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A STUDY OF THOMSEN'S DISEASE (CONGENITAL MYOTONIA) BY A SUFFERER FROM IT.

BY

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Not since Thomsen's classical description of this disease in 1876, so far as the writer knows, has it befallen the physician reporting it to be himself the sufferer. The writer here describes Congenital Myotonia as occurring in himself and his own family group. The affection has for long been of interest to neurologists and clinicians; partly from its rarity (Hale White has referred to it as "probably the rarest disease in medicine"); and, partly from the varied theories that have been put forward to account for its muscular anomalies.

Osler (Ed. 1906) quotes Hans Koch's statistics of 102 recorded cases (91 males, 11 females), many of which, however, were probably associated in family groups. The writer has come across no case in the Canadian journals or clinics. No attempt will here be made to go into the now quite extensive literature of Thomsen's disease; but those interested in the subject may be directed to Thomsen's original monograph, to the various papers of Erb of Heidelberg, and, especially to the very full and interesting account by Hale White in the *Guy's Hosp. Reports*, 1889. The electrical reactions, muscle-tracings, etc., in connexion with the present case were worked out some years ago with the assistance of friends on the staffs of the Liverpool Royal Infirmary and other hospitals. To Dr. F. H. Edgeworth—now Professor of Medicine in the Bristol Medical School—he was particularly indebted. He regrets that he has been unable to get a recent set of tracings for this paper, the original ones being out of his possession (Edin. M. D. Theses, 1898. "Thomsen's Disease"). The diagnosis was made by the writer

himself whilst still a medical student, and has since been amply confirmed by experts.

Previous History.—Ever since the patient can remember, he has been afflicted with a painless stiffness and cramp on first attempting any voluntary movement, especially after rest. This was first noticed by others at about seven years of age, and was always attributed to "rheumatism." It was also recognized that the stiffness quickly wore off on continuing the particular movement, *e.g.* in running, but that it recurred after a brief rest. This "stiffness" affected all his muscles, and gave to his initial movements of any kind a peculiar clumsiness. He often suffered falls and minor injuries as a result of the cramps and his inability to "limber up" his muscles quickly. Rather unusual strength and muscularity were early evident, though he tired easily, and profuse sweating, especially about the head and neck, was rather noticeable on exertion. As a schoolboy the stiffness seemed to increase and was a source of great disability in all the sports and games. His schoolmates thought he was "ham-strung." Even his eye, tongue and jaw muscles were stiff at times. There was never any pain—only a tense, cramp-like feeling during the "limbering up" process; and, if he caught cold, he seemed to suffer more than most people from general muscular soreness. He was always considered a nervous and highly-strung lad, and was himself well aware that mental stress aggravated the cramps. *Pari passu* with the muscular development the disability progressed up to early manhood, since which time there has been no appreciable change in the condition.

Present condition.—*Æt.* 45; height, 5 ft. 8½ ins; weight, 150 lbs.; lean. The station is rather characteristic. There is a moderate lordosis. Both upper and lower limbs are carried with a slight flexion at the elbow and knee joints, which is only straightened out with a sense of effort and strain, due apparently to permanent hypertonicity of the more powerful flexor groups. The gullei are massive, the scapulae rather prominent. Thus the moderate lordosis, winged scapulae, slightly bent knees, and arms carried slightly flexed in front of the lateral line of the body give a picture quite different from that of pseudo-hypertrophic paralysis and from that of any other disease. The whole muscular system is very well developed—the different groups standing out sharply on being thrown into contraction. Some groups are, however, noticeably better developed than others; thus, the neck is both long and thick (the right sterno-mastoid rather heavier than the left); and the forearm muscles, glutei, vasti, internal obliques and the intrinsic muscles of the hand are all those of a trained athlete, although no systematic

exercise has ever been taken for any lengthened period. The calf muscles are not so well developed as those of the upper limbs. The pectorals and serrati can be made to bulge well. On light palpation the muscles show no abnormal firmness, though they quickly harden under firm kneading. On putting any group into strong voluntary contraction (this applies chiefly to the limbs) the muscles are found for a number of seconds to be of iron hardness; but this rapidly passes off and, if the contraction be maintained, a sense of fatigue rapidly supervenes and the muscles become somewhat flabby for a short time.

Peculiarity of movement.—This is entirely restricted to voluntary movements, and, to quote Hale White, "Consists in the fact that the contraction of the muscle which the patient wills to move is slower than normal, and that, because it relaxes *gradually and very slowly*, it remains for some seconds more or less contracted; this contraction is so strong that the antagonistic muscles cannot overcome it. If a certain voluntary movement is repeated several times, the patient begins to execute each movement before the preceding contraction has completely relaxed, and thus his difficulty as regards the stiffness becomes less and less in each movement." In the writer's case *all* voluntary movements are more or less affected, and they appear to be affected in proportion to the bulk of the muscular group involved. Thus, if, after a period of rest in a low chair, he attempts to rise and walk away, he can rise though somewhat slowly, and, preferably, with some help from his arms, but the advance of the leg in the first step is then checked by a painless cramp of the extensor muscles which have been thrown into action in rising, the other leg follows before the tonic spasm has passed completely away in the first, only to be checked in its turn by a cramp of the knee extensor and associated muscles. The second movement of the first leg is initiated before the spasm has completely relaxed, but the cramp this time is of less duration. With each succeeding advance of either limb the duration of the spasm and stiffness becomes rapidly less, until in a varying number of strides a normal gait is evolved. Whilst this is taking place, the stiff clumsiness of the movements is very noticeable, though the patient from long experience has learnt to mask this to some extent. Should running be suddenly attempted, the difficulty is exaggerated, the rapid initiation of fresh leg movements before the preceding spasm is fully relaxed necessitating some help from the arms to maintain the balance and secure better leverage until the legs get "limbered up." Should he at this stage strike his foot against any obstruction, a fresh spasm results and he is very apt to fall headlong, saving himself with difficulty from injury,

as the arms become stiff in their turn as they are extended in front of him. In fact, the rigidity extends more or less to *all* the muscles under these circumstances.

Breaking from a walk into a run is more easily performed; but, speaking generally, any throwing into action of a new group of muscles, or even any sudden extra-energizing of groups already in easy action, e.g., walking to running, evokes the tonic cramps.

In waltzing, after the preliminary "limbering up" process, the evolutions are performed correctly enough so long as "reversing" is not attempted. This causes at once severe rigidity, as the previously slightly used groups of muscles are brought into action.

"The ordinary gait, after limbering up", always shows a slight jerkiness and spasticity, especially if full extension of the leg be attempted in each stride.

In "punching the bag," the first blow is delivered a trifle slowly, but the arm reaches full extension, there is then an appreciable delay in drawing it back for the second blow owing to the extensor spasm. The second blow is slower and extension far less perfect from the powerful flexor spasm, at the third attempt the blow is more rapid, and the resulting spasm shorter in duration, though the patient can still *feel* the cramp. With each successive blow that he delivers this becomes less and less, until, as in the case of the lower limbs, it rapidly wears off and the blows become forcible and regular.

On turning the head suddenly to one side, spasm of the neck muscles concerned results, wearing off rapidly if the same movement be repeated. If, however, the head be turned alternately to either side resulting difficulty is aggravated for obvious reasons.

In shaking hands firmly there is often inability to relax the finger-flexion quickly (*vide* muscle tracings), a trifle which may give rise to misconstruction in ordinary social intercourse. If the patient will to close the hand forcibly the contraction of the flexors is slower than normal, the grip is powerful, but its full force is not attained at once. On attempting to unclothe the hand as quickly as possible a period of several seconds often elapses before full relaxation of the fingers is secured, the joints slowly extending from above downwards. If these movements be repeated as quickly as possible, it is again evident that the second extension act is initiated before complete relaxation of the opponents has taken place, that the flexor spasm is of shorter duration each time and the extension more complete, until, very shortly the movements are apparently quite normal. The myographic tracings show, however, that slight irregularities occur for many subsequent contractions—and this fact the patient himself recognizes. (Hale White).

Swimming shows the muscular disability very markedly, for here two contributing factors which the writer regards as important aggravate matters, viz., cold, and the nervous anticipation of the general spasm which follows. The movements are very stiff and sluggish, and co-ordination very poor for an appreciable time until he gets into the stroke. The large number of co-ordinated muscular groups brought into play results in so much spasm, that he may at times get a "ducking" before he can get sufficiently "limbered up" to get going.

In stooping, the back is stiff, partly from the lordosis and partly from the apparently hypertonic condition of the erector spinæ. If attempts to touch the toes with the knees straight be repeated he can reach a little nearer the toes each time, but never as far as the normal range of spinal flexion.

The *jaw* muscles are affected, for it, after rest, he attempts to open and shut the mouth rapidly the spasm and slow relaxation of the masseters and interal pterygoids may cause an appreciable delay in getting the mouth fairly open. Difficulty in chewing movements may thus result.

The extrinsic muscles of the *tongue* also show the defect—if rapid protrusion and retraction be attempted. All the facial muscles are involved, but, as the spasm seems everywhere in proportion to the bulk of the muscles, the defect is not so noticeable in the face as in limbs and trunk, still, if he laugh or make any facial gesture after rest or exposure to cold, he is often conscious of a stiffness about the face and a smile may take on the sardonic type and possibly require explanation. The spasm has been noticed in the frontalis. The rarely involved *eye muscles* are decidedly affected. Sudden lateral movements of the eyes cause a spasm which cannot at once be overcome, resulting in phosphenes momentary diplopia and dizziness—the patient relieves this by stroking down the closed lids for a moment or two to help relaxation.

Grafe's sign may at times be elicited, and is to be attributed to contraction of levator palpebræ superioris. (Raymond).

Movements made at command sometimes end in contracture, especially upwards.

When the eyelids are forcibly closed, there is at times, sluggishness in opening them until the act has been performed a few times.

At times there are phosphenes on head movements, as in a case of Raymond's (quoted by Knics). This he ascribed to pressure on the globe by the extrinsic muscles or of the muscles of the neck on the aorta.

In rare instances, the laryngeal muscles have been stated to be involved. In the writer's case there is at times, but only after prolonged

rest and in cold weather, decided thickness of speech for a few moments, due to stiffness of the extrinsic tongue muscles and those of lips and mouth. In singing there is at times difficulty in getting a full note or tone, a difficulty which is associated with a feeling of something amiss with the laryngeal muscles, and wearing off, as usual, very rapidly on persistence of the attempt—this point is not, however, easily demonstrated.

Micturition, like all the organic reflexes, is said to be never affected. If, however, the stream be stopped by voluntary contraction of the sphincter the fleeting spasm and slow relaxation is easily appreciated in the present case.

Though aggravated by emotion ("nervousness") it often occurs when this can be excluded. It is only the voluntary muscles concerned that are involved. It is to be noted that, in any particular group, it is often the *second* movement of a similar kind that shows the disability most markedly, this is easily understood if it be borne in mind that the *prolonged relaxation* after any contraction is the most serious trouble.

As regards the effect of cold, emotion, etc., on the severity of the tonic cramps, the writer finds himself at variance with some other observers; thus Hale White, who has gone into the subject so thoroughly, states (Albutt's System), that these peculiar arrests of movement are affected (in his case) neither by cold, by direction of attention to them, by mental excitement, by time of day, by alcohol, by meals, nor by temperature; but that sometimes fatigue will bring them out with unusual prominence. The writer is convinced that the following factors are important, as Thomsen, Blumeau, Dana and others have remarked in the past.

(a) *Prolonged rest of the muscles.* This is the most important factor. The longer any particular group of muscles is kept at rest, the more severe and prolonged is the tonic spasm when they are put into contraction.

(b) *The suddenness and force of the contraction that the patient wills.* A sudden and strenuous attempt to "drop-kick" a football will be followed by a severe extensor spasm, whilst the act may be performed with comparative ease, if a few gentle preliminary kicks are taken to "limber up" the muscles involved. Instances might be multiplied.

(c) *Mental excitement and emotion. Direction of attention to it.* The writer's case shows marked aggravation under these conditions. As a schoolboy he was a distance runner. When the pistol was fired for the start of a race, the strong attempt to rapidly innervate the leg muscles was accompanied always by a momentary and indescribable

feeling of utter powerlessness, the stiffly-advanced limbs would be affected with a cramp of unusual severity, which took longer than usual to wear off and, should he, by fixing the arms and initiating new contractions too rapidly or forcibly, overdo things, he would be sure to trip and fall prone. The writer regards this subjective and fleeting sensation of absolute loss of power succeeding the moment of willing as representing the subject's actual appreciation of the *delay in the latent period*, which some observers state does not occur. This is a point of some interest in connexion with the view generally held as to the nature of Thomsen's disease.

(d) *Cold*. This definitely aggravates the condition in the writer's case. Dry warmth seems to help "limber up" the muscles. This cause is much less efficient than the preceding.

(e) *Small doses of alcohol* undoubtedly diminish the severity of the cramps for the time being—possibly owing to the effect of alcohol on the inhibitory mechanism.

(f) *Fatigue* is a moderately effective factor. After any excessive muscular exertion there is marked stiffness and some soreness of the muscles. The abnormal functioning of the muscles may result in the production of an excessive amount of the bye products of metabolism, thus aggravating the spasm. It is usually stated that the *muscular strength* is not in proportion to the bulk of the muscles. Observation of the writer's case would indicate that this is an error, since from early schooldays the patient has been regarded as unusually strong (muscularly) for his size and weight. The hand-grip, for instance, is very severe, but owing to tardy contractions its maximum intensity is only slowly attained, and *fatigue ensues more rapidly than normal*. The statements as to the power of the muscles seem to depend, the writer thinks, on a failure to recognize this premature onset of fatigue which the patient himself best appreciates, and which seems out of proportion to the efforts made.

It should be added, that the tonic spasms are entirely painless as a rule, and it is only when successive contractions are rapidly and powerfully initiated before anything like complete relaxation of the preceding ones has occurred, that the muscles become "tied-up," and a marked sense of discomfort amounting, though rarely, to pain or even a "sprain" of the muscle may result. *Passive* movements are free. The superficial, deep and organic reflexes all appear normal. The knee-jerk is slightly exaggerated perhaps. The patient *sweats profusely* under rather slight causes, especially about the head and neck. This has been noted in other reported cases.

Electrical reactions.—We are indebted to Erb, of Heidelberg, for our initial knowledge of these, and they are, when typically present as in the writer's case, collectively known as *Erb's Myotonic reaction*. Hale White gives them as follows:—

(i) The motor nerves show no increase of irritability to mechanical stimuli;

(ii) To the faradic current the motor nerves are quantitatively normal; but, if the current be strong, the contraction produced on closing the circuit lasts much longer than it does in health;

(iii) To the galvanic current the motor nerves are quantitatively normal; but here also, if the current be strong, the contraction lasts longer than in health;

(iv) Mechanical stimuli applied to the muscles, as by hitting them, induce contractions more easily than in health; these contractions often last from five to thirty seconds;

(v) The faradic current applied directly to the muscles, if strong, sets up a contraction, which lasts from five to thirty seconds;

(vi) When the galvanic current is applied directly to the muscle K.C.C. and A.C.C. are equally easy to obtain; while in health, as is well known, K.C.C. is more readily elicited than A.C.C. In Thomsen's disease even with weak currents the contraction lasts longer than in health; with strong currents it lasts some seconds and relaxes very slowly. *With the stabile application well-formed wave-like contractions are seen to proceed slowly from the cathode to the anode.*

It is to be noted that in many of the reported cases there has been a failure to demonstrate all these points. Thus Hale White in his case (shown before the Medical Society of London, 1890), failed to make two of Erb's six, viz., muscular contractions on mechanical irritation, and the wave-like contractions under the stabile galvanic current.

In the writer's case *all* of these demands have been met under the independent scrutiny of such experts as R. Caton of Liverpool, and Edgeworth, of Bristol, and the late James Stewart, of Montreal.

The excessive irritability under mechanical stimulus of the muscles (*vide cut*), and the cathode-anode undulation under the stabile current are easily elicited.

The stronger *faradic* currents produce marked, and, what is essential, *sluggish* contractions of the muscles, *persisting after the cessation of the current*; weak irritation causes only short lightning-like spasms. At any time a rap from a percussion hammer on forearm, pectorals, glutei or vasti will produce a lumpy contraction, often with a central depression, which may be thirty seconds in relaxing, and which can

be felt as a localized cramp by the patient for, perhaps, another thirty seconds.

Myographic tracings after the method of Hale White, have confirmed and elucidated the above mentioned phenomena. The flexors in the forearm were selected and the patient directed to shut and open the hand as strongly and as fast as possible.

(a) Prolongation of the latent period. The patient *feels* that when he *wills* it he cannot start the first contraction instanter.

(b) A slow and powerful initial contraction taking much longer than the normal to reach its maximum.

(c) An appreciable delay at the top of the wave before relaxation begins.

(d) A *very prolonged relaxation curve*—often five or thirty seconds before complete.

(e) Initiation of the second contraction before complete relaxation of the first—each succeeding contraction being started at a shorter interval than its predecessor.

(f) A number of contractions and relaxations occur before the curve becomes normal.

(g) The first one or two powerful contractions are succeeded often by some feebler ones, and the rise to normal is only attained later.

(h) The early contractions and relaxations are often a little irregular. To the trained observer one and all of these phases are appreciable during the performance of a series of strong voluntary contractions.

Histology.—Fragments of muscle excised from the vastus externus showed the points which have been noted by a number of observers, viz. :—

(a) A marked increase in size, and especially of the breadth of many individual fibres, which are more rounded than polygonal on section—and some of them three times the normal width.

(b) Indistinctness of striation and waviness of outline of fibres.

(c) An apparent increase of the nuclei of the sarcolemma.

(d) An absence of interstitial changes and vacuolation (as described by Erb).

It is more than doubtful whether these changes can be regarded as essential or characteristic.

The observations of Erb, Nearonow, Hale White and others all agree in these points, and Dégérine and Soltas proved them at autopsy on a case of Thomsen's disease in which careful examination of the whole nervous system gave negative results.

Hale White found the fibres in his case to vary from 1-150 to 1-500

of an inch. He controlled this by examination of fibres from the flexors of a normal adult forearm which varied from 1-350 to 1-1000 of an inch.

It is to be noted that Jacoby, from his earliest researches, doubts whether these muscle changes can be regarded as peculiar to Thomsen's disease—a doubt which may be borne in mind in the consideration of its etiology.

Pathology.—Since Thomsen's day many theories have been offered to explain the condition. So far as the writer knows the necropsy by Dégérine and Sottas still remains the only one on record, so that any discussion can only be speculative. Thomsen's own view seems to have been that the affection was a neurosis, and he called special attention to the heavy incidence of nervous disease in his family group. It has been ascribed to a congenital, faulty development of the pyramidal tracts. Jacoby has regarded the disease as a congenital malformation of the muscular fibres—each fibre containing too many sarcois elements—hence the hypertrophy of the fibres, and the increased duration of their contradictions. Dana says: the disease is probably a primary muscular dystrophy. There may be, however, a peculiar defect in innervation, resulting from a congenital anomaly of the motor tracts. The views of Hale White are thus stated:—"It would appear that each individual affected is from his birth faultily constructed, so that some of his muscular fibres all through his life grow abnormally, and in consequence of this abnormal growth contract in an abnormal manner. This is more in harmony with what we know of other diseases than to believe as Dégérine and Sottas apparently do, that the abnormal contraction of the muscle leads to its abnormal growth. All who have written on the subject agree that it is a disease solely of the muscular system." (Albutt's System, Ed. 1905).

The writer ventures to dissent from the last statement as the possibility of the nervous system being seriously at fault seems to be held by a number of most competent observers.

Hale White calls attention to the similarity of the muscle tracings in Thomsen's disease to those induced in animals poisoned with veratria; and also to the well known experiments of Ringer and Sainsbury with phosphate of soda on curarized animals, from which it appears that the myotonic contractions produced on stimulation of the sciatic nerve are due to the action of phosphate of soda on the muscular fibres themselves.

Danilla in reporting a Russian case (1886), expresses the view that it is a functional disturbance of the cerebral psycho-motor centres.

Cook and Sweeten have suggested the following explanation of their

reported case (B. M. J., 1890):—"This seems to be entirely a functional derangement. . . . It may be supposed that, after a period of rest, during which the motor cells have acquired their maximum force, the voluntary impulse causes an excessive discharge of motor energy, which of itself sets up a second and succeeding discharges in the same cells, and thus the muscle is again stimulated to contraction before it has had time to relax from the first contraction, and that, after the cells have been thus relieved of their excess of energy, they become more stable, and are able to work smoothly. Or a similar theory might be applied to the muscle cells."

Osler states:—From Jacoby's latest studies it is doubtful whether these changes in the muscles are in any way characteristic or peculiar to the disease. J. Koch, however, has found, in addition to the muscle hypertrophy, degenerative and regenerative changes present which he considers sufficient to account for the myotonic disorder. Karpinsky and Von Bechterew, from careful urinary examinations, regard the affection as due to an auto-intoxication of the muscle tissue, caused by some faulty metabolism. The writer has not had the urinary changes exhaustively investigated; but there is present intermittently an excess of indican and the aromatic sulphates. No other abnormality has been noted in a routine examination, which, of course, supplies little evidence for or against the last mentioned theory.

