proposed by Mr. Lafleur, and responded to by Sir Wm. Dawson. In his usual able manner, the distinguished Principal pointed out the great advantages to medical students of being trained under the influences of a broad university education.

The next toast proposed was that of " Our Benefactors." This agreeable duty was ably performed by Mr. J. G. McCarthy. Sir Donald Smith, in rising to reply, was loudly applauded. He paid a glowing tribute to the general worth and true charity of medical men.

The " Dean and Professors," proposed by Mr. Metcalfe, was responded to by Drs. Palmer Howard, Fenwick, R. L MacDonnell, and J. C. Cameron. The Dean urgently pleaded for the endowment of those chairs, the occupants of which are required to devote their whole energies to their special subjects.

" Our Hospitals," proposed by Mr. Boone, was responded to by Mr. Andrew Robertson, the indefatigable President of the Montreal General Hospital.

The toast of the " Sister Universities and Schools" was responded to by Dr. Kennedy of Bishop's College, Mr. Galloway for the Toronto School of Medicine, Mr. Philp of Trinity School,

Mr. Hay of the Royal College, Kingston, Mr. Campbell of Bishop's, and by representatives of Laval and Victoria.

Dr. T. J. Alloway responded to the toast of " Our Graduates." He showed by a careful statistical review how much the graduates of McGill were appreciated throughout all lands where the English language is spoken.

Dr. Geo. Ross, in proposing the " Class of '87," pointed out the advantages students of the present day have compared with those of even a very few years ago. This toast was responded to by Mr. J. A. Dickson.

Dr. Mills, in an able speech, proposed the health of the " Freshmen," which was responded to by Mr. G. M. Campbell.

After three cheers for the " Press" and " Ladies," the most successful dinner ever held by the Undergraduates in Medicine came to an end.

Medical Items.

—Dr. Alleyne Nicholson, Professor of Natural History in the University of Aberdeen, is dead.

—Prof. J. Clark Murray, of McGill University, has been requested to allow his " Handbook on Psychology" to be translated into Polish. The work has been introduced into several colleges in Great Britain and the United States.

—The following are appointed examiners in medicine in the University of Toronto for the year 1887 :—*Physiology and Pathology*, G. A. Tye, M.D.: *Medicine and Therapeutics*, J. J. Cassidy, M.D.; *Midwifery and Forensic Medicine*, W. Britton, M.D. ; *Anatomy*, D. B. Fraser, M.B. ; *Surgery and Surgical Anatomy*, I H. Cameron, M.B. ; *Clinical Medicine*, J. E. Graham, M.D.; *Clinical Surgery*, L. Teskey, M.D. ; *Hygiene and Medical Psychology*, T. S. Covernton, M.D.

—Dr. Wm. J. Crittenden, of Unionville, Va., says :—In pneumonitis, pleuritis and bronchitis I have found Papine to answer an excellent purpose. In dysentery it is useful both as an anodyne and in relieving the tenesmus. In the diarrhœa of children I frequently combine with it bismuth subnitrate and prepared chalk. I have used it also in cystitis. In neuralgia, when I wish an anodyne, I use Papine. As an anodyne it is equal if not superior to morphia ; and I have never yet seen any unpleasant effects from its use. As a hypnotic I find it to be an agent of great value. It is inferior to bromidia when we simply wish the effect of a hypnotic. But it fulfills the indications when we wish a decided anodyne as well as a hypnotic influence.