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THE  
MONTREAL MEDICAL JOURNAL.

VOL. XIX.

JUNE, 1891.

No. 12.

Original Communications.

RETROVERSION AND RETROFLEXION OF THE  
UTERUS.\*

BY CLINTON CUSHING, M.D.,  
Professor of Gynecology, Cooper Medical College, San Francisco.

In preparing a paper for this Society on some subject within the domain of gynæcology, it has seemed to me that a subject should be selected which should have, as far as possible, relation to the every-day work of the practitioner. The question of backward displacements of the uterus has been so thoroughly discussed in the books, in the societies, and in the medical newspapers, that it would seem that there is little that is new or novel to be brought forward. Nevertheless, the daily experience of anyone whose time is much occupied in the consideration and treatment of special maladies is almost sure to develop practical and successful methods of treatment, the relation of which is likely to prove of interest to the general practitioner.

Before proceeding to the discussion of individual experience and opinion, it may prove profitable to say a few words concerning the anatomy of the pelvic organs; and first, as to the much vexed question as to what forces are potent in retaining the uterus in its natural position, or perhaps we might ask, What is the natural position of the uterus? In the case of an organ so movable as the uterus, attached as it is by elastic and movable supports to the surrounding parts, changing its position with every movement of the diaphragm and of the patient's body, it

\* Read before California State Medical Society, April 22nd, 1891.

is not strange that writers on this subject so frequently disagree as to what the normal position should be. In the first place, it should be remembered that no two women are exactly alike in this part of their body any more than that their faces are exactly alike. One woman has a long and narrow vagina with the uterus very high in the pelvis; another woman has a very short and broad vagina with the uterus very low in the pelvis. One woman with a large bladder fully distended with water will have the fundus of the uterus pushed over toward the sacrum, and very far forward near the pubic bone when the bladder is empty.

The connective tissue which attaches the uterus to the bladder, as well as the connective tissue of the broad ligament, undergoes, under certain circumstances, such as intra-abdominal pressure from muscular exertion, an amount of distensibility which permits a very great degree of motion to this organ.

Notwithstanding these statements, there seems to be one general proposition which can be safely agreed upon by all,—that where the bladder is entirely empty and contracted the fundus of the uterus should be in rather close apposition to the top of the contracted bladder, and the pressure of the small intestines should be behind the uterus instead of in front of it; in other words, in a condition that some writers would have us believe is one of anteversion, a condition which, in my opinion, is not a pathological one. For years I have been looking for a case where the symptoms and position of the uterus would warrant the belief that an anteversion of the uterus was the cause of suffering. Thus far I have been unable to find one.

Now as to the forces which retain the uterus in its normal position. The utero-sacral ligaments, attached as they are to the junction of the body and the neck of the uterus and passing almost directly upwards, one on either side of the rectum, to the anterior surface of the sacrum, are doubtless the principal elements in keeping the uterus in its normal position. So long as the neck and lower portion of the body are kept drawn upwards and backwards by these ligaments the fundus of the uterus tends to fall forward, and so the intra-abdominal pressure is exerted against the posterior wall, and thus tends to keep the uterus

crowded forward into a state of so-called anteversion. The round ligaments, acting as guys, probably tend also to keep the fundus of the uterus forward, but their force is small compared with that exerted by the utero-sacral ligaments.

As far as downward or backward displacements of the uterus are concerned, the broad ligament seems to exert very little influence. The normal condition of the perineal body and the pelvic floor, I am convinced, exercise considerable influence in keeping the uterus in its normal position. If the perineal body and the pelvic floor have been over-stretched and torn to a sufficient degree to allow a prolapse of the vaginal walls through the vaginal opening, the dislocation downwards of the bladder and the pelvic organs generally tends to place the uterus lower in the pelvic excavation, and the uterus, following the curve of the pelvis, tends gradually to become displaced downwards and backwards. This is especially true in women during the first few weeks following child-birth, when the connective tissues and the ligaments are left in a relaxed and over-stretched condition, and the uterus is large and heavy; and I am sure that many women date their uncomfortable pelvic symptoms, due to a retroversion of the uterus, to their first confinement.

The moment that the uterus becomes displaced downwards to a point where the pressure of the small intestines gets in front of instead of behind the body, a backward displacement is inevitable. I can easily understand how the combination of the wearing of tight corsets and the habitual over-distension of the bladder, occurring in the same woman at the same time, would be a very decided cause of displacements of the uterus backwards.

That backward displacements of the uterus may be congenital is well known. Soudry, in seventy-one post-mortem examinations of infants, found the uterus retroverted in fifteen cases and retroflexed in two cases; and I have so frequently found retroflexion and retroversion of the uterus in young girls who were suffering from dysmenorrhœa that I doubt not that a considerable proportion of all women have congenital retroversion or retroflexion of the uterus.

If the uterus becomes enlarged from any cause, and by its

weight settles down in the pelvis much below its usual position, it is easy to understand how a retroversion would eventually follow. It is claimed that peritonitis and metritis are causes of backward displacements of the uterus. My experience does not warrant this opinion.

There is no doubt that tight-bandaging following confinement should be considered as a cause of retroversion, by crowding the enlarged uterus with its relaxed ligaments downwards and backwards into the pelvis. It is claimed by some observers that a backward displacement of the uterus is not of sufficient pathological importance to justify effort to correct it. It is true that I occasionally see a case of backward displacement of the uterus where no disagreeable symptoms prevail, but this is certainly a very rare exception. The symptoms, in some degree, of painful menstruation, of back-ache, of irritable bladder, of inability to stand or walk with comfort or ease, of constipation, of reflex nervous symptoms, either of the stomach or the head, one or all, sooner or later force the patient to apply to the physician for relief; and the very marked mitigation of the troublesome symptoms following the successful treatment of these cases proves past all argument the truth of the proposition that all backward displacements of the uterus, attended with local or general symptoms, should have the displacement corrected.

The cases that seem to show the least evil effect in backward displacements of the uterus, are women where the change of life has occurred. Here we may have a markedly displaced and atrophied uterus with no attending local or general symptoms.

The common causes of backward displacements of the uterus are, first, anything which weakens its supports. Thus the ligaments, in common with all the other structures of the body, may become weakened from any exhausting sickness. They are left relaxed following confinement, or the perineum, from being overstretched or torn so that a part of the support of the vagina and bladder from below is removed. Secondly, any intra- or extra-abdominal pressure exercised from above, whether from tight corsets or heavy skirts, or unusual muscular exercise, or the growth of some form of abdominal tumor. Any one of these

causes, acting upon a uterus whose ligaments are weakened or relaxed, is liable to end in displacement downwards or backwards.

A chronic enlargement of the uterus is doubtless an additional element in the causation, if the two causes already mentioned are already in operation; but simple enlargement of the uterus, without the other causes being in operation, is probably very seldom the cause of displacement.

Habitual over-distension of the bladder should be considered as a cause of retroversion.

There are certain pathological conditions that are nearly universally present in all long-standing cases of backward displacement of the uterus: first, an enlargement of the body; second, endometritis. The symptoms vary greatly. There is usually increased muco-purulent discharge from the cervix, more or less backache in the region of the sacrum. Troublesome constipation is a common symptom, and an irritable condition of the bladder frequently prevails. Reflex symptoms, such as pain under the left breast, functional disturbance of the stomach, troublesome headaches and pain down the thighs occur in varying degrees in the larger proportion of these cases, and I know of no treatment, medical or otherwise, that is of any avail in the relief of these symptoms excepting the correction of the displacement.

The diagnosis in these cases seems to me to be so easy that a mistake should seldom be made, if the well-known methods of examination are carefully followed out; that is, the bi-manual examination without any constriction of the waist, and, if necessary, the use of the uterine sound.

The prognosis as to relief is generally good. The prognosis as to cure is uncertain, if by the term "cure" we mean that the uterus shall retain its normal position after all supports and appliances have been removed.

The foregoing is simply a preliminary to the more practical questions of how best to treat these cases; and first as to the method of re-position. So much depends upon the existing state of the parts immediately surrounding the uterus, independently of the fact of displacement, that it will be necessary to dilate

somewhat upon what would appear to me to be some very important propositions.

In the first place, if the abdominal wall is relaxed and thin, and the uterus freely movable and not sensitive to touch, and there is no constriction of the woman's waist, with the woman lying upon her back with the shoulders raised and the knees well drawn up, it is usually an easy matter, by introducing two fingers into the vagina and crowding the fundus well upwards with the left hand, to push, with the ends of the fingers of the right hand, the abdominal wall down into the pelvic excavation so that the fingers in Douglas' pouch and the ends of the fingers on the surface of the abdomen will meet just below the promontory of the sacrum. And now one of the fingers in the vagina is placed in front of the cervix, and as the cervix is pushed backwards the body of the womb is drawn over forwards and crowded over upon the bladder with the fingers of the right hand, which are on the surface of the abdomen.

This procedure is exceedingly easy after a little practice in appropriate cases; and this statement applies either to a retroversion or a retroflexion.

If the uterus is somewhat enlarged and not freely movable, or the abdominal wall is rigid or loaded with fat, this last mentioned procedure is not practicable; and especially is this true if, as a result of former attacks of pelvic inflammation, adhesions exist between the uterus and the rectum and surrounding structures. Here the most feasible plan is to place the woman on a table on her elbows and knees, have all constrictions removed from the waist, introduce the Sims speculum into the vagina, and have it held by an assistant. Now with a small vulsellum seize the cervix by the anterior lip and draw the uterus well down into the vagina. Now take a stiff copper sound—or what I very commonly use is a No. 8 steel urethral sound—and pass it gently into the reflexed or retroverted uterus. Now turn the sound very gently and carefully so as to place its concavity forwards instead of backwards, and then gradually draw the uterus over into its normal position, the amount of force required governing you as to the extent of the replacement which you shall effect.

If the adhesions between the rectum and the body of the uterus are very firm and of long standing, this procedure, however thoroughly done, will not suffice. No kind of treatment of this form or description will be of any avail. The reason for this opinion I will give presently.

If, however, the adhesions are not very firm they can be broken up in this way, and the uterus can be retained in its normal position successfully and with relief to the symptoms.

As the sound is withdrawn from the now properly replaced uterus, the cervix, which is still held by the vulsellum, is crowded backwards toward the sacrum. This tends still further to force the body of the uterus farther over toward the pubes.

Now, several pieces of absorbent cotton the size of a hen's egg, to which are attached pieces of strong thread, are saturated with glycerine and are crowded up into the post-cervical pouch, and the lower part of the vagina is now filled with a half dozen pieces of common cotton batting, also with threads attached, and the woman is allowed to lie upon a sofa or bed for half an hour or an hour before attempting to stand upon her feet.

Unless the woman suffers from unusual pain, this vaginal dressing is allowed to remain *in situ* for forty-eight hours, when the woman removes it and takes a large vaginal injection of hot water. If, however, the pain is very severe, the vaginal tampons should be removed at any time and a large vaginal injection of hot water used at once.

The effect of the glycerine, on account of its affinity for the water in the tissues, acts as a leech in taking from the tissues their water, which runs away from the vagina in large quantities for the first twenty-four hours after the dressing is applied. The non-absorbent cotton acts as a support to the uterus and the surrounding tissues, and the congestion of all the surrounding parts is much relieved as a consequence of the treatment.

This plan of procedure should be repeated every three or four days until the uterus goes over into its position with ease and without marked pain. And then the question will come up of the application of some permanent vaginal support which the woman can wear for months, to keep the organ in its proper position.



Many writers tell us that the sound should not be used in this manner ; that its use is attended with danger ; that it sets up pelvic peritonitis and cellulitis, and thereby endangers the life of the woman. In a large experience at the clinic for women at the Cooper Medical College in San Francisco, as well as in my practice, I have used this method extensively for the past ten years, and in that time, out of many hundreds of cases, pelvic inflammation has followed in not more than three or four instances.

Now I would like to call attention especially to the conditions where the use of the sound is unwarrantable, or is likely to be followed by evil results. Where there is a history of acute or subacute pelvic inflammation, or where there has been a history of recurring attacks of pelvic peritonitis, or where there is a recent effusion of lymph, or firm fixation of the uterus with marked tenderness, the sound should never be introduced into the uterus. If it is, there can be but one result—an aggravation of all the symptoms ; and the reason why the introduction of the sound in these cases so surely sets up a new inflammation, and the reason why the topical application of remedies to the cervix, or an examination of any kind with an instrument, or even with the finger, in some instances is followed by an acute inflammation of the pelvic peritoneum, is now comparatively easy of explanation. What was to me a mystery in days gone by, before our knowledge of this department of medicine became very accurate, is now as plain as that two and two make four.

I am sure that I am within bounds when I say that nine out of every ten cases of pelvic inflammation are due to the extension of disease from the Fallopian tubes into the pelvic cavity. This is the reason why pelvic peritonitis is almost unknown among men and is so exceedingly common among women. If a woman has pus or muco-purulent secretion in the Fallopian tube, in certain cases it is only necessary that a contraction of the uterus and of the walls of the tube be set up by the use of a sound, or some local application, or perhaps even by digital examination, and that some of the secretion be forced out of the open end of the tube into the peritoneal cavity, and forthwith a pelvic peri-

tonitis ensues. This, then, is the explanation in nearly all cases of pelvic peritonitis following the introduction of a sound into the uterus.

I take it for granted that all intelligent medical men at the present day use only sounds and instruments that are absolutely clean and free from infection. It would seem, then, from what has been said, that the degree of safety with which the sound can be used depends upon the ability of the operator to diagnose correctly the existence of pyosalpinx and salpingitis.

Where the tubes are enlarged or tender to the touch, where there is a history of recurring attacks of pelvic inflammation, the greatest gentleness should be used, and the free use of the tincture of iodine to the vaginal vault and the frequent use of vaginal tampons of glycerine and cotton, with large injections of hot water, should precede any effort at instrumental replacement of the uterus.

In other words, the tenderness about the uterus should be reduced as the very first step, and all instrumentation of whatever nature should cease immediately if the inflammatory symptoms are in any way aggravated; and I think it will invariably be found that any case of subacute pelvic inflammation that is made worse by a properly applied tampon of glycerine and cotton will prove to be a case of pyosalpinx, and that this opinion will be verified by the subsequent history of the case.

Where it can be conclusively shown that pyosalpinx exists, the proper treatment is to open the abdomen, remove the diseased tubes, draw the retroverted uterus forward and stitch it to the anterior abdominal wall with two sutures of silk-worm gut. This I have done frequently during the past two years, and thus far have been much pleased with the result.

I have already stated that where the adhesions from pelvic peritonitis, between the posterior wall of the uterus and the rectum, were very firm they could not be broken up by drawing the uterus well forward with the steel sound. I have repeatedly opened the abdomen in such cases, and have found the adhesions so firm that it was with the greatest difficulty they could be dissected off with the finger-nails so as to free the uterus sufficiently

to allow it to be brought into its normal position. In such cases it is folly to expect, by any kind of force brought to bear from the inside of the uterus, we shall be able to loosen such adhesions.

In using any kind of vaginal pessary for the correction of backward displacements of the uterus there are several important conditions which should be carefully considered. In the first place, the fundus of the uterus should be placed so far forward that with the ends of the fingers of one hand upon the abdominal wall and with two fingers of the other hand in the vagina, if the cervix is crowded well backwards the body of the uterus should be pushed easily forwards, so that there can be no question but what the organ is placed in a condition of so-called anteversion. This I consider indispensable before any attempt is made in fitting a vaginal pessary. Secondly, the tissues surrounding Douglas' pouch, notably the utero-sacral ligaments, must be practically free from tenderness. If these two points are carefully attended to, success will probably attend the use of a properly fitting vaginal pessary.

Now, what constitutes a well-fitting vaginal pessary in backward displacements of the uterus? The Hodge pessary, or some modification of it, is the only instrument which will be considered in this connection. I have long since given up every other kind of pessary. Instruments with an external support are attended with so many difficulties that they have not proved feasible in my hands.

One of the best tests of a properly fitting instrument is that the patient is not aware from her sensations that she is wearing a pessary. There should be an absence of any sensation in the vagina of the existence there of a foreign body, and no instrument can be worn with benefit to the woman if it cause any pain whatever. This I make an invariable rule, that if a woman is wearing a vaginal pessary which causes pain or discomfort that is not relieved by a vaginal injection of hot water or by lying down for an hour, she is ordered to remove the instrument at once, as it is sure to do harm rather than good. The length, the breadth, and the curves of the instrument must be adapted to the individual case.

It is impossible to lay down any fixed rules regarding the fitting of pessaries, except, perhaps, the one that they must not cause pain, and that they shall retain the uterus in its normal position. The instrument should be sufficiently loose in the vagina to permit of the introduction of the finger by the side of the pessary without much force, and the pushing of the pessary upwards and backwards with a moderate amount of force should not cause pain. I frequently find it necessary to change the size and form of a pessary several times during the first week before success is achieved.