Excess of both preformed and conjugate sulphates has been noted in pseudo-hypertrophic paralysis (Simon).

The writer has for many years been convinced that the nervous system plays a more important rôle that is to-day usually conceded. He thinks that too little stress has been laid on other neuroses occurring in the different family groups. His own view, for which neither originality nor completeness is claimed, is something as follows: That the disease is primarily a congenital functional defect in the mechanism of inhibition. That, owing to the faulty functioning of the neurones concerned, the muscles at rest are kept in a state of hypertonus; and, on attempting suddenly to contract a muscular group, the inhibitory "break," so to speak, cannot be taken off rapidly enough. This delay would represent the prolonged latent period and the moderately slow contraction. On attempted relaxation the disorder of inhibition is more than ever in evidence—the "break" is taken off with much increased difficulty, and thereby is explained the persistence of the contraction and the remarkably slow relaxation. The more powerful the contraction, the greater the inhibitory difficulty. The hypertrophy of the muscles would thus be a secondary development, dependent (a) on the state of hypertonus (kept

up by the over-activity of the inhibitory mechanism) during rest; and (b) on the prolonged contractions and delayed relaxations constantly repeated. It is conceivable that the trouble might be aggravated by the excessive accumulation of the products of muscle waste during the prolonged contractions. This view would make the defect in Thomsen's disease comparable to that in stammering, and class it as a neurosis of the whole psycho-motor tract. It accounts easily for the aggravation caused by depressing mental emotions, cold and fatigue, and the relief under the opposite conditions. The writer acknowledges frankly that there are strong points to be urged against such an explanation; but not one of the numerous views which have from time to time been held seems to him impregnable. It still remains for the physiologists to clear up for us the whole subject of "inhibition."

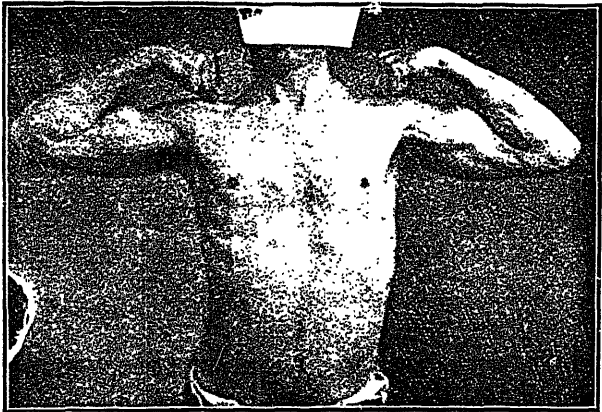
The wearing off of the spasm on repetition of the movements would be explained by a rapid exhaustion of the excessive inhibitory impulses; and the early fatigue, by the excessive accumulation of the products of muscle waste. The longer the period of rest, the greater the rapidly-renewed power of the inhibitory "break," and, consequently, the greater the tonic spasm on voluntary movement requiring powerful willing to overcome it.

The incidence of other neuroses (as in the appended table, and especially in Thomsen's own family), is, to say the least, *suggestive*.

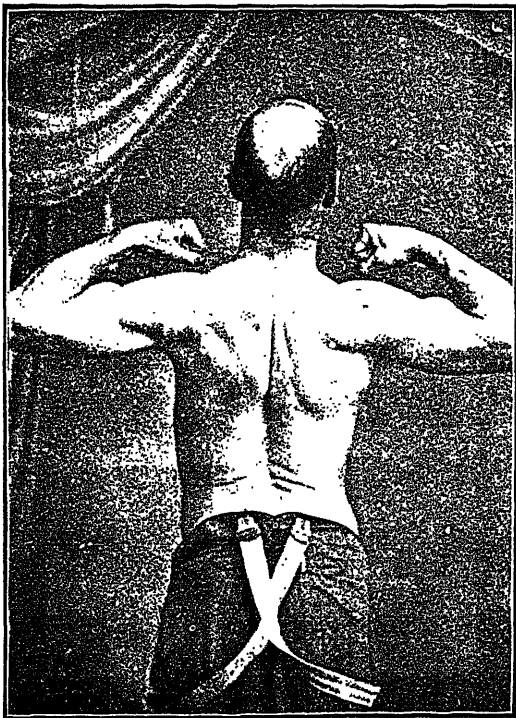
Diagnosis.—In a fully developed case with this very characteristic clinical picture there can be no difficulty. Even in early childhood (it is usually at about 7 or 8 years of age that the disability is first noticeable) the history, the persistence of the spastic condition for a varying number of seconds on attempted voluntary movement, and the awkward movements to overcome the rigidity; the rapid "limbering-up," on repetition of the movements; the unusually well-developed musculature; together with Erb's myotonic reactions make recognition easy.

Cases showing only traces of it, as in the two maternal cousins of this group, (*vide* *wee* showing incidence of T.D.), may be puzzling, and a careful scrutiny of the condition of other members of the family should be made.

Friis (quoted by Zappert, of Vienna) observed the condition in an infant at the breast, which showed frequent, sighing respiration, inability to open the eyes, immobility of the face when the child began to cry, and interference with the movements of the legs and fingers. Friis' case did not show the myotonic reaction, although the muscles of the legs were hypertrophic. His attention was directed to this child through the presence of the disease in other members of the family.



A. Indicating the general muscularity (without systematic exercise).

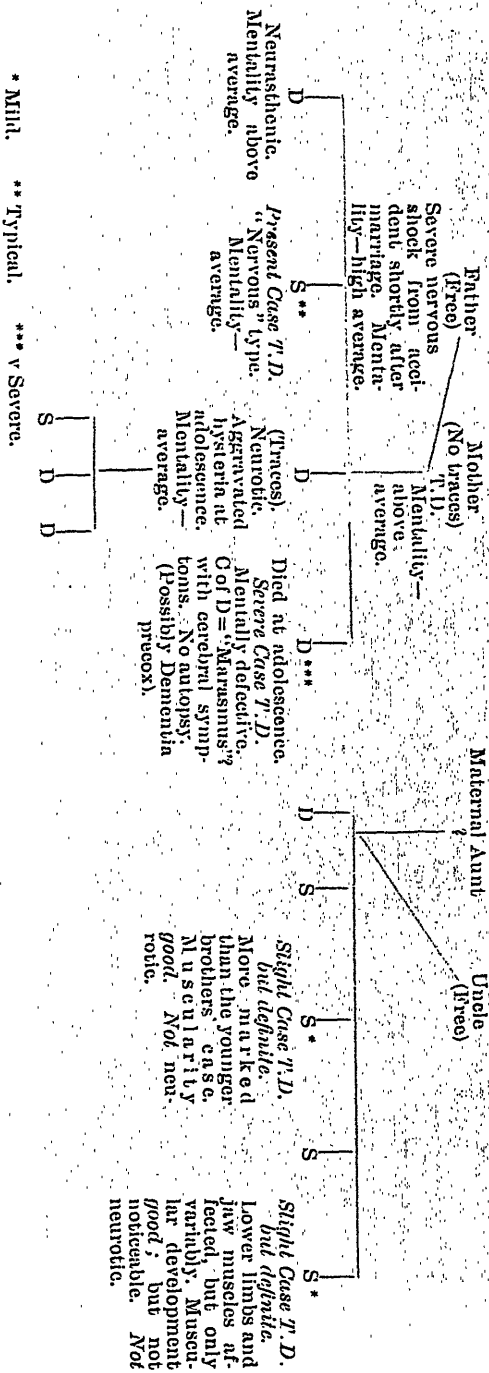


B. Indicating general muscularity and the lordosis.



C. Showing persistent lumpy contraction of vastus for many seconds after mechanical irritation.

TREE SHOWING INCIDENCE OF THE DISEASE AND OTHER NEUROSES IN FAMILY GROUP.
(THROUGH THE FEMALE CHIEFLY TO THE MALES).



* Mild. ** Typical. *** v Severe.

PHOTOS A. B. & C.

A. & B.—Showing general muscularity in T.D. despite sedentary life. Lordosis noticeable.
C.—Showing lammy contraction of thigh muscles after rap with percussion hammer at least 30 seconds to full relaxation.

The Prognosis is unfavourable as regards recovery. The writer's condition seems to have remained unchanged since adolescence. It obviously causes great disability in the choice of an occupation; and time and money may be saved the unfortunate sufferer, if an early diagnosis be arrived at. The greatly increased risk of *accident* should be borne in mind, as a sudden movement to get out of harm's way is often impossible.

Treatment.—Nothing has proved of any avail. Organotherapy has been tried unsuccessfully. A warm and rather dry temperature seems to suit the writer best, and he feels more supple and alert under such conditions. *Moderate, regular exercise* is most important.

Incidence of the diseases on other members of the family.

One sister suffers from *traces* of it. Is neurotic and suffered from aggravated form of hysteria in earlier life.

One sister (deceased) showed it in a severe general form. As a child a push would send her staggering with all extremities more or less locked in the spastic position. Was always mentally rather defective, and died with symptoms suggesting dementia precox.

Two maternal cousins (both males) suffer from it. In one the jaw muscles alone, and in the other the legs, arms, etc., are involved also (*vide* appended family tree).

REFERENCES.

1. J. Thomsen—"Tonische Krämpfe in Willkürlich beweglicher muskeln in folge von ererbter psychischer dispositionen." Arch. von Psych. und Nerven Krankheiten, Berlin, 1876, Bd. VI, S. 702.
2. Erb.—Ziemsens's Cyclopaedia, Vol. XIII. Trans. New York, 1878, p. 808 (and later articles).
3. A. McL. Hamilton—"A Consideration of the Thomsen Symptom-Complex with reference to a new form of Paralysis Agitans." Med. Record, N.Y., Jan. 23rd, 1886.
4. Hale White. "On Thomsen's Disease." Guy's Hosp. Reports, London T. 46, 1889.

CHORIO-EPITHELIOMA MALIGNUM.

BY

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My excuses for bringing this subject before you are first: my having been so fortunate as to have had under my care at the Montreal General Hospital, a second patient afflicted with this dread disease, which is interesting so many investigators all over the world, and, second, my having been able to collect histories of seven cases which have been observed in Canada.

As the officer in command of an army sends out his spies, engineers and sappers to observe and prepare the country to be invaded, so does the impregnated ovum send forth its advance guard of cells which burrow beneath the uterine mucosa and prepare a resting place where it may remain secure during its further development. These trophoblastic cells ordinarily disappear after having performed their normal function, but in a few cases, owing to some unexplained cause, they give rise to a growth, which, in the vast majority of cases, ultimately ends by depriving of life the organism which has sustained and nourished it, and which, therefore, has been spoken of by Pinto¹ as "a sustained decidual reaction."

This growth was first described in 1888, by Sanger,² who considered it to be a sarcoma derived from the decidua, for which reason he called it "Deciduoma Malignum." In 1895, Marchand questioned the correctness of this view, holding that it did not arise from the decidua alone, but from the epithelium of the syncytium and Langhan's layer, that is to say, from the lining of the villi, thus suggesting a double origin, viz: a foetal from Langhan's layer and a maternal from the syncytium. Later, however, in 1895, he modified this theory, believing that the syncytium did not arise from the maternal tissues, but from the foetal ectoderm, and this theory, viz: that the disease is entirely of foetal origin, is that which is held at present.

Schmauch³ claims that the vitality of the trophoblast is limited to the formation of but three varieties of cells, viz: the cells of Langhan's layer, the plasmodium or syncytium, and the syncytial cells. He says that "it is the surroundings which give chorio-epitheliomatous cell its form. It is neither an epithelial nor connective tissue cell, it is something between these two. Consequently, it is able to assume the characteristics of both."⁴ These cells being present in all pregnancies, what determines their malignancy? This is a difficult question to answer, but probably there is some change in the maternal organism which renders it less able to offer an effectual resistance to their undue proliferation. The possibility of this loss of inhibitory power being due to an alteration in the blood serum is a question of importance and well worth working out. It is not simply due to a transplantation of epithelium, as such a proceeding is followed by a proliferation of the cells which is but temporary, this fact lending strength to the theory of a change in the maternal structures being the cause of the malignancy. Neither the deportation of the villi nor the proliferation of the epithelium proves the malignancy of the growth. The former occurs in all pregnancies, and the epithelium is innocuous as long as it remains attached

to the villus and does not penetrate the surrounding tissues. Kröner⁵ suggests that possibly deep implantation of the ovum may favour the development of chorio-epithelium, but against this may be urged the fact that in all uteri with adherent placentæ the villi will be found to have burrowed deeply into the muscular tissue without any intervening decidual tissue. In this instance, Veit speaks of these villi as being "deported," but this application of the term is misleading, as they remain attached to their source of origin and the metastases are due to an actual deportation or migration of portions of villi or masses of cells to more or less distant parts by the bloodstream.

Etiology.—Pregnancy is the great predisposing factor in the causation of chorio-epithelioma. and, therefore, it is more prevalent during the period of woman's greatest sexual activity than at any other age. The average age in Teacher's⁶ list was 35, with slight rises at either extremity due to the tendency of immature or old uteri to produce abortions, especially hydatid moles. In my own list of 227 cases published in 1905,⁷ the age was not stated in 19. Four were under 20, 105 were between 20 and 30, 80 between 31 and 40, 57 between 41 and 50, and 12 over 50 years of age. While pregnancy precedes the great majority of cases, it is not an essential factor, the disease having been observed in young girls before the onset of menstruation, in women well past the menopause, and even in the male. Bostrom⁸ saw a man aged 32 years who was operated on for cerebral tumour which the microscope showed to contain decidual masses and the autopsy revealed metastases in the lungs and on the peritoneum, all of which contained chorio-epitheliomatous tissue. Ritchie performed an autopsy on a man in whose mediastinum were two masses, one of which was a dermoid and the other a tumour composed of cells similar to those seen in the disease under discussion. Two of our own confreres, Drs. Keenan and Garrow, have at present a patient from whom a diseased testicle was removed, and who had cutaneous metastases composed of true chorio-epithelial tissue. Those cases in which the disease does not follow pregnancy, are probably due to one of two causes. Either it arises from teratomata or there has been inclusion by the developing ovum of some trophoblastic cells which have lain dormant until some mysterious, undetermined agency has caused their active proliferation.

Hydatid degeneration of the chorion has an undoubted influence in predisposing patients to this malady. In my own series, the nature of the pregnancy was stated in 262 cases; 36.78 per cent. were seen to follow molar pregnancies; 31.80 per cent. followed abortions, and 26.43 per cent. occurred after full term labours. Gebhardt states that one

pregnancy in every 728 is terminated by the formation of a mole, while Williams gives a much lower ratio, viz: 1-2400. Berry Hart claims that only one mole in every thousand becomes malignant, which is not a very high rate of malignancy.

Disease of the ovaries is an important complication of this disease, and accompanies it with such frequency that some authors claim that it has some influence in its causation. Usually, it takes the form of excessive luteal development, especially in the formation of cysts, but it is difficult to determine the relation between the two conditions, as in many cases of chorio-epithelioma not even a corpus luteum is seen, and Seitz⁹ has proved that lutein elements are increased in every pregnancy. Experiments have even been carried out which seem to prove that the successful termination of a pregnancy depends upon this increase in the lutein tissue.

Pathological Anatomy.—Examination in situ with the naked eye shows the growth to be an irregular, diffuse, fungous mass deeply implanted in the uterine wall by numerous prolongations which run between the bundles of muscular fibres. At other times the surface is rough, ulcerated and coarsely ragged, with villous vegetations. At the seat of the disease, the uterine wall may be almost or entirely eaten through. Solivij¹⁰ reports a case where the disease had penetrated into the parametrium. More rarely, the growth may be pedunculated or the tumour may be sessile, nodules of it lying beneath the mucous membrane, which is apparently intact. The tumour varies considerably in size; it may be as small as a marble, but almost never is larger than a foetal head at term. In colour, it is usually greyish, with dark hæmorrhagic spots, but it may be either dark green or bright red. The growth is usually soft and friable in consistence, never being firm as in fibroid disease, or hard, as is seen in ordinary epithelioma. It is usually situated high up near the fundus of the uterus, but the vagina may be the primary site and cases of this have been reported by Landau and Büsse. Landau's¹¹ patient was a girl of twenty, who had previously enjoyed the best of health. She was admitted to his clinic on November 9th, 1900, having been last "unwell" in the middle of the previous August. At the end of October, pain in the lower abdomen and bleeding came on. She was examined and the external os found to be closed. Curettage revealed nothing, but she suffered from repeated attacks of hæmoptysis. On November 9th, Landau found the uterus and ovaries to be healthy, but he discovered two swellings in the lower part of the left wall of the vagina near the introitus. One of these was the size of a bean, while the other

was about twice as large. They looked like thrombosed veins and the mucosa over them was ulcerated, with blood at the base of the ulcer. No physical signs of pulmonary disease could be discovered. The vaginal masses were removed and the uterus curetted in February, 1902. Microscopic examination of sections of the nodules showed typical chorio-epithelioma, while the curettings presented nothing abnormal.

Contrary to most uterine growths, secondary deposits occur both early and frequently in chorio-epithelioma, and this fact may be considered as symptomatic of the disease. Extension takes place by means of the blood-vessels, and in many specimens one can see the tumour cells projecting into the blood-spaces or even lying loose there. A case reported by Lockyer, however, suggests their transmissibility through the lymphatics as well. The patient was 26 years old and had given birth to a full term child four weeks before coming under observation. Ten days after labour, she began to have dragging pains in the vagina accompanied by a brownish discharge, and ten days later a lump appeared in the groin. This mass did not show any glandular structure, but its appearance and situation were those of the inguinal lymphatics. The lungs are the organs which are the more prone to be affected secondarily, thus accounting for the cough, dyspnoea, hæmoptysis, etc., so often met with, and after the lungs comes the vagina. Here, the growth usually presents itself as a soft violet coloured nodule, which rapidly increases in volume, ulcerates and bleeds profusely. Eirman's statistics show 28 pulmonary to 20 vaginal metastases, while in my own series, there were 103 pulmonary and 72 vaginal deposits. The nervous system may be affected as may also the bones, and none of the viscera have escaped.

Histology.—The typical elements of this tumour are (1) Small well-defined polyhedral cells with large vesicular nuclei packed together in masses without any connective tissue between them. (2) Large multi-nucleated masses of protoplasm (plasmodia or syncytia) in which no definite cell boundaries are visible. (3) Large cells, sometimes mono- and sometimes multi-nucleated, some of which resemble decidual cells, others being identical in character with the multi-nucleated giant-cells which occur in the decidua serotina. These in some parts are arranged in cell masses without intervening stroma, while in other places they are infiltrating and destroying adjacent tissues after the manner of sarcomata. The cells of the first class are those of Langhan's layer. When young, they are small, but they increase in size with age. Their nuclei contain a fine intra-nuclear network and are easily stained. They also contain glycogen. These cells of Langhan's constitute neither an im-

portant nor a necessary element in chorio-epithelioma and may be completely absent in undoubted cases of this disease. The same statement does not hold good, however, in regard to the syncytial masses, these being always present in these growths. The plasmodia or syncytia are not true cells, but are simply ill-defined masses of protoplasm with one or more nuclei. The protoplasm is usually homogenous and opaque and takes the staining reagents readily. The nuclei are small, oval or round, and are scattered throughout the mass without any semblance of order. They multiply by direct division and may be vacuolated. The syncytium forms the boundary of the growth, i.e., it is seen at the periphery. In the centre of the neoplasm, no vessels with true walls are seen, but the growth is nourished by lacunæ, the walls of which are composed of syncytial masses which penetrate the uterine wall. In doing so, they send long processes between the muscular bundles which run along the vessels and ultimately penetrate their walls. Before actually opening into the vessels, however, they cause a weakening of their walls, thus allowing of a localized dilatation of the vessel, which gives it an appearance of being thrombosed or varicose. After entering the vessel, these plasmodia actively proliferate and act in one of two ways. The mass in the vessel may form a thrombus, which may itself go to some distant part, or it may give off cells or smaller processes, which in their turn, travel with the blood stream and so give rise to new foci of disease. Or the thrombus may form and remain where it is, becoming caudalized and taking the place of the vessel wall. The above process explains the manner of spread of the disease as well as the hæmorrhages which accompany it. Haultain¹² thinks that many cases of cure may be explained by the blood being poured out around the neoplasm and cutting off its nourishment by pressure.

Marchand recognizes two forms of chorio-epithelioma, viz: the typical and atypical. The former is characterized by the presence of syncytial masses, sending off branches in various directions, thus forming a network, the strands of which are covered with nuclei and in whose meshes are clear cells which vary in number. In the atypical variety, the cells are irregular and compact, with very large deeply stained nuclei, and, while multinuclear cells are present there are no continuous plasmodial masses.

