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TONSILS AND ADENOIDS.

BY

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Founded on the experience of 7,000 cases.

In the second visceral cleft is developed an almost complete circle of lymphoid tissue. On each side of the pharynx is the faucial tonsil, at the base of the tongue and anterior to the epiglottis is the lingual tonsil, above and behind the soft palate is the pharyngeal tonsil commonly known as "adenoids," and at the pharyngeal orifice of the Eustachian tube is a considerable mass of lymphoid tissue known as the "tube tonsil" of Gerlach. The faucial tonsils or what are commonly known as the "tonsils" begin to develop during the fourth month of embryonic life, and at birth they are histologically complete. Their size increases until the age of three or four years, then normally they begin to atrophy, and this goes on till about the age of puberty when they are nearly completely gone.

The palatoglossus muscle, which forms the anterior pillar of the fauces, unites above in the soft palate with the palato-pharyngeus muscle which forms the posterior pillar of the fauces, and at the angle of meeting of these two arches the supratonsillar recess is formed. In this second branchial cleft lymphoid tissue develops from cells of the hypoblastic layer of the embryo.

At the junction of the foregut with the stomatodæum, that is the pharynx with the mouth cavity, a considerable constriction takes place. There are two folds of mucous membrane here that deserve special mention. One fold stretches across between the two pillars of the fauces just beneath the soft palate, and on account of its shape has been called the plica semilunaris. This fold forms the inner boundary of the supratonsillar recess. The other fold stretches across from about the lower

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half of the anterior pillar of the fauces to the most prominent part of the tonsil and this has been called the plica triangularis. If these two plicæ are well developed the tonsil may be almost completely hidden. The lingual tonsil is produced by a proliferation of lymphoid tissue from an accessory nodule at the base of the faucial tonsil.

Now from slight developmental peculiarities different clinical varieties of tonsils may be described.

(a) The imbedded tonsil. This is the normal type of tonsil in a child up to the age of three or four years. Looking into the throat you can scarcely see any tonsillar tissue, but on making the child retch, two globular masses come out below the soft palate and nearly touch in the middle line. This type of tonsil is hidden by the anterior pillar of fauces and by the two plicæ, namely semilunaris and triangularis.

(b) Sessile or flat tonsil is the normal type of tonsil found in middle life. If the tonsillar tissue of the young child is not subject to much inflammation it begins to atrophy after about the fourth year of life, so all that remains in middle life of the large tonsillar mass of the child is a few scattered masses of lymphoid tissue.

(c) If, however, the tonsils are subject to considerable inflammation after the fourth year of life, they enlarge instead of atrophying and this may go on until adult life. This inflammatory enlargement produces what is known as the prominent tonsil. It is due to a proliferation of the lymphoid tissue at the outlet of the tonsillar sac. These tonsils are easily seen when looking into a patient's throat. They stand out as if they were on a pedicle.

(d) Another type of tonsil is where the lingual prolongation is very well marked. The faucial and lingual tonsils seem to be one continuous mass of lymphoid tissue.

Anatomy:—The tonsils are masses of lymphoid tissue partially surrounded by a capsule and situated between the pillars of the fauces. The capsule is absent on the pharyngeal surface of the gland. Areolar tissue separates the capsule from the Superior Constrictor muscle of the pharynx. The pharyngeal surface of the tonsil is perforated by a number of orifices which lead into the tonsillar crypts. These crypts vary in number from eight to twenty. They are usually separate and pass completely down through the tonsillar tissue to the capsule. Rather more than half these crypts open in towards the pharyngeal isthmus, but the remaining ones open into the supratonsillar recess. If the plica semilunaris is well developed it is very difficult for this cryptic secretion to get free from the supratonsillar recess. Tonsillar calculi occasionally form from this retained material. Quinsies are also frequent in such

cases. In some cases the supratonsillar recess extends down on the external surface of the tonsil into the areolar space between the tonsil and the Superior Constrictor muscle of the pharynx.

Blood Supply:—The tonsils are well supplied with blood. The chief arteries are the tonsillar branch of the facial artery and the dorsalis linguæ of the lingual artery. Less important arteries are the ascending palatine from the facial, the ascending pharyngeal from the External Carotid artery and the descending palatine from the Internal Maxillary artery. The nearest large artery to the tonsil is the facial artery. The Internal Carotid artery is fully three-quarters of an inch distant from the tonsillar capsule.

The venous blood from the tonsil is returned into a venous plexus situated just external to the tonsil. This blood in turn goes into the pharyngeal plexus of veins, and hence into the Interior Jugular.

The nerve supply to the tonsil is not very free. A special tonsillar twig comes from the glosso-pharyngeal nerve, unites with the pharyngeal plexus, and from this the circulus tonsillaris is formed. This supplies the mucous membrane covering the tonsil, the adjacent part of the soft palate and the pillars of the fauces.