It is as reasonable to expect a dealer in shoes to have his eyes blindfolded and then, after examining his customer's foot with his hands, to have him go to an adjoining room and, after removing the bandage from his eyes, select from his stock of goods a pair of shoes that will be a satisfactory fit without ever having seen the foot of the purchaser, as it is to expect the physician to make a perfect fit of a pessary in the vagina before having made a digital examination. In fact it is much more difficult than the fitting of the shoe, because in the case of the uterus you have a movable organ attached to elastic and movable supports, and the physician must carry in his mind's eye the length, the width and the relations of the parts, as well as the points of tenderness in the tissues about the roof of, but outside, the vagina. No man may hope to succeed in the management of these cases unless he be possessed of patience, gentleness and a fair share of mechanical skill; and the elements which enter into the composition of cases of retroflexion and retroversion of the uterus are so diverse that personal experience in the management of them is a not unimportant factor.

To realize the difficulty attending the successful management of some of these cases, I have only to say that while I have in my office from three to four hundred pessaries to select from, I am often unable to find in all this stock an instrument that will fit a certain case, and am therefore forced to remodel a pessary before I can succeed. This statement should certainly give courage to those who have a smaller stock of instruments and a smaller experience, when they are unsuccessful on first or second trial.

The question will often be asked, How long it will be necessary to wear the pessary? There can be but one answer given: that it must be worn as long as it gives comfort and relief, and can be permanently removed only when its removal is not followed by subsequent pain or discomfort.

The argument that it is an artificial appliance, and that it does not cure, has little force, for we see many people about us every day who are using or wearing some artificial appliance in order that their life may be made more comfortable or tolerable. False teeth, spectacles, trusses for hernia, wooden legs, ear-trumpets, glass eyes, are all artificial appliances that are intended, not to cure, but to give the individual comfort.

The patient should be instructed to be little upon her feet for the first forty-eight hours after the introduction of a pessary.

In retroflexion, I have found that in a considerable proportion of cases the body of the uterus curls backward over the upper cross-bar of the pessary, and that all efforts to correct this displacement and deformity fail until after the introduction of the stem pessary into the cavity of the uterus. This prevents the flexion, and now the retroversion pessary keeps the uterus in its proper position without difficulty. I have used the stem pessary in this manner many times with the most satisfactory results.

Usually I have found it necessary for the patient to wear the stem about a month. Thereafter the uterus retains its normal position without further trouble if the patient continues to wear a properly fitting retroversion pessary.

It is true that I occasionally see a case of retroversion of the uterus remain permanently cured after the pessary has been worn for several years, but this is certainly the exception to the rule.

There is an impression that is quite general in the public mind, and it is shared to some degree by the profession, that backward displacements of the uterus are cured by child-bearing. This is not true, but, on the contrary, a retroversion or retroflexion of the uterus is made worse than better by this process, and I never have known a case where this condition was in any way benefitted by pregnancy and parturition.

Experiments have been made of late years by shortening the round ligaments, by opening the abdomen and stitching the fundus of the uterus to the anterior abdominal wall, and various other methods of ventral fixation, to cure permanently backward displacements of the uterus. Some or all of these plans have proved moderately successful in women who do not subsequently become pregnant, but it must be manifest to all that if the uterus is fixed anteriorly by any such methods, if she should become pregnant the uterus, as it enlarges, will break away from any artificial adhesions of this kind long before the end of the pregnancy.

My own experience in these cases is confined to ventral fixation of the uterus in cases where the ovaries and Fallopian tubes have been removed on account of extensive disease, and where the uterus is retroverted and bound down by adhesions. In several cases of this kind, after the removal of the tubes and ovaries I have stitched the fundus of the uterus to the anterior abdominal wall with silk-worm gut, and thus far have been satisfied with the results. No untoward symptoms have followed, and the uterus in nearly all instances has remained in the position in which I left it, so far as I have been able to ascertain, and the effect upon the health and comfort of the woman has been most satisfactory.

I herewith append a list of the printed instructions which I furnish to every patient in whom a vaginal pessary is fitted :

1. Remember that to obtain the best results the following instructions must be observed.

2. If the pessary you are now wearing causes you pain, use an injection of hot water in the vagina and lie down for a few hours. If this does not relieve the pain, remove the pessary at once ; pass your finger into the ring, which you can feel, and draw the pessary away. You can do yourself no harm in removing it.

3. Use a vaginal injection of hot water every night and morning while wearing the pessary.

4. Never allow more than a month to pass without being examined by a physician, while you are wearing the pessary.

5. Do not wear tight or heavy clothing about the waist; and do not wear tight corsets.

6. Keep the bowels regular; have a movement of the bowels at least once a day.

7. Avoid as much as possible going up stairs, using the sewing machine, lifting heavy weights, or riding over rough roads.

8. If possible, lie down an hour in the middle of the day, and keep very quiet during menstrual periods.

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## ELEVATION OF THE PELVIS AS A MEANS OF RELIEVING VOMITING OF PREGNANCY.

BY SIR JAMES GRANT, M.D.,

Consulting Physician General Hospital, Ottawa, &c.

In 1877 I was called to attend a lady in her first pregnancy, about the third month of utero-gestation. I learned that for fully ten days she had been unable to take food, and with great difficulty retained even the smallest quantity of liquid nourishment. Almost every form of treatment had been tried without any apparent good result. As a last expedient, I decided to test the effect of elevation of the pelvis, which was accomplished by lowering the head and thorax, and placing several pillows under the sacrum. In a short time the change for the better was encouraging, and continuing the position at intervals for a few hours, in two days the marked improvement in the system was quite evident, and utero-gestation proceeded to the full term without any return of this abnormal condition.

Within the past month, two cases of severe vomiting in early pregnancy came under observation, in both of which I adopted the same treatment, with equally satisfactory results.

Guémot, referring to the rational treatment of vomiting during pregnancy, says that a morbid or abnormal state of the uterus, the nervous system, as the carrier of reflex action, and the stomach, are the prime factors in the malady. The idea of Smellie's, that the complaint is "chiefly occasioned by fulness of the vessels of the uterus," certainly is most rational. The elevation of the pelvis gradually lessens the quantity and force of the blood in the uterine vessels, and thus reduces the quasi-irritability, or, as Dr. James Stewart of McGill terms it, "the

instability of the nerve elements" in the uterine nervous system, the abnormal influence of which, prior to the change of the pelvic position, had been rapidly telegraphed to the spinal and gastric nervous centres.

### VIVISECTION.\*

By J. A. MACPHAIL, B.A., M.D.

There are questions of science and questions of sentiment, but there are questions in which both are combined. To this last class Vivisection belongs, and the present aim is to establish the proper relation existing between these two factors. Much work has been done on this subject at different times, and evidence has been adduced on both sides by the staunchest opponents, at least the evidence was recorded, but no systematic attempt has been made at a summing up from which any plain unprejudiced mind could draw an authoritative conclusion. All that now remains is to consider the evidence offered along with the facts that have arisen since that time, and to point out on which side, according to all reasonable rules, the decision must lie.

The store of published facts concerning Vivisection in America is singularly small, because in this country it has never really become a public question, but in England, on the occasion of the first attempt at restrictive legislation fifteen years ago, the conflict between those who favored the practice and those who opposed it was singularly keen.

There are two classes of persons working to lessen pain: those who oppose vivisection, striving to prevent the sufferings of animals, and the vivisectors whose motive is the seeking after truth and knowledge, which will go toward alleviating the sufferings of humanity, and of the animals themselves through scientific medicine or applied physiology. That these two classes, who have a common aim, should hold views so conflicting must be due to some misapprehension, which it is intended the present exposition of facts will help to remove.

If it can be shown that the pain and death which vivisection implies have been wrought for the good of humanity, by leading to knowledge light and power, and that this knowledge,

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\* From the manuscript of an essay awarded the prize of \$250 by the American Humane Education Society, with Emendations by the Author.



light and power could have been arrived at in no other way, and that these are so considerable that mankind would be badly off without them, then the case for Vivisection may be considered proved. But if, on the other hand, it is clear that Vivisection is practised indiscriminately with no object in view but to satisfy an idle curiosity, that suffering is inflicted out of proportion to the benefits received, that it is not a useful means of obtaining information which is procurable in some other way, and is essentially bound up with cruelty, then grounds may be said to exist for its limitation, or even its actual suppression. What restrictions, if any, should be laid upon the practice are to be considered afterwards.

By Vivisection is to be understood the operating with cutting instruments or other means on the bodies of living animals.

The objections advanced against it are mainly two—the cruelty involved, and the consequent injury to the moral nature through the infliction of a wrong; but it is also urged that the practice is not justified by the results. It will first be necessary to estimate the amount of pain actually caused, for it is in this the principal fallacy lies.

In the transition from life to death there are three stages: the first marked by loss of consciousness, the second cessation of breathing and heart action, and the third is initiated by those changes that characterize the rigidity of final death and decomposition. An animal may have life and not be "living," that is, it may be alive but unconscious and without the capacity for suffering pain. The animal lies perfectly quiet and appears dead; it can be pricked or cut in the most sensitive parts and give no signs of pain. The only functions that remain are breathing and heart beating; all consciousness is asleep, and these two mechanical operations alone are unsuspending. It is under these conditions, induced by anæsthetics, that most vivisection is performed. The heart may be in full working order, the respiratory movements unimpeded for hours after consciousness has disappeared, and in the case of cold-blooded animals even for days. Operations performed on such an animal are rightly classed under the head of Vivisection, but to brand them as improper is as unreasonable as to charge the skilful surgeon with cruelty who uses all care in removing a tumour from a living but unconscious patient. By

the use of those anæsthetics which physiologists habitually employ the animal is rendered unconscious. This is the moment the Vivisector chooses for his work. He brings into use the instruments of his research. He watches the ebb and flow of blood, the throbbing of vessels, and takes tracings of them; he measures their force; he gathers the juice a gland secretes; he divides one nerve and stimulates another, or poisons a third. He records his observations and finishes a painless but profitable death in one of a variety of ways. Just as anæsthetics have rendered the surgeon's task a simple one and enlarged his sphere, so they have rendered new experiments possible, and have become as great a necessity in physiology as in surgery.

Dr. Yeo submitted the following estimate as to the proportion of operations that caused pain:—

Absolutely painless.....	75
As painful as vaccination.....	20
As painful as the healing of a wound.....	4
As painful as a surgical operation.....	1

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100

This is on the assumption that the capacity an animal has for suffering is equal to that possessed by a human being. As a matter of fact, the cases in which anæsthetics interfere with the progress of an experiment are exceedingly rare except in certain researches on the functions of sensory nerves, but these functions have already been worked out, and as it now stands the percentage where pain is an essential factor is very low. The public mind has been befogged by the use of a single term vivisection for two separate things: experiments upon sentient and non-sentient animals. It would be easy one would think to distinguish between these two, yet Miss Cobbe, speaking for all opponents of vivisection, says:—"We find it practically impossible to separate torturing from non-torturing vivisection," and Mr. Bergh implores pardon for saying "that if the rose would smell as sweet by any other name, surely the blood of tortured animals would also retain its repulsive odor under any other designation."

The question whether vivisection is good or bad is not affected by saying that there are other things equally wrong,

the agonies caused by sportsmen to birds dragging their wounded bodies to some hidden covert, the piercing cries of the hunted hare, the suffering of the brave fox as his living body is to be torn by the pursuing hounds, or that the pain caused by vivisection ever since it was practised is as nothing compared with the suffering animals undergo in transportation and in slaughter houses for the satisfaction of man's bodily needs, or to assert that in every agricultural community vivisection is being performed constantly for no purpose but to increase the power of man over male animals and to make the noblest of these beasts of burden more easily answerable to his guidance, or to show that the ghastly scenes anti-vivisectionists conjure up from physiological laboratories with their "torture troughs," represent no such cruelty as is depicted in Snyder's "Boar Hunt" or in Landseer's "Death of the Otter." It is also useless to point out that the most earnest vivisector may be an ardent lover of animals, and that his deepest endeavor is to alleviate their suffering in common with that of mankind, or to affirm that their opponents are actuated by an unmanly sentimentalism.

First, there is the principle that should govern man's conduct in relation to animals. Without swearing to the words of any teacher, or committing one's self to any school, it may be laid down as a truth that life is a struggle, a struggle with fellowmen, with living beings, animals and plants, and with the lifeless forces around us. The conditions in which men find themselves inevitably lay upon them this burden, and they are obliged to use the means they find around them in this struggle, amongst which are the lives of animals. If then man is to prosper he must kill animals, it may be tigers, sheep or vermin. It is a duty imposed upon him by nature, even if a painful duty, but self-preservation demands it. The rule cannot be laid down that an animal may be killed for one purpose and not for another, that life may be taken to gratify an appetite or nourish the body, but not to increase the existing store of knowledge or benefit the mind.

The only test is whether the death of an animal is likely to be of benefit to society at large. Man must be fed; he is justified in killing and eating sheep; man's success in this struggle for existence depends on superior knowledge; he is

justified in killing a frog or rabbit if it can be shown that human knowledge is thereby enlarged. But he is not justified in causing pain if it can be avoided, or unless pain is of advantage to him. Death is painful in itself, but that does not mean he is to abstain from killing; it means that he is to kill with the least possible pain. One could imagine a costly system of anæsthetizing animals about to be slaughtered, but no one has shown it to be practicable, just as a surgeon may not find it practicable to administer chloroform where some local anæsthetic like cocaine, or the ether spray would serve the purpose nearly as well.

It was pointed out that to justify vivisection the information must be obtainable in no other way. Let this be qualified by saying "in no other reasonable way," and to illustrate place the only two means that are in any way reasonable side by side. Take cholera, for example, in which experiments have been conducted on both principles. On the one side are the scientific infection experiments of Thiersch and others following him, performed by vivisection; on the other hand are the popular experiments which have at various times been performed during cholera on human beings, by companies supplying them with water and other commodities. Even the most confirmed anti-vivisectionist will commend the former way. But even if this knowledge could be arrived at in "some other way" at some future period, what of the suffering and death that must in the meantime come to the human race? What of those who must die unaided till the light comes in some hypothetical and mysterious way, and of those now living, whose lives are due to their laying hold of the remedies and the prophylactics which Vivisection has brought?

But it is not certain that the knowledge could be obtained in any other way, for the discovery of the lethal agents in the transmission of disease was only and could only be determined by means of experiments on living animals.

It remains to be proved that the human race has benefited considerably by the results obtained from vivisection. To discuss this in detail would involve the tracing of every step in the progress of medicine, for medicine is no longer an art to be practised by rule of thumb, and whatever progress it has made is due to observation and experiment. There was ground

for the mocking words of Voltaire when he jeered at physicians, "pouring drugs, of which they knew little, into bodies of which they knew less." They were doing their best in those pre-division days; they gave the white spots on a leaf to consumptive patients; they gave the carrot in jaundice because it was yellow; for kidney diseases they gave fruits which resembled that organ. They were groping in the dark unaided by the light of experiment, and men were dying around them of complaints that to-day it is unnecessary to feel. Contrast the present position of medicine with that of fifty years ago, and you have a measure of the value of experiments, for the most part performed on living animals. Experimentation on animals for the benefit of humanity is the key note of modern medicine, and the physician who underestimates its value is out of tune with the best that is said and thought on the subject. Physiology is at the basis of rational medicine, and it is to physiology the physician must seek if he would be anything more than a "medicine man," a dispenser of chance gotten drugs. Experimental pathology is the synthesis as clinical diagnosis is the analysis of disease, and physiology reduces the facts to a system. If Physiology consists in the study of vital processes going on in living organisms, it follows that many of them must be studied as they actually take place. It is useless to appeal to the dead body, for though there the changes can be noted the processes will have passed away. In the dead body there is no disease, as Virchow remarked disease presupposes life.