Symptoms.—Chorio-epithelioma may begin very insidiously by bringing out symptoms of some very different malady, as is seen in the case reported by Büsse.¹³ This patient had a fatal hemiplegia and the autopsy revealed the presence of chorio-epithelioma affecting the right Sylvian

artery, with secondary deposits in the liver, spleen and right heart, the genitals being quite free from the disease, although the patient had suffered from a miscarriage six months previously. Usually, however, it is uterine hæmorrhage which first attracts attention. This bleeding is marked by its severity and its resistance to treatment, even curettage being of but very evanescent benefit. The blood loss rapidly impairs the patient's health; she loses weight and the skin becomes waxy. Between the hæmorrhages, there is a discharge which may be either serous, sero-sanguineous or smoky, and which has a foul odour. Local pain is either entirely absent until the later stages of the disease or else but slight. The patient may have chills, fever, vomiting, cough, purulent expectoration, hæmoptysis, nervous affections, etc., which are produced by the metastases, or in the case of the chills and fever by sepsis. Examination of the patient, where the uterus is the primary site of the disease, reveals that organ to be enlarged, but the amount of this enlargement varies, it rarely, however, being bigger than a foetal head at term. The surface may be either nodular or else smooth and even. Per vaginam, the cervix may be felt to be soft and the os, to be so patulous as to permit the entrance of the examining finger into the uterine cavity, where one may find a mass of soft, spongy material, resembling placental tissue. This growth is usually situated on the anterior or posterior wall of the uterus, near the top of the fundus. While exploring the cavity, the finger may remove a fragment of tissue for microscopic examination. Pigmentation of the skin, which is so often seen to accompany the usual forms of malignant disease, so far has not been recorded in chorio-epithelioma.

The duration of time which may elapse between pregnancy and the onset of the disease varies. Usually only two or three months intervene, but McCann reports a case with a nine years interval, Fleischman six years, and several with an interval of from two to three years. My own first patient afflicted by this disease had been delivered of a molar ovum three and a half years before showing any evidence of malignant trouble. There may, however, be no interval at all, the growth developing during the progress of a pregnancy.

Prognosis.—Generally speaking, chorio-epithelioma may be considered to be one of the most malignant tumours which attack the uterus. If not interfered with, death usually supervenes in a few weeks or months, but occasionally the patient may live for one or two years. If discovered early and treated radically, the patient may recover, and the same happy result has been reported even where no treatment was carried out; but in these cases the diagnosis has been doubtful. However, well authenticated

cases have terminated favourably where only part of the growth was removed. In connection with this, a case reported by Dr. Charles V. P. Noble is of interest. In November of 1900, he removed a uterus for chorio-epithelioma. The bladder wall was also involved and the tumour implicating it was not touched, as its removal would have called for too extensive an operation. The patient made a good recovery from the operation and died of some rather acute pulmonary trouble in September of 1905. Dr. Noble saw her a few days before death and could then find no sign of any tumour or swelling in connection with the bladder or any other pelvic organ, so that it is strongly probable that the lung trouble was not consequent upon the former disease, as if any recurrence had taken place it would have been most likely to have done so in the bladder wall.

Velits considers¹⁴ that spontaneous cure may result from necrobiosis. "as shown by the lowered vitality and the disappearance of the cells of Langhan's, and the appearance of wandering cells which shows the separation of the syncytium." Cases similar to that of Noble; where the secondary nodules have not been touched, but hysterectomy has been performed and the patients have made permanent recoveries, have been reported by Albert, Kolomonkin, Marchand and others.

Those cases which follow moles are less virulent than those which are preceded by ordinary pregnancy, and, of the latter, those ending in abortion appear to have the highest rate of mortality. In my own series, the mortality was: after moles, 52.85 per cent.; after abortions, 63.75 per cent.; and after full term deliveries, 54.33 per cent.

There is nothing in the appearance of the elements of the tumour which will help very materially in arriving at a decision regarding the ultimate fate of the patient, except that where you have a great number of the cells showing subdivision of the nuclei, you may expect a fatal result within a short time. The invasion of connective tissue by the epithelial cells has been thought by many to indicate malignancy, but Loeb¹⁵ has shown that in cases of transplantation of skin, epithelial cells were seen to be able to penetrate, not only connective tissue, but also even cartilage without being malignant. Velitz claims that the presence of wander-cells in the neighbourhood of chorio-epithelial growths is evidence of degeneration of the cells of that growth and so warrant a favourable prognosis, but Fleischman, Herman and Schmauch dispute this theory on the ground that it only applies to that group of cells which resemble puerperal wander-cells, and the distinction between these two groups of cells is not always easy.

The number of Langhan's cells in a tumour will be of some assistance, Schmauch saying that "the simple presence of Langhan's cells in

larger numbers and their appearance in foci between muscle cells will always be sufficient to declare the case to be malignant." The atypical cases, composed of cells of the character of wander-cells and giant-cells without plasmodial masses have a favourable prognosis.

Diagnosis.—All cases of hæmorrhage from the uterus following pregnancy are not due to chorio-epithelioma, but in cases where it is severe and difficult to control, one should be suspicious, especially if the pregnancy has terminated in the discharge of an hydatid mole. It may be due to retention of products of conception, posterior displacements of the uterus, endometritis, inversion, carcinoma or some general systemic disturbance. The careful use of the curette with examination of the scrapings, will, however, usually clear up the diagnosis. Do not trust to the result of the curettage alone, as at least one case has been reported where it was found that the growth was distinctly pedunculated and the curette had gone all around it without touching it at all. Where curettage for hæmorrhage following pregnancy is followed by more blood-loss, especially if this is excessive, and cannot be controlled by either drugs or local treatment, where there is any foul discharge and cachexia, treat the case as one of chorio-epithelioma, and you will seldom be wrong. In fairness to our friends the pathologists, it is only just to say that it is extremely difficult to form any opinion as to the necessity or otherwise of operation by an examination of the scrapings, as, to be sure that removal of the uterus is necessary, you ought to find the malignant cells scattered through the muscular tissue, and, as a rule, none of this latter tissue is removed by the curette.

Treatment.—The treatment may be preventive, palliative or curative. The former consists in careful attention to the interior of the uterus after pregnancy, especially where this has terminated in an abortion. Before we knew how serious a condition might follow an expulsion of an apparently normal ovum, it was considered good treatment to leave an ovum, the subject of a "missed abortion," in the uterus for an indefinite time to see if it would not come away spontaneously. The same view regarding the treatment of a retained fragment of placenta was held by many. In the light of our present knowledge, however, I think that this line of treatment will be abandoned for one much more energetic and radical and that these foreign, and potentially dangerous bodies, will be removed with great care and thoroughness as soon as discovered, in order to prevent placental grafting with its possible serious results.

The palliative treatment is only to be adopted in cases where the growth cannot be removed. Tonics are indicated by the debility of the patient. The uterus should be curetted, douched with an antiseptic

solution and packed, and caustics or styptics may be applied to the interior of the uterus with benefit. All nodules in the vagina should be excised thoroughly and the incisions necessary for that purpose closed by suture. Pain and other complications are to be combatted as indicated.

Where there is any chance of curing the patient, early and complete removal of the growth should be effected. If the uterus is the seat of the primary tumour, the whole organ should be excised, the appendages being removed with it, by either the vaginal or abdominal route as seems best to the operator. All enlarged glands are to be removed at the same time, even if they do not ultimately turn out to be infected by the growth, as it is impossible to determine this macroscopically.

The following are the reports of the cases which have occurred in Canada up to the present date:

1st. Writer's first case, reported in the *Montreal Medical Journal*, September, 1905.

Patient was 47 years of age and a unipara. Three and a half years before the onset of the symptoms of the present trouble, she was delivered of an hydatid mole. In June, 1904, she began to have an hæmorrhagic discharge from the vagina, and this has continued up to the time of her admission to hospital. At first, the discharge had no odour, but during the last few weeks it has been very disagreeable, and she has lost flesh. For the last five months she has been losing freely almost all of the time.

Until just before leaving for home after the operation, there was no sign of pulmonary involvement, but at that time she began to have a cough. Nothing abnormal in the lungs could be made out on physical examination.

The examination of the genitals revealed a mass, ovoid in shape, attached by a comparatively narrow pedicle to the anterior vaginal wall and quite free from the uterus. It was about the size of a hen's egg, freely movable and of a greyish colour. The uterus was felt to be slightly enlarged and hard and its mobility was limited. To the left of the uterus could be felt a hard mass which was about the same size as that in the vagina.

The vaginal mass was removed under an anæsthetic and the uterus was curetted, but all of the diseased tissue could not be removed on account of its having extended deeply into the pelvis. The cavity was closed over by catgut sutures.

The patient went home, but died in about four months, fresh nodules of the disease having appeared in the vagina. The uterus also became considerably increased in size, evidently becoming the site of a metastatic

growth. No autopsy could be obtained, so that one cannot speak with certainty as to the location of metastases; but as the patient suffered from cough before leaving hospital and a great deal of dyspnoea after arriving home, it is, at least, probable that there were secondary nodules in the lung.

Nothing abnormal was seen in the sections taken from the scrapings of the uterus, but those made from masses of the tumour of the vagina showed a new growth in the form of villi projecting into masses of degenerated tissue and blood, part of the latter being clotted and more or less organized. These villous-like processes contained numerous cells, closely packed together, with vacuolated nuclei; larger mono- or multi-nucleated cells, polygonal in shape; and, lastly, multi-nucleated masses of protoplasm without any cell-border.

2nd. Dr. Howitt, of Guelph, sent a uterus to Dr. John McCrae, for examination. (Case not reported).

Patient was 34 years old, had given birth to 10 full term children, and had suffered one miscarriage. Two weeks after the abortion, the woman began to have hæmorrhage from the uterus. It was profuse and did not yield to any kind of treatment. The uterus was felt to be somewhat enlarged and soft with a patulous os.

Complete hysterectomy was followed by death of the patient from "metastatic deposits in the lung." No autopsy was obtained.

Dr. McCrae has informed me that the uterus was enlarged to measure 11 x 6 x 9 cm., and that in the fundal region lay a rounded mass measuring 3 x 2 cm., firmly attached to the posterior wall about 2 cm. down from the highest point of the cavity. This mass was whitish in colour, firm in consistence, and, when finally hardened artificially, broke away from the uterine wall, leaving a deep hollow. Sections of the growth showed that it was composed of Langhan's cells, large polygonal cells and syncytial masses, i.e., typical chorio-epithelial elements.

The next three cases were reported by Dr. M. J. Ahern, of Quebec, in the *Bulletin Médical de Québec*, July, 1907; and I am indebted to him for the notes.

3rd. Woman, aged 44 years, had given birth to eight full term children. She had four other pregnancies, one of which had ended in the discharge of an hydatid mole at the eighth month, this being followed by a severe hæmorrhage which was most difficult to control. Four months before admission to hospital, she had passed a second mole, this time at the second month of pregnancy. The lochia stopped on the eighth day, but two days later, she began to lose blood, which loss soon became very excessive. It was absolutely unaffected by treatment, even curettage being

ineffectual. Uterus was enlarged and the os sufficiently dilated to admit the index finger. Two masses could be felt to be attached to the uterine wall, one being firm and the second soft and friable. Total hysterectomy was followed by recovery and the patient was well when the case was reported three years after operation.

On examining the interior of the uterus after removal, one small, glistening nodule was seen in the upper part of the posterior wall. To the left of this was a cavity filled with material resembling blood-clot, into which the finger could be easily forced. The adnexa presented nothing unusual. Microscopically, the invading masses were seen to consist of Langhan's cells and syncytium.

4th. Age 30. This woman had given birth to three full term children, one being born dead, and one pregnancy had ended in a miscarriage at the fourth month, in June, 1903. She continued to bleed until she entered hospital in the following July, and had suffered pelvic pain for some months. She was thin and pale, with an icteric tint in the skin and conjunctivæ. There had been cough and expectoration of blood for some time. There was a malodourous discharge from the uterus. The latter organ was felt to be enlarged, sensitive, and mobile. On the posterior vaginal wall were three bluish nodules, resembling hæmorrhoids. Curettage was attempted but had to be abandoned on account of hæmorrhage, and the patient died in a few days. No autopsy was obtained, but Dr. Ahern reports the diagnosis as "chorio-epithelioma with metastases in the vagina and lung."

5th. Age 19. Patient had given birth to two sets of twins. When the last were born, one was normal, but the other ovum had developed into an hydatid mole. This delivery was followed by severe post-partum hæmorrhage. One month later, the woman began to lose blood, and this hæmorrhage resisted all kinds of treatment. When she entered hospital, the uterus was enlarged and the external os admitted the index finger with ease. Total abdominal hysterectomy was followed by recovery.

The adnexa were seen to be healthy. On cutting open the uterus, two friable nodules were seen on the wall. Sections of these showed a similar picture to that seen in case 4.

6th. Drs. Garrow and Keenan have at present under observation a case which is unique in Canada, and rare in any part of the world. It is one of chorio-epithelioma in the male. The patient is a young man, twenty years old, who bruised one of his testicles getting into a bath. This injury was followed by pain and swelling, for which Dr. Garrow removed the organ. Numerous metastases have appeared in the skin and sections from these and the original tumour show most typical chorio-epitheliomatous formation.

7th. Mrs. K., *æt.* 38, entered the gynaecological ward of the Montreal General Hospital on the 28th of May, 1907, with a history of having menstruated last on the third of the previous January. Sixteen days prior to admission, she had an attack of abdominal pain for two nights, followed by "flowing," and the blood loss had been continuous ever since. Three days before admission, she had severe cramp-like pains followed by an increase in the amount of the flow and the discharge of a "fleshy" mass, after which the pain and flow became less marked. Her menstrual history was negative and she had never been pregnant. The examination of the pelvic organs revealed a healthy vagina and a uterus which was slightly enlarged, the external os being patulous and cervix soft. An incomplete abortion was diagnosed and the uterus was curetted, examination of the tissue removed confirming the diagnosis. The operation was followed by a rather more profuse flow of blood than is ordinarily seen. She was readmitted on the 21st of November, 1907, complaining of "flooding." Since her return home, she had only been twice "unwell," viz: on July 3rd, and October 3rd, the flow being scanty each time. On November 14th, she began to have a foul smelling discharge from the uterus. This became blood stained the next day and has continued so ever since. On the 18th, the blood loss was very severe, going right through the mattress, and the next day she passed a mass which she said looked "like a bunch of veins." This was the size of a walnut. She has had one or two other hæmorrhages which were preceded by colicky pains. There has been loss of weight and strength.

Local examination, revealed a reddened area around the meatus, but the vagina was healthy. The cervix was firm and closed. The fundus was in good position, mobile, firm, and the size of a two months' pregnancy. The appendages were not enlarged.

On account of the obstinate hæmorrhage, the passage of tissue resembling "a bunch of veins, the foul discharge and the loss of flesh, malignant disease, probably chorio-epithelioma, was diagnosed, and the uterus and appendages were removed." The patient made a good recovery, but before she left hospital, there was a small nodule to be felt in the vagina just below the cicatrix, and she had a cough. Dr. Finley examined the lungs and reported dulness over both bases posteriorly and the usual signs of the presence of fluid in the pleuræ. The pleural cavity was twice aspirated, but only a little bloody fluid found once.

On cutting open the uterus, it was found to measure 12.5 cm. in length with a wall 2 cm. thick. The cervix and lower part of the fundus appeared to be healthy, but in the fundus was a mass the size of a small hen's egg closely incorporated in the uterine wall. Projecting down

from this was a ragged looking tongue of tissue 3.5 cm. in length. This whole mass looked bluish-red. A prolongation into the uterine end of the left broad ligament was seen.

Microscopic sections through this tissue showed it to be composed of muscle into which projected villous-shaped masses of cells, with evident signs of hæmorrhage. These cells were of three kinds. There were the numerous small rounded cells with vesicular nuclei, the cells of Langhan's, larger cells, polygonal in shape, some with single and some with multiple nuclei, and finally, numerous masses of syncytium. In places, small groups of these elements entirely surrounded by muscle could be seen, while elsewhere they appeared in large masses, and scattered throughout the field areas of blood and degenerated cells were evident.

The patient came back to hospital on the 16th of January last, on account of a profuse, foul vaginal discharge, and a sloughing mass 3 cm. in length by 1 cm. in breadth, was seen to involve the anterior vaginal wall, in the region of the nodule which was present when the woman last left the ward. This was curetted away and the edges of the wound so produced were brought together with catgut, union by first intention resulting, and the patient was discharged. She returned to the ward on March 30th, complaining of intense headache and vomiting. There had been a sudden attack of unconsciousness eight days previous. She remained in a comatose condition for some hours and seemed stupid when she recovered her senses. Her eye-sight had been failing for some time, so Dr. Mathewson kindly examined her eyes for me. He found "neurorinitis in both eyes with hæmorrhages, more marked in the right eye." The patient died quite suddenly on April 3rd.

At the autopsy, which was performed by Dr. Lyman, to whom I am indebted for a very complete report, numerous metastases were found. In the tissue between the bladder and vagina, was a mass of growth about 3.5 cm. in diameter, but the vaginal cicatrix was free from disease. Numerous small metastatic nodules were seen scattered throughout both lungs. The intestines were also studded with small masses of new growth. On examining the brain, the vessels were seen to be congested, and several nodules were noticed to be scattered through the lobes of the cerebellum and one in the right half of the cerebrum. Each of these nodules is dark and hæmorrhagic in appearance and is surrounded by an area of pigmentation.

In conclusion, I wish to thank Dr. Duval for much assistance, Dr. Fraser Gurd for the sketch of the uterus, and Mr. Wade for cutting and staining the sections which were under the microscopes.

BIBLIOGRAPHY.

1. Pinto. Hegar's Beit., vol. 9.
2. Sanger. Central fur Gynak., 1889.

3. Schmauch, G. *Surgery, Gynæcology and Obstet.*, Sept., 1907.
4. Schmauch, G. *Jour. Amer. Med. Ass'n.*, 1904.
5. Köner. *P. Deut. Med. Wochen.*, 1907, No. 33.
6. Teacher. *Gyn. and Obstet. Jour. of the Brit. Empire*, July and August, 1903.
7. Lockhart, F. A. L. *Montreal Med. Journal*, Sept., 1907.
8. Bostrom. *Verhand. der Deut. Path., Gesell.*, 1902.
9. Seitz. *Centr. fur Gyn.*, 1905.
10. Solivij. *Cent. fur Gynak.*, 1899.
11. Landau. *Zagojanski-Kissel, Arch. fur Gyn.*, 1902.
12. Haultain, F. W. N. *Trans. Edin. Obstet. Soc.*
13. Busse. *Wiener klin. Wochen.*, 1902.
14. Velits. *Zeits. fur Geb. und Gynak.* Band, 111, Haft. 2.
15. Loeb. *Arch. fur Entwick.*, vol. 6.

THE GONOCOCCUS AS A FACTOR IN INFECTION FOLLOWING ABORTION OR FULL TERM DELIVERY.

BY

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Probably no subject of equal importance in medical science shows such diverse opinions as that regarding the cause and means of prevention of infection following the discharge of the products of conception from the uterus. Since Mayrhofer, in 1863, Coze, in 1869, and more especially since Pasteur, in 1879, found the streptococcus in the lochia of women suffering from puerperal fever, this organism has been looked upon as the most important bacteriological factor in this disease. The streptococcus being looked upon as the most important infecting agent in puerperal fever, the attention of numerous investigators has been directed towards the presence of this coccus in the vaginal discharge of pregnant and non-pregnant women.

The results of examination have not been uniform, and opinion has been varied regarding the possibility of auto-infection and the value of ante-partum douches.

Although many observers have proved the prevalence of gonorrhœa in modern society, few have been able to show that it is of definite importance in the production of more important forms of puerperal fever.

As a result of a series of careful bacteriological examinations, the following notes have been prepared. In them I shall attempt to show the comparative prevalence of the gonococcus in puerperal fever. I shall suggest a reason for the different results obtained by various examiners, as well as the different opinions based upon these results.

Experiments by Duhrssen, Bumm and others, as well as my own ob-

servations, appear to prove that the normal vaginal, cervical and urethral epithelium is not attacked by the ordinary pyogenic cocci. When, however, the resistance of the parts is overcome by such an organism as the gonococcus, other bacteria seem able to produce their characteristic lesions. This fact, I believe, is of importance in our consideration of post-partum infections, and will help, in part, to explain the diverse opinions held by various authorities upon the question of auto-infection.

The number of cases in my series is small. The results are, however, very suggestive. I believe that the careful examination of the lochia at the onset of fever would demonstrate the gonococcus in a large number of cases. It does not seem unreasonable to suppose that the streptococcus and other pathogenic organisms which are constantly present in the rectum and the external genitals should be ready to invade the vagina whenever an opportunity is given. The gonococcus present in the cervical glands or other part of the genital tract takes advantage of the bruised condition of the tissues after labour and sets up an inflammatory process. This process paves the way for a secondary infection by more pathogenic organisms, such as the streptococcus. These secondary invaders having gained entrance, the disease becomes more serious and presents graver symptoms.