The lymphatics of the tonsil are very important. The efferents from the tonsil pass to the submaxillary group of glands. From there some lymph goes to the superficial lymph glands around the External Jugular vein, but the most of it goes to the deep lymphatic glands around the Internal Jugular vein. The lymphatics from the adenoid tissue in the nasopharynx go to the upper deep cervical set of glands. So in both cases the lymph eventually gets into the lymph glands along the Internal Jugular vein. If septic absorption then takes place from the tonsil, the glands at the angle of the jaw and down the neck soon become enlarged and tender to the touch. It has been demonstrated that if a sterilized emulsion of black pigment be injected into the tonsillar tissue, it can afterwards be traced into the lymphatic glands along the lateral wall of the pharynx, hyoid bone, larynx and along the deep vessels of the neck. It can be found in the bronchial and mediastinal glands.

Physiology:—No definite function has yet been satisfactorily proven for the tonsils and adenoid growths in the naso-pharynx. However, there are several facts in connection with their life-history that are very suggestive. The tonsils begin to develop during the fourth month of fœtal life, which would suggest that their function is not a very vital one. Tonsils and adenoids may be completely removed from a child three or four years old, and the system knows no harm. Even nature tends to remove this lymphoid tissue by a slow process of atrophy, beginning

about the end of the third year, and finishing about the age of puberty. So whatever their function may be it is confined to the first few years of life. The position of the tonsil is full of significance. Placed as it is at the entrance to the respiratory and digestive systems, it must be there for some reason. It is a well known fact that young children tend to put everything in their mouth that they get their hands on, and also that they have a total disregard for bad odors and poisonous gases. Nature then to protect the life of the young has placed a ring of lymphoid tissue at the entrance to the body to absorb poisonous gases and destroy harmful organisms. As the child grows older, intelligence increases, and so there is not the same necessity for this lymphoid tissue in the throat and so it disappears. The scientific world to-day is very much interested in immunity, and the tonsils have been investigated along this line. The tonsillar crypts have been likened to culture tubes, the mucus they contain to culture medium, and from their very position they are always exposed to many different kinds of bacteria. So by a biochemical process antibodies, etc., are produced and so immunity. Naturally it is in early life that immunity from different diseases is required. So after this function is fulfilled they disappear. Of course immunity is only a relative term. Why some people take many infective diseases and others do not we cannot say. This immunity theory makes a nice picture, but there is not sufficient proof yet to accept it.

Many other functions have been attributed to the tonsils. One, that they produce an internal secretion like ductless glands, another that they aid in salivary digestion. By others they are considered to be a great source of the leucocytes in the young.

Indications for the removal of tonsils.

(a) *Local Conditions*:—Occasionally, apparently healthy tonsils require to be removed only on account of their enormous size. Their presence interferes with respiration and deglutition to such an extent as to be a serious hindrance to health, and even life itself. I once saw a child of four years old brought to the Hospital cyanosed and in great respiratory distress. The only thing that was found wrong was enormously enlarged tonsils and adenoids. They were immediately removed, no anæsthetic being given. Within a very short time the child was a good color and quite happy. Often children with enlarged tonsils make a peculiar noise when eating; this is relieved by removing the tonsils.

Frequent attacks of tonsillitis are an indication of unhealthy tonsils. The crypts become filled with septic material and quinsy or some variety of tonsillitis occasionally develops. Diseased crypts keep up a chronic

inflammation of the tonsils as indicated by a continual aching pain in the throat, or an occasional sharp shooting pain up towards the ear. In these cases the breath is usually offensive.

The organisms usually found in diseased crypts are staphylococcus, streptococcus and occasionally the pneumococcus. Tubercular ulceration of the tonsillar tissue is very rare, and when present is usually associated with phthisis. Some authorities state that tubercle bacilli and giant cells can be demonstrated in from 4 to 10 per cent. of all tonsils removed.

(a) *Constitutional Conditions*:—The close relationship between tonsillitis, rheumatism, chorea and endocarditis has been well known for many years, but it is only recently that the close relation between rheumatism and arthritis has been proven to be associated with septic tonsils. This can best be demonstrated in young adults and people in middle life. They come complaining of considerable pain about the tonsils, offensive breath, and rheumatic pains all over the body, particularly in the larger joints, such as the knee and shoulder. On investigating the tonsils you find they are not large, but in the crypts is an offensive cheesy material, especially the crypts that open into the supra-tonsillar recess. These tonsils are inflamed and fibrous when probed. Completely remove these tonsils by enucleation and in a short time the patient will tell you that the rheumatism has disappeared. From this one sees that a diseased tonsil is a portal to systemic infection. On operating on such tonsils they must be entirely removed. Slicing off a piece of the tonsil with a guillotine is worse than useless, for by so doing you remove considerable normal epithelium and only a small portion of the tonsillar crypts which are the foci of infection.

The close relationship between tuberculosis and diseased tonsils has long been established. Frequently have I noted in strumous anæmic children with enlarged glands in their neck that their tonsils are large, soft and the crypts full of a caseous material. Undoubtedly the glands in the neck were infected by way of the tonsils. It is good practice to advise the removal of all diseased tonsils whether they are large or small, and particularly should this be done where there is a family tendency to tuberculosis.