It will be possible to refer only to the most notable examples of vivisectional results in relation to the practice of medicine, but enough will be given to obtain for it the justification of practical utility. Vesalius, the founder of anatomical study, states in his work on the human body that it was through experiments on living animals he was led to his wide generalizations in anatomy, which, before his time, consisted of shreds and patches of crude observation and false induction. Harvey, "having frequent recourse to vivisections," received the first hint of the circulation of the blood, by watching the palpitating heart of a living creature. Haller, who by his doctrine of "irritability," laid the foundation of the true physiology of the nervous system, wrought through pain and

death to animals. Charles Bell and Majendie traced out the distinction between motor and sensory nerves, and Marshall Hall demonstrated by vivisectional methods the occurrence and importance of reflex actions, by which one-half of our life is controlled. Weber demonstrated in the same way the inhibitory action of the pneumogastric nerve upon the heart, and laid down the principles of a rational treatment for the prevention of heart failure in diphtheria and other acute diseases. Du Bois-Raymond, Pfluger, Flourens, Brown-Sequard, Schiff, Vulpian, Goltz, Waller; in fact all physiologists by their work attest that if physiology is not a hopeless puzzle and a baseless fancy it is due to the results of experiments on living animals. The chemistry of living beings was worked out in the same way by Lavoisier and Priestly, who first made out the chemistry of respiration. The chemistry of digestion and nutrition would yet have been a phenomenon and a guess if it were not for the labors of Schmidt and Bidder. Fever and inflammation, old mystic words, were never understood till Claude Bernard and Cohnheim made their researches on the vaso motor nerves of living animals. It was by vivisection Aselli and Pecquet discovered the system of lymphatic vessels and Malphigi the capillary circulation. Artificial respiration was made a practicable means of resuscitation by Vesalius, Hooke and Lower, through experiments made upon dogs. The experiments of Rev. Dr. Hales on pressure of the blood in the arteries are also to be noted. In the seventeenth century Sir Christopher Wren and other Fellows of the Royal Society experimented on the transfusion of blood, and recently it has been made a means of saving life. In 1835, a committee of physicians at Dublin showed how heart sounds are produced and enable clinicians to diagnose the various forms of heart disease. Duhamel in 1740, Sir Astley Cooper in 1820, Syme in 1831, and more recently Ollier and others have conducted experiments on living animals to show the processes by which wounds are healed and injured parts restored, and especially how fractured bones are united, the practical results of which are inestimable. The surgery of the old days has been robbed of its horrors through the results of vivisection. The "fearful fear of hemorrhagy" that the old surgeons felt is now groundless, through the experiments made in ligaturing the

arteries of animals. By this simple process the boiling oil, the vitriol and caustics, the hot searing irons and receptacles for blood are no longer seen at an operating table, where the surgeon is willing to avail himself of the benefits to be derived from vivisection. It was by such experiments the Esmarch bandage, a bandage applied to a limb about to be amputated to prevent the flow of blood, came into use. This inaugurated bloodless surgery. The principles of antisepticism were studied on animals, and with the introduction of aseptic methods all dread of pyæmia, fever, tetanus and secondary hemorrhage have disappeared. Inflammation is no longer a formula "redness swelling heat and pain," since by the experiments of Bernard, Virchow and Cohnheim, and later by Redfern and Von Recklinghausen, on the blood cells in the leg of a frog and the eye of a rabbit, its secret has been pierced and following it, new knowledge of abscesses, ulceration, gangrene and clots. The present abdominal surgery had its origin in Vivisection. In the American Civil War out of 3,717 cases of wounded intestines 3,273 ended fatally. A series of experiments was conducted in Chicago, in which 37 dogs were etherized and shot when the feasibility of opening the abdomen was proved. The percentage of fatal cases after such injuries at present is 12; before this experiment it was 88; that is, the position is exactly reversed, and if they had been performed before the Civil War, 3,273 soldiers, instead of 446, would now be living, and their injuries would not even be considered grave enough to entitle them to a pension. Sir Spencer Wells, by operating on dogs, introduced the practice of suturing the peritoneum and reduced the percentage of fatal cases from 34 to 11. Out of 1,000 cases of his, 760 were saved and 17,800 years added to the sum of human life. Martin, of Berlin, in the same manner, proved the possibility of ovariotomy, and performed this operation, which a few years ago used to be denounced as murderous, in 130 cases, with only one fatal result. By these observations on the opening and suturing of the peritoneum of animals, and the treatment of the pedicle by ligature, abdominal surgery is now a matter of routine.

Another feature in modern surgery is the progress made in operations on the brain, and all of these are based on experi-

ence gained by vivisection. Hitherto the brain was looked upon as the "oracle of God," but Dr. Ferrier, by his experiments on animals, demonstrated the location of sensory and motor functions in the cerebral hemispheres as clearly as if the skull and membranes surrounding the brain were transparent.

Dr. MacEwan, of Glasgow, in one year saved the life of ninety patients by following Ferrier's methods.

In one year Dr. Echeverria collected 165 cases of epilepsy, of which 75 were cured by following the principles of localization laid down by Ferrier, yet for these experiments the eminent doctor was haled before the magistrates as if he were a burglar or a swindler.

Thousands of patients died from malignant affections of the kidney till Simon at Heidelberg demonstrated on animals the possibility of its extirpation and the performance of the excretory function by a single organ. It was by an experiment of this kind, innoculating the udder of a cow to produce a vaccine pustule, that Jenner was aided in his great discovery of a preventive of small-pox.

By the experiments of Gerlach it has been shown that tuberculosis in cows can be communicated to healthy animals such as man, fed upon their milk, that the disease may be induced by tubercular matter being inhaled or taken into the stomach, facts of importance in relation to the prevention of the disease. By the sacrifice of a few dogs and rabbits information was obtained which may have, and as a matter of fact has had an important bearing upon the safety of the human race.

These results were arrived at by making on a few animals experiments which men for generations have in blind ignorance been making on themselves. Cholera has already been referred to, and since 1884 Freire in Brazil has been working to obtain a specific against yellow fever along vivisectional lines, and is only waiting for an epidemic to put his results at the service of mankind.

Rev. R. M. Luther, a missionary in India, by vivisection obtained an antidote successful in sixty cases out of a hundred of bite by the brown viper, and with it saved the life of a fellow-worker, who was afterwards instrumental in inducing 2,000 natives to embrace Christianity. Dr. Wood, by "baking



alive" at 120° two pigeons, ten guinea pigs, twenty rabbits and six dogs, that is, subjecting them to a temperature of 120°, a degree of heat which labourers often experience in summer, proved that sunstroke is due to the coagulation of the brain and heart, and from this he deduced the proper treatment, abstraction of heat from the body. The "morality" that will take offence at experiments such as these deserves the pitying contempt we would accord to personal cowardice. The only gleam of hope that has ever come to a patient affected with those terrible maladies, diseases of the kidneys, has been through Bernard's experiments on the formation of glycogen in the liver, and until the mystery is cleared up by the death of more animals the treatment of these diseases must remain a matter of empiricism.

Whatever of good Pasteur has conferred on mankind he has accomplished by vivisectional methods, and yet the results are out of all proportion to the pain inflicted. There is a danger of becoming technical, in pointing out that it was through observations made upon the tadpole by Arnold, it was found out that blood vessels are formed by the hollowing of protoplasmic cells, and to enter upon a discussion of what Embryology owes to Vivisection would take one far beyond the present limits and the needs of this discussion. The modern method of pharmacology is based on vivisection. Instead of "experimenting" on patients, the effect of a new drug is tested upon such plants as the algæ and fungi and then upon the frog, rabbit or dog. Its mode of action is exactly ascertained, and the physician knows what organs and structures will be affected, how they will be influenced and the changes which will be produced by the progress of a disease. Even if the charge were true that Vivisection had never added a drug to the pharmacopœia it would prove nothing, for it is the work of the vivisectionist to test the effects of existing drugs and define their uses. A few instances will suffice. If nothing were ever learned by vivisection but the action of Digitalis upon the heart, the pain caused would be abundantly justified. Bromide of Ethyl was brought forward as an efficient anæsthetic, but a vivisectionist by the death of a few dogs prevented a series of those dreaded accidents, death on the operating table, which would have followed its use. By operations on

animals Bernard discovered the hypodermic use of drugs, and Majendie of strychnine. Traube explained the real nature and use of digitalis and Maure of saline purgatives. Luchsinger, following up the clue, obtained from experiments on dogs, demonstrated the value of strychnine as a preventive of night sweats in consumptive persons, and by the same means nitrite of amyl was shown to allay the agony of angina pectoris and pepsin to be of value in dyspepsia. In the same way Jequirity was introduced in ophthalmic surgery, Nitrite of Amyl in epilepsy, Salicylic Acid in rheumatism, Jaborandi in dropsy, Iodoform as an antiseptic, and the Bromides, Chloral and Paraldehyde as analgesics. All the new drugs—antipyrine, exalgin and antifebrine—that have cooled so many fevers and alleviated so much suffering, were all tested and their effects proved on animals. Who would have dared to use cocaine on the human eye, like all anaesthetics, "God's best gift to his suffering children," with all the risk of inflammation, if its effects had not first been ascertained on animals?

But this charge is not true, for Dr. Lauder Brunton has showed that between 1864 and 1867 seven drugs were added to the pharmacopœia, and from 1867 to 1874 eleven were added.

Commercially, Vivisection has been of the greatest practical importance. Dr. George Fleming, in his work on Veterinary Science, makes some estimates of the results. In one district in France sheep to the value of £213,600 died in one year of Anthrax, and in Russia 100,000 horses died annually till Braueil, followed by Delafond, Davain, Chauveau, Toussait and Pasteur, perfected the knowledge of the poison and shewed the means by which its energy may be abated. The desolating scourge of the cattle plague was stayed, and the silkworm disease was brought under complete control by Pasteur. Small-pox of sheep, the swine plague and distemper of dogs and chicken cholera can be prevented by inoculation. The exact method of the propagation of pleuro-pneumonia in cattle has been made out, which is the first stage in discovering a remedy. The ravages of epidemic fever in cattle and analagous diseases of horses and sheep have ceased since their nature and mode of prevention have been discovered by vivisectional methods, and hydrophobia is now robbed of its terrors. Glanders, a disease "as infectious as syphilis and as fatal as

tuberculosis," can only be diagnosed by the method of innoculating animals.

Another use vivisectional experiments have been put to is in the detection of murderers who have resorted to poison. The notorious Lamson, who was executed in England in 1883, may be mentioned. He used aconite to kill his victim, and the presence of the drug was only proved by its effect on small animals. If it were not for this, secret poisoners might enjoy all the immunity that was formerly obtained in the days of the Borgias.

It will be permissible to place in evidence some important statements on the value of Vivisection. The International Medical Congress, held in London in 1881, and which was attended by three thousand physicians and surgeons from Great Britain, America and foreign countries, passed unanimously the following resolution:—

"That this Congress records its conviction that experiments on living animals have proved of the utmost service to medicine in the past and are indispensable for its future progress, and while deprecating the infliction of unnecessary pain it is of opinion that in the interests of man and of animals it is not desirable to restrict competent persons in the performance of such experiments."

At the same Congress, Mr. Simon, principal officer of the Government Board, speaking in connection with diseases of horned cattle, of carbuncle and marsh fever, ventured to say "that in the records of human industry it would be impossible to point to work of more promise to the world, and they are contributions which from the nature of the case have come, and could only have come, from experiments on living animals." Before the British Medical Association in 1881 Professor Humphrey declared "almost every advance in our knowledge of the working of the human body has been made through Vivisection."

As Mr. Wilks puts the case for England, "All the leading men in Europe, those who are best capable of forming a true judgment, have expressed their opinion strongly in favour of experiments on animals, and have at the same time supported their opinion by an exposition of facts. Opposed to these savants are certain lords and ladies, certain bishops and members of Parliament, who, with all the dogmatism of mature ignorance, declare that "Vivisection only panders to curiosity,

without doing anything for science;" "that it is a detestable practice not attended with scientific results." I would ask the reader to picture to himself a platform on which Virchow, Pasteur, Humphrey, Foster, Simon, Huxley and Fraser unite in the statement that the remarkable advance in medical science and art during the past twenty years is due to experiments upon the lower animals, and immediately afterwards a sincere rural dean and a conscientious auctioneer uniting in stating "that experiments on animals led to no useful results."

In the United States resolutions affirming the value of experiments upon animals, and deprecating legislative interference, were adopted by seven medical schools, by the New York Medical Society, and by sixteen organizations in various localities.

Three of the leading American universities have been quoted in support of the practice, and to the number is to be added Harvard Medical School, a believer in the experimental method.

But, after all, there are a number of experiments, a small number, which necessarily involve pain to animals, and in their defence it is only necessary to fall back upon the original position that the pain is justifiable for the sake of the good that is accomplished. These are the ones necessary to demonstrate the effects of drugs, of poisons like that of cholera, and such as were performed by Chossat in which the animal must be deprived of food, but the experiments which cause pain become fewer and fewer as physiology advances until all that remains to be studied is pain itself, and the physiologist can study that best upon his own body.

Some hasty opponent has recommended Vivisectors to practice among themselves. And so they have. The names of Toynebee, found dead in his laboratory; Christison, Hunter, Heinrich, Dvorak and Schiff need but be mentioned in this connection.

It is not a pleasant occupation spending one's days and nights in nauseous dissecting rooms surrounded by dead and dying animals. Physiologists have found themselves ostracised and vilified, and their practice ruined for it when they had any, but the misrepresentation which they have suffered has

not stayed their hand from working for science and humanity. Like the Good Samaritan of the parable, they subjugate emotion and feeling to judgment, and do not pass by on the other side with pity or scorn.

The provision that vivisection should not be practiced unless there is a probability of beneficent results must not be pushed too closely, for science must be untrammelled. The science of to-day brings us nearer to the science of the future, and one truth may in an unseen way be the germ of others. Science has only to do with the seeking of truth, utility will follow in its train. Who, for instance, could foresee that a simple physiological preparation, the leg of a frog with its living but non-sentient nerve in the hands of Galvani, was to be the origin of Galvanism, electricity and allied subjects.

If one urge that experiments may be performed on one class of animals and not on another, it is to be said in reply that no two persons could agree where to draw the line between the bacillus and the dog, and some might even include within the pale the phylloxera that formerly destroyed the vineyards of a nation.

For the benefit of those who deny that utility and morality have any interdependence, it will be necessary to refer to the ethics of vivisection. If there is a moral wrong involved in experimenting on animals then, they say, no considerations of utility can justify it, even if by the death of one animal the light would break upon the pestilence that stalketh only in the darkness, and that there may be a knowledge which man is bound to forego, that the alleviation of human pain is not the highest good. According to the same principle it were better to starve than to do that violence to the moral nature which is involved in the death of a creature. They say that honour should deter man from exercising the tyrant's power, which nature has given him, and that it is well nigh impossible to deal rightly with animals when men are at the same time judge, accuser, witness and culprit.

Another class of objectors resist scientific research because it loves what art hates, analysis, and yet another class, because they accuse it of attempting to reduce God to a "physical necessity." To the one it may be said that art itself may have a basis in truth, and "to the solid ground of nature trusts

the mind which builds for aye," and the other class of objectors is urged to remember that the "Kingdom of God is within."

But the greatest show of reason is with those who object on what they call "moral grounds." Arguments have been urged against them by Virchow, who held that an animal was a man's "honestly bought chattel," and by Dr. Carpenter, who affirmed that moral duties exist only towards those possessing moral responsibility, but these do not meet the case. As reasoning beings we can only be reasonable when we deal with the facts around us as we find them. It would be easy to conjure up Swift's land of the "houyhnhnms," where the relations between men and beasts were reversed, but with this condition we have not to do; there is no brotherhood between man and beasts. Without insisting too strongly on the fiat which went forth in the world's first spring time, "Let man have dominion over the fish of the sea, and over the fowl of the air, and over the cattle and over all the earth," it is undeniably one of the principles of creation that animals are subordinate to man for his use in the progress of life. Nature has ordained it and Nature is not without pain to living beings whilst they dwell in this world, or whilst they come into or leave it. "The whole creation groaneth and travaileth in pain." Man has to live; like the Apostle he is enjoined to "rise, kill and eat." Man's duties towards inferior creatures must take in man's nature, which he cannot discard. Therefore his relations towards animals can only in a qualified sense be regarded as ethical, and the divine injunction cannot apply: "Do unto others even as ye would that they should do unto you." It would involve one in a tiresome discussion to include a consideration of sacrifice, vicarious and by compulsion, but it might be noted that the Great Teacher admitted that mankind was of more value than many sparrows.

If Vivisection is productive of good to humanity it remains to be considered under what restriction it should be practised. Vivisection and cruelty are in no way bound up together, and even if in some countries it appears that improper methods are used it does not follow that the practice should everywhere be restricted. Because exiles are badly treated in Russia it does not follow that no criminals should be sent to Siberia or that lawbreakers should go unpunished.

It yet remains to indicate the course and results of legislation in restriction of Vivisection from which it will appear that it has been both futile and harmful. The only country where restrictive legislation is really in force is England, though the attempt was made in Germany, Sweden, Denmark and the United States. The first important legislative attempt to restrict the prosecution of physiological research was by Lord Hartismere's Bill in 1875 in England, which aimed to restrict the work to specified places and licensed persons, and compelled the use of anæsthetics in every case. It was objected to as destructive of original work and never came into effect. Then a Royal Commission was appointed composed of Lord Cardwell, Lord Winmarleigh, Hon. W. E. Foster, Sir John Karslake, Professor Huxley, Mr. Erichsen and Mr. Hutton, to enquire into the "practice of subjecting live animals to experiment for scientific purposes." They examined every person in England likely to throw any light on the question. The evidence is contained in a bulky blue book, and in that report it is stated:

"The imputation of cruelty, which has always been indignantly repudiated, has not been substantiated by a single authentic instance. In their evidence given before the Royal Commission, the Society for the Prevention of Cruelty to Animals state through their Secretary that 'they do not know a single case of wanton cruelty.' The report also recommended 'that no ban be placed upon vivisection.'"

The teachers of physiology addressed a memorial to the House of Commons, in which it was stated: "We repeat the statement which most of us have made before the Commission, that within our personal knowledge the abuses in connection with scientific investigation, against which in this bill it is proposed to legislate, do not exist, and never have existed in this country. The memorial was signed by Professor Sharp-ley, University College, London; Dr. Wm. Carpenter, London Hospital; Professor G. Humphrey, Cambridge; Professor Rutherford, Edinburgh; Dr. Pavy, Guy's Hospital; Dr. M. Foster, Trinity College, Cambridge; Dr. Bourdon Sanderson, University College, London; Dr. Robert McDonald, Dublin; Professor Redfern, Belfast; Professor Cleland, Galway; Professor Charles, Cork; Professor McKendrick, Glasgow; Dr.