The mortality figures of hospitals, in other ways of equal merit, do not materially differ where douches are used during the latter days of pregnancy or not. At the same time, although the installation of aseptic methods has enormously reduced the mortality from puerperal infection, there still persists a certain number of cases occurring year by year. Many of these cases occur in women in whom labour has been spontaneous or even precipitate. Again, the mortality rate does not give an adequate idea of the incidence and importance of puerperal fever. Many patients are only saved after the most careful nursing and constant attention. Others after a severe illness for a few days are apparently cured and leave the hospital well. A still larger class run a mild fever for two or three days and are discharged after an otherwise normal puerperium. It is women of these classes who return within a few weeks or months to consult the gynaecologist for inflammation of the uterine appendages, pelvic peritoneum, or the uterus itself. How rarely is a pelvic abscess or pyosalpinx found in women who have never been pregnant!

No matter what the opinion held by obstetricians regarding the value of douches in healthy women, all are of the same mind regarding the management of gonorrhoea. All admit that this condition demands active treatment. As a rule, however, the failure to carry out such treat-

ment is supposed to result in a mild form of infection from which the patient may be expected, in the great majority of cases, to recover in a few days. The presence of the gonorrhoeal condition is usually inferred from the presence of an acute vaginitis or vulvo-vaginitis, with redness, and perhaps, swelling of the vaginal walls or vulva, accompanied by a profuse creamy greenish yellow discharge. In the absence of such vaginitis signs of urethritis are looked for.

The gonococcus is a much more frequent inhabitant of the vagina than such a diagnosis would lead one to believe. In a series of examinations made by the writer of the vaginal discharge of 113 women, the gonococcus was isolated 52 times. These cases represent the average class of women applying for treatment for pelvic disease at hospital clinics. This group of cases consisted of 13 of acute vaginitis, from eight of which the gonococcus was isolated; 36 sub-acute cases showed the gonococcus in 22; from 44 cases suffering from chronic pelvic disturbances of one kind or another, the gonococcus was isolated 22 times. Twenty cases showing no evidence of inflammation, examined as controls, showed no gonococcus. The results of this series of examinations show that the gonococcus is a common factor in the production of pelvic disease.

The method of isolation employed in the above series of cases, as well as the cases reported in this paper is simple. The material to be examined is procured upon a sterile swab, such as is used in ordinary routine bacteriological examinations. The cervix is exposed by means of a bivalve speculum. After thoroughly sterilizing the external genitals the cervix is cleansed with a series of sterile cotton sponges. The point of the swab is then passed through the os and thoroughly rubbed over the endometrium. A tube resembling that used by Döderlein, has been used in a number of cases. This tube has not shown itself to be an adequate method of obtaining material, as it procures only the most fluid part of the discharge which is well known to contain the bactericidal properties in largest proportions. The result has been that although numerous organisms are usually seen in the smears prepared from the fresh material, rarely is any growth effected. Within as short a time as possible the material on the swab is surface seeded over blood agar. With some experience isolated colonies may be readily procured by this method. As a rule, within 24 to 48 hours gonococci, if present, will appear as small bluish-grey, semi-transparent colonies varying from .5 to 1.5 m.m. in diameter. The observer accustomed to the growth of the gonococcus and other organisms resembling it will rarely be in doubt as to the nature of the bacteria when a typical growth is produced on blood agar. The

results of a very complete test of the relative value of cultural methods of identification, and stained smears of fresh discharges in the above mentioned series, show that the fresh stained smear preparation is of little value. In the examination of uterine lochia, the fresh smear is of more help. Here, also, however, no definite diagnosis can be made without cultivation of the organisms. The same features which render the examination of the fresh lochia from the uterus of more value than that of the vaginal discharge in general, viz: the larger number of gonococci usually present and the smaller number of contaminating organisms, renders the isolation in cultures correspondingly more easy.

During the past year I have had the opportunity of examining the lochia from 14 cases of severe endometritis, following abortion or full term labour. In all cases the women suffered from definite constitutional disturbances. In all, the temperature rose to above 103° F. Three patients died and came to autopsy; two others developed metastatic pyogenic processes. In addition to the fourteen cases examined during life, the bacteriological factor has been determined in six other cases coming to autopsy. Of the twenty cases, four followed abortion; the other sixteen had been delivered at full term.

The organisms isolated were as follows:—

Streptococci, 10 times in 7 fatal cases.

Pneumococci, 2 times in 1 fatal case.

B. *Erogenes capsulatus*, 1 fatal case.

Gonococci, 5 times and 1?* 4 times along with the streptococcus.

B. *Coli*, once in almost pure culture.

B. *Coli* was also found in larger or smaller numbers in practically every case.

Staphylococci, both aureus and albus were found in large numbers and saprophytic organisms were frequently found.

In addition to the six pathogenic organisms a Gram-negative coccus, not resembling the gonococcus either morphologically or in culture was isolated twice.

In a certain number of cases no growth was procured. This was probably due, in a few cases, to the antiseptic douches which the patients were receiving. Four negative results were undoubtedly due to the use of a tube in the collecting of the material for examination. One of the cases which gave no growth was probably due to the gonococcus.

In our series of twenty cases we have five cases from which the gonococcus was isolated and one in which it was almost certainly present. Only one of the cases infected with the gonococcus was fatal. Death was

* See case 2.

apparently due in this case to a secondary streptococcus infection. All cases, however, suffered from high fever and rapid pulse; five had chills. The onset of fever in these cases was early with the exception of one case following abortion (case 3). Two cases (1 and 5) had a fever of 102° F. before removal from the confinement table. In one case (case 6), the temperature rose to 102° on the second day following delivery; it returned to normal the next day, reaching 104° F. again on the eighth day. The remaining two cases developed fever on the second and fourth days respectively.

As is usual with all forms of puerperal infection the patients did not realize the severity of their condition. As a rule they claimed to feel well and protested against being kept in bed. Fever lasted as a rule from one to two weeks. All patients with the exception of case 4, which died, recovered strength comparatively rapidly once free from fever.

Two cases had a profuse creamy, yellow, purulent discharge. In two (cases 3 and 4) the discharge was moderate or scant in amount and mucopurulent in character. Cases 1 and 2 presented the false membrane covering the vaginal walls usually associated with a streptococcal infection.

It has been found in the examination of vaginal discharges of acute vaginitis that other pyogenic cocci such as streptococcus and pneumococcus are not infrequently present in large numbers, sometimes in such large numbers that they seem to be the only organism demonstrable. The history, subsequent examinations or course of the disease, shows in nearly all such cases, that the gonococcus of Neisser is the primary pathogenic factor. That a similar combination of the gonococcus with one or more pyogenic bacteria in the endometritis following child-birth occurs, several of the following cases will prove.

Case 1.—Bacteriological No. 07.799. Mrs. C. G.; primipara. Patient was admitted to the Montreal General Hospital, service of Dr. Lockhart. She had been confined four days previously and was suffering from a bloody muco-purulent discharge, her fever was high, $103.2-5$; her pulse 120. The vaginal walls and vulva were covered with false membrane with numerous underlying areas of excoriation. During the last six months of pregnancy, the patient had suffered from a profuse greenish, creamy discharge, with redness of the vaginal outlet and excoriations. She had been treated with douches of creolin and mercury bichloride. Before patient was returned to bed after delivery her temperature had risen to 102° F., and her pulse was very rapid. The discharge and the severity of her symptoms increased until her entry into hospital. She was put under constitutional treatment and frequent douches, and left the hospital well on the twenty-fifth day.

A smear stained by Gram's method by the doctor in charge one day post-partum contained numerous gonococoid organisms.

A bacteriological examination of the lochia the day after admission showed streptococcus pyogenes present in large numbers along with a mixture of various Gram-positive and negative bacilli.

In this case, although the gonococcus was never culturally isolated, it appears justifiable in the light of the persisting acute vaginitis, apparently gonorrhoeal, and the result of the smear diagnosis of the physician in charge of the case, to classify it as undoubtedly gonorrhoeal in origin. At the time, however, of the patient's entry to the hospital, she presented the picture of a phlegmonous vaginitis usually associated with infection by the streptococcus pyogenes. That this organism was really the cause of the severity of the patient's symptoms the bacteriological examination proved.

Case 2.—Mrs. J. G., aged 32, primipara; bacteriological No. 07.722. Patient, three days post-partum, had a chill and developed a high fever and rapid pulse with more or less profuse bloody slightly foul smelling discharge. Upon the fifth day, post partum, she was brought to the hospital. When examined on the sixth day, the whole vagina was covered with a false membrane of a foul-smelling sloughy material. Previous to delivery there had been no evidence of any inflammatory disturbance. Delivery had been instrumental and difficult. The strictest technique had, however, been employed.

BACTERIOLOGICAL REPORT.

Smears taken from the cervix on the second day after the chill stained by Gram's method, showed numerous pus cells, together with an enormous number of all sorts of organisms, including large and small bacilli, many cocci retaining the Gram's stain, and a few biscuit-shaped Gram negative diplococci.

Planted upon blood agar, gave a mixed growth of staphylococcus albus and gonococoid organisms, as well as several saprophytic organisms.

This case has been included in the series, although the large number of contaminating organisms made a diagnosis of the gonococcus impossible. This case has been placed in Table A as gonococcus.

Case 3.—Bacteriological No. 07.686, Mrs. A. P., aged 25; multipara. Patient was admitted to the hospital suffering from pain in the right leg and arm. She had a scant bloody purulent uterine discharge. There was no tenderness in the pelvis. The condition in the leg developed into a definite femoral phlebitis. The right wrist became the site of a septic arthritis.

Three weeks prior to admission the patient had aborted, giving birth to a four months' foetus. She had remained in bed two days following the miscarriage. She continued to lose blood for over two weeks, when she developed a fever and a feeling of malaise. She was curetted, but her condition did not improve.

Patient had had four full term children, the youngest being ten years old. Up to the present abortion she had had but scant leucorrhœal discharge and no other symptoms of pelvic disturbance.

Bacteriological examination of the uterine discharge, one day after admission, showed numerous pus, few epithelial cells. Many Gram negative cocci were seen occurring in pairs, both inside and outside cells. Numerous chains of six to ten were also seen of cocci retaining the Gram's stain.

Planted on blood agar, in twenty-four hours there was a profuse raised semi-transparent growth of greyish colonies, measuring from .5 to 1.5 m.m. in diameter. Stained by Gram's method these colonies showed Gram negative bean-shaped diplococci in pairs and fours. A very few colonies of five dark points made up of Gram positive cocci in chains were also seen.

Blood cultures taken upon two occasions were sterile. Pus from several metastatic joint conditions and abscesses showed streptococci in pure culture, with absolutely no evidence of gonococci.

This case exemplifies two characteristics of gonorrhœal infection. In addition to the fact that an undoubted gonorrhœal endometritis was followed by streptococcus infection of the uterus which ultimately became general, this case demonstrates the chronicity of gonorrhœal lesions and the freedom from discomfort which the patient often enjoys. In all probability, the ten years' period of sterility immediately preceding her last pregnancy had been due to what is by some considered to be the conservative salpingitis which protects women suffering from gonorrhœal infection from the dangers of child-birth and pregnancy. This protection in some way being overcome, pregnancy ensued only to be followed by abortion and an almost fatal termination.

Case 4.—Mrs. L. T., widow; aged 29; bacteriological No. 07.955; autopsy No. 08.14. Patient admitted to the hospital, service of Dr. F. A. L. Lockhart, December 27, 1907. She had aborted at three and a half months two days before, since when she had considerable bleeding.

Before admission her temperature was 100° F., and her pulse 112. Six hours later these were: temperature 104° F., pulse 130.

The uterus was cleaned out with the finger and lightly with a sharp curette and douched out with sterile saline solution. A large piece of

foul smelling chorionic tissue was removed. Microscopically, this tissue showed numerous polymorphonuclear leucocytes. From December 28th to January 9th, the patient's temperature was septic in type, and during this time she suffered from chills of more or less marked severity. She complained of but little distress, always replying when asked regarding her condition "I am better." Her respirations were extremely rapid and at one time she had a sharp attack of dyspnoea with cyanosis and gasping.

On January 9th, 1908, a mass was palpable to the left of the uterus. A vaginal incision was made under spinal anaesthesia and a small quantity of pus discharged. An abdominal incision was made, and the left ovary, which was filled with pus, was removed.

The patient's condition, however, did not improve and she died January 10th, 1908.

BACTERIOLOGICAL REPORT.

Two examinations were made of the uterine discharge. B. 07.955.

Stained by Gram's method, the fresh pus shows numerous pus, few epithelial cells. A small number of Gram positive cocci are seen mainly in pairs. There are numerous Gram negative bacilli with rounded ends, for the most part occurring singly. Moderate numbers of diplococci gonococoid in shape, decolorizing by Gram's method are seen, both inside and outside cells. Planted upon blood agar, gave no growth in 48 hours. The failure to obtain a growth in this examination was undoubtedly due to the antiseptics being used in the douches.

Second examination, B. 08.-8.

Stained by Gram's method, the fresh pus shows large numbers of pus cells. Numerous Gram positive cocci in pairs and chains of four are seen. Many Gram positive and negative bacilli are found. There are also a few pairs of well formed biscuit-shaped Gram negative cocci.

Planted upon blood agar in 24 hours, the surface was moderately covered with isolated colonies of *B. coli*. Fine colonies of Gram positive cocci in pairs, also two fine greyish semi-transparent colonies 1 m.m. in diameter of gonococci were also seen.

During the course of the disease, blood cultures were attempted upon two occasions, but proved negative.

Autopsy was performed sixteen hours after death.

ANATOMICAL DIAGNOSIS.

Acute diffuse peritonitis; puerperal septicaemia (streptococcus); acute gangrenous endometritis; multiple abscesses of uterus; plebitis with thrombosis of peri-uterine veins; multiple pelvic abscesses; acute vagin-

itis; acute suppurative oophoritis; acute suppurative nephritis; oedema of the lungs; fatty liver; healed gummata of the liver; chronic pulmonary tuberculosis; chronic pleuritis; chronic pericarditis; acute splenitis; congestion of the liver and kidneys; laparotomy; salpingectomy; venesection; vaginal section.

Case 5.—Mrs. D. D.; aged 32; bacteriological No. 07.289. The patient was delivered in the Montreal Maternity Hospital of a full term child. Labour was normal.

From the time of delivery the patient suffered from a fever of 100° F. or more. On the fifth day post-partum, she had a chill and the temperature rose to 104.2°. She complained of little pain and no distress, the uterus involuted well, though a profuse creamy, greenish-yellow discharge developed. No interference was attempted, with the exception of one intra-uterine douche and repeated vaginal douches. Patient left the hospital apparently well, the child, however, developed a severe condition of ophthalmia neonatorum, which led eventually to septicæmia and death.

On questioning the husband, it was found that he was being treated for "kidney disease." This was found, on examination, to be a case of frank acute gonorrhœal urethritis.

Bacteriological report. B. 07.289.

Smear shows numerous pus, few epithelial cells. Many bean-shaped Gram negative diplococci are seen. These are situated, both inside and outside of the pus cells. Many cells present a "typical" appearance, being filled with closely packed gonococcioid organisms.

Planted upon blood agar, in forty-eight hours, a moderately profuse, almost pure, growth of gonococci developed. A similar organism was also isolated from the baby's eyes.

Case 6.—Mrs. S.; aged 26. The patient was confined in the Montreal Maternity Hospital. Labour normal. Two days after delivery, the patient's temperature rose to 101.1° F. It fell to normal the next day, but rose to 102° upon the eighth day; two days later it rose to 104°. The patient's temperature remained up and she left the hospital against the advice of the physician in attendance on the fourteenth day post-partum.

The lochia consisted in a profuse creamy, greenish purulent discharge, which persisted at the time she left the hospital. The child showed no signs of ophthalmia. No history was obtained of any ante-partum inflammatory condition.

Bacteriological report. B. 08.24.

Smear shows numerous pus, few epithelial cells. Many Gram negative bacteria, with rounded ends, were seen, also Gram positive cocci in pairs. One or two pairs of Gram negative bean-shaped diplococci are also found.

In twenty-four hours a culture upon blood agar showed several large isolated greyish, creamy colonies of *B. coli*, also a few white colonies of *staphylococcus albus*. Between these larger colonies are seen numerous small semi-transparent colonies of gonococci.

Cases 5 and 6 demonstrate the severity of the disease which an uncomplicated gonorrhoeal infection may produce. The unfortunate ending, too, of the ophthalmia in the child from case 5 also brings before us the importance of the gonococcus in the pregnant and puerperal woman.

Although case 2 was probably gonorrhoeal, I will, for the purpose of this paper, speak only of the other five cases. In all of these, the infective process began as a gonorrhoeal condition. In all the most careful technique had been followed during delivery, nevertheless, five became septic and ultimately suffered from severe infection. In three, this infection was undoubtedly due to streptococci. All physicians dealing with large numbers of pregnant women have seen cases in which fever, at times severe, has followed cases of spontaneous or precipitate labour, in which absolutely no examination of the internal parts had been made at any time. Experience shows, also, that it is in unmarried girls that fever is most frequently met with. It is naturally in illegitimates that gonorrhoea is most frequently found. Cases such as these influence Lennhartz and others to support the prophylactic douche. Many cases occur in which retained secundines, filth of the external parts and other such causes are insufficient to explain the development of the infective process.

In 1898, Burr (34), in an article entitled "Gonorrhoea as a factor in Puerperal Fever," puts the question which he proceeds to answer: "Notwithstanding advancement along lines of antiseptics, etc. . . . why is there not greater freedom from septic puerperal conditions?" "In the mother herself." He draws attention to the prevalence and chronicity of gonorrhoea and states the idea, which I have expressed above, in the following words: "the gonococcus will share its possessions in apparent harmony with other pathogenic germs, or at an indefinite period quit the field in their favour."

My own experiments, as well as those of many observers, seem to prove that streptococcus as well as numerous other organisms is, undoubtedly present in the lower part of the vagina and about the vulva. Thus, different investigators have had different results owing to different

technique. Williams is probably correct, when he says "that in those cases (in which pathogenic organisms are found in the upper vagina), the infection is probably carried up by the instrument made use of in procuring material for examination." Other opinions and clinical experiences, on the other hand, are due, I believe, to the fact that sufficient account has not been taken, in considering the question of auto-infection, of the chronic forms of gonorrhoea, which give rise to no clinical evidences of their presence.

CONCLUSIONS.

(1) The gonococcus, either alone or as a primary infecting agent, plays a much more important role in the production of puerperal fever than is usually appreciated by most observers.

(2) Various micro-organisms, especially the streptococcus and *B. coli* are usually present about the vaginal outlet, although apparently infrequently found in the upper part of the vagina of the healthy woman. These organisms are ever ready to attack the tissue whose resistance has been destroyed by the action of the gonococcus.

As corollaries there follow, (a) the necessity for the most careful examination of the history of the patient and of the vaginal discharge early in pregnancy in all cases presenting the least grounds for suspicion. (b) The necessity for more than ordinary caution in examining internally all cases presenting even the slightest evidence of an inflammatory condition.

I wish to express my thanks to Dr. F. A. J. Lockhart for use of cases in the Montreal General Hospital, as well as the physicians of the Montreal Maternity Hospital, for notes upon cases in that institution. I wish also to thank Dr. C. W. Duval for numerous suggestions from time to time.

UTERINE INVERSION.

BY

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An inverted uterus has been defined as "a uterus turned inside out," forming a hollow, pear-shaped mass, projecting into the vagina. Externally it is covered by the uterine mucosa, internally the cavity is lined with the peritoneum, and between these lie the muscular coats of the uterus.

In cases of recent occurrence, the uterine ends of the Fallopian tubes and the utero-ovarian ligaments may be found within the pouch, while the ovaries and upper ends of the tubes lie just above it.

In cases of long standing, however, only the innermost portions of the broad ligament may be found within, the greater portions of the Fallopian tubes remaining above the inversion. The cavity of the tumour thus formed, is about one inch in length, and its orifice, a narrow slit, opens into the peritoneal cavity.

Various forms of inversion have been recognized, the most important of which are described as acute and chronic. The acute, by far the most common, is practically of puerperal origin, and is usually caused by injudicious pressure on the fundus after delivery, or improper traction on the cord in the removal of the placenta. The chronic form may be simply a continuance of the acute form, for although, according to Hart and Barbour, "toleration of the condition is rare," yet cases have been reported in which the uterus has become reconciled to its new position, and has occasioned the patient little or no inconvenience. Again, the chronic form may be gradually produced along with the expulsion of a fibroid polypus attached to its walls. Three degrees of inversion are recognized, viz:—Simple depression of the fundus, depression of the fundus to the cervical orifice, and complete inversion. Fortunately, complete inversion is exceedingly rare. Samuel Cache speaks of it as a grave, but infrequent accident, occurring in his experience twice in 4,600 labours; and John W. Taylor, Birmingham, while reporting a case, states that "this is the only case of absolutely complete inversion that I have ever seen or known of." Yet quite a number of cases have been reported. Moreover, it has been known to follow abortion, as early as the third month of pregnancy, five such cases at least having been reported.

Symptoms.—Speaking generally, these are: hæmorrhage, anæmia, irritability of the bladder, weakness, and pain.