Exanthematous Fevers:—Children with enlarged tonsils and adenoids are very prone to contract scarlet fever and diphtheria, if they are exposed to the specific virus. It is reasonable to suppose that infection takes place through some fissure in the tonsillar epithelium. So the larger and the more diseased the tonsils are the more likely is this individual to take these infectious diseases if exposed to them; acute suppuration of the middle ear is almost sure to occur during the course of

these diseases if the child has enlarged tonsils and adenoids. Also the patient's chance of ultimate recovery from a bad attack of either scarlet fever or diphtheria is much lessened by the presence of enlarged tonsils and adenoids. The respiratory system is handicapped from the very beginning. So children who are likely to be exposed to infectious fevers should have their throats cleared out early.

Nocturnal Incontinence:—An increased amount of adenoid tissue has been associated with enuresis of children almost since the discovery of these post-nasal growths. It seems to be one of these things that text-books copy from one another. True, children troubled with nocturnal incontinence occasionally have adenoids, but the removal of these growths rarely, or I may say never, cures the enuresis.

It has lately been pointed out that thyroid extract in small doses is very effectual in curing this pernicious habit.

Ear Conditions:—No treatment for chronic suppuration of the middle ear is likely to effect a permanent cure if there are present in the case enlarged tonsils and adenoids. The pharyngeal orifice of the Eustachian tube is continually kept swollen and congested by the adjacent adenoid tissue. Even if there are enlarged tonsils and no adenoids, the enlarged tonsils push the posterior pillar of the fauces backwards and so up against the region of the Eustachian tube. This is particularly the case if the tonsils are imbedded.

Chronic middle ear catarrh is much relieved by the removal of enlarged tonsils and adenoids. This lessens the tendency to rhinitis and colds in the head and so lessens tubal congestion. Chronic otalgia is a symptom that many children with enlarged tonsils and adenoids complain of. It is nearly always relieved by clearing out the throat of the lymphoid tissue.

Children suffering from adenoids are mouth-breathers. They snore during sleep or at least breathe heavily. They have a chronic rhinitis with frequent acute exacerbations as evidenced by a copious watery nasal discharge. These patients are slightly deaf, but this symptom is marked when the patient has an acute cold in the head. The ear drums on examination are anæmic and indrawn.

To positively diagnose adenoid vegetations it is necessary to either see or feel them. It is usually impossible to see them under 6 years of age. However, over this age, by tactful management of the child, it can usually be accomplished, a post-nasal mirror being used. To make a digital examination, the patient should sit on a stool or low chair. The surgeon stands by the right side of the patient, and the nurse should hold the hands of the patient. The child is asked to open the mouth

widely and the left fore-finger of the surgeon presses the cheek, between the teeth. The right index finger is quickly passed in the mouth to the posterior pharyngeal wall and then up behind the soft palate. Feel first for the posterior border of the septum nasi, and the posterior choanæ, one on either side of it. Next pass the finger upwards, backwards and laterally. The amount of adenoid tissue can be estimated in this way. The fossæ of Rosenmüller should be explored at the same time. A little bleeding often follows the examination, and is in proportion to the amount of trauma used, and the amount of adenoid tissue present.

Neglected tonsils and adenoids produce very serious results. Examine a marked case in a child say about 12 years of age. It is a pitiable sight. The child that might have been mentally and physically well-developed has the appearance of an idiot. The child goes about with an open mouth, listless expression and is dull of hearing. The face is pale, long and narrow. On closer examination considerable facial deformity may be recognized. The upper alveolar arch is V-shaped instead of the normal U-shaped arch. The hard palate is high and narrow. When the mouth is closed the upper incisor teeth project in front of the lower ones about half an inch so that a finger might be placed between the teeth and not injured even when the molar teeth are tightly closed. Such a condition has been termed open-bite. Adults with enlarged tonsils usually have no adenoids. The chest presents a transverse constriction known as Harrison's sulcus, and the sternum is very prominent, producing what is known as pigeon-breast. These chest conditions are produced by nasal breathing during sleep, and are more marked when the tonsils are enlarged as well as the adenoid tissue in the naso-pharynx. At an early period in life the ribs are soft and pliable.

Operation.—Removal of tonsils and adenoids.

It is a difficult operation to do properly. The field of operation being so hidden from view, the laity are compelled to judge the thoroughness of the operation by the amount of blood produced. Occasionally a mother will venture an opinion that one tonsil is yet a little large or that the child still snores. The doctor dispels her fears by telling her the tonsil will soon disperse or the snoring now is only a habit and will soon go.

As the operation is not one of emergency, due preparation should be made for the anæsthetic, and for the sterilization of the instruments used. Probably no operation in surgery has so frequently ended in disaster as this one. The combination of anæsthetic and blood in the throat makes it so serious. The surgeon and the anæsthetist must both be very much on the alert during the short space of time of the operation. The pa-

tient's throat should always be inspected immediately before operation, and the temperature taken if you are suspicious of fever. Although you may have seen the child two or three days previously and arranged the operation for a fixed time, yet the child may have contracted diphtheria, scarlet fever or measles in the meantime. Make it the exception to operate if the temperature is over 99°.