Pye Smith, Guy's Hospital; Professor Yeo, King's College, London; Mr. Charles Yule, Magdalen College, Oxford; Professor Gamgee, Owen's College, Manchester.

The Belgian Special Commission's report, published last July, practically substantiates this position. Notwithstanding the failure of a Royal Commission to obtain evidence of the abuse of physiological vivisection in Great Britain, the Legislature was induced to pass a prohibitory enactment, which has been so worked as almost to prevent experimental research on live animals in England ever since.

Lord Carnarvon's Bill prescribed:

1. That experiments must be performed with a view only to the advancement by new discovery of knowledge, which will be useful for saving or prolonging human life, or alleviating human suffering.

2. That they must be performed in a registered place.

3. By a person holding a license.

4. The animal must, during the whole experiment, be under the complete influence of some anæsthetics.

5. It must be killed before it recovers consciousness.

6. Experiments must not be performed for demonstration.

7. They may be performed for the purpose of acquiring manual skill.

In 1883 Mr. Reid introduced another bill, but it never came to a discussion. If it had passed it would have stopped all progress in physiology, pathology and pharmacology in those places coming under the influence of its provisions. The Home Secretary, Sir W. Harcourt, affirmed at the time "that under the then existing circumstances there was very little infliction of pain, and what suffering was caused was abundantly justified for the benefit of humanity at large."

The effect of this mischievous and meddling legislation was disastrous to English physiology, and compelled those who practiced vivisection to flee to France and Germany and to draw upon the United States for their medical knowledge. Mr. Lister found the working of the Act so "vexatious as to be practically prohibitory," and went to Toulouse to carry on his investigations. This scientist, whose observations and experiments in connection with infection have been the means of saving thousands of human lives, was obliged to discontinue



his investigations and conduct them in other countries. He said: "Even with reference to small animals the wording of the Act is so vexatious as to be practically prohibitory of experiments of a private practitioner unless he chooses to incur the risk of transgressing the law.

Dr. Greenfield, Pathologist in Edinburgh University, who was at work on investigations for the prevention of splenic fever, was forced to write:—"I have not been engaged in other investigations, for the simple reason that with the present restrictions and the difficulty of obtaining a license, I regard it as almost hopeless to attempt any useful work in this country. As the result of my experience it is my opinion that these hindrances and obstacles constitute a most serious bar to the investigation of disease and of remedial measures. When to this is added all the annoyance and opprobrium which are the lot of investigators, it is to be wondered at that anyone should submit to be licensed." He also mentions the case of a surgeon who came to him with what appeared to be a remedy for lock-jaw, to have it tested; the law forbade the experiments and the patient died.

Professor Fraser writes:—"In several instances in which the objects were of the highest interest and in which the importance of the results could not be predicted, the Government has constituted itself the supreme arbiter of science, and has ventured to decide that certain experiments were not required and should not be performed. I have only just now experienced the mortification of being refused a licence where permission was requested to perform a few experiments on rabbits and frogs with a reputed poison used by the natives of Borneo to anoint their arrows."

Professor Foster thus sums up his views:—"This legislative action has gone far to cripple physiological research in this country. Our science has been made the subject of a penal act. We are liable at any moment in our enquiries to be arrested by legal prohibitions. We are hampered by licenses and certificates. We are asked to make bricks when they have taken the straw away from us." Speaking of the Congress of 1881, in which Virchow declared the charge of cruelty was a subterfuge, Dr. Foster says:—"One good fruit of the present Congress is 'that our foreign brethren, seeing our

straits, will go home determined to resist to the utmost all attempts to put the physiological enquirer into chains, for we are assured that experiment is the best weapon with which we can fight against the powers of darkness of the mysteries of life.'"

Sir James Paget thought it intolerable that he might pay a ratcatcher to poison the vermin about his place, and not be permitted to use them for the good of mankind, or that he should have to appeal to a Government official for leave to prick a mouse.

Dr. Lauder Brunton was engaged in England in experimenting with the poison of venomous serpents, when restrictive legislation was introduced and put an end to them. But the Government that introduced the legislation supplied Dr. Weir Mitchell and Dr. Reichert, who lived in a more reasonable country, with the snakes, and they succeeded in isolating the poison. This was necessary before discovering an antidote to a poison which annually carries off twenty thousand victims.

Mr. Horsley, in the *British Medical Journal*, protests against the difficulty of obtaining a license, and Dr. Wyatt Johnston observed that the incubation period of disease should be lengthened, since it usually developed before a license could be procured. Scientific men are averse to be licensed like publicans or prostitutes. They refuse to work in an atmosphere of distrust and suspicion, even upon subjects not proscribed by law, and object to having their laboratories searched by detectives as if they were smugglers' dens. Notwithstanding the existence of a law which limited the number of persons performing experiments to twenty-six in England, Scotland and Ireland, and under which the Government inspectors continually spoke of the cruelty practiced as "insignificant," "inappreciable," "equal to that caused by vaccination;" the opponents of vivisection were not satisfied. This was in the face of the report of the inspectors appointed by the Government. In 1878 they reported that there were not more than forty cases in which "an amount of suffering worth noticing was inflicted." In 1879 the number was twenty-five, ten of which were on frogs, and in the other fifteen the suffering was about equal to that caused by vaccination. In 1880 and the

two following years the inspectors report that there were only ten cases in which any pain was caused. The Irish inspectors reported that "the experiments were free from any appreciable suffering." Mr. Bush, in his report for 1884, admits that the "amount of direct or indirect actual suffering as the result of physiological and therapeutic experiments performed under the Act in England and Scotland was wholly insignificant." He then specifies that in the case of three frogs, six mice, thirty minnows and sticklebacks, some suffering might have been caused—a grand subject truly for a nation of whose newborn two per cent. die yearly from neglect. This legislation, so sweeping in its provisions and so drastic in its results, one would think, left to the votaries of the suppression of vivisection very little to desire. One of the foremost of them, Mr. Colam, acknowledged that after employing the "surveillance of detectives" he could "not accuse the physiologists of cruelty." Yet in 1883 every endeavour was used to have Vivisection totally prohibited. But, after all, Frances Cobbe, the chief scribe of the anti-vivisectionists, was led to exclaim: That "anti-vivisectionists recognized that their work must take the shape of an ethical and religious agitation." The law hampered and harrassed the vivisectionists for a time, till they were able to take up their work in other countries, but the total amount of pain inflicted was not diminished by one iota. Fortunately for humanity, there were centres where researches could still be carried out, but the results have not gone to further the credit of English physiological work, being arrived at under the aegis of foreign schools. The public is exacting of the ability of a physician, but by a senseless agitation it forbade the means of acquiring knowledge. Yet it has not been slow to avail itself of the advantages derived from physiological research, and would stand aghast if medical men were to cast aside what has been gained by the method of vivisection and return to the days when quacks flourished and vended their vaunted nostrums, their charms and cure-alls. But the indications are that English physiologists will not long remain under the burden, and it is fairly certain that a similar restriction will never again be placed upon scientific men.

In the United States there is really no restriction placed

upon vivisection, and the discussion of the question has been meagre. Professor Dalton makes the general statement:—"The exhibition of pain in an experimental laboratory is an exceptional occurrence. As a rule, all the cutting operations are performed under the influence of ether" (not of curare, which dulls the motor but not the sensory nerves). This is because the infliction of pain is generally no part of the experimenter's object, and on every account it is preferable to avoid it. In his own demonstrations he says: "I do not make experiments upon animals involving more pain than is caused, for example, by pithing to kill, or injecting an anæsthetic subcutaneously."

Dr. Leffingwell, by quotations from the physiological treatises of Professors Dalton and Flint, shows that there are only seven experiments in which anæsthetics are not always employed, and in them there is reason to believe the pain inflicted is either brief or not very severe. And there is also reason for belief that there is an annual decrease in the number of such demonstrations. The charge of Ray Lancaster is thus disproved, "that the number of experiments must increase in geometric ratio as physiology advances." Professor H. C. Wood writes, "So far as concerns the medical schools of Philadelphia, vivisection without anæsthetics is not practised to any extent, if at all, for class demonstrations."

In 1867 an Act was passed by the State of New York "for the more effectual prevention of cruelty to animals." It declared it a misdemeanor to "unnecessarily or needlessly mutilate or kill any living creature," but nothing in the Act was to be construed "to prohibit or interfere with any properly conducted scientific experiments or investigations performed only under the authority of some regularly incorporated medical college or university of the State of New York." This law was so vague its provisions did not interfere with vivisection any more than the Blue Laws prevent reasonable recreation on Sunday.

At the session of 1881, Mr. Henry Bergh introduced into the New York Legislature a bill providing: "That every person who shall perform, or cause to be performed, or assist in performing upon any living animal an act of vivisection shall be guilty of a misdemeanor," and "the term vivisection

used in this Act shall include every investigation, experiment or demonstration producing pain or disease in any living animal, including the cutting, wounding or poisoning thereof." The attempt was renewed in 1882, and again in 1883, but since that time nothing has been heard of the bill, and vivisection in America is practically untrammelled, a fact the English Government has not been slow to take advantage of to evade the provisions of its own laws. From this it appears that vivisection can be practised in a civilized country extensively and carefully, without cruelty or unreasonable pain, and without legislative interference. Indeed the physiologists and legislators of the United States have proved the case for unrestricted vivisection. As the celebrated Owen said, "The Legislature of the United States of America, assailed by well meaning ignorance, has refused to pass a law which would cast an unproven and unmerited stigma on scientific men."

If anti-vivisectionists claim that legislation has not diminished the practice as a whole, then their labor has been in vain; if they claim that it has, then they have committed a wrong against humanity in the light of the benefits vivisection has bestowed. But it is impossible to apply these principles by any other than moral force, and the great work the opponents of vivisection have wrought is, that they have stimulated and rendered sensitive the moral sense of operators, which deters them from unnecessary cruelty. In England and America, where the moral nature of the operator and community is well grounded, the suffering has been shown to be inappreciable, the number of operators small, and the operations few, but even on the continent there is nothing to show that cruelty is practised at the present day. In a common German manual of physiology this rule is laid down: "An experiment involving vivisection should never be performed, especially for purposes of demonstration, without previous consideration whether its object may not otherwise be attained. Insensibility by chloroform or other drugs should be produced whenever the nature of the experiment does not render this absolutely impossible." Indeed Professor Schiff of Geneva, one of the best known of continental vivisectionists, has never found it necessary to practise on a feeling animal.

Dr. Pye-Smith, in his address before the British Association

in 1879, laid down the lines on which anti-vivisection legislation is at all permissible. "The only restriction which Christian morality imposes upon such practices is that no more pain shall be inflicted than is necessary for the object in view. Any one who would inflict a single pang beyond what is necessary for a scientific object, or would by carelessness fail to take due care of the animals he has to deal with, would be justly liable to public reprobation." This means that the physiological laboratories should be licensed like dissecting-rooms under the Anatomy Act in England, and licences given only to persons of adequate knowledge and known character, and that then the experts should be left to follow their own methods.

Upon the question of the restriction of vivisection, Professor Dalton says categorically: "I think investigators and teachers should be the sole judges as to what is necessary in their investigations and teachings." Dr. L. S. Pilcher believes it only necessary that "the public should be informed of the truth relating to vivisection in order that there should be secured to science every advantage and privilege which its advancement may need." Professor Wesley Mills, the leading physiologist in Canada, declares openly that a scientist can be the only judge of the rights and obligations of his own profession. Dr. Osler, his predecessor, now of Johns Hopkins, was of a similar mind. In Dr. Yeo's table it is admitted that only one experiment in a hundred is painful. Legislation aims to deal with this one case, and in doing so suppresses the other ninety-nine as well, and the way to ensure that not more than one case in a hundred shall be painful and yet science go untrammelled is not by legislative enactments based on sentiment and insufficient knowledge, but as Frances Cobbe, its most ardent opponent, admits, "by an ethical and moral agitation," by a more refined morality on the part of the operators and the community in which they live, brought about by the methods of ethics and religion. The action of the Societies for the Prevention of Cruelty to Animals, by countenancing the extremists who would suppress vivisection, has alienated the support of physicians whose position and relations would be invaluable in furthering the general aims of the Societies. The medical journals are no longer shy of the practice. Under the influence of public opinion at one time they spoke of vivisection apolo-

getically and with caution; in recent years they adopt no line of excuse and treat the objections of the opponents with aggressive scorn, confident that false sentiment, assumptions, and illogical reasoning cannot, in the long run, retard the progress of light.

It does not appear either that restrictive legislation has lessened the sum total of cruelty, or that physiologists have altered their methods under its compulsion. It will always be ineffective, because there will continue to be communities not over powered with "genuine British narrowness," where biologists can labor unimpeded in the name of truth, science and humanity.

The extent to which legislators should interfere with vivisection is very limited, unless they choose to incur the responsibility Darwin speaks of that "he who retards the progress of physiology commits a crime against mankind." Physiologists themselves assent to the principles laid down by Sir Thomas Watson: that experiments must not be performed at random to see what will happen; that they must have some object in view, a question to settle or a doubt to remove, and with a reasonable hope of resulting benefit; that operators have the skill, judgment and intelligence, and previous knowledge to make experiments successful and instructive; that they guard against everything that would enhance pain, and do nothing out of mere curiosity.

Looking at the whole question from the distance of a few years, and in the light of the results that have been attained since then, it is clear that the outcry against vivisection has been the result of a popular delusion that cruelty and vivisection were synonymous, that the experiments were useless and unnecessary, and that the same knowledge might have been gained in some other way.

But the present exposition of facts shows that vivisection is not of necessity cruel, and should not be interfered with, since

1. It has tended to correct and extend our knowledge of the functions of the human body.

2. It has aided in obtaining exact knowledge of the processes of disease.

3. It has tested the remedies by which diseases are to be controlled.

4. By it the means have been ascertained of checking contagion and preventing epidemics both in man and beasts.

5. Poison can be detected.

6. All this information could have been obtained in no other way.

7. There is no moral wrong involved in the operations either to animals, to operators, or spectators.

While physiologists and physicians know it as a fact that the road to a more perfect medical science lies through experiment, it may be painful experiment, they can afford to resist the clamour of those whom they would serve, believing, by the added experience of two centuries, with Harvey of immortal name, who, in speaking of this same subject, declared that skill and knowledge could be arrived at "*non ex libris sed ex dissectionibus.*"

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## DEATH UNDER CHLOROFORM.

DR. ED. EVANS, LACROSSE, WIS.

*March 23rd, 1891.*—I was called about noon to see a woman who had been delivered about twelve hours before by a midwife, after eighteen hours labor. The placenta was retained. She was 37 years old, VII-para; large, pale, exsanguinated looking. She was lying on a filthy bed; soiled clothing, with blood, etc., had not been removed. The stench was terribly foul. Pulse 124, regular, fairly full and strong; temperature 101°. Abdomen slightly tender and full fundus above umbilicus. Nurse declared she lost but little blood. After changing clothing and thoroughly cleansing exterior parts and vagina, I gave chloroform. She took it easily, and was soon under its influence; altogether a little less than two drachms was used. I gave the mask to nurse, with instructions to use a little if directed. I then removed the placenta and gave a hot, weak carbohc, uterine douche, patient all the time seeming to breathe well. Just as I had finished, patient gave a gasp, and in less than two minutes was dead, after giving two or three more irregular gasps. I used all possible means to restore her; saw that the tongue was forward and throat clear, lowered the head (inversion), used



hypodermic of brandy and artificial respiration, but to none of these did there appear to be the least response. A post-mortem was not allowed. The verdict of the coroner's jury was, "Death under chloroform, no blame attaching to any one."

Careful examination before giving the anæsthetic failed to reveal any evidence of heart or lung trouble, and her history was one of uninterrupted good health. There was no history of kidney trouble. There was no urine in bladder. This woman's death impressed on me the oft-repeated and oft-neglected warning, "When possible to avoid doing so, never give an anæsthetic alone." It also impressed on me the words of Dr. Allis, of Philadelphia. He says: "A study of the accidents, the modes of death, and the efforts at reanimation, has led me to put little confidence in restoratives. Most of those resuscitated reacted promptly within a few seconds, certainly within a minute or two. Unless the heart and lungs resume their functions promptly, I believe death always follows. I do not believe a life has been saved by tracheotomy or artificial respiration, if five minutes have passed without good results."

## Hospital Reports.

### MONTREAL GENERAL HOSPITAL.

#### CONDENSED REPORTS OF CASES IN DR. MACDONNELL'S WARDS.

##### TYPHOID FEVER.

During the twelve months ending March 31st, 1891, I have had under my care in the wards thirty-two cases of typhoid fever. For the most part these patients were admitted during the winter service, and the results of the treatment was more satisfactory than in the series previously reported,\* for there were no deaths, although a large proportion of the cases were of a severe type.

*The connexion between tuberculosis and typhoid fever.*—This point has been particularly carefully studied. In clinical lectures, as well as in the wards, I have frequently expressed the opinion that tuberculosis very rarely follows typhoid, and that when a case of fever ends in phthisis, the original diagnosis of fever will not bear inspection.