Diagnosis.—In the acute form the diagnosis is easy. If, after the termination of labour or abortion, the above symptoms are present, together with the complaint of something unusual in the vagina, pressing downward, a careful bi-manual examination should be made. Should there then be found occupying the vagina, a red, bleeding pyriform tumour some three centimetres in diameter, larger below than above (Kelly); together with the inability, externally, to palpate the fundus in the pelvis, the diagnosis should be indisputable. But in chronic inversion the diagnosis may be much more difficult. Duhrassen reports a case of twenty years' standing, in which the vaginal walls had become so adherent to the inverted mucous surface of the uterus as to become an integral part of the inversion, and the diagnosis could only be confirmed by the absence of the uterus within the pelvis and the presence of the depression at the cervical orifice.

Prognosis.—If the condition be neglected, the outlook is most unfavourable. A few cases of spontaneous reposition have been reported, but this is an exceedingly rare event. Robert Boxall, in 1904, reported a case in which spontaneous reposition took place three weeks after delivery, and a second case is reported in which it occurred within a few hours of the accident. But, as a rule, inversion is followed by hæmorrhage, which may be continuous or intermittent. Anæmia from loss of blood may follow and become very serious. Prusman, of Berlin, reports a case of inversion following an abortion at the third month of pregnancy, in which case the patient died from extreme anæmia. Again, ulceration followed by sepsis may occur, and a case has been reported of spontaneous amputation of the body of the uterus. But as previously stated, adhesions may form, in the course of time, between the mucous covering of the uterus and the vaginal walls, arresting hæmorrhage and preventing ulceration, the patient experiencing very little discomfort.

Treatment.—The safest and most satisfactory treatment is reposition, either manual or by means of repositors, and this is usually successful when the inversion is of puerperal origin and the attempt made soon after its occurrence.

Two methods of manual reposition are practised—first by taxis, as in reducing a hernia, second by depressing the most prominent part of the fundus, with the fingers or knuckle, steady and continuous pressure being kept up within this indenture. The reinverted tissue thus acting as a wedge, dilates the cervix and passes up into the pelvis, after which the uterus and vagina are to be packed with gauze until the danger of recurrence is past. Elastic pressure by means of the cup-shaped repositor of the late Lawson Tate, has proved successful in many cases, and Granville Bantock reports a case of inversion of two years duration in which reposition was accomplished in twenty-four hours, by means of Aveling's repositor. Again, Boxall considers that constant vaginal douching materially assists the process of reposition. Yet one is not justified in making too prolonged attempts at manual reposition for fear of bruising the parts or lacerating the cervix. In chronic cases, owing to the rigidity of the cervix and neck of the inverted sac, and the fibroid changes in the uterine wall, manual reposition is almost impossible. Moreover, in long standing cases, the peritoneal surface of the uterus becomes considerably smaller than the mucous surface, so that, were reposition possible, the peritoneal surface would require stretching, and the mucous surface would prove too large to be contained within the newly formed cavity. One must then consider what surgical treatment would be safest to adopt under the circumstances.

Various operations have been recommended; but I shall only mention a few of the most important. These may be described as vaginal and abdominal. But the only abdominal operation worthy of note consists in opening the abdomen, dilating the cervical ring by means of fingers or instruments and pushing the body of the uterus up into the pelvis. This method, however, has not proved very successful. Of the vaginal operations two have met with favourable criticism. First, Kustner's method of opening into the peritoneal cavity posterior to the uterus (Douglas's pouch) and incising the neck of the sac sufficiently to enable one to push through the body of the uterus. Second, anterior vaginal uterotomy. This operation is described by John W. Taylor, as follows: A transverse incision having been made along the anterior vaginal wall as close to the inversion as possible, the anterior margins of the cervix are seized on each side of the middle line by volsella, and the uterus divided between them with long straight scissors. As soon as the peritoneum has been opened and the median incision of the anterior wall of the uterus carried beyond the cervix into the body of the uterus, attempts are made to replace the inversion. The sides of the incision are then brought together by fine silk sutures and the vaginal incision united by separate sutures on either side of this. In long standing cases, in which the peritoneal surface has become much smaller than the mucous surface, Taylor found the muscle wall and the mucous surface to bulge through the incision and prevent apposition of the peritoneal edges. He therefore, recommends removal of the excessive tissues before suturing, avoiding undue tension, securing exact coaptation and union, and preventing suppuration.

Should these methods prove unsuitable, there remain amputation of the body of the uterus and complete vaginal hysterectomy.

The case which I wish to report, one of fundal fibroid tumour with inversion, is of special interest, from the fact that the cause was an unusual one, and that, while being of puerperal origin and recognized in its acute stage, treatment was deferred long enough almost to make it become chronic, and there was attached to the fundus uteri a small fibroid tumour. This case I shall take the liberty of reporting fully.

It has been my privilege to see two cases of puerperal uterine inversion, one acute and one chronic. The chronic case, came to the outpatient department of the Montreal General Hospital, complaining of constant hæmorrhage, anæmia, frequency of micturition, general weakness and pain. A bi-manual examination revealed the presence of a pear-shaped mass, occupying the vagina, broad below and narrow above, and from the surface of which blood was oozing. No fundus could be

palpated in the abdomen, but a depression could be felt on the upper narrow end of the vaginal tumour. The patient gave a history of having given birth to a child some three months previously, a difficult forceps delivery, attended and followed by profuse hæmorrhage. Arrangements were made to have the patient admitted to the hospital on the following day; but she did not reappear and I regret to say has not since been seen.

The Acute Case.—Past history—menses began at twelve years of age, were always regular and painless, and lasted from three to four days. She had always been an exceedingly healthy girl. At the time of labour she was thirty years of age, primipara, and had been married ten months. The nine months previous to the onset of labour were uneventful.

History of Illness.—Labour pains began on the evening of August 12th, 1903, and were continuous throughout the night, the membranes rupturing early on the following morning. At 4 p.m., ether was administered and forceps applied. The delivery, a tedious one, was not attended with any complications other than a rather severe laceration of the perineum. Immediately after delivery my attention being given to the infant the fundus was controlled by the anaesthetist, who reported the uterus firm and contraction good. Some twenty minutes later the placenta came away without undue pressure on the fundus or traction on the cord. After delivery of the placenta, the fundus was controlled by myself for about five minutes, when, the anaesthetist having departed, it was entrusted to the care of the nurse while the perineum was being repaired. There was little or no vaginal hæmorrhage at this time. A few minutes later the patient complained of feeling weak and began to yawn. On examination, she was found to be in a state of collapse. Her face was blanched, the radial pulse was absent and the fundus was considerably above the umbilicus. At midnight she was still speechless, only semi-conscious and her heart's action could not be detected with the stethoscope. On the events immediately following I shall not dwell. Convalescence was slow. For three days the fundus appeared to remain about stationary and the lochia were almost absent. From the third to the fifth day the fundus gradually receded until it was below the umbilicus, and a sero-sanguineous discharge was observed escaping from the vagina. By the fifth day the temperature had gradually risen from subnormal to normal and the pulse had gradually decreased to about 100. From the fifth to the seventh day the temperature varied from normal to 100 2-5, and the pulse from 96 to 112. On the afternoon of the seventh day the temperature rose to 101, and the pulse gradually increased to 140. The lochia remained about the same, were very scanty, sero-

sanguineous in character and no clots were expelled, but on the seventh evening a fairly large clot was removed from the vagina.

From the seventh to the tenth day the pulse varied from 120 to 140 and the lochia became profuse, sometimes bright red and at other times dark in colour. Several clots were expelled. During the next ten days, the patient's condition was very changeable and her pulse irregular, varying some days from 88 to 120. But altogether there was a steady improvement in her condition and she felt very well. Yet the hæmorrhage was rather profuse and very puzzling. As the fundus could not be felt in the abdomen it was thought to be fully involuted and no vaginal examination was made. About the twenty-fifth day, the patient complained that "the stitches were hurting her," that she felt as if something were pressing on them. The condition of the perineum was, however, considered sufficient explanation for any discomfort felt in that locality. Throughout the following week the hæmorrhage greatly decreased, yet the patient still complained of pain and pressure in the vagina. An examination was then made and the diagnosis established. The vagina was entirely filled with a pear-shaped mass, from the end of which a small tumour, about the size of a pigeon's egg protruded. The patient was then removed to Dr. Lockhart's hospital, and I am indebted to him for the privilege of reporting the surgical treatment of the case. Under an anæsthetic, careful and persistent, but unsuccessful attempts were made to replace the uterus by manual reposition. The following operation was then performed:

OPERATION.

With the patient in the lithotomy position, the vagina and surrounding parts were exposed and sterilized. As handling the mass caused profuse oozing from the general surface, hot cloths were wrapped around it, and ineffectual efforts to replace it by taxis were made. Each lower lateral corner of the uterus was grasped by tenaculum forceps and downward traction was made. The anterior vaginal wall was then transversely incised just where it was reflected off from the cervix, and, after pushing the bladder out of the way, the uterine wall was exposed. A vertical incision was made through the whole thickness of the anterior wall of the uterus in the middle line from the external os to within half an inch of the tip of the fundus, and even this half inch was invaded in order to shell out a small fibroid tumour. The peritoneal cavity was thus opened and the uterus re-invaginated, that part which was near the roof of the vagina being reduced first. Downward traction was now

made on the uterus by means of tenaculum forceps attached to the cervix on each side of the incision. The two halves of the divided wall of the uterus were then brought together by two rows of interrupted catgut sutures, after which the vaginal incision was closed by a continuous catgut suture and the uterus and vagina were packed with gauze.

Out of the case which I have just reported several interesting questions arise:

First—When did inversion occur?

Second—What was the cause of it?

Third—Could it have been avoided?

Fourth—Was the treatment employed the best possible under the circumstances?

I. It has been stated that during the first few days the fundus could be well defined and remained stationary, and that there was practically no vaginal discharge. One might infer, therefore, that inversion did not begin until after that period. From the third to the fifth day, however, the fundus had descended below the umbilicus and there was a sero-sanguinous vaginal discharge, and, as the temperature and pulse rate had slightly increased by the fifth day, in all probability the first degree of inversion took place about that time.

Again, on the evening of the seventh day, the temperature arose to 101, and the pulse to 140, and a large clot was removed from the vagina. It is likely, therefore, that the second degree took place about that time. Had there been any greater degree of inversion than this on the seventh night, the fibroid tumour could have been felt while the vagina was being explored and the clot removed.

Again, it has been stated that during the three succeeding days, the pulse varied from 120 to 140, and the vaginal discharge became profuse and clots were expelled. And that from the tenth to the twentieth day the temperature and pulse were very irregular and the vaginal discharge unaccountably profuse. One may conclude, therefore, that from the seventh to the twentieth day, the third degree (complete inversion) was slowly and gradually taking place.

II. What was the cause of it? In answer to this question, I submit two theories for consideration. First, from the fact that, in all probability, the uterus was completely exhausted from twenty-four hours of almost continuous contraction previous to delivery, in this exhausted condition, it might easily collapse, slip from the nurse's hand and quickly fill with blood to its utmost capacity. Stephenson, of Aberdeen, has stated that "in a state of simple relaxation the uterine muscle is passive and offers no resistance to extension, provided there is an extending

force." One has then to deal with a uterus, the walls of which are practically paralyzed from exhaustion and over-stretching. Now we know, that at the time of the ballooning of the uterus, there was practically no vaginal hæmorrhage. This fact might lead one to conclude that the hæmorrhage came chiefly from the fundus, because, had it come from the lower part of the uterine wall, it would surely have poured into the vagina, or having become clotted, have arrested the hæmorrhage altogether by pressure. Let us assume, therefore, that the hæmorrhage did come from the fundus. Moreover, two facts are worth remembering in this connection, viz:—

First, the source of post partum hæmorrhage is chiefly from the site of placental attachment.

Second (again quoting Stephenson), the placental site is that portion of the uterus where the process of retraction is least advanced. It is safe to conclude, therefore, that the softest portion of the uterus in this case, was that part, to which the fibroid tumour was attached. Bearing these facts in mind, together with the knowledge, that the uterine walls were to some extent supported by the blood clot, one might easily believe that this soft inert portion of the uterus, with its attached tumour, would naturally drop into the uterine cavity as soon as there was room for it, and as the space increased below, so likewise would the depression increase above, until it had descended too far to retreat, when its very presence would act as a stimulus to cause contraction of the uterine walls, after which it would be forced gradually downwards into the vagina. Moreover, intra-abdominal pressure may have assisted somewhat in the process.

With regard to the second theory, while I do not claim for it the whole cause of the inversion in this particular case, it may possibly have proved a factor in its causation. Consider a uterus filled with clotted blood and which is temporarily, at least, rendered inert, to the fundus of which, internally, is attached a fibroid tumour. Later this clotted mass becomes organized, contracts, and serum is liberated, which, being thinner than the organized mass, would naturally take the course of least resistance towards the cervix. Now, when one remembers that during the first three days after delivery, there was practically no vaginal discharge, the inference is, that there was obstruction of the cervix, due either to contraction of the uterus at that point or to impaction of the clot. Moreover, although active contraction was absent, retraction is ever present and continuous, and when once established, is permanent (Stephenson.) It is not an expulsive force, but may expel fluids free to move. It gathers the walls around and moulds them to the form of whatever is

within the uterus. The uterine wall would thus be kept in close contact with the organized clot, preventing the entrance of air. Therefore, as soon as the clot began to contract, a vacuum would tend to be formed in the upper portion of the uterus, into which the fibroid tumour, together with that inert portion of the fundus, (the site of placental attachment) would readily be drawn. Then as the clot descended, the fundus would be drawn down after it. Later the lower uterine wall, having regained in some measure its tonicity, might contract on the inverted fundus and assist in gradually forcing it down into the vagina.

Now, if one cannot find in either theory a satisfactory explanation of the cause of this inversion, perhaps, by considering both together, one might accept them as a reasonable solution of the problem.

With regard to the third question.

III. Could the inversion have been avoided?

Out of this question arises another, viz:—

Was the inversion entirely due to the post partum hæmorrhage, or would the accident have happened in any case? Notwithstanding the fact that for half an hour after delivery the uterus was well contracted, we know that after a contraction has subsided there follows the quiescent state of relaxation. During this state the blood pressure which refills vessels emptied by the contraction, might it itself be sufficient to enlarge the muscle walls to an alarming extent in an exhausted uterus. But would this expansion be sufficiently great, the predisposing cause being present, to cause inversion, or would the fibroid tumour attached to the placental site alone be sufficient to cause inversion? These are difficult questions to answer. On the other hand, if we assume that the post-partum hæmorrhage was really responsible for the accident, even then could the inversion have been avoided? And what methods might have been employed with this end in view?

First—The uterus might have been grasped with both hands, the blood rapidly expressed, and an attempt made to knead down the fundus, and by friction stimulate contraction.

Secondly—One hand might be introduced into the uterus and kept there until the external hand had regained its grasp on the fundus, when, by kneading and moulding between the hands, the cavity would gradually lessen, and the internal hand be slowly forced out; after which friction should be kept up for some time by the external hand. These methods were considered at the time, but the patient's condition was thought to be too critical to justify one in making the attempt. I cannot but feel, however, that had the control of the fundus at first established been maintained, the accident would not have occurred.

IV. Was the treatment employed the best possible under the circumstances? At the time of the post-partum hæmorrhage the foot of the bed was raised, subcutaneous and rectal salines were given, and the patient kept perfectly quiet with fairly large hypodermic injections of morphine, and moderate doses of strychnine administered. After twenty-four hours the morphia was discontinued and the stimulants increased, and I still think that this course was a wise one.

TREATMENT OF THE INVERSION.

As previously stated, manual reposition was unsuccessful. Repositors were not tried, but I do not think they would have proved a success, as the uterus could not be reinvaginated even when the cervical ring was incised, but only when the incision was carried up to the fundus.

With regard to the operation.—The anterior was chosen in preference to the posterior operation, because in it one has a much better view of the field of operation, hæmorrhage may be detected and controlled much more rapidly and the uterus can be sutured with less difficulty.

In conclusion, I may state that the treatment was successful, recovery without incident, and the patient has enjoyed the best of health since.

AUTO-TOXÆMIA OF PREGNANCY.

BY

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In bringing the subject of auto-toxæmia of pregnancy before the meeting, it is not my intention to take up your time in a scientific discussion of the question, for, as a matter of fact, it is a long distance to the last word, and it is far too vast a subject to consider fully in a paper of fifteen minutes, but rather I wish to consider it from the clinical side. Briefly: What is the condition due to? What conditions commonly met with are due to it? How may we recognize it? How may we treat it with success? Also, I should like to encourage discussion of a subject that is second to none in importance, in the practice of the general practitioner.

Formerly but few,—and I am sorry to say, from my personal observation, the vast majority of our profession to this day—paid a tithe of the necessary attention to the pregnant woman before her confinement. Possibly a large share of this want of attention is directly due to the carelessness or ignorance of the woman herself. The fact that the woman looks upon pregnancy as a natural condition, which should occur without undue trouble, as in the case of the mother of the past, is also responsible

to a large degree for her attitude in the matter. The facts are that in civilized countries, and especially in cities, labour is really becoming more of the nature of a severe surgical operation, as dangerous as appendectomy, if not more so. It has been stated that in large cities, the death rate is from 10 to 15 per cent., and in well conducted maternities, where there is the opportunity for the woman to receive the special surgical treatment required, it is one-half of one per cent.

What is the cause of auto-toxæmia? To put it briefly, the growing belief amongst those engaged in the scientific work on the subject, is that it might really be called "placental indigestion," faulty interchange at the placenta, causing the retention of poisonous matter in the mother's blood. It may possibly be that an unhealthy uterine mucosa at the time of conception is the primary cause. It is claimed by some, that many, if not all, women suffer with a slight degree of auto-toxæmia at the menstrual period, and we come across cases where the blinding headache, severe vomiting, and depression, are present every month and are looked upon as signs of auto-toxæmia.

What clinical conditions result from the auto-toxæmia? Whatever the true cause may be, we find certain and almost invariable results. Probably the best authority to-day is Dr. C. Edgar, who divides the subject into regional or, according to the organs attacked, as hepatic, renal, splenic, or cerebral; or, and as I believe, more usefully, from a clinical standpoint as regards duration and intensity into fulminant; acute; sub-acute; chronic; and benign.

THE FULMINANT type as expressed by acute yellow atrophy of the liver may cause death in twenty-four hours and some of the sudden deaths in the gravid.

ACUTE TYPE usually described as of three stages. The first stage which Edgar terms premonitory, consists of prostration, headache and vomiting, which may pass unnoticed into the second stage, where the nerve centres are involved. This may pass into the third stage, apathy, coma, and death, and often without convulsions having been present. Here the liver is usually, if not always, seriously affected, according to Ewing, and the type is markedly fatal, if not always so.

THE SUBACUTE TYPE.—This is the type we meet with most often and here death is not inevitable, and indeed, if the necessary care has been taken, need, I think, rarely occur. The chief clinical conditions are eclampsia, hyperemesis, ante and post-partum phlegmasia, pulmonary embolism, and increased liability to sepsis. The liver is usually damaged more or less, and the pregnancy kidney is frequently found. Klein asserts that the pregnancy kidney is only found when the thyroid does

not develop its usual hypertrophy. In this type, I believe, we can early detect the onset of this condition and by proper treatment carry the woman and her child to full term safely.

THE BENIGN TYPE.—This includes the petty morbidity of pregnancy as evidences of slight toxæmia, pruritus, perverted tastes, etc., and the maternal organism is able to throw it off.

It is now certain that the foetus is affected as much as the mother by the toxæmia, and with less resisting power it dies in many cases within a few hours or days of its birth, the mother recovering. It becomes difficult for the physician to explain why a healthy looking child should die with no cause apparent to the family.

What proportion of women suffer with toxæmia? Taking a healthy woman of 120 pounds, she should excrete say 472 grains of urea daily. The quantity of toxins excreted daily we have no method at present of calculating. We do not even know what they are, but clinically, we find that women excreting about 472 grains of urea daily, will excrete a normal amount of the toxins, and as the quantity of urea excreted is diminished, so is the quantity of toxins diminished, so that clinically all that is necessary to do is to examine the urea quantitatively with the Doremus ureometer and the hypobromate of soda solution. The following table is taken from the last 200 cases in the Women's Hospital:—

| | | | |
|---------|----------------|----------|----------------|
| Over | 400 grains | 35 cases | 17.5 per cent. |
| Between | 350-400 grains | 26 cases | 13 per cent. |
| Between | 300-350 grains | 37 cases | 18.5 per cent. |
| Between | 250-300 grains | 29 cases | 14.5 per cent. |
| Between | 200-250 grains | 36 cases | 18 per cent. |
| Below | 200 grains | 20 cases | 10 per cent. |
| Below | 150 grains | 13 cases | 6.5 per cent. |
| Below | 100 grains | 4 cases | 2 per cent. |

200

This table shows that a much larger number of women suffer with toxæmia in varying degrees than one would suppose. In the 200 cases there were 17 per cent. of the cases with albumen varying from a trace which, on treatment, disappeared, and in other cases a grave quantity. We also find that in cases where there is considerable diminution of urea, say 100 to 150 grains for a prolonged period, the toxins seem to be stored up and suddenly may produce acute or subacute types, as eclampsia, and that without the kidney having shown any sign of being affected up to the time of the first convulsion. Therefore, the usual, and in most

cases the only examination of the urine which is made, is for albumen, which is not only deceptive of the condition present, but relying on it, our patient may become gravely, if not fatally, ill before we are aware of it, and if she should survive, she often does so with seriously damaged kidneys. So strongly do I feel this, that if a waiting patient in the hospital develops eclampsia, I hold the staff to blame, as they could have foreseen the probability of such a condition setting in and treating it prophylactically. It has only happened once to my knowledge in the hospital, and then it was due to carelessness. If eclampsia occur either the doctor or the patient, and usually the latter, is to blame from either carelessness or ignorance of the necessity of ante-partum examination and treatment.