Anæsthetic:—The patient should have a purgative the previous night. A child may have compound liquorice powder and an adult a cathartic pill containing a grain of calomel.

This is the operation par excellence where surgeon and anæsthetist should know how to work together. In no operation can the anæsthetist be more useful to the surgeon than this one. For this reason the surgeon always prefers to have the same anæsthetist. For the removal of adenoids alone, any anæsthetic that will produce anæsthesia for about one and a half minutes is all that is necessary. Gas or gas and oxygen does nicely, or chloroform and ether, equal part by weight. For the double operation, that is the removal of tonsils and adenoids, a much longer anæthesia is needed. I prefer a mixture of chloroform and ether, equal parts by weight. As ether by the open drop method is so safe, and produces no congestion of the veins of the head and neck, no doubt it will be used a great deal in the future. One disadvantage of it, is the length of time to produce anæsthesia. Whatever anæsthetic is selected, you obtain a considerably longer period of anæsthesia if you continue to keep the patient "under way" for three or four minutes before beginning the operation. Ethyl chloride for this operation is not good. It is unsafe, and also congests the veins of the head and neck. Although I have never seen a death with it, yet it often gives a good deal of trouble.

Local Anæsthetic:—Used chiefly for adults. By it tonsils can be removed with very little discomfort to the patient. However, if the patient is very nervous a general anaesthetic is preferred. I prefer to remove both tonsils at the same sitting. Frequent operations under local anæsthetics are not to be advised in nose and throat work.

Swab the tonsils, pillars of the fauces, soft palate and posterior pharyngeal wall with 20 per cent. cocaine solution. Warn the patient not to swallow any of the solution. A patient can stand a great deal of cocaine without any ill effects, if none is swallowed. The thorough cocainization of the pharynx and soft palate prevents the patient from coughing and retching during the operation.

Then inject with a special syringe 30 to 40 minims of a 1 per cent. solution of cocaine hydrochloride for each tonsil. Inject 10 minims under the mucous membrane in four different areas. These areas being

the middle of the anterior pillar, the upper part of the anterior pillar on a level with the base of the uvula, the middle of the posterior pillar and high up between the two pillars in the supratonsillar recess.

The same amount of a 3 per cent. solution of the lactate of cocaine may be used. It is less toxic, and also less effectual in relieving pain. A useful combination to inject is 30 minims of the following solution:—

T. Rx. Cocaine Mur.	40 grains.
Atropine Sulph.	1-3 grain.
Resorcin	1 drachm.
Glycerine	4 drachms.
Carbolic acid	5 grains.
Listerine	4 drachms.
Aqua Destillata ad..	8 ounces.

The Technique of the Operation.

Treat the tonsils the same as you would treat diseased lymphatic glands in other regions of the body, and when operating on them remove them entirely. The day for the tonsillotome is nearly over, except in special cases; I would not advise the use of the tonsillotome in a patient over 14 years of age. Slicing a piece off the tonsil is very bad practice. Every operator who has done many of these operations has his own fixed ideas about instruments to be used, and the position of the patient during the operation. Our aim should be to completely remove both tonsils and adenoids with the least possible danger to our patient. Anything that increases the length of the operation increases the danger. Too many instruments are a nuisance. After trying every possible variety of operation, I will now describe more or less in detail what I consider the best method in each particular case.

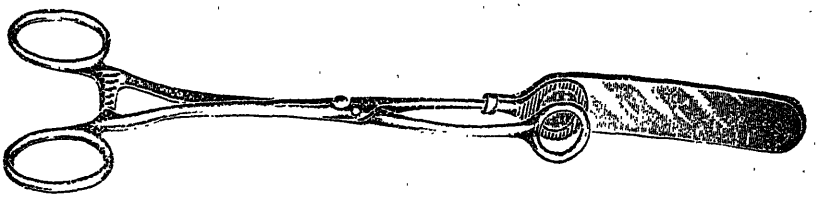
Operation for Adenoids Only:—Patient on the back and in a horizontal position. The instrument I like is a caged curette, St. Clair Thomson's modification of Delstanche's. They are made in four sizes, each a different width, and by selecting the proper width for different ages you are always able to just pass the orifices of the Eustachian tubes without injuring them. One sweep in the central line will remove the main mass of the adenoid tissue, and with the caged curette the growth is at the same time removed from the throat, and prevents its being swallowed or going down into the larynx. The patient should then be immediately turned on the right side to allow the blood to run out of the mouth, and now the operator should introduce his finger into the naso-pharynx. If adenoid tissue is left in the fossæ of Rosenmüller, it is easily removed by Lowenberg's bullet pointed forceps. Tieman, of New

York, makes a very nice-shaped one, with a curve that allows it to pass behind the palate. Any lateral curetting in the naso-pharynx is dangerous and unnecessary. By removing the central mass and what is in the fossæ of Rosenmüller the small amount of lymphoid tissue that is around the orifice of the Eustachian tube will atrophy on account of its blood supply being greatly reduced.