It would seem that there is such a thing as a tubercular fever, a condition of the body preceding the actual local manifestation of pulmonary tuberculosis. The routine examination of the sputum of all patients with febrile symptoms would, I am sure, lead to the early recognition of the true nature of such cases. Everybody can remember cases called typhoid fever in which fever is really the only symptom, the abdominal disturbances being entirely absent. In some cases such as these, phthisis may in course of time develop itself and be then regarded as post-typhoid tuberculosis. The following is a case in point :

J. S.—, aged 25, a well-built young Irishman, was admitted Jan. 25th, 1890, complaining of general weakness. He says that he was in hospital for three weeks, in 1877, with "typhoid." The family-history was little more than negative, the father and mother both being alive, but one brother died of "water on the brain." He says that his illness began, three weeks before admission, with headache and diarrhoea. There was then a slight cough. He remained three weeks in hospital, the temperature

\* One Hundred Cases of Typhoid Fever. The Medical News, Sept. 6th, 1890.

rising and falling in a somewhat intermittent fashion until the beginning of the third week, when it became normal. There was diarrhoea when he was in the hospital. The tongue was noted white fur at centre and tip, and edges clean. The splenic enlargement was not present. There were no spots. No physical signs were ever found in the lungs, though they were most carefully looked for. The case was regarded as one of typhoid fever. Eleven months later he was readmitted with perineal fistula. Evidences of extensive consolidation were found in both lungs, and bacilli were in the sputum.

Now, on looking into this case it is plain that if we leave out the fever, which itself was not characteristic, we have little that belongs to typhoid fever. I believe this febrile attack to have been of tubercular nature. The previous attack of so-called typhoid fever is significant.

Another supposed case of typhoid was that of H. K. He was admitted on the 24th March, 1890. No family history of phthisical affections. He had previously had acute rheumatism. He had been ill one week with headache, chills, and pains in the back and side. Although pain in the chest was a prominent symptom throughout, yet there were some symptoms which were thought to point to typhoid fever, such as pain, tenderness and gurgling in the right iliac fossa, and furred tongue. Repeated physical examination of the lungs gave perfectly negative results. After a very long illness of 76 days, he was discharged as convalescent and resumed his duties, when, after a fortnight, he began to suffer from pain, shortness of breath, loss of appetite and feverishness, and was readmitted with his right chest full of fluid, which was aspirated; and after a stay of some weeks, he was discharged. I have not heard of him since. Although I called the case one of typhoid fever, I must now regard it quite differently. The continued fever and pain in the chest—they were not localized—point to the presence of a cause acting slowly, in this case, on the pleura and developing into a pleurisy, which, I take it, is here the first open manifestation of the oncoming of pulmonary tuberculosis. Pleurisy is one of the rarest of typhoid complications, and when present, is in almost every, if not every, instance purulent.

*The Skin Eruptions.*—In my report of one hundred cases I was struck with the fact that typhoid rash was entered in the case-books as occurring but 51 times. Not sufficient care had been taken in searching daily for cutaneous eruptions. They were present in 19 of the 32 cases, and some of them enabled me to verify Murchison's observation that typhoid rash is often found on the backs and shoulders when it is not present on the abdomen or chest. The detection of the rash is an important matter, inasmuch as it fixes the diagnosis. Cases with no skin eruption whatever should be looked upon as requiring strong corroborative evidence in support of a diagnosis.

In one case the rash was most profuse. Beginning to appear upon the abdomen, it extended gradually all over the body to the arms and thighs and over the neck and face, extending as high as the lower lid of the right eye. This proved to be a most severe case.

Scarlatiniform rash was observed in 54 cases. It was particularly well marked about the neck and chest, but though I call it scarlatiniform for want of a better name, it differs from the eruption of scarlet fever in being of a much lighter red, not being punctate, but very profuse. No throat symptoms were present at all. In one of the patients who presented this rash at the commencement of the disease, an outbreak of urticaria occurred in the fourth week; this followed close upon the administration of a dose of bromide of potassium. But in another case, urticaria made its appearance at a time when no medicine was being taken. All four cases in which scarlatiniform rash was present were severe and prolonged.

In the case of a young woman who was convalescing from a mild attack, herpes zoster set in severely and gave rise to a great deal of suffering.

*Abdominal Symptoms.*—In but one case was there diarrhœa, and no severe meteorism was present in any case.

*Enlarged Spleen.*—The spleen was in every case examined daily with the greatest care, and was found to be decidedly enlarged in twelve cases. Splenic enlargement must be sought for from day to day. We have notes of cases where the patient

was admitted with a small spleen, but as the fever went on the organ underwent enlargement. Without careful and repeated examination such a change might easily escape notice.

*Two cases presenting unusual features.*—These two cases illustrate the extraordinary length of time a case of typhoid fever may last, as well as some other interesting complications :

R. W. B., æt. 44, was admitted on what was probably the tenth day of his fever. I have already spoken of the rash in this case, which extended all over the body even up to the level of the eyelids. He remained in hospital 100 days. The temperature became normal on the 35th day, remained so for a week, rose slowly to  $102^{\circ}$ , remained high for another three weeks, very slowly coming down to normal. The case presented many of the most unfavourable symptoms of typhoid fever, viz., delirium, continued high temperature, abdominal distension, retention and subsequently incontinence of urine. The most alarming symptoms were referable to the heart. On the 52nd day it was first noticed that the pulse was intermittent and irregular. During the next twenty-four hours the pulse at the radial beat sometimes at 60 and 70, sometimes at 120, while the beats of the heart, counted at the apex, were always 120. The sounds were foetal. The following day this disturbance disappeared. Apart from cardiac weakness, which was manifestly present, another cause existed in the fact that the stomach was greatly distended. During the period of his apyrexia he was taking quinine in small doses, and I stopped this and substituted digitalis, with a good result. Tongue very dry and brown. The relapse continued in progress, a second eruption appearing on the 61st day. He was discharged on the 110th day of the fever. Shortly afterwards a periostitis of the second rib, its cartilage and a portion of the sternum developed itself, forming a firm swelling on the front of the chest, quite painless and non-fluctuating. This remained unchanged for some three weeks, when he went to his home, and I have not heard from him since.

This typhoid affection of the ribs and cartilages was new to me, but it has been described and lately has received great attention. Helferich,\* in a paper read at the recent Bremen

\* Berliner Klin. Wochenschr., No. 42, 1890. See also the Practitioner, March, 1891.

Congress, gave the result of his observations in eight such cases. The seat of the affection was always the chest, more especially the cartilaginous portion of the ribs, and the swelling was followed by redness of the skin, discharge of pus, and the formation of a sinus leading to a small cavity filled with weak granulations, in which lay exposed perichondrium. Helferich observed that this typhoid rib affection differed from tubercular disease of the ribs in the fact that, even if it existed a long time, it never led to depression of the patients general condition. The cases reported were those of persons well on in years—31 to 63.

Another very prolonged case was that of Jane H—, æt. 33. She was 94 days in the wards, being six days ill before admission. Normal evening temperature was reached on the 31st day, and there was an apyrexial period (the temperature was taken every two hours) of six days. Apparently without a cause the temperature then slowly began to rise, and remained at points between  $104^{\circ}$  and  $102^{\circ}$  for fourteen days, but never again fell to normal until the 81st day. The tongue became brown with the relapse, and a fresh crop of spots appeared. The complication seemed to rise entirely from the stomach. Severe pain in the upper part of the abdomen was complained of from the first, and through the active part of the fever violent retching was present at very short intervals. The patient's condition was most distressing, and all treatment was quite unavailing. The retching began to be troublesome on the 36th day, and it was not until the 61st day that it ceased. At one time, when it was at its worst, a round worm was vomited, and it was hoped that the violent efforts at emptying the stomach would then cease, but its expulsion seemed more the effect than the cause of the retching. Abdominal symptoms, such as tympanites and diarrhoea, were absent throughout. She made a very good recovery.

*Other complications—Pregnancy.*—I have reported in detail elsewhere the case of M. W., a woman aged 33, who was some seven months pregnant. At the date of her admission in August, 1890, typhoid fever was undoubtedly present, as was evidenced by the presence of spots as well as other symptoms. She went home after the temperature fell to normal, was delivered of the

child, and some three weeks afterwards returned to hospital with a relapse of fever and fresh spots. She brought with her two daughters, aged about 11 and 13, both of whom had typhoid fever in most typical form. This woman's temperature never went down. She developed periostitis in the right tibia and a discharging sinus remains. We found physical signs of phthisis at the left apex and bacilli in the sputum. Since then she has had attacks of dry pleurisy and has plainly drifted into a condition of chronic tuberculosis.

*Typhoid fever in a patient whose appendix vermiformis had been removed.*—About a year ago the appendix of Julia B—, æt. 23, was removed by Dr. Shepherd successfully. It was her third attack of appendicitis, and her case was instructive from the fact that although all the symptoms of general peritonitis were present at the time of the operation, yet when the abdomen was opened the disease was still local. After the operation a hernial protrusion remained, which was difficult to keep reduced. The fever was very severe, but the special complication was incessant cough, which caused protrusion of the hernia.

In some cases of typhoid very severe cough is an annoying complication. It wastes the patient's strength and suggests a formation of tubercle. This, however, I have never observed. In another case besides this one, incessant cough has proved an alarming symptom, but in neither could any evidence of phthisis be obtained. In both, morphine was given in large enough doses to afford relief.

*Treatment.*—All these cases were treated on the plan commonly called expectant. In this series of 32 cases, sulphurous acid in 20 minim doses was administered during the acute stage of the disease. It is significant that no meteorism was reported. The number of cases noted is too small to allow conclusions to be drawn.

## Reviews and Notices of Books.

**Principles of Surgery.** By N. SENN, M.D., Ph.D., Professor Principles of Surgery and Surgical Pathology in the Rush Medical College, Chicago, Ill., etc. Illustrated with one hundred and nine wood engravings. Philadelphia and London: F. A. Davis, publisher. 1890.

This work by the well known surgeon and pathologist, Prof. Senn of Milwaukee, supplies a real want. Most of the recent works by English and American authors are undoubtedly defective in those parts relating to the principles of surgery, taking little heed, in fact, to those great discoveries relating to the pathology of surgical diseases. It has evidently been the aim of our esteemed author to fill this great want in surgical literature. As he very truthfully says: "The student who has mastered the principles of surgery will have no difficulty in applying his knowledge to practice, while the one who has burdened his memory with numerous details to meet special indications is always at a loss in making prompt and judicious use of his therapeutic resources when confronted by rare lesions or unexpected emergencies."

It would be impossible, in the short space allotted us, to give anything like a comprehensive review of this admirable book. The first and second chapters are devoted to the subject of "regeneration," having special reference to wound-making in all tissues. Then follow inflammation and its various terminations. Much space is given to the important and interesting subject of "Pathogenic Bacteria." The author has here evidently drawn largely from his previous well-known work on "Surgical Bacteriology," although much is new. The chapters on septicæmia, pyæmia, erysipelas, tetanus, and surgical tuberculosis are very interesting. The latter, "Surgical Tuberculosis," is, we happen to know, one of Professor Senn's pet subjects, and hence no less than five chapters are devoted thereto. We find everything here from the first inoculation experiments of Kortum in 1789 down to the recent investigations of Koch, but exclusive of his lymph inoculations.



On account of its purely scientific character this work will of necessity interest only a limited number of the profession—teachers and advanced students especially,—but we hope that in future editions the author will find opportunity to introduce his advanced views on antiseptis and his well-known original work in abdominal surgery.

**A Text-Book of Hygiene.** A Comprehensive Treatise on the Principles and Practice of Preventive Medicine from an American Standpoint. By GEO. H. ROHÉ, M.D. Second edition; pp. 421. Philadelphia and London: F. A. Davis, publisher. 1890.

For years past students and teachers of hygiene in medical schools have found themselves at a loss for a text-book that contained the essentials of the subject as taught in the curriculum leading to the M.D. degree. In America the valuable encyclopædic treatise edited by Dr. Buck was at hand, but for a college text-book it was manifestly constructed on too large a scale. Parke's Hygiene, the standard English text-book, was also too comprehensive in its scope and an undue proportion of its pages was devoted to the hygiene of the soldier. The other text-books were for the most part written for local use, and better adapted for those living in Great Britain than for those living in America.

The aim of the author is to place in the hands of the American student, practitioner and sanitary officer a trustworthy guide to the principles and practice of preventive medicine, and he states in his preface to the first edition that though he cannot flatter himself that much in the volume is new, yet he hopes that nothing is untrue.

The twenty-two chapters deal with the subjects which are commonly comprised under the title Hygiene, and are well written. The information given to the student fulfils all his requirements. No page in the book can be passed over as containing matter not worth learning. A useful feature in the work is the carefully prepared bibliography which is to be found at the end of each chapter, by the means of which the student who wishes to pursue the study of the subject he may have in hand is enabled to find further information.

**Heredity, Health, and Personal Beauty.** By JOHN V. SHOEMAKER, A.M., M.D. Philadelphia and London: F. A. Davis, publisher. 1890.

This is an octavo work of more than 400 pages, much of the really valuable matter of which has already appeared in the small popular volumes of the health series. If an important connection between the above three topics, especially the first and the others, had been established, new and valuable results would have been achieved; as it is, we confess that this is one of the books of that numerous class that leave one in doubt as to whether, upon the whole, they had not better have been left unwritten. Especially do we feel thus after reading or rather glancing at the contents of certain chapters, for we are inclined to believe the mind is not rendered more pure or healthful by their perusal. Few men seem to be able to write of the sexual relations, of female beauty, of matings, and kindred topics successfully. The result is sometimes, at all events, a rather unpleasant disclosure of the author's own inner life. All these topics are worthy of a dignified and scientific treatment such as Darwin has given them; but what good purpose, for example, a description of a party of female bathers surprised by one of the opposite sex can serve is beyond our comprehension; but, of course, there is much we cannot ourselves fathom. But of one thing we do feel convinced—that the responsibility of such writing is very great.

**Essentials of the Diseases of Children.** By W. M. POWELL, M.D., Physician to the Clinic for the Diseases of Children, Hospital of the University of Pennsylvania. Philadelphia and London: F. A. Davis. 1891.

The work is based on large hospital experience, as well as the substance matter of the chief authors on the diseases of children, and discussed ably and briefly from a symptomatic and therapeutic standpoint. To the student as well as the general practitioner, who must also be a constant student at the bed-side, this work will be found useful. The diseases of children are often obscure, and depend, as to diagnosis, more on the careful ob-

ervation of the medical man than the information to be obtained from "the little hope of the house." A timely hint or a practical observation such as may be obtained from this little volume may prove of great service. Being the outcome evidently of patient work, carefully thought out, we consider it worthy of a place in the library of the progressive practitioner.

**Essentials of the Practice of Medicine.** By HENRY MORRIS, M.D., Philadelphia. With an Appendix on "The Examination of Urine," by LAWRENCE WOLFF, M.D. Philadelphia and London: F. A. Davis. 1891.

This compact volume of between three and four hundred pages is intended as an aid to students of medicine, chiefly during their college course of study, and to young practitioners as an aid to both diagnosis and treatment. At the very commencement of medical practice there is nothing so important as the careful noting of all cases that present for treatment. Let the habit of collecting facts or data be cultivated and established, and in after life it is impossible to estimate the benefits which will result. This volume will be found of great service in the lines of careful direction as to facts, the very essentials of practice. Under these circumstances we would recommend this work as one worthy of careful study, inasmuch as it may prove as serviceable as an electric light to a previously dark pathway.

**The Pocket Materia Medica and Therapeutics:** A Resumé of the Action and Doses of all Official and Non-official Drugs now in Common Use. By C. HENRI LEONARD, A.M., M.D., Professor of Medical and Surgical Diseases of Women and Clinical Gynæcology in the Detroit College of Medicine. Detroit: The "Illustrated Medical Journal Company," publishers.

This volume, intended mainly for practitioners, will fulfill a useful purpose. It gives in a short space the more important actions and uses with the preparations, doses and mode of administration of all official drugs, and nearly all the recently introduced agents.

**Diabetes: Its Causes, Symptoms and Treatment.**

By CHARLES W. PURDY, M.D., author of "Bright's Disease and Allied Affections of the Kidneys," &c. With clinical illustrations. Philadelphia and London: F. A. Davis. 1890.

The author of this work is well and favorably known through his excellent manual on Bright's Disease. The treatise on Diabetes shows the same care in preparation, and will prove useful to any one desirous of acquainting himself with the most recent views on the nature and treatment of diabetes. The chapter on the dietetic treatment is especially full and ably written, and will well repay a careful perusal. We are pleased to find the author devoting some space to the consideration of the natural mineral waters of this country, which may be employed with benefit in this disease.

**The Modern Antipyretics: Their Action in Health and Disease.** By ISAAC OTT, M.D. E. D. Vogel, bookseller, Easton, Pa. 1891.

This work is mainly devoted to the consideration of original observations performed by the author and his assistants. The nature of fever is first considered, and then a valuable chapter devoted to the discussion of the mode of action of antipyretics, and we finally have a short account of the more important antipyretic agents. The book reflects credit on American medicine.