We may meet with toxæmia at least as early as the third month. In hyperemesis gravidarum, I believe that we have in most cases an auto-toxæmia grafted on to an existing emesis, causing a simple condition to become grave.

How may we best treat auto-toxæmia? In slight diminution of urea before severe signs arise, I stop meat, and give chiefly milk diet with salines, following small doses of calomel, and find very often the condition greatly improved or it passes off altogether. I know of no other successful treatment for severe cases of diminution of urea, except that for threatened eclampsia, hot packs, saline purgatives, skim milk diet and iron and digitalis, and often rest in bed is required. The effect of such treatment will be seen in the following cases in three days time:

| | | | |
|----|-------------|-----------------|------------|
| 1 | 174 grains. | After treatment | 325 grains |
| 2 | 153 grains. | After treatment | 209 grains |
| 3 | 220 grains. | After treatment | 483 grains |
| 4 | 186 grains. | After treatment | 316 grains |
| 5 | 175 grains. | After treatment | 260 grains |
| 6 | 185 grains. | After treatment | 342 grains |
| 7 | 129 grains. | After treatment | 310 grains |
| 8 | 139 grains. | After treatment | 352 grains |
| 9 | 186 grains. | After treatment | 341 grains |
| 10 | 139 grains. | After treatment | 349 grains |

The hot packs were alternated with the saline purgatives and the urine tested every two or three days, until marked improvement occurred. Of course, clinically, we get in severe and advanced cases of deficiency of urea, the usual prodromata of convulsions in addition, severe headache, spots, sparks or flashes of light, sciatica, a most marked sign with many, and often a severe pain over the epigastrium. There may be general

anasarca also present, or only the feet and ankles affected. If you ask a patient who has been under treatment for deficient urica, how she feels, say after one week's treatment you will require no world-renowned authority to convince you of the correctness of your diagnosis or treatment, nor your patient of what you have done for her.

We also find that in cases in which there has been marked deficiency of urea, the orderly mechanism of labour is upset and the case is slow and often ended only by forceps. The after effects of this auto-toxæmia are more common than is believed. If the liver is examined, there is diminished liver dulness; the patient is pale or even jaundiced, stools are pale or even putty-coloured, and diarrhœa is frequently present. If the conditions are not as severe as here pictured, the patient, I find, is a long time in recovering her usual health.

Another important point is that, if the patient becomes pregnant within, say a year or so, the next pregnancy shows increasing signs of auto-toxæmia, and several years should elapse before pregnancy can safely be undertaken.

Such cases, if they become pregnant, should be warned by their physician of the necessity of being properly taken care of during the term of pregnancy, and frequent analyses of urine made. If the case is rapidly becoming worse and the pregnancy kidney developed, I think that emptying the uterus is the safest and best course.

In conclusion, I wish to specially emphasize the fact, that if eclampsia or other toxæmia condition occur in a case under our care, when the woman has been willing to do whatever we advise, the responsibility rests upon us, and is a reflection on either our knowledge or our care of such a patient, for, in the vast majority of cases, preventive treatment is curative.

I think that we meet with deficiency oftener in cities than it is met with in the country, although it certainly does occur in the country to my knowledge.

CÆSAREAN SECTION.

BY

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Cæsarean section is a classical operation. It was performed by the ancient Greeks after the death of the mother. Among the Romans it was decreed that no pregnant woman should be buried until the child had been delivered by abdominal section, and the name Cæsar was given to

all children born in this way. Jacques Nufu, in 1518, a shoemaker, I believe, by trade, was the first man to perform the operation on a living woman, the patient being his own wife. Rousset, in 1581, wrote a treatise on the subject. Libias, in 1769, was the first to close the uterus by suture. Polim, of Kentucky, in 1828, was the first to carry out this method in America, using silver wire to close the uterine wound. Surgical technique of the present day has robbed the operation of most of its terrors, and instead of a mortality rate of 60 to 80 per cent., as given by Schroeder, in 1874, we have now almost eliminated death in these cases, when done at a selected time and by rapid and competent operators.

INDICATIONS.

The indications for Casarean section are absolute and relative. They are absolute when delivery by the natural method is impossible. They are relative when the choice lies between this and other procedures, such as induction of premature labour, turning, forceps, symphysiotomy, or craniotomy. Indications are absolute with the living child in a flat pelvis of a conjugate of 6.5 centimetres or less, or in a generally contracted pelvis of 7 centimetres or less—or in case the child is dead with a pelvis of 5 centimetres or less. Indications are relative with a conjugate of 7.5 centimetres with a living child. When the conjugate is less than 7 centimetres, symphysiotomy is a more hazardous operation. Turning should never be attempted with a conjugate less than 8.5 to 9.5 centimetres. As to the time at which the operation should be performed, I believe it is better to anticipate labour by a week, in order to make proper preparation for the case, to select proper assistants, and properly prepare the patient if possible. Should labour set in, operation should be performed at once, as each hour of labour increases the risk of rupture or infection. Results are better in cases of early operation. Two operations are performed: (a) The Conservative Sanger-Cæsarean; (b) The Radical Porro-Cæsarean.

After the usual preparation for laparotomy, the patient is anæsthetized and the cervix is dilated up to two fingers; vagina is washed out and filled with sterile gauze, which is removed after the operation, and a sterile pad placed over the vulva. A six-inch incision is made in the middle line over the most prominent part of abdomen, beginning above the umbilicus. Sterile pads are packed around the uterus which is held up by an assistant making pressure at the side. The placenta is felt for and the incision in the uterus is made to avoid it if possible. The child is quickly seized by the legs and withdrawn, the cord being clamped and cut. If bleeding from uterus is severe an assistant compresses the uterine arteries. The placenta is rapidly removed, the uterine cavity sponged

out, and sutures rapidly placed in the uterus. Sutures always control the bleeding. Chromic gut sutures penetrating down to the muscosa are tied separately. A few superficial stitches and a continuous peritoneal suture closes the uterus. The abdomen is flushed out and closed by the usual three layers of sutures. If the radical operation is to be performed, instead of saturating the uterus a few clamps are applied to the cut edges, and the usual operation for hysterectomy is done. The mortality rate is very small in ordinary cases. I have now performed this operation fifteen times without a death. These cases have been done at varying times before and after labour had set in, and sometimes after ineffectual attempts have been made at delivery. I have selected a few case reports as indicating different conditions met with.

Case 1.—Fibroid tumour and hæmorrhage complicating the pregnancy.

Case 2.—A generally contracted pelvis with labour just beginning.

Case 3.—A generally contracted pelvis of the male type operated on after attempts had been made to deliver with forceps.

Case 4.—Cæsarean section after rupture of abdominal wall and escape of abdominal contents.

REPORTS OF CASES.

Case 1.—Mrs. W., aged 30 years, last regular menstruation five months ago, has since had two hæmorrhages, last one a few days ago. One year ago she consulted me for a swelling in the abdomen, and menorrhagia. On examination a diagnosis of uterine fibro-myoma was made and hysterectomy advised. The patient put off operation and has now returned believing herself pregnant. Patient gives a history of a sudden cessation of menstruation five months ago followed by the usual signs of pregnancy. At three months she had a slight hæmorrhage which was controlled by rest in bed, and morphia administered hypodermically. A few days ago she had rather an alarming hæmorrhage and was sent into the hospital for operation. On examination the large fibroid was found filling the pelvis, and an enlarged thin walled uterus above containing a foetus. No foetal heart sounds could be made out and patient maintained that no life had been felt for two weeks. Porro-Cæsarean operation and the situation explained to her with reference to future pregnancy. growth completely filling the pelvis, with the foetal sac high up above it. The placenta encroached on the fibroid area from which some stripping had occurred explaining the hæmorrhage. The patient made an uninterrupted recovery, leaving the hospital in three weeks.

Case 2.—Mrs. C., aged 25, primipara. Sent in from maternity hospital at onset of labour. A generally contracted pelvis. Conjugate 6.5

centimetres, rickety English immigrant. Patient was prepared for operation and the situation explained to her with reference to future pregnancy.

At her request a Cæsarean operation was done and tubes removed as she did not wish to take the risk of future pregnancy. The ovaries were not removed. The child was a vigorous nine pound child, and mother and child left hospital at the end of three weeks.

Case 3.—Mrs. E. B., aged 40 years, primipara; admitted to hospital after being 36 hours in labour. Ineffectual attempts had been made to deliver with forceps. On examination, the vagina showed signs of severe bruising. Liquor amnii and blood coming away. Head firm, high up, and not engaged. Conjugate estimated at 6.5 centimetres. Pelvis rigid. Coccyx firm. After a rapid preparation of patient, Cæsarean section was performed. The uterus did not contract well, so a hot sponge was left in to be removed next morning per vaginam. On examination of interior of the uterus it was interesting to note the result of the severe efforts made to deliver with forceps. At the level of the inner os or slightly above it the muscular and mucosal tissue had been completely severed by the pressure of the head on the pelvic bones and cervical portion was apparently held only by the peritoneum.

Case 4.—Is one of unusual interest. Mrs. E. C., aged 42; multipara. Two labours previously, both very severe forceps cases. Her family physician was called hurriedly on the morning of November 5th. On arrival at the house he found her suffering from considerable shock with a large amount of intestine protruding from her side. The patient was vomiting and straining, and more intestine was coming out at every effort; a large hypodermic of morphia was at once administered, as the doctor expressed it, "to prevent her forcing the liver out, as she had everything else except a pregnant uterus outside." The intestines were covered with hot dressings, a binder applied, and the patient put on a train for the hospital. Owing to railway delays she arrived at hospital thirteen hours afterwards.

She gave a history of having a large inguinal hernia, which had been operated on unsuccessfully two years before at St. Bartholomew's Hospital, London, on which she had since worn a truss. As pregnancy advanced she had discarded the truss, substituting a binder therefor. On the morning of the accident she had been doing her usual work when pains commenced, and her expected labour began. She had a very severe cold, coughing and sneezing a good deal. She was coughing and vomiting when she suddenly felt something give way and became very faint. She knew her abdomen had ruptured as the bowels fell out, so she got

into bed, covered the intestines with an old night shirt, and sent for the doctor. The woman reached the hospital in a critical condition. Temperature sub-normal, pulse 128, very thready, face anxious, extremities cold, showing considerable shock. She was immediately put under an anæsthetic. On the binder and dressing being removed, she presented an appalling sight. A full term pregnant uterus, a ruptured abdominal wall, a huge mass of black, lymph-covered, intestine, larger than a common pail, which covered the left lower abdomen and thigh, hanging down to the table, made a picture not pleasant to look at. The intestine was flushed off with hot water, and covered with hot towels. The abdomen was then rapidly opened in the middle line and Cæsarean section made. A child was delivered alive, and the incision closed as rapidly as possible after sponging out the abdomen. Thanks to good assistance this was finished in fourteen minutes, and then the inguinal ring was incised, the intestines separated, cleaned and returned to the abdominal cavity, which was flushed out and left full of hot saline. The inguinal ring was closed with kangaroo tendon, and the patient returned to bed. She was rather badly collapsed, but picked up rapidly after an intravenous injection of hot normal salt solution. She made an uneventful recovery, except for a broncho-pneumonia, which she developed on the fifth day. However, she left the hospital with her baby at the end of the fifth week.

CONCLUSIONS.

1. Cæsarean section is a much less dangerous procedure than we considered it a few years ago.
 2. Rapid operation is a great factor in these cases.
 3. Early operation, if possible, before exhaustion of patient or rupture of uterus.
 4. Advisability of careful examination of all obstetrical cases by the family physician, especially with cases where there is a possible rickety history.
 5. Cæsarean section is a much safer procedure for mother and child than a high forceps operation.
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THE

Montreal Medical Journal.

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

EDITED BY

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THE TUBERCULOSIS EXHIBITION AT WASHINGTON.

Despite certain adverse criticisms on the part of some of the delegates to the meeting just held in Washington, with regard to the success or otherwise of the meetings held there, there is, I think, but little doubt in the minds of the vast majority of the individuals who had the good fortune to be present, that such a conference must result in the greatest possible good to the world at large, and particularly to Canada and the United States.

With regard to the deliberations of the various sections, and the papers presented, there is naturally always a possibility that the most important facts will not be appreciated at the time of their presentation. With regard, however, to the teaching of the multitude of facts and figures presented to the eye by means of charts, diagrams, photographs, models, etc., in the exhibition, but one statement, I think, is generally made; that is to say, that the impression received was, in the majority of cases, most illuminating and stimulating to one who has not spent a special amount of time during the last three years in noting the progress made throughout the world in the anti-tuberculosis campaign.

The evidence of effective work carried on by voluntary societies, by large and small municipalities, and by governments, was little short of marvelous. Some forty odd societies, representing work carried on in all parts of North and South America, and throughout almost every

country in Europe, presented exhibits showing the work which had been carried on by them. These societies were entered into competition with one another to show who had been successful among voluntary societies in carrying out the most successful campaign against the White Plague. Thus, Uruguay came in competition against Boston. Small societies in Providence or British Columbia, attempted to show that their work had been as effective as that carried on by New York State, or the committee upon tuberculosis of the Charity Organization Society of New York. Again, Sweden and Ireland, with their short lived campaign, showed how favourably their work had compared with the work carried on in other parts of the world by young and old societies, by societies spending fifty and sixty thousand dollars a year, and societies spending little more than a thousand a year.

The judges in charge of this competition, of whom the writer was one, had thus an extremely difficult task before them. That the circumstances under which societies in Europe and America were working was appreciated as being very different, was shown by the decision on the part of the judges to divide the first two prizes, making the Women's Health Association of Ireland, and the New York Charity Organization Society divide the honours of the first place, and each to get \$500.00 of the \$1000.00 prize money. The second place was divided between the Swedish Association for the Prevention of Tuberculosis, and the Boston Association for the Relief and Control of Tuberculosis. In the same way Hungary demonstrated effective work, which was considered equal with that of smaller societies like those in Cleveland and Providence, each of these receiving silver medals. Other societies doing excellent work, and honourably mentioned by this committee, were the District Nurses of Philadelphia and Baltimore, and the Maryland Association for the Relief of Tuberculosis.

Although this one aspect of the Exhibition proved an almost inexhaustible source of interest and information, this part of the work, however, was in reality but a small portion of the exhibit. Thus, architects from different countries, in both Europe and America, submitted plans for hospitals, dispensaries and sanatoriums. Germany presented a most interesting exhibit of excellent plans and several well executed models showing a new method of constructing hospitals in tiers of gradually diminishing size, so that the sun porches of one story should not interfere with the sunlight of the story beneath. A similar plan will probably be made use of in the construction of the new Henry Phipps Institute in Philadelphia, the preliminary architect's plans of which were also exhibited along with a very fine model.

One aspect of especial interest, possibly on account of its novelty in this part of the country, was the interest which had been shown in many places on the part of the labour unions and other trade societies. In Germany, of course, the method of compulsory insurance of the workmen has tended to develop this interest to a marked degree, it being a matter of personal interest to both employer and employe to see that the lives of the individual workman be prolonged as much as possible. The result has been, throughout Germany, a most complete system of hospitals and sanatoriums for the treatment of the various forms of tuberculosis. But not only in Germany has this interest on the part of the workmen been put to practical use.

The United Printers' Union maintains a well organized Sanatorium at Colorado Springs, for the treatment of the members of that body. Although no such complete method has been adopted by other trade societies, in a great many places the leagues and associations are receiving very substantial help from the labouring classes through their assistance. In Hartford, Conn., a most unique method of interesting both the labouring man and his employer, has been made use of, and had been found to be of definite value. The Hartford Working Mens' Society for the Relief of Tuberculosis, is the name now adopted by this society, which commenced as The Working Mens' Club. This society is composed of a large number of units, each unit representing the staff of some manufacturing concern in Hartford. The society has a well maintained hospital for the isolation and treatment of tuberculosis, the expenses of which are paid for by the various units in proportion to their size. The funds supplied by these units or individuals houses are procured jointly from the men and from the employers, the employers being willing in every case to duplicate the subscription taken up by the men in the works. The result is, that a condition of affairs more or less approaching that in Germany, has been arrived at. The men and the employer both have financial interest in the welfare and health of the individual worker. Here as elsewhere has been found that the prevention is better than the cure, and marked improvement in sanitation, lighting and ventilation, disposal of sputum and so on, has been noted in many of the factories, for if a factory is not itself making demands upon the hospital they are only to a small extent liable for contribution to its support.

Mr. Hatch, of Mass., in an address to the lay workers in connection with the tuberculosis societies draws attention to the fact, that it is only by a multiplication of the efforts against the disease that it can be successfully handled.

That the various social and economic organizations already existing are able to materially assist in the campaign is shown by the excellent work demonstrated by the societies already mentioned, by classes held in connection with various charities and clubs, and by the numerous advancements made as the result of earnest endeavour on the part of those in legislative power, although these smaller societies are necessary for the complete eradication of the disease, their work is only of value if under the careful supervision of experienced workers. That this supervision should be controlled by the various governments was undoubtedly the suggestion of the majority of the exhibits at the conference. Evidence of excellent work already accomplished, was also supplied by many State and Municipal Boards of health. Possibly the most complete in this way is that in New York City. Here the problem before the authorities is probably the most difficult of that presented anywhere in the world, for nowhere else does congestion exist to the same extent.

Despite the special difficulties under which the New York authorities are working, the result of their campaign has been most gratifying to those in charge, amongst whom the greatest credit is due to Dr. Hermann S. Biggs and his staff. During the past eighteen months they have been successful in passing laws making isolation for advanced cases of tuberculosis, which are unable through poverty or ignorance, to render themselves harmless to their friends compulsory. It is needless to say that there is an adequate provision made for the housing of these cases. At the same time the apparent harshness of this rule, which precludes any return of the individual, during life, to his old haunts, is largely mitigated by the fact that in most of the cases, the helpless and poverty stricken wretches are only too willing to accept such relief. In no better manner can the gradual progress in this direction be impressed than by means of the charts, diagrams, and photographs, showing the particular working of the methods of both the health department itself and the Tuberculosis Committee of the New York Charity Organization Society.

Numerous occasional, though valuable methods of dealing with the disease are, in an exhibition of this kind, brought prominently before the observer's attention. Among these more novel methods of treatment, is that initiated by Dr. Joseph Pratt, of Boston, during the last two or three years. The increase in the earning capacity of the members of this class, together with the extremely satisfactory rate of improvements and the large proportion of cures and arrests of the disease, makes a very interesting demonstration. We are indeed fortunate in

our prospect of having Dr. Pratt with us at the time of our own exhibition, along with the same exhibit shown by him at Washington.

Naturally the findings of the majority of observers with regard to the importance of infection of the children with bovine tuberculosis, through the medium of milk from tuberculosis cattle, has given a special impetus to the subject of pasteurization. As a result, the excellent exhibit of Mr. Nathan Straus, of New York, demonstrated as it was by expert attendants, attracted more interest than it would probably have done twelve months before.

The dominant note of the exhibition, as of the Congress, was the eradication of the disease rather than the treatment. Among factors of value in bringing about this condition, the educational campaign seems to be in popular favour. Among the methods in the educational campaign, probably the most important in the long run, and the one which has produced the greatest results has been the exhibition. Large exhibitions have been held in practically all the larger cities upon both this continent and in Europe, and travelling exhibits have scoured the country, even down to the smallest hamlets. Probably the most extreme adaptation of this form of education, has been that made use of in Ireland, where by means of a large van similar to the Western Prairie Schooner, and drawn by several horses, the exhibition has gone from one village to another, photographs and diagrams being displayed upon the outside and inside of the canvas covering, the lecturer making his address from the back steps of the cart.

If the above notes have been successful in stimulating interest and giving information to those who have asked the question, "what is the purpose of a tuberculosis exhibition?" they will have performed everything for which they were intended.

A CAMPAIGN AGAINST TUBERCULOSIS.

When a city is growing rapidly, it is a reasonable expectation that permanent improvements be built upon a scale commensurate with the probable subsequent development of the city. To do less is not economy, but waste. So is it with this question.