Removal of Tonsils and Adenoids:—The patient is under a general anæsthetic and in the horizontal position with the head slightly lower than the rest of the body. It is an advantage to have a small flat sand pillow under the shoulders. Now if the tonsils are prominent and the pillars of the fauces not adherent to the tonsils, I would remove the adenoids first, the patient being on the back, then immediately turn the patient on the right side and remove the tonsils by feel, using a Heath's (modified Mackenzie's) tonsillotome. The tonsils must be well pushed in by pressure behind the angle of the jaw by the anæsthetist. The lower tonsil should be removed first. With practise the tonsils can be completely removed in this way. Light anæsthesia is best, the cough reflex being retained. Testing the corneal reflex is of very little use in children.

The total length of the operation will vary from one to two minutes.

For Imbedded Tonsils:—The patient under anæsthetic and on the



Author's Tongue-depressing Forceps.

back, the head slightly on the side towards the operator, apply the tongue depressing forceps and give them to the anæsthetist to hold. Grasp the tonsil with a volsellum and pull it well towards the middle line. Then with a long dissecting forceps make an incision just external to the internal edge of the anterior pillar of the fauces, making the incision the whole length of the tonsil. Then by a little pressure made with the dissecting forceps, you find that you are beneath the tonsillar capsule and that the gland will shell out very readily. Now free the top and bottom of the tonsil a little, keeping outside the capsule. This freeing of the top and bottom makes a depression for the snare to engage in. Slip the loop of the snare over the volsellum and around the tonsil. Gently tighten the snare and the tonsil is removed completely with its capsule intact. As the loop of the snare is tightened it passes in the direction of the least resistance, and that is in the areolar space between the ton-

sillar capsule and the Superior Constrictor muscle of the pharynx. In this case remove the adenoids last. There is very little bleeding, as the severed arteries retract into the substance of the Superior Constrictor muscle. The total length of the operation varies from 5 to 10 minutes depending on how well the anæsthetic is taken. The cough reflex should be abolished.

For Flat or Sessile Tonsils:—This variety of tonsil is usually found in adolescence and in middle life. There is frequently a marked lingual prolongation, and if so it should also be removed. In this case, free the tonsil as in the previous type of case, and shell it out from top to bottom. A nice instrument for doing this is a blunt pointed scissors curved on the flat. In adults if the anterior pillar is widely attached to the tonsil by the plica triangularis, Leland's tonsillar knives are useful in freeing it. When you have the tonsil well freed down to the side of the tongue, sever the tonsillar tissue by the use of the snare. As in the previous case there is very little bleeding.

Local Anæsthetic:—The patient to be sitting up in a chair with a good head rest. Apply the anæsthetic as above recommended. Grasp the tonsil with a volsellum; pull it well inwards, and get beneath the capsule as stated in the previous cases. Sometimes in adults when local anæsthesia is used, it is less painful to free the tonsils from the anterior pillar by using special tonsillar knives.

After Treatment:—The patient in all cases should remain in bed for at least 24 hours, and a day or two longer if there has been much bleeding. The less fussing and spraying of the nose and throat the better. Ice to suck for the first two hours relieves the pain and tends to stop the bleeding. The food for the first 24 hours should be cold. Ice cream, custard, or cold bread and milk are all nourishing and easily swallowed. The second day, the temperature is frequently up a degree or two, but usually means nothing serious. Enquire for earache. Adults usually complain of a good deal of pain on swallowing after the removal of the tonsils. This may continue for 4 or 5 days. A purgative on the second day should be given. For children there is nothing better than castor oil.

Hæmorrhage:—(1) *Primary.*—Rarely does bleeding give much trouble under 14 years of age. The tonsils that bleed are the small fibrous ones of adults. Frequent inflammation has caused an undue amount of fibrous tissue, and the arterial walls are prevented from contracting as they normally would. In young adults you often see large red soft tonsils. These do not bleed much, as the original relative amounts of lymphoid and connective tissues are maintained. The use of the snare re-

duces bleeding to a minimum. After the operation is completed a careful examination of the throat should be made. If any adenoid tags are present remove them. They are usually indicated by persistent coughing. Sponge off the face and neck with a marine sponge out of ice-cold water. The cold tends to waken the child out of the anæsthetic and excites deep respiration, and so arrests the bleeding.

If the bleeding continues after the operation is over, make another careful examination of the throat and decide where the blood is coming from. (a) It may be a persistent capillary oozing. If so, apply pressure in the tonsillar sinus by means of a gauze sponge tightly rolled and held in place by a forcep. If necessary moisten the sponge in hydrogen peroxide. The bubbles that form seem to act mechanically in obstructing the capillary endings. Adrenalin chloride is of little use. It increases blood pressure and possibly increases the bleeding. It is an excellent drug to prevent bleeding, but is almost useless in stopping it. Secondary hæmorrhage often follows its use. If the hæmorrhage still continues take:

Mr. T. Mark Hovell's paste.	Tannic acid, 3 parts.
	Gallic acid, 1 part.