**A Treatise on the Diseases of the Nervous System.**

By WM. A. HAMMOND, M.D., Surgeon-General U.S. Army Retired List, Late Professor of Diseases of the Mind and Nervous System in the College of Physicians and Surgeons, New York, &c. With the Collaboration of GRÆME M. HAMMOND, M.D., Professor of Diseases of the Mind and Nervous System in the New York Post-Graduate Medical School and Hospital, &c. With one hundred and eighteen illustrations. Ninth edition, with corrections and additions. New York, D. Appleton & Co.; Montreal, W. Foster Brown & Co. 1891.

The ninth edition of this well-known work has been thoroughly

revised and brought up to our present knowledge of this intricate and extensive subject. Dr. Hammond's work has always enjoyed a popularity not only on this continent, but also on the continent of Europe, as is evidenced by its translation into the French, Italian and Spanish languages. From the care bestowed by the learned author, with the assistance of his son, on the present edition, there is no doubt but what it will be as cordially welcomed as its predecessors have been. The work is profusely and well illustrated, and reflects credit on the well known publishers.

**The Medical Annual and Practitioner's Index : A Work of Reference for Medical Practitioners. Editor : Percy Wilde, M.D. 1891. Ninth year. Bristol : John Wright & Co. ; Toronto : J. A. Carveth & Co.**

This excellent manual differs mainly from the Year Books of Treatment in containing, in addition to an account of the progress of medical and surgical science during the past year, several valuable monographs on different subjects. Among the latter may be found an admirable article on "The Position of the Hand in Nervous Diseases," by Dr. Long Fox of Bristol. It is illustrated with several well executed colored drawings. Another article of merit is one on "The character of the Sputum as an Aid to Diagnosis," by Dr. Wethered of London. The "Motor Centres of the Brain," also well illustrated, presents, in a short-space, a very complete report of most of the recently acquired knowledge of the anatomy and physiology of the cerebral motor cortex. An article of particular value is one on "The Diagnosis of Gastric Neurasthenia," prepared by Dr. Dujardin-Beaumetz of Paris.

As showing the value of the work as a book of reference for the medical practitioner, the index of the volume contains nearly three thousand references to diseases and remedies.

**Twenty-first Annual Report of the State Board of Health of Massachusetts. Boston : Wright & Potter Printing Co., State Printers. 1890.**

Though the reading of blue-books is not usually regarded as

very entertaining, yet we always look forward to the Annual Report of the Massachusetts State Board of Health. The issue of this year is in no way inferior to any of its predecessors, and a perusal of it will convince the reader that substantial progress in sanitation has been made. The reports which form the volume are all of a very high order of merit, and deal with the subjects of Water Supply and Sewerage, Food and Drug Inspection, Pollution of Ice Supplies, Summary of the Weekly Mortality Reports, Intermittent Fever in Massachusetts, the Physique of Women in Massachusetts, the Influenza Epidemic of 1889-90, the Health of Cities and Towns. In the space at our disposal we can do no more than merely call attention to the more instructive of these papers.

There is an evident diminution in the frequency of adulteration of food and drugs, and when we compare this report with its predecessors it is plain that the world has become a little more honest, at least a little less dangerously dishonest than formerly. We are still prepared to hear that maple syrup is usually not maple syrup but glucose, and that the result of the labours of the little busy bee is to produce, not honey, but grape sugar; but these, though fraudulent, are not dangerous. Seemingly the only dangerous impurity detected in articles of food was lead, which was present in preparations sold as "lemonade" and "sarsaparilla," and contained in bottles provided with patent stoppers composed of metallic lead, which, being in constant contact with the acid liquids, was readily acted upon by the latter, which were thereby converted from harmless drinks into subtle poisons. Our Montreal experience with soda water is somewhat similar.

Dr. C. H. Cook's report on Intermittent Fever in Massachusetts tends to show that gradually ague as an indigenous disease is becoming common in the State, but he contents himself with the storage of deserved facts, leaving time to prove whether the disease is on the increase. Very interesting maps accompany this essay.

The influenza epidemic of 1889-90 has been thoroughly investigated, the report comprising the results of observations by about

400 persons. In Massachusetts the epidemic did not cease in the first three months. For several months afterwards deaths were frequently recorded, which must be attributed to illness contracted during the epidemic period.

The diagrams, maps, etc., accompanying the report are admirably executed.

Transactions of the Medical Society of the State of Pennsylvania at its Fortieth Annual Session, held at Pittsburg, 1889-90. Vol. XXI. Published by the Society. Philadelphia: Wm. J. Dornan. 1890.

The twenty-first volume of the Medical Society of the State of Pennsylvania is more than usually interesting. The addresses on *Medicine, Hygiene, Surgery, Obstetrics and Mental Disorders* are all prepared with great care, and touch upon subjects of practical interest in these various departments. Dr. Tyson of Philadelphia has a paper on "The Management of Obstinate Dropsies" of particular interest. He gives a record of three cases where the employment of skim-milk and sparteine in two and caffeine in the third brought about a marked and decided relief. There are a number of other papers, which will well repay perusal.

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#### BOOKS, PAMPHLETS, &c., RECEIVED.

The International Medical Annual and Practitioner's Index: A Work of Reference for Medical Practitioners. 1891. New York: E. B. Treat, 5 Cooper Union.

A Compend of Equine Anatomy and Physiology, by William R. Ballou, M.D., Professor of Equine Anatomy, New York College of Veterinary Surgeons. With twenty-nine graphic illustrations, selected from Chauveau's "Comparative Anatomy." Philadelphia, P. Blakiston, Son & Co.

Essentials of the Practice of Pharmacy. Arranged in the Form of Questions and Answers, Prepared especially for Pharmaceutical Students, by Lucius E. Sayre, Ph.G., Professor of Pharmacy and Materia Medica, of the School of Pharmacy of the University of Kansas. Philadelphia, W. B. Saunders, 913 Walnut street.

Origin, Purpose, and Destiny of Man, or Philosophy of the Three Ethers, by William Thornton, Boston. Published by the Author. 1891.

Early Diagnosis of Some Serious Diseases of the Nervous System : Its Importance and Feasibility, by E. C. Seguin, M.D. (Reprinted from the Boston Medical and Surgical Journal of December 25th, 1890, and Feb. 5th, 19th and 26th, 1891.) Boston, Damrell & Upham. 1891.

A Study of the Anæsthesias of Hysteria, by Charles L. Dana, M.D., Professor of Diseases of the Nervous System in New York Post-Graduate School. From the American Journal of the Medical Sciences, October, 1890.

Morvan's Disease ; with the Clinical Report of a Case, by Archibald Church, M.D., Professor of Neurology in the Chicago Polyclinic. (Reprinted from the Journal of the American Medical Association, March 7, 1891.)

How Should Girls be Educated? A Public Health Problem for Mothers, Educators and Physicians, by William Warren Potter, M.D., of Buffalo, The Anniversary Address of the President delivered at the Eighty-fifth Annual Meeting of the Medical Society of the State of New York. (Reprint from Transactions, 1891.)

The Thermometer in Obstetrics and Gynæcology, by A. D. Leith Napier, M.D., F.R.S., Physician-Accoucher, St. Pancras and Northern Dispensary. London, H. K. Lewis. 1890.

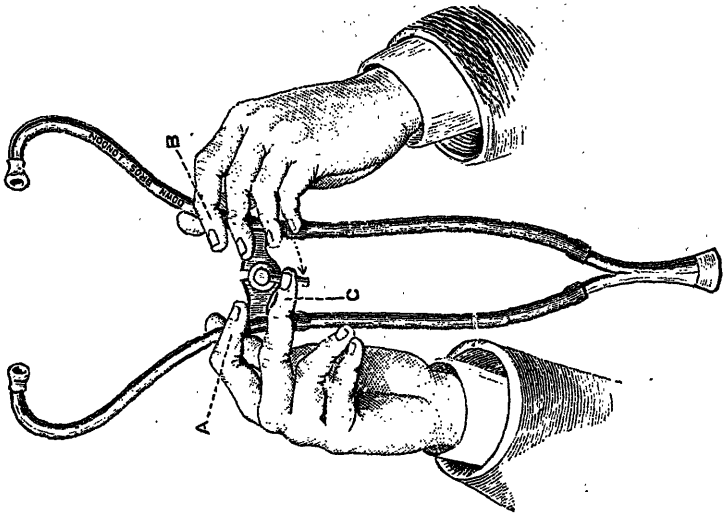
On the Use of the Oil of Eucalyptus Globulus, combined with other Antiseptics, in the Treatment of Scarlet Fever and all Infectious Diseases, by Brendon Curgenvven, M.R.C.S., formerly House-Surgeon to the Royal Free Hospital. London, H. K. Lewis. 1891.

A Case of Non-Alcoholic Cirrhosis of the Liver, by D'Arcy Power, M.B. (Reprinted from the Transactions of the Pathological Society of London.)

The Franklinic Interrupted Current, or My New System of Therapeutic Administration of Static Electricity, by Wm. Jas. Morton, M.D., of New York. Reprinted from the Medical Record, Jan. 24, 1891.



## NEW INVENTIONS.



The illustration shows an improvement in the binaural stethoscopes generally in use, suggested by Dr. George Herschell of West St. Finsbury Circus, and patented by Messrs. Down Bros. of St. Thomas's St., London, S.E. The objection to the ordinary forms is that whether the spring which holds the two arms in position and presses the ear-pieces into the meati is formed of elastic or of steel, it is frequently found either too weak to be of service, or too strong to be borne with comfort, and in fact is not adaptable to the different widths of head of the various users. The new stethoscope having been comfortably placed in position can be instantly fixed by a slight movement of the finger. This moves the lever and locks the joint, which will remain fixed until it is desired to remove the stethoscope; it will not then be found necessary to again touch the lever, but the upper part of the arms are seized in the usual way, the stethoscope removed, and then closed together for placing in the pocket.

A minor improvement in this stethoscope, also suggested by Dr. Herschell, consists of enlarging the orifices in the ivory ear-pieces, so that the bore of the instrument may remain in continuity with the axis of the auditory meatus during the rotatory movement round the said axis made in altering the position of the stethoscope.

## Society Proceedings.

### GYNÆCOLOGICAL AND OBSTETRICAL SOCIETY OF BALTIMORE.

#### *March Meeting.*

THE PRESIDENT, DR. HENRY M. WILSON, IN THE CHAIR.

DR. HOWARD A. KELLY read a paper upon the technique of the Cæsarian section, described in a series of steps, from the selection of the case down to the after treatment. The relative and absolute indication were described. The Porro operation was rejected excepting under special peculiar circumstances; for example, when there was good reason to suspect septic infection, as after prolonged efforts at delivery, at turning, or the use of the forceps, also in cases of large tumors occupying the body of the uterus, or in some cases of cancer, or in uncontrollable hemorrhage from the placental site. Thus limited, the conservative operation and the Porro operation are mutually exclusive, not occupying the same field. It is a serious surgical error to mutilate a woman by performing the Porro operation where special indications do not exist. The mortality of the Porro operation is fully as great, and probably greater, than that of the conservative. In a healthy case, free from sepsis, with unruptured membrane, it is not necessary to deliver the uterus from the abdomen before incising it and delivering the child. It is rarely necessary to use any constricting ligature around the cervical end of the uterus. Excessive hemorrhage from the placental site or the margin of the wound can very well be temporarily controlled by constricting the cervix with the hands of an assistant. The uterine suture consists of deep sutures, embracing the peritoneum and muscularia, but not the decidua. About ten such sutures are needed. Between each of these deep sutures half deep sutures can be passed, securing perfect coaptation of the peritoneal surfaces. The sero-serus sutures are not necessary in cases free from any suspicion of infection. In such clean cases, the uterus is dropped back into the abdomen and covered with the omentum. If there exists a slight suspicion,

it is of advantage to draw the omentum down behind the uterus, thus favoring the discharge of any septic material through the lower angle of the wound. Drainage of the pelvic cavity cannot be efficiently carried out. The abdominal wound must be concealed by a dressing made of snowy cotton dissolved in alcohol and ether, containing one part bichloride to 16,000. A little strip of gauze saturated with this solution is laid over the wound. This adheres until it is time to take the sutures out, concealing the wound, and preventing contamination from the outside much better than many layers of gauze and cotton. The baby should be allowed to nurse as soon as the mother has thoroughly recovered from the anæsthetic. The vagina should not be douched out as a matter of routine. The vaginal outlet should be secured from the introduction of sepsis from without by separating the labia and throwing into the vulvar orifice a drachm of powdered iodoform and boric acid (1 to 7). A cotton pad loosely applied to the vulvus should be changed as often as soiled by the discharges. The patient thus passes through a perfectly normal puerperium.

DR. CHAS. P. NOBLE—In the technique of the operation laid down by Dr. Kelly, reference has been made to typical cases. In such cases I agree entirely with what he has said. But all cases are not typical. I will report an unique case upon which I did the Cæsarian section recently. Dr. Kelly had operated in a previous pregnancy. As a result of the first operation there remained a fistular opening from the uterine cavity through the abdominal wall. Notwithstanding this fistula she became pregnant, and for several weeks the amniotic bag protruded into the opening, so that there was nothing between the foetus and the outer world but the thin amniotic sac. This sac ruptured at the thirty-third week. The woman had a generally contracted pelvis, besides having a large mass of fibrous tissue behind the cervix, left from her previous Cæsarian labor. Had spontaneous labor been possible, the foetus would have escaped through the fistula and not per vaginam. In view of the conditions, I thought Cæsarian section preferable to delivering the mutilated foetus *per vias naturales*. The finger was inserted into the uterus

through the fistula, and with this as a guide the incision was made through the region of utero-abdominal. Sufficient room not being afforded for delivery, the peritoneal cavity was opened and the uterine incision lengthened. The living foetus was then delivered. The placenta and membranes were firmly adherent, and were slowly peeled off. To control bleeding during this time it was necessary to insert the uterus through the abdominal incision to enable the assistant to grasp the lower segment. The patient passed through a perfectly normal puerperium, and is now quite well and soundly healed. This case is entirely unique in its conditions and in the technique of the operation. Three cases of Cæsarian section have been observed by me, all having made good recoveries. When the operation is done at the proper time, and after the method described by Dr. Kelly, I am sure this result will be quite uniform. The essentials of success are :

1. Operation at the proper time, before labor or at the beginning of labor.
2. Rapidity in operating.
3. Accurate suturing.
4. Asepsis.

With reference to suturing, I believe that the Lembert suture as ordinarily described is purely theoretical. The peritoneum will not hold a suture. Operators have unconsciously included the deeper tissues in the so-called Lembert suture. An important point not generally recognized in this country is, that the diagnosis should be made in the last weeks of pregnancy, and under ordinary circumstances the operation be decided upon and done at the close of pregnancy, before labor sets in or immediately thereafter. I would not do the modern Cæsarian section in a case which had been tampered with by efforts to deliver with the forceps or by version ; but in such cases would prefer the operation. In Philadelphia in the last four years twelve Cæsarian sections have been done, and ten mothers have recovered. One that died had pneumonia at the time of the operation. The other case was one in which the surgeon at the same time removed a fibroid tumor.

DR. B. B. BROWNE—I think all the procedures recommended are in the main correct, and are in accordance with the rules and suggestions laid down five or six years ago by Garrigues, Sänger and Leopold ; these should be carried out in ideal cases,

but, unfortunately, we meet with many complications which must be dealt with as they occur. Having recently performed the operation myself, and looked up the literature and technique of the subject, I was surprised to find that we can to-day make but little improvement or change for the better. In 1886 Sanger had operated four times, saving all the women and children. Dr. Leopold had operated nine times and lost one woman, saving all the children.

DR. T. A. ASHBY—I wish to congratulate Dr. Kelly on his brilliant success with the Cæsarian section. This success is convincing proof of what can be done when the section is instituted under proper conditions and at a proper time. The future of the operation rests upon a proper and judicious selection of the case, and upon an immediate resort to the section before other methods of delivery have been attempted and abandoned. I doubt whether the Cæsarian section under such conditions will give a higher mortality than the ovariectomy of ten or fifteen years ago. The technique of the section is simple enough, and certainly its mechanical execution is not as difficult as that necessitated in the removal of many conditions of tubal and ovarian disease. Hemorrhage is not large and it is easily controlled. Septic processes should not follow if strict aseptic precautions are observed. The progress of the section as a substitute for other methods of delivery rests upon an early and clear recognition of the pelvic measurements and a prompt acceptance of this method as the proper procedure in the given case. When this is done, the success of the section is not compromised by unfortunate interference in other directions. When we have obtained the statistics of this class of cases, we are in a position to compare the mortality of the section with other operative methods.

DR. N. P. CHUNN—I did not hear the first part of the history of the case, but I think I would have removed the ovaries or tied the Fallopian tubes to prevent future conception. It is hard to say just what operation should be done.

DR. NOBLE—In doing a Cæsarian section, I would not touch the ovaries and tubes as Dr. Chunn speaks of doing, but would

do nothing to prolong the operation. Tying of the tubes would probably cause salpingitis. This objection is purely theoretical. So far as I know, this has been done only twice—once in England and once in America.