The activity on all sides manifested in questions relating to tuberculosis, the recent Congress, the coming exhibition, the zeal of the league, Colonel Burland's splendid gift, all constitute a point of departure upon better achievement than we have hitherto attained. We must be careful that the steps we now take are the best in view of the much greater means we may have at our disposal in a few years. We must keep in view that ten years hence we may be conducting a much bigger fight than we are

at present. How should our present resources be expended to make them available to the highest extent hereafter, as part of what will then be a more extensive system? The first question that arises is: "Will private benevolence be required to do the work of stamping out tuberculosis? Or will the Government, federal or provincial or municipal, or all three together, undertake what is really their business?" Supine as our governments have been in this regard, we may reasonably expect that they will awake or will be awakened to their responsibilities. They alone can conduct the fight on the proper scale. Already an indication of movement on the part of the Quebec Government is the statement of the Premier, of his desire to appoint an advisory Royal Commission on the subject. In the meantime it behoves us now to use our funds so that any buildings we erect or funds we establish may be available to become part of any wider, national or other scheme that may be hereafter devised.

A city such as this should have a large organization, which should consist of a dispensary, which will govern the whole; it will have connected with it, sanitariums for curable cases, and a hospital for incurable cases. The central dispensary, ministered to by all the hospital "outdoors," will be the head office to which all cases will be reported; cases will be examined, classified, sent to sanitariums to be cured, or to incurable hospitals to die; it will also keep the individual history of houses where cases arise, and will attend to the disinfection of houses infected, and to the education of those in contact with the sick, as well as to the education of those cases which are not treated in any institution. With the growth of the community, other dispensaries would arise, which would remain outlying agents for the main dispensary, working with it. No small part of the work of such a dispensary in Montreal would be the education of the children in schools, and the constant encouragement of opposition to spitting, which is "the national vice of the Province of Quebec." Of all these functions, perhaps the greatest is that of education; this can be done only by beginning early in life, and never ceasing to teach people that neglected colds and such ailments may mean tuberculosis; that the existence of the disease can be determined only by careful examination; that such examination can be obtained, and that without it a physician's assurance, though well meant, is injudicious and misleading. People must be trained to consider tuberculosis as a probability, and to face the question, each in his own case. Only in this way can cases be reached at an early stage in the disease; and as the wider campaign is carried on, the scope of the sanitariums for curable cases is likely to be enlarged, and a time may come when the advanced cases requiring hospital treatment may be so well instructed that they

could be dealt with in their homes without being a menace to others. This last, we fear, will not be in our day, but, at least, we may be excused if we hitch our humble waggon to a star, because we must think of every step undertaken hereafter in Montreal, as part of a great and widely-acting system.

ORGANIZATION IN THE WEST.

The organization of the medical profession in Canada is progressing surely. Manitoba is the latest province to form a Medical Association which will affiliate ultimately with the Canadian Medical Association. The slow labour of those who founded the large body so widely and so well, is justified by the result, and we may hope in time to see in all the provinces strong associations working in harmony and bound together through the Canadian Medical Association.

At the organizing meeting, held in Winnipeg, October 8th, the profession was widely represented. Amongst the names of those present we find:—Drs. W. Rogers, W. Chesnut, R. G. Montgomery, H. A. Gordon, C. E. Coke, T. Beath, C. A. Mackenzie, Egerton L. Pope, W. A. Gardner, R. Renny Swan, W. K. C. Fisher, Walter L. Watt, Chas. A. Ritchie, R. S. McMunn, J. R. McRae, Geo. Hughes, R. Thomson, P. H. Miller, Harry J. Watson, W. R. Nichols, Fred. J. Hart, Hugh Mackay, W. Webster, J. McKenty, F. D. McKenty, H. E. Hicks, Geo. Clingan, Herbert P. H. Galloway, A. D. Carseallen, D. G. Ross, Raymond Brown, J. H. Leeming, J. A. MacArthur, F. S. Keele, J. R. Jones, R. J. Blanchard, H. J. McDermid, N. J. Maclean, James Patterson, H. H. Chown, S. W. Prowse, G. Beel, E. S. Popham, W. W. Moody, P. C. Macarthur, W. Harog Smith, J. R. Gunn, J. R. Davidson, Thos. Turnbull, F. C. A. Walton, John H. R. Bond, H. C. Norquay, J. W. Good, John Macdonell, Fred. A. Young, John P. Hooder, Jasper Halpenny, R. W. Kenny, D. S. Mackay, Robt. T. Rorke, S. C. Peterson, O. C. Meindle, W. A. Cluff, V. E. Latimer, E. Richardson, C. G. McGreer, E. A. Jones, E. W. Montgomery, C. C. McGlashan, C. W. Clark, Chas. E. Sugden, H. J. Hassard, Robert Mackenzie, C. T. Sharpe, J. O. Todd, T. R. Rochon, A. E. Walkey, Bertram Neild, S. J. Burrige, J. E. Coulter, J. S. Kennedy, R. M. Cumberland, Chas. Nanton, Geo. Henderson, Oscar C. Dorman, John A. Macdonald, P. Lachance, J. R. A. Lorimer, John S. Macheson, H. Jankes, G. E. Swallow, A. W. Allum, N. K. McIvor, J. A. Hamilton, R. Goodwin, J. A. McGuire, Adam Clarke, J. T. Whyte, C. H. Vrooman.

The following officers were elected:—President, Dr. J. R. Jones, Winnipeg; Vice-President, Dr. J. A. McDonald, Brandon; Second Vice-President, Dr. J. R. McRae, Neepawa; Secretary, Dr. Jasper Hal-

penny, Winnipeg; Treasurer, Dr. R. W. Kenny, Winnipeg; Executive Committee, Dr. Hicks, Griswold; Dr. Ross, Selkirk; Dr. Keele, Portage la Prairie; Dr. Specchley, Crystal City; Dr. Harrington, Dauphin; Auditors, Dr. Blanchard and Dr. Moddy, Winnipeg.

COLONEL BURLAND'S GIFT.

We welcome the announcement that has been made in the press that Colonel Jeffrey Burland has notified the League for the Prevention of Tuberculosis that he will give \$50,000 for the building and equipment of a new dispensary in connection with the work of the League. Colonel Burland has already made the purchase of a building and land in Belmont Park. A condition is attached to the gift that \$50,000 must be forthcoming from other sources for the endowment of the establishment, and it may be confidently predicted that this condition will be fulfilled. This generous donation is intended as a memorial of the giver's father and mother, and no nobler monument could be reared than one such as this; we congratulate alike the donor and the community.

Reviews and Notices of Books.

A TEXT-BOOK OF HUMAN PHYSIOLOGY, THEORETICAL AND PRACTICAL, by GEORGE V. N. DEARBORN, A.M., Ph.D., M.D., Professor of Physiology in the Medical and Dental Schools of Tufts College, Boston; Professor of the Relations of Body and Mind in the Sargent School for Physical Education, Cambridge. Lea and Febiger, Philadelphia and New York.

This book of 550 pages with numerous illustrations, is written in a pleasing and interesting style, and is well got up. A special feature is a chapter on "Mental Function," which discusses consciousness, feeling, willing, knowing, etc., from a physiological and psychological point of view.

It is a good book as far as it goes, but it does not go far enough. Such important subjects as nitrogenous metabolism, the functions of the liver, and voice production are practically omitted, for, while a page or two is devoted to each, the information given is not sufficient to be of any use to medical students.

We do not like the order in which the chapters are arranged. We think it a serious error of judgment to put the chapter on the central nervous system, which requires an advanced knowledge of anatomy, almost at the beginning. It is not even preceded by an account of muscle physiology, as is the case in Howell's text-book. Some of the most funda-

mental facts of muscle physiology are not mentioned in the body of the work at all, but are left to be gathered by the student from the practical exercises in the appendix.

This book is not, in our opinion, adapted to the needs of medical students, but might serve the needs of dental students fairly well. It is still better suited for students of psychology or for high school teachers or scholars. To the latter, the omission of important subjects here and there would not necessarily be a serious matter. W. S. M.

PATHOLOGICAL TECHNIQUE: A practical memorial for workers in Pathological Histology and Bacteriology, including directions for the performance of autopsies and for clinical diagnosis by laboratory methods by F. B. MALLORY, A.M., M.D., Associate Professor of Pathology, Harvard University, and J. H. WRIGHT, A.M., M.D., S.D., Director of the Pathological Laboratory of the Massachusetts General Hospital, Assistant Professor of Pathology, Harvard University. Fourth Edition, revised and enlarged: pp. 480, with 152 illustrations. Philadelphia and London: W. B. Saunders Co., 1908. Price \$3.00.

There is no better, more useful work of reference for the workers in the pathological and clinical laboratory than this, and each successive edition makes it better, more useful and more essential. Thus, the present edition has been brought up to date by the inclusion of the latest methods for differential cultures of the typhoid bacillus. It details Best's admirable method for staining glycogen, von Kossa's method for demonstrating lime salts, Klotz's modification of the same being duly noted, Sir A. E. Wright's method of staining bacterial vaccines, not to mention the very valuable methods devised by the authors: Mallory's for fibroglia, myoglia and neuroglia fibrils, and Wright's for the differential staining of blood platelets.

ANATOMY, DESCRIPTIVE, AND SURGICAL, by HENRY GRAY, F.R.S. 17th Edition. Revised and Re-edited with Additions, by JOHN CHALMERS DACOSTA, M.D., and ED. ANTHONY SPITZKA, M.D., Professor of Anatomy, Jefferson Medical College, Philadelphia. Illustrated by 1,149 engravings. Lea and Febiger, Philadelphia and New York, 1908.

"Gray," as a text-book, has always been a favourite with students. When Gray's Anatomy first appeared, it was a very distinct advance on the older text-books, especially in the way of illustrations. But of the original Gray, not a great deal survives. This is the seventeenth edition,

and each edition, especially the American ones, has been re-edited, added to, and altered, so that now we have a book of more than sixteen hundred pages, and large ones too. The fact that a new edition has been called for within two years, speaks loudly for the popularity of the work amongst teachers and students; but when is the increased matter in text-books on anatomy to cease? Yearly, they become more elaborate and more attention is given to detail. The poor student's brains do not increase *pari passu* with the amount of knowledge required of him, and what is to be the end—God only knows. These books will, perhaps, in the future be used as books of reference, and some concise, well written manual, deprived of verbiage and useless illustrations, will appear to relieve the burden of the overtaxed student. This new edition, as might have been surmised from the fact that Dr. Ed. Spitzka's name appears on the title page, has had the section on the nervous system largely re-written and new illustrations added. The edition is fully up to date and will continue to be considered as one of the best text-books in use in medical schools, though it has many rivals. We should like to ask why the names of the English editors, which appeared in the last edition should be omitted in this?

RATIONAL AND EFFECTIVE TREATMENT OF HIP DISEASE, by P. BRUCE BENNIE, M.A., M.D., Melbourne, Australia. 108 pages. London: Bailliere, Tindall and Cox. Canadian Agents, Carveth & Co., Toronto, 1907.

This little book describes the author's results in the treatment of tubercular disease of the hip by means of the Thomas' splint. The chapters on the description and application of the splint are excellent and clearly expressed. The author gives the methods of general and local treatment by which he has had the best results, and in this lies the value of the publication. The short pathological description and the discussion of other methods are quite elementary. The teaching is practically that of Thomas himself. A series of cases illustrating different types of the condition are cited in concluding a very practical publication.

ESSENTIALS OF REFRACTION, by THOMAS G. ATKINSON, M.D., Chicago. G. P. Englehard & Company, 1907.

According to the preface of this small book, it has been written expressly for the examining optician or, as the class is denominated in the United States, the refractionist. It deals in a superficial manner with the refraction and anatomy of the eye and is certainly not to be recommended to the student of medicine. The book is the production of a doctor of medicine and associate professor of physiology in the

American College of Medicine and Surgery, in Chicago. It is difficult to see how any graduate of medicine could bring himself to write the fifteenth chapter of this book, in which the author presumes to impart to the refractionist the differential diagnosis between various eye diseases and in certain cases advises the treatment to be followed. J. W. S.

DISEASES OF INFANCY AND CHILDHOOD: THEIR DIETETIC, HYGIENIC, AND MEDICAL TREATMENT.—A text-book designed for Practitioners and Students in Medicine. By LOUIS FISCHER, M.D., Visiting Physician to the Willard Parker and Riverside Hospitals, of New York City; former Instructor in Diseases of Children at the New York Post-Graduate Medical School and Hospital, etc., etc.; Fellow of the New York Academy of Medicine. With 303 Text Illustrations, several in colours, and twenty-seven full-page half-tone and colour plates. 979 Royal octavo pages. Extra cloth, \$6.50 net; half-morocco, \$8.00 net. Sold only by subscription. F. A. Davis Company, publishers, 1914-16 Cherry Street, Philadelphia, Pa.

Dr. Fischer's book has become such a favourite with the student as well as the general practitioner, that a second edition has been called for within six months. While there is evidence of careful revision, the general plan of the work has been maintained. It is essentially clinical in character, rather than didactic, and much stress is laid upon diagnosis and treatment. The author has decided views of his own as regards treatment, and states them frankly and fearlessly; the reader feels that in every chapter he is coming into personal contact with a clinician of wide experience and sound judgment. Few books, nowadays, have so little padding; few are so clear and concise. The case reports are numerous and well chosen; the illustrations are mostly original and add greatly to the value of the book. J. C. C.

PULSATING EXOPHTHALMOS, by GEORGE E. DE SCHWEINITZ, M.D., Professor of Ophthalmology in the University of Pennsylvania, and THOMAS B. HOLLOWAY, M.D., Instructor in Ophthalmology in the University of Pennsylvania. 6" x 9", 124 pages. Cloth, \$2.00 net. W. B. Saunders and Co. Canadian Agents, J. A. Carveth & Co., Limited, Toronto.

The object of this essay, as stated in the preface, is to compare the therapeutic measures, surgical and otherwise, which have been employed in the treatment of the cases which are analyzed, and to endeavour to determine from these analyses those surgical procedures which seem likely to prove of the greatest advantage in the control of the symptoms of pulsating exophthalmos. In addition to the review of the etiology, symptomatology, and pathogenesis of this affection, particular considera-

tion has been accorded to the orbital operations which have been performed for its relief, and to which Professor Sattler's comparatively recent paper on this subject has called renewed attention. As one would expect, the authors have done their work in a very thorough manner, and the profession is under obligation to them for a very comprehensive and up-to-date monograph on this interesting group of cases.

W. G. M. R.

A TEXT-BOOK OF SURGICAL ANATOMY, by WILLIAM FRANCIS CAMPBELL, M.D., Brooklyn, N.Y. W. B. Saunders & Co., Philadelphia and London. Canadian Agents, J. A. Carveth & Co., Toronto. 314 illustrations.

This is an excellent book. The author has presented the cold facts of anatomy in such a way as to make both interesting and profitable reading. The clinical value of anatomical facts are set forth in a lucid and thoroughly practical manner. The work is sure to meet with general favour: by the student and practitioner in mastering the essentials of practical anatomy, and especially by the active surgeon as a work of reference, in carrying out his routine daily work. The volume is of convenient size, well printed on good paper and liberally illustrated. The arrangement of the book is excellent for reference. The various regions of the body are considered and presented in six parts, each region or part being again subdivided into two or more chapters, according to the importance of the region under consideration. For example, Part I deals with the head and neck under ten chapters; Part II, the thorax, two chapters; Part III, the upper extremity, seven chapters; and so on to the end of the book. The author is entitled to much credit for the clear and interesting way in which he has set forth the clinical values of what are usually considered but dry and uninteresting anatomical facts. The book may well be considered as a companion volume to that most excellent work on operative surgery by Bickham, published also by W. B. Saunders and Company.

F. R. E.

Medical News.

ROYAL VICTORIA HOSPITAL.

Monthly report for September, 1908: Patients discharged, 327; patients admitted, 359; patients died, 17. Medical, 112; surgical, 148; ophthalmological, 22; gynæcological, 45; laryngological, 32. Out-Door Department:—Medical, 1,038; surgical, 626; eye and ear, 340; diseases of women, 200; nose and throat, 498; total, 2,702. Number of ambulance calls, 117.

Retrospect of Current Literature.

SURGERY.

UNDER THE CHARGE OF DRs. ARMSTRONG, BARLOW, ARCHIBALD, AND CAMPBELL.

ALEX. MORRISON. "On Thoracostomy in Heart Disease." *The Lancet*, July 4th, 1908.

To the internist of conservative tendencies, a title such as the above is apt to suggest no more than the vagary of some chance surgical mind, rather possessed by mere *rabias operandi* than possessing even that modicum of knowledge which is popularly supposed to enable its owner to be a surgeon. And yet, the two chief men who have advised operation in certain forms of cardiac lesion are both internists, of recognized ability and teachers.

Brauer, in 1903, then of Heidelberg, now of Marburg, recommended and had carried out an operation consisting in the removal of a certain area of the ribs over the heart, and designed for the relief of intrinsic pericardial and especially costo-pericardial adhesions, which, in his opinion, interfered so seriously with the free motion of the heart as to cause serious symptoms. A number of such operations have since been performed, and with very encouraging results. In the article which is the subject of this review, Morrison lays down the indications for a similar procedure in cases of heart disease dependent on an entirely different pathology. He says, that for some years, there had "been a growing conviction in my mind that it was less the tethering of the heart than its bulk and force of systole which were the determining factors in the situation; and that operation to afford room adequate for the free action of the enlarged organ was the primary consideration, whether the organ itself were tethered or not. One has so often observed post mortem a large muscular heart associated usually with aortic valvular disease and without extraneous adhesion, succumb to the mechanical difficulty, while possessing apparently an amount of wholesome muscle which one would, a priori, have imagined should have contended with the obstacle in the circulation for a much longer period, had it not been exhausted by some other cause." He takes the abnormal size of the organ, together with cardiac pain, as the chief indications, and he relates the history of a patient suffering from double aortic valvular disease, associated with a much enlarged heart and frequent attacks of cardiac pain, in whom such an operation, which he entitles 'Thoracostomy,' gave great relief.

His argument is somewhat as follows: "The normal beat of the 'apex' occurs at an intercostal space, and is expended on soft structures.

When, however, the heart is increased in size and the force of the systole is also in excess of what is normal to the individual, the cardiac apex thrusts, not against a yielding interspace, but against interspace and rib, one or more, according to the size of the systolic ventricle. The finger or hand placed over the heart then feels the concussion of the stroke, both against rib or ribs and interspace or interspaces. Again, notwithstanding recent controversies as to the role of muscle and nerve in cardiac action, it is admitted that direct muscular stimulation of the eviscerated heart induces contraction, and that in the heart *in situ* nervous impulses have a powerful effect on the organ by way of inhibition, augmentation, and acceleration.

“Given, therefore, a large heart powerfully pulsating against hard and resistant structures, what more natural than that the striking and indirectly struck organ should from time to time develop a condition of excitation or erythmism in excess of what is normal to it, and that such erythmism should be associated with increased systolic pressure augmented by mental causes due to subjective discomfort in various degree, from uneasiness to pain. Such pain, moreover, as has long been known, may find more or less widespread expression in the somatic sensory nerve territory issuing from the segments of the cord related to the organic nerves stimulated on the principles discussed by James MacKenzie and Head. These inconvenient consequences do not follow even the powerful systolic palpitation of a normal heart in a normal situation. It is reasonable to suppose, therefore, that to provide the enlarged and powerfully pulsating heart with a proportionately large interspace void of osseous resistance might prove a means of sparing its energy.”

The case reported concerned a boy of 19, whom Dr. Morison had observed at intervals for six years. The chief lesion present was aortic regurgitation. The heart had steadily increased in size till ultimately “the area of cardiac dulness measured $5\frac{1}{2} \times 5\frac{1}{2}$ inches, the apex beat was in the 6th space 5 inches from mid-sternum, the area of palpable concussion measured 3×4 inches, and was covered by the 5th and 6th ribs over an extent of four inches, including their cartilages.” He suffered greatly from breathlessness and pain in the chest, and was latterly unable to get about. The pain occurred in attacks which Dr. Morison calls “anginoid,” but which (he says) ought properly to be called “anginal.” They had become very frequent and often disturbed his sleep. The operation, performed by Mr. Stabb, consisted in the removal, from under a U-shaped flap, of about five inches each of the 5th and 6th ribs from sternum outwards. “The effect of the operation, objectively and subjectively was very satisfactory. The space previously occupied

by the 5th and 6th ribs now consists of a soft unresisting cushion formed by the 4th, 5th and 6th intercostal spaces and the sites of the removed ribs. The palpating hand finds little thoracic concussion, but the powerful throb of cardiac systole into the yielding covering of the heart. The other physical signs remain as before, but the exaggeration of carotid and suprasternal pulsation is less marked and the blood pressure registered is from 120 to 130, and at times as low as 115. The apical presystolic rumble is not to be heard. The only palpable thrill is basic (aortic) and diastolic in time."

Two months after operation, the patient stated that he was able to get about "quite well," and that he had not experienced his present condition of thoracic comfort since childhood. He had also increased five pounds in weight since leaving hospital. The diminution in his anginal pain had been most gratifying; the frequency of the attacks and the degree of pain had both greatly diminished.

The author reproduces blood pressure records and sphygmograms, showing the beneficial effect of the operation. "The operation," he remarks, "does not seem to have reduced his normal blood pressure, but to have greatly modified the tendency to an erythetic rise of it. This can only be from the removal of some physical as distinguished from emotional incentive to erythism, and that incentive we are surely justified in regarding as the osseous provocation to cardiac stimulation removed by thoracostomy.