Mix these two powders. Then with a pestle and mortar make up a putty-like mass by adding a small quantity of water to a quantity of this powder. Now imbed the right index finger in this mass and rub it firmly over the bleeding tonsillar area. It usually stops the bleeding immediately, and as it can be quickly done it is not very disagreeable to the patient.

A patient who is bleeding, or has been bleeding, should be very carefully watched. The patient will not bleed to death by capillary oozing, except in hæmophilic cases. The hæmorrhage produces syncope with weakened heart's action, and so the bleeding stops. The patient must lie down head considerably higher than the rest of the body, and over nearly on the face with a suitable basin under the mouth. The patient must be specially warned not to swallow the blood. Often have I seen patients not spit out any blood, and the first indication that the nurse had that hæmorrhage was going on was when the patient vomited 2 to 3 pints of bright red blood.

If necessary to keep the patient quiet give, hypodermically, a good dose of morphia. Calcium lactate may be given per rectum, one drachm every 3 hours for 3 doses. If the volume of the pulse becomes very small an interstitial saline may be indicated, and in extreme cases saline intravenously. Normal saline enemata are also very useful.

For a Spurting Vessel:—Clear away all the blood and clots in the tonsillar sinus and pick up the bleeding point by a Mixter's artery forceps. Do not attempt to ligate the vessel for you will give the patient a great deal of unnecessary annoyance and in the end fail to get the ligature on the vessel. The forceps is not very uncomfortable in the mouth, and it may be removed in four hours. I have had over 25 cases of severe tonsillar hæmorrhage and they all recovered. The tonsillar clamp was never applied nor was the External Carotid tied. I think both these methods quite unnecessary.

Secondary Hæmorrhage:—Hæmorrhage after the first 24 hours is not common. When it does occur it is usually in adults who have had considerable primary hæmorrhage and where the primary hæmorrhage was arrested by the formation of a blood clot in the tonsillar sinus. The patient so reduced by the primary hæmorrhage does not stand the loss of blood well the following few days.

Case:—A girl aged 10 years, delicate and anæmic. Tonsils and adenoids were removed at 10 a.m. The tonsils were removed by a guillotine. There was considerable hæmorrhage at the time but it was soon arrested by the ordinary means. At 6 p.m. the child was allowed to leave the hospital and go home as there was no more bleeding, and the patient was in fair condition. After getting home the patient was put to bed and remained there the next day. During the second day, the child took considerable fluid nourishment. Early next morning, that is about 46 hours following the operation, the patient began spitting out some blood and shortly afterwards vomited up a large quantity of blood. A doctor was immediately sent for, but the child died before he arrived.

Acute Suppurative Middle Ear:—In hospital practice it occurs in about 1 per cent. of cases operated on. In 500 cases that I took notes of, it occurred 6 times. As far as could be ascertained, these cases had never any previous aural discharge. It is usually cured in a short time by suitable treatment.

In hospital practice doubtless a great many of the operation cases go to unsanitary homes. It is surprising that suppuration of the middle ear is not more common. Trauma to the Eustachian tube predisposes to it. Too much fingering in the naso-pharynx is not good. A lengthy operation increases the risk of blood getting up the Eustachian tube to the middle ear, and then suppuration is likely to follow.

Patients should be warned when blowing their nose not to obstruct both nostrils at the same time. In this way blood and purulent discharge is prevented from being forced up into the middle ear. Tags of adenoids

increase the discharge in the naso-pharynx, and if they become septic middle ear suppuration may follow.

Case: — A boy, age 7 years. Never had any previous aural discharge. Tonsils and adenoids removed. Earache followed on the 4th day, and aural discharge shortly afterwards. Streptococci found in the discharge. Child brought to the hospital on the 8th day following operation. An acute mastoid abscess was present, and was operated on immediately; perisinus abscess was also found. Lateral sinus was not thrombosed. Two days later child had a rigor and temperature went up to 106°. Wound opened up, sinus was now thrombosed. Internal Jugular vein was ligated in the neck. Child died on the 15th day after the removal of tonsils and adenoids. The cause of death was meningitis.

Septicæmia:—This is a very rare complication following the removal of tonsils and adenoids. Occasionally the temperature may go up to 101° and 102° and remain up for two or three days. This is due to septic absorption from the fresh wound in the throat. The lymphatic glands in the neck may become enlarged and tender. The best treatment is free purgation, liquor ferri perchloride internally, and a coarse hydrogen peroxide spray for the throat.

Too vigorous use of the adenoid curette low down on the pharynx wall may open up the retro-pharyngeal space. If so, sepsis may follow and give considerable trouble.

Case: — A man, age 23 years, had his adenoids removed by a caged curette. Retro-pharyngeal space was opened up on account of the patient jumping about during the operation. Gas was the anæsthetic. Five days afterwards the patient was admitted to the hospital with a very sore throat and temperature 103°. The next ten days his temperature was between 103° and 105°. He was treated by a cold pack and given polyvalent anti-streptococcus serum. Patient made a good recovery.