DR. BRINTON—I have been for some years interested in measuring the pelves of women. Very often we go to labor cases without knowing anything about the condition of the pelvis. With the hospital surgeon who has the best facilities, the Cæsarian operation will undoubtedly be the best in cases of extreme pelvic contraction. But with the average practitioner what is best? I think that with these physicians craniotomy will hold the place. In speaking of craniotomy “holding its place,” I refer to those cases of pelvic contraction where the child could be extracted without harm to the mother, say from  $1\frac{3}{4}$  to 3 inches.

DR. T. A. ASHBY—I must offer an apology for presenting a series of experiences which are familiar to all who have done much intra-abdominal work. I have brought these charred remnants of tubal and ovarian inflammation before the Society to invite discussion, not to exhibit anything original. They present nearly every phase of intra-pelvic inflammations, and illustrate the various degenerative conditions which are found in the pelvis after an inflammatory fire has passed over these tissues. Of the nine specimens here presented, removed from the same number of cases, no two are alike. In one case the tube has received the brunt of the attack; in another the ovary is involved in abscess cavities, whilst in a third both tube and ovary are tied up in a knot by adhesive inflammation, and so on through the series. The clinical histories of these cases would be exceedingly interesting did time admit of a recital, but I shall not tax your patience with details. We have the same old story in all of these cases save two—one, the large specimen of a tubal sac of uncertain origin, probably an interrupted tubal pregnancy of long standing; and the other the remnants of a catarrhal salpingitis and ovaritis with intra-pelvic adhesions. Of the other seven specimens the origin of the condition is of chief interest in this connection, since they explain to my mind the essential factor in the production of the specimen here presented. Each

of these women have borne one or more children ; in each case the history of the intra-pelvic trouble dates from the last lying-in period, which was accompanied with mild or severe symptoms of child-bed fever. In each of these women there was an old lacerated cervix, in some more pronounced than in others. The histories of these cases, as far as they can be made out and can be interpreted, tell the simple story. During labor a cervical tear occurred ; in this wound septic material gained a lodgment ; a septic process was established, which extended from the cervix to the cavity, from the cavity to the tubes, and from the tubes to the intra-pelvic peritoneum. The severity of the symptoms in each case must have bore some relation to the septic process and to the tissues involved, though no way is offered for verifying this statement. We simply find the results in general destruction of the tube or ovary, or of both, and the inference is that drainage was secured and pus escaped, leaving no remnants of this character behind, except in two of the specimens, in which I found pus cavities in the ovary containing each a drachm or more of pus. These cases illustrate the fearful havoc which a septic process following parturition may occasion among the pelvic organs. " A little fire kindleth a mighty conflagration " is literally true in more respects than one. In an experience with other cases I have observed this septic process in its very beginning when limited to the cervix and cavity, and I have seen the lying-in woman's temperature fall from 103° to normal within twelve hours after thoroughly cleansing and disinfection of the cervix and cavity in these cases, and a complete arrest of the process before the tubes were involved. In another case I have seen tubal and general pelvic-peritonitis in active force following immediately the infection in the cervix and cavity. This experience convinces me, despite all other theoretical teachings, that we have in the lying-in state an explanation of those intra-pelvic diseases which render the lives of so many women useless and oftentimes utterly miserable. Now is it necessary that the lying-in period should be surrounded with extra-hazard, high temperature, and severe pain. A septic endometritis following parturition may run a very mild and low grade course,

and still result in subinvolution, salpingitis, pelvic adhesions, and other intro-pelvic conditions which impair the normal function of these organs. The lesson clearly taught by such experience is that aseptic conditions should be enforced in every case of labor, that the least suspicion of sepsis should lead to immediate investigation of the uterine cervix and cavity with a view to thorough cleaning and arrest of the septic process. If this be done, as I have done it in a number of cases seen with medical friends in consultation, we can cut short a sepsis and arrest a condition which will surely extend to the tubes and pelvic peritoneum in the absence of prompt attention.

DR. B. B. BROWN—The fact that laceration of the cervix is so frequently found in married women suffering from tubal disease is, I think, because the purulent discharge from the uterus passing over the torn surfaces prevents their union, while the septic material also extends to the tubes; when there is no septic material in the uterus the lacerated surfaces readily unite and the tubes are not affected.

DR. J. WHITRIDGE WILLIAMS—The specimens exhibited represent a class of cases that are very common, and which will become more so as we become more expert in bimanual examination. Indeed, to a skilful palpator, it almost seems that the majority of women examined have, more or less, tubal or ovarian disease. The specimens are particularly interesting to me, because I have studied carefully the pathology of a large number of similar cases. The etiology in many cases is doubtful, but most observers appear to cling to Noegerath's theory of latent gonorrhœa. Examination of the pus in cases of pyosalpinx brings forward most interesting facts. For in most cases it is impossible to discover any species of bacteria either under the microscope or by culture methods, which shows that the bacteria which caused the trouble have long since died, for closed pus cavities are not particularly favorable for the growth of organisms. In two cases we found undoubted gonococci, and in a case following an imperfect abortion the streptococcus, and in another case the staphylococcus aureus. Clinically, the cases due to the pus organisms are much more acute and virulent than those due to



the gonococcus. These results correspond with those of Zwerfel of Leipzig, who has just published his observations. He also found the gono- and streptococcus, but not the staphylococcus. In one of his streptococcus cases the subject was an undoubted virgin, and he accounted for the infection by an abscess following an attack of typhoid fever some years before. Dr. Ashby speaks of the relation of lacerated cervix to salpingitis, etc. I cannot consider it a factor in the production of the disease, and regard it merely as a coincidence. If it were a potent factor in producing the trouble we should find salpingitis and pelvic adhesions far more frequently than we do now; for we must remember that in most women there is more or less laceration of the cervix during labor. Moreover, this cause is certainly inapplicable to the frequent cases occurring in multiparous women, and especially in virgins. A close study of the clinical history of a number of cases inclines me to believe that the majority of cases follow infection during labor or after an incomplete abortion; for in many cases it is impossible to obtain even a history of leucorrhœa before the labor, which would apparently exclude gonorrhœal infection. By infection during child-birth I do not necessarily mean the cases in which we have well-marked puerperal fever, but the milder degrees of infection as well; for most of the cases of so-called milk-fever are due to infection and may give rise to serious results. Zwerfel, on the contrary, who has just published a remarkable series of 79 salpingo-oöphorectomies, with only one death, believes in the gonorrhœal origin of most cases. Säger traces most of the cases in virgins back to a gonorrhœal salpingitis during childhood, which has persisted and ultimately affected the Fallopian tubes. While I do not feel justified in subscribing to this view, I can say that it is quite probable. For lately I have seen a number of cases of undoubted gonorrhœa in little girls of from two to seven years of age in which there was no suspicion of criminal action. In eight cases of vaginitis in little girls which I have examined, I found gonococci in six of them. In several, the mode of infection was quite clear. In one case the husband acknowledged an attack of gonorrhœa with which he infected his wife during her pregnancy,

and each of the children born after it had ophthalmic neonatorum, followed, when they were older, by gonorrhœal vaginitis. In another case, an older brother had gonorrhœa and his two little sisters used his towels for bathing. These remarks will show that the vaginitis of little children is not of strumous origin, as generally supposed, and that it demands a more active treatment than is generally employed; especially when we consider its possible consequences.

DR. BRINTON—I can corroborate the views of Dr. Williams in regard to the specific origin of the cases of vaginitis in children. Having recently treated first the father with gonorrhœa, later the mother, and within a fortnight from the time the father consulted me was called to see the little daughter, aged four, with a severe "vaginitis," which yielded to the usual treatment in about the usual time. My experience has been that if a child is found with a "vaginitis," close investigation will prove that some older member of the family has either a "urethral" or "vaginal" discharge.

DR. NOBLE—Dr. Ashby has brought up so many points that it is difficult to know just what to take up. It is now the fashion to call all unilateral collections of blood extrauterine pregnancies. But I have recently had a case that proved not to be a pregnancy. With reference to the uterine hemorrhage coming from the tubes, we do know as a fact that it is possible for blood to come from the tubes. This was common to all in the days when the stump was treated by the extra-peritoneal method in doing ovariectomy. I am quite sure that gonorrhœa has been the cause of most of the cases of pyosalpinx that I have seen; and I think that the cause of salpingitis in young women is often from a simple infection. Many cases of dysmenorrhœa in young women are due to salpingitis. In such cases it is unnecessary to question their chastity. I agree with all the speakers in reference to the relation of lacerated cervix to salpingitis. Where there is a laceration there is frequently an endometritis, and there is no reason to think that it may not follow out into the tube. I believe firmly in the great value of the drainage tube; and use it in almost every case. When properly cared for it is practically

free from objection, while being of most positive advantage in allowing the escape of serum and blood.

DR. H. P. C. WILSON—I did an exploratory laparotomy for a fibro-cystic tumor. In manipulation I found great tendency to bleeding, and as I could not get at the ovaries nor remove the tumor without causing death, I closed the abdomen. She got on well for fourteen hours, when she became very feeble, heart and respiration very weak. She was put upon digitalis and muriate of quinine and urea, but it did no good. The heart became so weak that the pulse could not be felt. I then began with five minims of tincture of strophanthus every three hours, and ether  $\text{m} \text{xx}$  hypodermically every three hours. The pulse became stronger (125 to the minute), and she felt better. The next day she became unconscious, pupils dilated, face flushed, pulse 120, temperature normal. The medicine was withdrawn, but she remained in this condition about twenty-four hours. To-day she is better, consciousness returning, pupils contracting. I have had no experience with the poisonous effects of strophanthus.

## MEDICO-CHIRURGICAL SOCIETY OF MONTREAL.

*Stated Meeting, April, 3rd, 1891.*

F. J. SHEPHERD, M.D., PRESIDENT, IN THE CHAIR.

DR. LAPHORN SMITH exhibited the following pathological specimens:—

1. *Small Cystic Ovary*.—The patient had been a sufferer for many years with pain in the left side and severe palpitation. Dr. Smith had tried every form of treatment without being able to give her any relief. He then concluded to operate. The appendages were removed, with the result of immediate improvement of her symptoms—the pain disappeared, and she was free from attacks of palpitation.

2. *Double Pyosalpinx*.—This patient was aged 33, married twelve years, and the mother of one full-grown child eleven years ago. Her labor had been difficult, and she had been in bad health ever since. She had recurring attacks of pelvic peri-

tonitis yearly for the past ten years. For the last two years her menstruation had been profuse. On examination, the ovaries and tubes were felt bound down in Douglas' cul-de-sac, and were excessively tender. Removal of the appendages had been advised, and the operation was performed by Dr. Smith, assisted by Dr. Armstrong. The tubes, which were exhibited, were enormously distended with pus. Up to the present time the patient was doing favorably. Dwelling upon the causation, Dr. Smith mentioned the probability of a septic metritis and salpingitis following her confinement eleven years ago. The recurring attacks of pelvic peritonitis could be attributed to the oozing out into the pelvic peritoneum of the pent-up pus in the over-distended tubes.

DR. SHEPHERD exhibited the following

ANATOMICAL VARIATIONS.

1. *The left fore-foot of a pig with six toes.*—The reproduction of the thumb was interesting, for the trapezium, which in the pig's foot is in a rudimentary condition, was here developed to its full size. In both the accessory toes there were three phalanges, thus differing from the ordinary first digit of the five-toed mammals with only two phalanges.

2. *An unciform bone* with the unciform process separate and evidently having an origin from a distinct centre, as there were no evidences of fracture.

3. *An Indian skull* with a well-developed supra-occipital or rather inter-parietal bone, as is seen in many lower animals. The portion of bone above the superior curved line was separated from the rest by a suture running across from one lateral angle to the other.

*New Methods in the Treatment of Granular Ophthalmia.*—

DR. F. BULLER followed with a paper of considerable interest on the above subject. (This paper appeared in the May number of this JOURNAL.)

*Discussion.*—DR. FOUCHER considered Dr. Buller's paper of interest to all, as it related to one of the severest diseases connected with the eye commonly met with. Before such remedies mentioned by Dr. Buller were adopted, cases presenting them-

selves for treatment in our hospitals increased in numbers owing to the inefficient methods then at the disposal of the specialist. The susceptibility of some individuals to trachoma more than others was difficult to explain. He had frequently noticed granular lids in patients with atrophic rhinitis. Was there any connection between these two diseases which somewhat resembled one another pathologically? Did tuberculosis predispose to granular ophthalmia? In the treatment he considered jequirity of great value, as well as corrosive sublimate, in suitable cases.

DR. PROUDFOOT had discontinued the use of inoculating with pus cases of granular ophthalmia since the introduction of jequirity. He has been in the habit of using the freshly powdered bean. If within forty-eight hours there was no inflammation, he washed out the sac. He had also employed caustic potash with great care, neutralizing the effect with a weak solution of vinegar. He found corrosive sublimate in the strength of 1 to 5000 beneficial when used frequently.

DR. SHEPHERD asked if sulphur had been tried in those cases where corrosive sublimate failed. It was known to act well in diseases of the skin.

DR. BULLER, in his reply, remarked that he saw no analogy between tuberculosis and trachoma. That trachoma was due to a specific diplococcus, cultures of which had been found to produce the disease. He was not aware that sulphur had been used in these cases. He considered scarification very valuable in recent cases with much swelling.

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*Stated Meeting, April 17th, 1891.*

F. J. SHEPHERD, M.D., PRESIDENT IN THE CHAIR.

*Chronic Ovaritis in Cases with unusual Nervous Symptoms.*

—DR. ALLOWAY showed specimens from three cases of chronic ovaritis. The ovaries and tubes exhibited were removed for the relief of unusual nervous symptoms. The first case was 30 years of age; three full-term children; menstruation had been very irregular. A year previous she had a trachelorrhaphy performed for laceration of the cervix, which improved her in general health

for some months ; but the following nervous symptoms remained and continued to become exaggerated : constant headache, vertigo, exaggerated hysterical symptoms, chiefly in the form of a feeling of irresponsibility for her acts, great cardiac excitability, insomnia, and pelvic pain. Since the removal of the appendages these symptoms have disappeared, and the patient has assumed altogether a different condition.

The next specimen exhibited by Dr. Alloway was the appendages removed from a lady 40 years of age. She had been married twenty-one years. Four full-term children ; youngest 14 years of age. Menstruation had been very irregular, severe pelvic pain, constant vomiting, which seemed to be of a reflex character and unaccompanied by nausea, constant headache, hysterical attacks were very violent, requiring severe measures to suppress them, and were followed by these attacks of vomiting before mentioned. This patient had been under every possible treatment for years without relief. At the operation, the ovaries and tubes of both sides were firmly adherent to the pelvic wall, and were with much difficulty separated on account of the age of the adhesions. This patient has not had a single attack of vomiting since the operation, and in other respects is thoroughly restored to health.

The third specimen exhibited by Dr. Alloway was the appendages from a patient of 29 years of age, unmarried. Her principal symptoms consisted in an inability to digest ordinary food for the past two years, the smallest quantity causing intense gastralgia, followed by painful and loud eructations of gas and enormous distension of the large and small intestines, giving appearance to the so-called phantom tumor. This tumor would gradually disappear towards evening, to reappear again the following morning accompanied by very loud borborygmus. This patient had had every possible form of treatment, including the washing out of her stomach ; had lived on milk diet for months at a time without any benefit. The appendages were removed and found extremely small and cirrhotic ; they were formed of unruptured cysts and fibrous tissue. Since the operation this patient has had no distension of the abdomen nor dyspeptic

attacks. She takes ordinary food without any inconvenience, and has no hysterical symptoms whatsoever.

Dr. Alloway said that he exhibited these specimens to show that hysterical symptoms accompanied by reflex phenomena relating to disease of other organs were really due to organic disease of the sexual organs; and that chronic ovaritis, due to past attacks of scarlet fever or smallpox, was invariably found on operation. This variety of disease was called by Tait exanthematic ovaritis, and was more prevalent than the profession generally suspected.