"We may, therefore, without any undue exercise of the imagination, conclude that one cause, at least contributory, to attacks of angina in aortic valvular disease with hypertrophied heart is direct stimulation of the organ by systolic impact against costal resistance, and this may also be regarded as a cause of the premature failure of the hypertrophied heart so frequently observed in practice."

MEDICINE.

UNDER THE CHARGE OF DRs. FINLEY, LAFLEUR, HAMILTON, AND HOWARD.

FLEXNER AND JOBLING. "An Analysis of Four Hundred Cases of Epidemic Meningitis treated with the Anti-Meningitis Serum."
Journal of Exp. Med., Sept., 1908.

The cases analysed have been collected from a number of different observers in Great Britain, the United States and Canada. The results obtained strongly support the contention of the writers of this article, that the serum treatment greatly lessens the mortality of the disease

In 393 cases treated by serum there was a mortality of 25 per cent. 43 fatal cases, however, are excluded from this series owing to their being moribund, fulminating in type or affected by secondary or mixed infections. Even with these cases added, there is a great reduction in mortality, which averages at least 75 per cent. in untreated cases.

Very striking is the results of treatment in children under one year, an age when the disease is almost uniformly fatal. With serum 50 per cent. recovered, and the analysis indicates that almost all the fatal cases come under treatment as late as the third week of the disease. Favourable results may therefore be anticipated when the injections are begun at an early stage, before hydrocephalus with consequent locking up of infected material in the ventricles occurs. The earlier the treatment is begun the more likelihood is there of a favourable outcome—thus a mortality of only 16.5 per cent. occurred in cases treated in the first three days, whilst it rose to 35 percent. when treatment was instituted later than the seventh day. Benefit may, however, be obtained even in the later cases, particularly when diplococci are found in the exudate. With serum a critical termination of the symptoms occurred in 25 per cent. of cases, and a larger proportion of these cases occurred in cases coming under treatment early in the disease. Relapses require a prompt and vigorous resumption of the injections, when their progress is often arrested and a favourable outcome results.

The diplococci rapidly diminish after the injections, disappearing from the fluid and becoming intra-cellular, together with changes in appearance and a lessened viability in cultures. In 110 cases the diplococci disappeared and lost viability rapidly, and in 10 cases slowly. Diplococci occasionally lurk in favourable niches and from these reinfection doubtless takes place.

The special exudate rapidly loses its turbidity, and associated with this is a rapid fall in the leucocytes of the blood, a change which is to be regarded as a favourable sign.

The conclusions drawn from the analysis of the cases are that the duration of the disease is materially shortened, that chronic types and lesions are prevented and the mortality greatly lowered.

CURT. SEIDEL. "The Treatment of Septic Diseases with Collargolum Enemata." *Deut. Med. Woch.*, July 30th, 1908.

The writer strongly recommends the use of collargolum in enemata, regarding this method as easier of application than the intra-venous, although having the disadvantage of being slower in its action.

Larger doses are recommended than are commonly used, and instead

of .2 to .5 g., 2.5 to 5 g. should be used in severe cases, as the initial dose. This is administered twice daily and gradually lessened in quantity, and continued for two or three weeks. Before giving the remedy the rectum should be washed out with soap and water, followed by normal saline or bicarbonate of sodium solution to remove mucus which interferes with absorption. A chill frequently occurs in one to five hours after the remedy is administered.

The rate of absorption can be judged by the use of the Röntgen rays. In one instance observed, the greater part was absorbed in an hour, and almost all in the second hour. If the preliminary washing is omitted, the intestinal mucus interferes with absorption, and a distinct shadow may be seen six hours later.

In milder cases smaller doses may be used, beginning with 1 g. and reducing the dose after a few days to .5 g., and continued for not less than eight to fourteen days. Within a few days there is almost always an improvement in the general condition: increase in appetite, lowering of temperature and pulse and localisation of the disease.

A number of illustrative cases are recorded, amongst them recovery from a very severe gonococcus infection acquired by a surgeon through a wound in the finger.

Not only are the septic diseases benefitted, but a variety of other infections, such as pneumonia, typhoid, epidemic meningitis, dysentery and infectious gastro-intestinal catarrh, particularly in children.

CUSHING & BORDLEY. "Subtemporal Decompression in a Case of Chronic Nephritis with Uræmia; with Especial consideration of the Retinal Lesion." *Am. Jn. Med. Sc.*, Oct. 1908.

The case on which this paper is based was one of uræmia, in which marked improvement took place after removing a plate of four and opening the dura beneath the temporal muscle. After a few days the headaches subsided; there was no further nausea or vomiting; her stupor disappeared; the usual lethargy state was replaced by a normal mental activity. Death ultimately occurred from cerebral hæmorrhage.

The operation was based on the view that the symptoms of uræmia are due to increased intra-cerebral pressure, and not to the generally accepted theory that they result from a toxic process. Many of the symptoms of uræmia correspond to those of increased pressure, notably headache, vomiting, drowsiness and vertigo, and the disturbances of respiration culminating in the Cheyne-Stoke's type. Local cedemas may account for focal palsies of cerebral origin which not infrequently occur in advanced renal disease, and owing to the reason that edema is an evanescent condition, there is no evidence of it post mortem.

Clinically this view is supported by the relief often obtained in uræmia by lumbar puncture.

In a number of cases the writers have found that albuminuric retinitis shows a striking improvement after lumbar puncture, as does also the accompanying headache and vomiting, but unfortunately, as might be expected, improvement is only transitory.

The case recorded is the first in which deliberate surgical intervention has been carried out for the relief of uræmia. It is not, however, the first recorded operation. Byron Bramwell records a case of uræmia in which the skull was opened for the mistaken diagnosis of cerebral abscess. An abundance of cerebro-spinal fluid escaped after puncture, evidently from the ventricle. The patient made an uninterrupted recovery, the headache and vomiting subsided, there was no return of the epileptiform attacks, the optic neuritis immediately declined, and in the course of a few days entirely disappeared. Bramwell, on the strength of this case, suggests the advisability of trephining in such cases of uræmia as have failed to be relieved by the ordinary remedies.

The writers suggest the propriety of permanent decompression in selected cases of renal disease when medical measures or lumbar puncture have failed to relieve cerebral uræmic symptoms, or when blindness is threatened owing to rapidly advancing degenerative changes of the neuro-retinal tissues.

H. HOCHHANS. "On Fatal Cerebral Affections without Anatomical Lesions." *Deut. Med. Woch.*, Sept. 24, 1908.

Cases of hemiplegia have long been recognized without an anatomical basis, and the writer records several instances of this nature. In these, distinct paralysis was present on one side, sometimes with increase of the deep reflexes, ankle clonus and Babinski's sign.

Jacobsohn distinguishes two classes of cases, in one coming on suddenly in individuals in good health, and usually showing well marked sclerosis of the vessels, especially those of the brain and often interstitial nephritis. In the other class the individual was usually the victim of some chronic disease: uræmia, tuberculosis, pneumonia, and some other infection or intoxication. Following older writers Jacobsohn explains these cases as being due to circulatory disturbances or to the direct action of toxic agents. Oppenheim regards the toxins of carcinoma as responsible for some of these cases. Sawyer, however, records a unique case in which a hemiplegia was associated with a sarcoma, and although the gross appearances were normal the membranes showed a microscopic infiltration of sarcomatous tissue.

The cases recorded by Hochhans are for the most part associated with vascular disease, but no definite statement is made as to the connection between the symptoms and anatomical condition.

OTO-LARYNGOLOGY.

UNDER THE CHARGE OF DRs. BIRKETT AND JAMIESON.

M. A. GOLDSTEIN, M.D. "Retro-Pharyngeal Abscess." *Lancet*, January, 1908.

Dr. M. A. Goldstein reports three cases with the following unusual features: One case was diagnosed as quinsy by the family doctor who made several incisions into the peritonsillar tissue without any relief; another was reported by the pathologist, who examined a section from the bulging posterior pharyngeal wall, as showing "distinct evidence of lympho-sarcoma;" and the last case, which had been previously treated for bronchitis, grippe, tuberculosis of the neck, syphilis, etc., was so choked up that examination was most difficult. Eventually an emergency tracheotomy had to be performed to relieve the increasing dyspnoea.

All three patients, who were under twenty-one months, made a rapid and uneventful recovery, after the abscess was opened by an incision into the posterior pharyngeal wall at the site of bulging.

Dr. Goldstein draws attention to the fact that in those cases fluctuation cannot always be made out, owing to the thickness and induration of the pharynx muscle.

The frequency of retro-pharyngeal abscess in children under five, and its increasing rarity, the older the child, is explained by the "unusual activity of the lymphatic ring and of the lymphoid tissue in the pharynx" during early life and the progressive atrophy of the same with the advance in years.

The author does not include in his paper those cases of retro-pharyngeal abscess due to tuberculosis or syphilis of the vertebra.

PROFESSOR E. HÉDON. "Paralysis of the External Rectus Muscle of the Right Eye occurring in a case of Acute Otitis Media, complicated with mastoid involvement." *Archives Internationales de Laryngologie, D'Otologie et de Rhinologie*, April, 1908.

The patient, a man aged 35 years, during the course of an attack of influenza, developed a bilateral acute otitis media. Despite frequent paracentesis of the membrana tympani, both mastoids became affected. Following a primary mastoid operation, the left ear was cured; but the

right continued to discharge freely, and for four days later the patient was seized with intense pain over the right temporal region, radiating over the frontal and parietal areas. As the pain was thought to be due to an accumulation of retained pus, a radical mastoid operation was performed, and though the dura mater, and lateral sinus were exposed, nothing was found to explain the condition. The intolerable temporal pain continued unabated, and there also developed lachrymation of the right eye, and redness of the conjunctiva, due to a marked dilatation of the vessels, and not an inflammation. Seven days after the radical mastoid operation, there suddenly occurred complete paralysis of the external rectus muscle of the right eye. All the other muscles of the eye and its appendages were absolutely normal.

It was only after a month and a half that the pain and paralysis had completely passed away, when the patient was restored to perfect health. The writer cites this case as an example of "Gradenigo's Syndrome," because it presented the symptom-complex of:—

1. An acute otitis media with involvement of the mastoid;
2. Intense pain in the temporo-parietal region on the same side as the otitis;
3. Paralysis of external rectus muscle of the eye of the same side.

In the absence of fever, slowing of the pulse, and, in fact, any sign of cerebral trouble, meningitis, or other inter-cranial complications could not be considered as ætiological factors.

Professor Hédon claims that the phenomenon is due to a neuritis of the fifth and sixth nerves, brought about, according to Gradenigo, by an osteitis of the apex of the petrous portion of the temporal bone and a surrounding localized pachymeningitis, which compresses and sets up an inflammation of the nerves at a point where, after piercing the dura mater, they lie quite isolated immediately behind, and to the outer side of the posterior clinoid process.

The conclusion drawn from the study of fifty-seven similar cases of "Gradenigo's Syndrome," is that in paralysis of the external rectus muscle of the eye occurring as a complication of acute otitis media spontaneous recovery is the rule, and consequently no special treatment is required.

FERNAND PEREZ, M.D. "The Bacteriology, Ætiology and Prophylaxis of Ozæna of Atrophic Rhinitis." *Annales des Maladies de l'Oreille et du Larynx, du Nez et du Pharynx*, May, 1908.

In an original article on "The Bacteriology, Ætiology and Prophylaxis of Ozæna of Atrophic Rhinitis," Dr. Fernand Perez, of Buenos-

Ayres, claims that ozæna is due to a specific micro-organism, and that it is contagious.

From the nasal discharge of patients suffering from ozæna he isolated a new, and heretofore unknown, organism, which he calls the "cocco-bacillus fætidus ozenæ." As its name implies, it is a cocco-bacillus, non-motile, negative to Gram, aerobic or facultative anaerobic, grows well at ordinary temperature on all media, does not liquify gelatine, nor coagulate milk, and emits a pronounced special and typical foul odour from the various cultures.

In fifty cases of rhinitis of different kinds, the cocco-bacillus fætidus was found only in the cases of ozæna.

Rabbits that were inoculated with the culture speedily developed a profuse, purulent, hæmorrhagic nasal discharge, from which the characteristic cocco-bacillus was obtained. Moreover, a later examination showed a complete atrophy of the anterior turbinates.

In support of the contagiousness of ozæna, the author cited his clinical experience. In ninety-three cases he found the infection came from some member of the patient's own family, and in thirty-five cases from some person outside his own family. The contagion is not virulent like measles or scarlatina, but is slow and difficult, requiring a prolonged and intimate contact, such as would occur among the members of a family. The infection is transmitted by nasal discharges, sputum, caresses, and the interchange of pocket handkerchiefs.

As the result of extensive bacteriological experiments and researches among different species of animals, it was found that the dog was the normal host of the "cocco-bacillus fætidus ozenæ."

With those facts in mind, Dr. Perez formulated the following rules for prophylaxis:—

1. The prevention of the cohabitation of dogs and people, especially children;
2. The avoidance of prolonged and intimate contact of healthy individuals with those suffering from ozæna;
3. The disinfection of patients' handkerchiefs, toilet and table articles;
4. The use of paper handkerchiefs that could be burnt after once used.

J. T. R.

Society Proceedings.

MONTREAL MEDICO-CHIRURGICAL SOCIETY.

The first regular meeting of the Society was held Friday evening, October 2nd, 1908, Dr. J. Alex. Hutchison, the President, in the chair.

The address of the retiring president, Dr. Wesley Mills, was read.

PATHOLOGICAL SPECIMENS.

The following pathological specimens were presented by Dr. OSKAR KLOTZ:—

ACUTE PNEUMOCOCCAL MENINGITIS.

The first specimen is the brain of a young man of whom but little history could be obtained. He was found in his room in an unconscious state. He had marked rigidity of the neck and limbs, and resisted passive movements. There was a definite double Kernig sign. The pupils were active to light; the right was slightly dilated. There was no eruption on the skin. Lumbar puncture gave a turbid fluid, in which many Gram positive diplococci of lancolate shape were obtained. The cultures proved the organisms to be the pneumococcus.

The patient only lived twelve hours after admission. At autopsy, the brain and cord showed a purulent meningitis, not unlike the typical epidemic cerebrospinal meningitis. There was a purulent exudate diffusely distributed over both hemispheres and base. The ventricles were filled with a purulent fluid, and the ependyma was covered with fine granulations and petechial hæmorrhages. Pneumococci were again isolated from the exudate. The right middle ear was healthy. The left middle ear and mastoid cells were filled with a gelatinous material from which pneumococci were obtained.

There was also an early acute peritonitis (without fluid exudate), from which the pneumococcus was obtained in pure culture. Pneumococci were isolated from the heart's blood.

The origin of the infection seems to have been the left middle ear, from which a pneumococcal septæcemia developed with localized foci in the meninges and peritoneum.

TRACHEAL AND BRONCHIAL DIPHTHERIA.

The second specimen is not presented on account of its rarity, but rather as an instructive one. The patient from whom the specimen was taken, suffered from diphtheria.

On examining the specimen, you will see that there is no membrane in the pharynx and very little in the larynx. The trachea and bronchi

on the other hand are plugged with membrane, even in the remotest part of the lung. The tongue was considerably swollen, and diphtheria bacilli were obtained from the crypts. The membrane in the trachea begins a little way below the larynx and forms a continuous layer into the bronchi, completely plugging many of them. About the plugged bronchi there is a pneumonic process in the lung. Diphtheria bacilli were demonstrated in the membrane of some of the small bronchi and lung tissue.

The disease in this case, whether beginning in the pharynx or the deeper respiratory tract developed its most prominent lesion in the lower trachea and bronchi. Here neither intubation or tracheotomy could be of any avail.

C. B. KEENAN, M.D.—The pathological report of this case was presented briefly by Dr. Keenan.

J. ALEX. HUTCHISON, M.D.—In my experience I have never had a case of simple stricture of the small bowel, and Dr. Garrow is to be congratulated that this was a simple condition. Were it malignant, it would be in a part of the bowel where malignancy is primarily active and the patient would not have done so well. The patient's gait as he walks across the room makes one think of ataxia and I should like to ask if Dr. Garrow has detected any indications of ataxia, especially in view of the statement that there was no history of lues.

A. E. GARROW, M.D.—The patient's reflexes were quite active, and this gait has only developed since he came out of hospital.

A. LAPHORN SMITH, M.D.—I have occasionally come across cases of great suffering caused by partial stricture of the intestine. The most recent was a woman who consulted a friend of mine for constant pain in the abdomen. On careful examination, much was found wrong with the pelvic organs, and he asked me to help him remedy these conditions. Five days afterwards he asked me to again see her when she was found to be in a bad condition from obstruction of the bowels. Immediate re-opening was advised, and on doing this the cause was found about an inch from the cæcum in the small intestine, and it was due to bands of adhesions, the result of one or more previous attacks of chronic appendicitis. The stricture was about the size of a lead pencil, and about two inches in length. Immediately on freeing the adhesions, the distended intestine at once emptied itself through this narrow place and the contents ran into the cæcum. The woman died, not from the ventrofixation, not from her recent operation, but from failure to recognize and remedy the true condition of the appendix which caused her death. The moral

is that in many patients suffering from uterine pains and stomach troubles, if we would always look for the cause of these troubles at the appendix or around the appendix, we would very often find it there. The woman's whole trouble was due to almost complete stricture of the small intestine. The cause of the case before us must, I think, have been due to something the matter with the mucous membrane or with the peritoneum outside. I do not think the muscle ever is the cause of such obstructive ulcerations.

JOHN McCRAE, M.D.—This is a very remarkable specimen, and one is hard put to it to find a causation; the stricture is so perfectly an annular one that one has to consider it as no mere ordinary ulceration as a typhoid ulcer would be. The whole wall has been affected at one time. Here, one has not to deal with an ordinary trauma, a hard piece of food, or thrombosis, and one is reduced to the possibility of a temporary intussusception having occurred at some time which may in a very few minutes cause the loss of sufficient mucosa to give rise to the beginning of such a perfect annular stricture, and one, perhaps, may imagine a case where such an occurrence might happen, and the man be cognizant of nothing more, perhaps, than half an hour's severe colic.

F. R. ENGLAND, M.D.—Dr. McCrae's suggestion brings to my mind a case which was brought before this society, where the intussusception did occur in the jejunum, and nature caused the intussusception to separate, necrose away and be regurgitated in the stomach and the man vomited it. The man recovered.

DEMONSTRATION OF A PELVIMETER.

DR. H. M. LITTLE presented a modified form of pelvimeter.

J. C. CAMERON, M.D.—This little instrument is practical and will help us to obtain a correct measurement of the pelvic outlet more easily than by the pelvimeters in ordinary use. I am glad that Dr. Little has proved the usefulness of his pelvimeter clinically before bringing it before the profession. Unfortunately some of the instruments which we see figured in our books, seem to have existed only in the mind of the inventor, in the sketch prepared for publication, or perhaps, in a model made for him by an instrument-maker, and have not been put to the best of practical experience. A valuable feature in Dr. Little's pelvimeter is the simple device on the back for the estimation of the pubic angle. We have several such instruments, but they are more complicated and require some mathematical calculation. When a pelvimeter is not at hand, a tape can be used to determine the distance between the tuberosities, and in most cases is sufficiently accurate for practical purposes.

I have here the pelvimeter figured by Dr. Williams, of Baltimore, in his book; I find it too light, and not as accurate or serviceable as the instrument devised by Dr. Little.

A. LAPHORN SMITH, M.D.—I see a great advantage in this instrument, for it will now be possible to predict almost surely whether we will have a tear or not. That is just the one thing I have been wanting for my method of putting in a stitch or two before the tear occurs. If the instrument can foretell this and the operator puts in a stitch, then he will find that the number of infected cases will be very small indeed.

SOME LABORATORY NOTES ON GASTRIC ACIDITY.

The paper of the evening was read by Prof. R. F. Ruttan.

C. B. KEENAN, M.D.—I have been greatly interested in Dr. Ruttan's remarks, and I am certain they will prove of great value. The analysis of stomach contents in the past done in the ordinary method, has often proved misleading as to the pathological condition there present, and Dr. Ruttan points out wherein the fallacy may have occurred. I believe in the light of this paper that the findings in analysis of stomach contents in the future will be of much greater aid in forming a correct diagnosis.

Henry S. Goodhall, calls attention to the intimate relation of pleurisy to pulmonary tuberculosis, which he supports by reference to modern statistics, among which are included those of Stony Wold Sanatorium. He considers first pleurisy as a complication of tuberculosis. This is frequent, and long treatment is indicated. The withdrawal of all the fluid contained in the pleural cavity is not beneficial when tuberculosis is present. The diagnosis of tuberculous pleurisy is established by the history and the finding of the bacilli in the pleuritic fluid, confirmed by animal inoculation. Differential blood counts are of little value. A very large percentage of serofibrinous pleurises may be demonstrated to be tuberculous in origin. Every case of pleurisy should be carefully examined and every effort made to ascertain whether it is tuberculous—*Medical Record*, June 27, 1908.