Pyæmia:—This is a very rare condition. Should acute otitis media and lateral sinus suppuration follow the removal of tonsils and adenoids, then it is easily seen how pyæmia might occur, but when there is not aural or lateral sinus trouble it is difficult to see how it could occur.

Case:—A child 8 years old. Very much enlarged tonsils and adenoids were removed. Child made an uneventful recovery until the 9th day following operation. There was never at any time aural discharge or enlarged or tender glands in the neck. The ninth day the child complained of pain in the right thigh, and in three days afterwards in the left thigh. There was phlebitis of both femoral veins, and an abscess was opened in each thigh. Five months afterwards there was another

abscess in the left arm. The case eventually made a good recovery. I am inclined to think it had no relation to the operation for the removal of tonsils and adenoids.

Probably no operation in surgery is so abused by the unskilful and also unnecessary removal of tonsils and adenoids. But when properly done and in suitable cases, the results are most satisfactory. The child's intellect, hearing and bodily welfare are preserved.

List of Instruments Used.

7½" dissecting forceps.
Doyen's gag.
St. Clair Thomson's adenoid curette.
Heath's tonsillotome.
Farlow's snare.
Mixter's artery forceps.
Leland's tonsil knives.
Lowenberg's post nasal forceps.
Author's tongue depressing forceps.
Tilley's raspatory for tonsil resector.
Andrew's volsellum.

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THE ACTION OF ARSENO-PHENYL-GLYCIN UPON *TRYPANOSOMA BRUCEI.*

BY

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I.

INTRODUCTION.

For two excellent reasons the practitioner in temperate climates must be interested in the experimental work which has been done on the treatment of the various diseases produced by trypanosomes. (1) The first of these reasons is that these researches have given him a third drug, to supplement mercury and potassium iodide in the treatment of syphilis. The second reason is, that during these researches some light has been thrown upon the method of action on the parasites of some of the trypanocides employed. As Ehrlich says, (2) through the continuation of studies such as these on the interdependence of chemical constitution and physiological, or therapeutic, action rational methods of treatment

may be developed and in the future, in prescribing, we shall "aim chemically" to affect that cause of disease we wish to destroy.(2)

During the first years of the search for an efficient trypanocide—a drug which would be as powerful in the treatment of trypanosomiasis as is quinine in the treatment of malaria—an enormous number of substances were tried. Some of them had a definite action upon the trypanosomes, but it was not until atoxyl was employed that the experimenters were able to definitely, and regularly, cure infections by pathogenic trypanosomes in laboratory animals.(3)

When it became known that syphilis, a disease in some of its symptoms almost identical with some forms of trypanosomiasis, was caused by a protozoan parasite not far removed from the trypanosomes, the idea suggested itself that atoxyl, which had a most powerful action on trypanosomes, might also be of value in the treatment of syphilis. It has been tried in syphilis, experimentally on apes and clinically on men, by several observers and it has become certain that atoxyl is distinctly valuable in the treatment of that disease.

The results obtained by the use of mercury and iodide are so constant that it is not suggested that treatment by them should be superseded by atoxyl; but it is maintained that atoxyl may be used with advantage in conjunction with these drugs and that there are cases refractory to, or with an idiosyncracy against, the ordinary drugs, which should be treated by atoxyl alone. To be successful, atoxyl must be properly administered. It must be given by injection, either beneath the skin, intramuscularly or intravenously; in the treatment of trypanosomiasis the latter is the best method. Since aqueous solutions of atoxyl deteriorate easily, the 15 per cent. solution of the drug to be employed must be freshly prepared and, in sterilizing, it should only be brought to 100°C. for two minutes. The dose should not be larger than 0.5 grammes of the drug. This dose may be repeated every five or six days and the treatment should be continued, probably, for some months. The patient should be watched carefully for signs of neuritis, especially if the dose mentioned is exceeded; neuritis and blindness have occurred in several cases of trypanosomiasis in which the drug was given too freely. It is interesting to note that antimonyl tartrate, which is also strongly trypanocidal, has been recently used in treating syphilis in negroes with considerable success.(4)

Atoxyl is the sodium salt of para-amido-phenyl-arsenic-acid.[1] It and

[1] "Atoxyl" is the trade name under which this compound was originally put on the market by a German firm. "Soamin" is the trade name of a compound of practically identical composition, which is prepared by Burroughs Wellcome & Co. It appears to be more constant and purer in composition than some of the samples of "atoxyl" which have been placed on the market recently.

its derivatives have been for some time the most efficacious drugs known for the treatment of trypanosomiasis; but they fail, not infrequently, to kill all the parasites in the animal treated and, consequently, recurrences of the disease are apt to occur after their use. Therefore, they do not afford a satisfactory means of treating diseases caused by trypanosomes.