*Uterine Fibroid Removed by Abdominal Hysterectomy.*—DR. LAPHORN SMITH showed this specimen, which was about the size of the head of a new-born child. He said that he had performed this operation with great reluctance and only at the urgent solicitation of the patient and her friends. She was 35 years old, and had always had regular menstruation, but four years ago she had begun to flow profusely, and her periods became extended to fourteen days, gradually growing more and more profuse until she had to be tamponed and confined to bed. About two years ago she had ten applications of electricity in Minneapolis, according to Apostoli's method, but owing to her intolerance of it and the impossibility of introducing the platinum sound through the several sharp curves of the uterine canal she only received very small intensities, and the benefit was in proportion. She was, however, so much improved (losing about half as much blood and for about half the length of time that she did previously), that she returned to her arduous duties as principal of a school. After a winter's work she began to suffer again from dysmenorrhœa and menorrhagia, and when she placed herself under his care last fall she was losing for fourteen days every month. He was unable to introduce a platinum sound, and was obliged to invent an instrument for her case—namely, a soft elastic bougie covered with aluminium wire—which he was able to introduce a distance of  $4\frac{1}{2}$  inches, and by means of which he was able to go as high as 100 mm. She improved so much after fifty applications that the flow was only profuse for two days, and was over in five or six. She then went down to New

Brunswick on a visit, where the periods continued to be less and less, and when she returned to Montreal a week ago she appeared in perfect health. Although all the cases which have improved under Apostoli's treatment had maintained their improvement, some after several years, yet Dr. Smith, on being asked, could not promise his patient that this would be the case with her. He advised her to return home, and if her improvement should not prove to be permanent, to return for operation next summer. The patient, dreading a return, requested that an operation should be performed immediately. Dr. Smith informed her that the only operation which would guarantee her against a return of the bleeding was a radical one—namely, the removal of the tumor with the uterus and its appendages, which he considered very little more dangerous than the removal of the appendages alone. Five days ago, with the assistance of Dr. Armstrong and of Dr. Spendlove (who gave the anæsthetic), he performed abdominal hysterectomy, removing the whole of the tumor and all of the uterus and appendages except a piece of the cervix, which was left for a stump. In order to lift the tumor out of the very small opening which he purposely made, he screwed into it a silver-plated cork-screw, which enabled Dr. Armstrong to lift it out without any effort. So far the temperature has not reached 100°, the only *contre-temps* being the oozing of about eight ounces of blood from the stump owing to the *serre-nœud* having gone to the end of its tether, so that he was obliged to place another *serre-nœud* around the first, which arrested the oozing. The stump came away on the fourteenth day, and there was every prospect of her making a good recovery.

DR. ARMSTRONG, dwelling upon reflex symptoms mentioned in Dr. Alloway's cases, considered that removal of the distal cause, when practicable, would necessarily tend to alleviation of the symptoms. Referring to hysterectomy, he questioned the propriety of submitting a woman to hysterectomy in cases where removal of the appendages would give relief. In the former the mortality was high, whereas in the latter the death-rate was low.

DR. MILLS said that the sexual organs played a great part in



reflex symptoms. The removal of the ovaries or testicles in an animal arrested its development. The moral, mental and even the physical life changed. In man these changes were not so marked, yet we had sufficient evidence to show that a centre could be, as it were, thrown out of balance by over-stimulation of an afferent nerve, whereby the physical life became disorganized. He hoped that gynecologists and obstetricians would be able to trace out the paths of these disturbances.

DR. ALLOWAY thought that the appendages in Dr. Smith's case might have been removed for a tumor of the size mentioned. He was of the same opinion as Tait in not performing hysterectomy when the appendages could be removed, which could be done in the majority of cases.

*Necrosis of the Bladder.*—DR. F. A. L. LOCKHART followed with a paper on this subject, which will appear in the next number of this JOURNAL.

DR. JOHNSTON had been interested in reading an article on the above subject from Dr. Haultain of Edinburgh. He was not inclined to consider this a special form of necrosis of the bladder in contradistinction to other diseases of the bladder, such as diphtheria and cystitis, which are also a kind of necrosis.

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*Stated Meeting, May 1st, 1891.*

F. J. SHEPHERD, M.D., PRESIDENT, IN THE CHAIR.

Dr. G. G. Campbell was elected a member of the Society.

*Multiple Epithelioma of Oesophagus and Stomach.*—DR. JOHNSTON exhibited this specimen, which had been obtained at the autopsy from a patient who had recently died in the hospital. It was a very unusual condition. Two epitheliomata were found high up in the oesophagus, whilst within the stomach, close to the oesophageal opening, was another tumor. The liver contained two large tumor masses and two smaller ones; the former were broken down in the centre. They differed in their microscopical appearances from those found in the oesophagus and stomach. The cells were not arranged in nests, but in alveoli. It was very difficult to say which was the primary tumor. But few of these cases had been reported.

*Brain Tumor.*—DR. JOHNSTON showed this specimen for Dr. Stewart. The growth was situated at the base of the brain, and occupied the position of the pituitary body, involving the optic nerves and optic commissure. The lateral ventricles were considerably distended, and covered with minute granulations produced by a thickening of the lining membrane from chronic distension. The tumor extended into the third ventricle. There were considerable areas of necrosis and fatty degeneration. From the microscopical appearances, the growth was pronounced a teratoid tumor, not uncommon in that region.

DR. JAMES STEWART remarked that the patient, whom he had seen, had been admitted to the hospital under Dr. Buller. He complained of failing vision, severe headaches, vertigo, and vomiting. There was double optic neuritis, which went on to complete blindness. He had ptosis of the right lid, and the head inclined to the right side. There was no history of syphilis. The symptoms were those of a gross lesion in the brain. Nothing pointed to the localization or nature of the tumor.

*Cardiac Thrombus in a Case of Pneumonia.*—DR. FINLEY related that the patient from whom this specimen had been obtained was a man, 46 years of age, who, in 1889, had had a pleurisy which had lasted six weeks. On the 7th February of this year the patient was taken ill with pneumonia. The fever disappeared on the tenth day, and he was apparently progressing favorably. A week later the patient was seized with a malarial-like attack. The chills were of a marked intermittent type, recurring at intervals of twenty-five hours. He had never had malaria, and had not lived in a malarial district. Dr. Finley was at a loss to explain their cause. The patient died from heart failure on 23rd March. At the post-mortem examination the right pleura was found greatly thickened. There was a localized pleurisy, with some effusion at the base of the right lung; the lung itself was in a condition of resolving pneumonia. Fraenkel's micrococcus of pneumonia was found. The examination of the heart was interesting from the presence of a large thrombus in the right side of the heart, which projected upward into the auricle; the valves beneath were perfectly healthy. Sections of the thrombus were made, but no bacteria were found.

DR. GEO. ROSS remarked that he had seen the patient on two occasions. At his first visit he had found him in one of those rigors mentioned by Dr. Finley, which was very violent, and very much like the chill of ague. At his next visit the patient was apparently well, pulse quiet, and temperature normal. There were physical signs of consolidation at the base of the right lung. The appearance of the ague-like attacks at a time when the patient should be recovering from pneumonia was very perplexing. The possibility of its being accounted for by septicæmia was negated by his good condition in the intervals. Malignant or ulcerative endocarditis, which has often been mistaken for ague, could also be excluded from the absence of a heart murmur. It was difficult to offer an explanation.

*Ulcerative Endocarditis.*—DR. F. R. ENGLAND, who reported the case, remarked that the patient, a man aged 36, employed as a locomotive engineer, had been in good health until two and a half years ago, when he suffered from an attack of articular rheumatism with endocarditis, which kept him in bed for four weeks. There was at that time a soft blowing murmur transmitted down the sternum and upwards along the vessels into the neck. He recovered and remained well until the winter of 1890, when he suffered from a dry, harsh cough, which disappeared in the spring. The cough returned again last winter, and impaired his health considerably; he lost weight and complained of night sweats. The loss of a child about this time preyed heavily upon his mind. He persisted in going to his work until the 10th of March, when Dr. E. was called to see him. He complained of cough, great weakness, and pain in the left lumbar region on deep inspiration or movement. His temperature was 101°F.; pulse quickened. There were no evidences of disease in the heart or lungs. For six days of the illness the temperature ranged between 100° and 101°. The nervous prostration, the profuse sweats, together with the persistence and severity of the lumbar pain, lead Dr. England to believe that the trouble was probably rheumatic. After the tenth day of the illness a harsh, double aortic murmur developed, with visible pulsation of the head and neck and smaller arteries. A congestive bronchitis appeared, and the patient became weaker and restless. The

temperature varied between 99° and 101° ; respirations 36 to 46, and pulse from 96 to 120 throughout the disease. No palpitation, or pain over the cardiac region, was at any time complained of. There were no rigors. Rheumatic pain and tenderness developed in the right shoulder, lasting for a few days. The patient died suddenly from heart failure on the forty-fourth day of his illness. Dr. Geo. Ross, who had seen the patient in consultation ten days before death, was strongly inclined to consider the case as one of malignant endocarditis.

DR. JOHNSTON, who exhibited the specimen for Dr. England, said the heart showed extensive acute endocarditis of three segments of the aortic valves, with large vegetations upon their free edges. Besides the recent endocarditis, the valves showed signs of old chronic endocarditis. Fusion of two of the segments of the valves had occurred, which was not uncommon in ulcerative endocarditis. A perforation was noticed directly in the middle of a segment with complete destruction of valve tissue at that point. The perforation was plugged with fibrin which prevented any leakage when water was poured upon the valves. This, Dr. Johnston suggested, might explain in some cases the disappearance of a murmur. The streptococcus pyogenes was found.

DR. GEO. ROSS considered the case of clinical interest. The prostration noticeable in this malignant disease was an important point. Another point was the different phases in the temperature curve ; few diseases were so deceptive in regard to the temperature curve. Dr. England's report places another case on record where a heart already the subject of endocarditis subsequently becomes the subject of ulcerative endocarditis.

*The Bacilli of Diphtheria.*—DR. WYATT JOHNSTON exhibited cultures of the Klebs-Löffler bacilli obtained from a case of diphtheria. The bacteriological examination of the diphtheritic membrane, as recommended by Roux and Yersin, was likely to prove of great practical diagnostic value in doubtful cases, as a positive diagnosis was possible within twenty-four hours. The appearance of the bacteria and their mode of growth were quite characteristic. Portions of membrane intended for examination could be sent dry in clean glass or between folds of blotting paper or cotton. In three cases of genuine diphtheria these

characteristic bacilli were found in large numbers, while two other cases with a suspicious-looking exudation on the tonsils were free from them, and proved to be simple cases of tonsillitis. One case where a peculiar fibrinous false membrane had formed in the nose, and a case of membranous conjunctivitis, were free from the diphtheritic organisms. Dr. T. M. Prudden's experience with what seemed to be cases of genuine diphtheria, where the bacilli were uniformly absent, was unique, and not borne out by his later results. It was probable that a certain proportion of primary acute inflammations of the throat, characterized by the presence of what was anatomically diphtheritic membrane, was due simply to septic organisms, such as the streptococcus pyogenes.

*Discussion.*—DR. A. D. BLACKADER had translated (some twelve months ago) an article on this important subject from *Le Journal de L'Enfance*. He had been surprised at the results obtained by Prudden on his first investigation for the Klebs-Loeffler bacillus. It was evidently the ptomaines which produced the poisonous effects.

DR. GEO. ROSS remarked that it was of great importance in doubtful cases to arrive at just conclusions. From recent work more than one disease was shown to be characterized by the formation of membrane. In two cases which had recently come under his notice in the General Hospital, one was a young child with a suspicious-looking follicular tonsillitis which was examined for the Loeffler bacillus, but none were found; the other case was admitted for quinsy, and when first seen by him the patient had had rigors and complained of severe pain at the angle of the jaw, with difficulty of swallowing. The tonsils were considerably swollen, and a suspicious, small fibrous patch was noticed on the side of the uvula. The next day the patch had extended, and he felt quite sure that the case was one of diphtheria. Dr. Johnston took a culture from the patient's throat, which showed the Loeffler bacillus abundantly. The most extravagant views were held upon the subject of diphtheria. Dr. Jacobi looked upon all cases of tonsillitis as diphtheria. The only way that such views can be positively disproved, will be by bacteriological examination.

DR. BULLER remarked that when true diphtheria attacked the conjunctiva, the local symptoms were very severe, and always sufficiently well marked to make easy the elimination of other diseases characterized by the formation of false membrane.

DR. BIRKETT stated that a case which had come under his notice, and which had been mentioned in Dr. Johnston's report, had somewhat of a diphtheritic appearance. A yellowish, thick, pseudo-membrane was found loosely attached to the septum of the nose, which, however, could be removed without bleeding. The larynx presented a similar condition, and the tonsils were swollen. The patient eventually got well three weeks after, before the membrane disappeared from the cords. The Klebs-Loeffler bacillus was not found.

DR. WILKINS referred to the difficulty, at times, in the diagnosis of follicular tonsillitis from diphtheria, and *vice versa*. A case which he had lately seen presented all the appearances and symptoms of a follicular tonsillitis, which he would have pronounced as such but for a small suspicious patch on the side of the uvula. The case proved to be one of diphtheria.

DR. ENGLAND mentioned a case of a child whom he had seen with a temperature of 101°F., glands swollen at the angles of the jaw, and both tonsils covered with white membrane. The case looked very much like diphtheria. In three days the membrane had all disappeared and the child was better. Another child in the same family was similarly affected, but in this case a large cervical abscess formed. The mother of these children was also taken ill shortly afterwards; membrane appeared on both tonsils, temperature rose to 101°F., and she was considerably prostrated. He questioned whether these were cases of true diphtheria, and was more inclined to consider them cases of septic sore throat, as mentioned by Dr. Johnston.

THE  
Montreal Medical Journal.

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VOL. XIX.

JUNE, 1891.

No. 12.

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THE TREATMENT OF PNEUMONIA.

A recent number of *The Lancet* contains an important contribution to the treatment of pneumonia by Dr. W. S. Fenwick of London. This paper is based on an analysis of one thousand cases of pneumonia treated in the London Hospital during the decade ending 1890. In the above list no case was included that had not been twenty-four hours and upwards in the hospital before a crisis or death occurred.

Dr. Fenwick divides his cases into two great groups—the sthenic and asthenic. The sthenic cases, five hundred and two in number, were treated according to the following methods:

1. A certain number were treated with hot applications to the chest, combined with the administration of various expectorant and tonic remedies.

2. A number of cases where large doses of quinine was the only treatment.

3. Cases where the treatment was carried out by the employment of general antipyretic measures.

In the first two classes the mortality exceeded twenty per cent. In the third class various antipyretic measures were used. In twenty-six cases, where the treatment consisted of cold applications to the chest, the mortality was about fifteen per cent. The cold pack was used in twenty-six cases with a like mortality. Cold sponging was used in sixty-five cases, with a mortality of about thirteen per cent. The ice cradle was made use of in forty-three cases, with a mortality of seven per cent. Taken altogether, there were one hundred and eight cases treated by the application of cold in various ways, with a mortality of ten

per cent. The mortality by the other methods being more than double that by the cold treatment. With the latter treatment, it should be mentioned that stimulants were also usually given.

In spite of the very considerable number of cases analyzed by the author, it would be unwise to place too much confidence in the apparent teachings. We know how fallacious the results of statistics may prove to be; it is therefore wise to be very guarded in accepting broad and definite conclusions founded on this evidence. The success of the "cold" treatment of other febrile and infectious diseases—especially in typhoid fever—has been proven beyond all manner of doubt. There is nothing improbable, therefore, in the statement that cold applications is the best treatment for pneumonia. Death in pneumonia is nearly always brought about by heart failure, and in the treatment of this disease it is of paramount importance to keep this in mind. We have always looked upon the treatment of pneumonia with cardiac depressants as being fundamentally wrong. In place of strengthening the citadel, we are by the employment of these agents undermining it.

In a superficial, theoretical sense there is something captivating in the idea that during the early stages of a pneumonia cardiac depressants should be used, while in the advanced stages these should be replaced by agents of an opposite class.

When we, however, consider the stern fact that death is owing to heart failure, we should have abundant proof that cardiac depressants (tartar emetic, veratrum, aconite, etc.) have an indirect effect in limiting the extent and severity of the inflammatory process. Have we undoubted proofs that they accomplish this? We believe we have not. It appears to us that the true treatment of pneumonia consists, in the early stages, of measures which reduce the temperature, while at the same time there is no depressant effect on the heart. Of all antipyretics, cold is the most efficient. The employment of quinine, anti-pyrine, etc., is open to the same objection as are tartar emetic, aconite, etc. They act as cardiac depressants. In the final stages of the disease, the state of the pulse is the index for treatment. In many cases, camphor, digitalis and alcoholic stimulants are not required, but their judicious use in threatened



heart failure is of the greatest importance. Dr. Fenwick shows that very particular dangers attend the period of crisis, it is therefore very necessary to guard the patient at this period by the use of those agents mentioned.

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### Medical Items.

—Dr. Geo. E. Armstrong has been appointed Instructor in Surgery in McGill University.

—Dr. Henri A. Lafleur has been appointed Instructor in Medicine in McGill University.

—Dr. John Elder has been appointed Assistant Demonstrator of Anatomy in McGill University.

—Dr. R. E. McKechnie has been appointed assistant to the Lecturer on Histology in McGill University.

—Dr. D. J. Evans has been appointed Medical Superintendent of the Montreal General Hospital.

—Dr. George E. Armstrong has been appointed Surgeon to the Montreal General Hospital, *vice* Dr. Geo. E. Fenwick resigned.

—Dr. R. C. Kirkpatrick has been appointed Assistant Surgeon to the Montreal General Hospital, *vice* Dr. Geo. E. Armstrong appointed surgeon.

—Dr. Mader (McGill, '91) has been appointed House Surgeon, after a competitive examination, to the Victoria General Hospital, Halifax.

—Dr. Hattie (McGill, '91) has been appointed to a position on the medical staff of the Nova Scotia Hospital for the Insane at Dartmouth.

—We have received several numbers of a very useful and ably conducted journal called *The Bacteriological World*. It is edited by Dr. Paul Paquin, the director of the Bacteriological Laboratory of the Missouri State University at Columbia, Missouri. It is a monthly periodical, the subscription being \$3.00 per annum.



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