Ehrlich, during his endeavours to ascertain the reason of the trypanocidal properties of various drugs used in the treatment of trypanosomiasis, came to the conclusion that a more reduced organic arsenical compound would have heightened trypanocidal properties; in *arseno-phenyl-glycin* he prepared such a substance.(5)

It is a yellowish powder, which must be prepared and kept *in vacuo* because it is so easily oxidisable. In his own laboratory Ehrlich found that this drug was more efficacious in the treatment of experimental trypanosomiasis in rats than any other substance with which he had worked previously.

Schilling,(6) Wendelstadt,(7) and Roehl,(8) in recently published papers have confirmed Ehrlich's statements by using arseno-phenyl-glycin in the treatment of the diseases produced by various trypanosomes in some laboratory animals.

The experiments reported in this paper were undertaken to determine the action of arseno-phenyl-glycin upon the disease produced in white rats by *Trypanosoma brucei*.

II.

Technique.

Trypanosoma brucei was chosen for use in these experiments because the disease produced by it runs an acute course; consequently, the result of observations on its experimental treatment can be obtained more quickly and with greater certainty than is possible with experiments made with parasites producing a more chronic disease. The strain of *Trypanosoma brucei* employed is one which has been maintained in small laboratory animals for some years. It is not a very virulent strain and only small quantities, one or two drops, of infected blood were injected in inoculating the rats; consequently, the disease produced was rather less acute than is ordinarily the case in rats infected by *Trypanosoma brucei*. It killed the six untreated control rats in from 8 to 14 days.

The existence of infection in the experimental animals was determined by examining microscopically, with a magnification of about 400 diameters, a fresh, unstained specimen of blood mounted between a slide and a coverslip.

The arseno-phenyl-glycin employed was sent to us by Ehrlich; we take this opportunity of thanking him for making it possible for us to perform these experiments. A freshly prepared 5 per cent. aqueous solution of the drug was always used and it was always given subcutaneously. Former work on the experimental treatment of trypanosomiasis makes it certain that the largest possible dose of the drug under trial should be employed. In order to determine the minimum lethal dose of arseno-phenyl-glycin, a number of rats were inoculated with varying doses of the solution of the drug, which were equivalent to from 0.1 grammes to 0.8 grammes *per* kilogramme of the body weight of the animal treated. Rats which received poisonous doses died within one to two days, according to the size of the dose received; none which lived for more than three days died from the effects of the drug.

It was found that a dose equivalent to 0.4 grammes, or more, of the drug *per* kilogramme of animal produced symptoms of poisoning in rats of 60 to 70 grammes weight; larger rats seemed to bear the drug better (one, weighing 104 grammes, survived a dose equivalent to 0.8 grammes *per* kilogramme of animal). The therapeutic dose for rats of about 70 grammes weight was fixed therefore at from 0.2 to 0.3 grammes *per* kilogramme of body weight of animal. In the paragraph which describes our observations whenever the amount of drug given is referred to, it is mentioned as the equivalent of so many grammes *per* kilogramme of body weight of the rat treated.

A trypanocidal drug, to be of any practical value, must be able to destroy the parasites in an animal already severely affected by them; for that reason the rats were not treated until they had been infected for some days and their blood contained considerable numbers of trypanosomes.

The treated rats were frequently examined until the parasites had disappeared from their blood. After the parasites had once disappeared, they were examined daily. If the trypanosomes recurred, the treatment was then repeated; in no instance was a second dose of the drug given unless the parasites had recurred.

As far as possible, rats of about the same size were used for all of the experiments. Most of the rats experimented with were young and small; consequently, those which survived the infection and treatment have grown and increased in weight rapidly.

III.

Observations.

1. Six rats (experiments IX, I, II, IV, XIX and XX) received a dose of 0.3 grammes after they had been infected for some days and while

their blood was crowded with trypanosomes. The number of the parasites diminished but they did not completely disappear from the blood of any of these animals; all died within 18 hours of the treatment and all died before the control rats which remained untreated.

2. Five rats (experiments X, G, XXIII, XXVIII, and GIII) received a dose of 0.2 grammes after they had been infected for some days and when their blood was crowded with trypanosomes. Although the parasites had disappeared from two rats and were diminished in the third, three of them died in from 12 hours to 4 days after the treatment and before the control rats which were untreated; two lived (experiments X and GIII), although the parasites recurred later in both.

3. Seven rats (experiments XIII, XVI, XVII, V, XIV, XXVI, and XXVII) received doses of 0.4, 0.3 or 0.2 grammes after they had been infected for some days, but while their blood contained small numbers of trypanosomes. The parasites immediately disappeared from the blood of six of them; in only one (experiment V) did they persist and cause the death of the rat. Trypanosomes reappeared after an interval in the blood of four of these rats,—experiments XIII, XIV, XVI and XVII. From the blood of the remaining rats—experiments XXVI and XXVII—the trypanosomes are still absent at (for experiments XXVI and XXVII) twenty-two weeks after receiving a single dose of the drug.

4. In six rats the parasites recurred; in experiment X in ten days; in GIII in four days; in XIV in two days; in XVI in one day; in XVII in two days, and in XIII after an interval of fifteen weeks after the first treatment. In every case, so soon as the recurrence of the parasites was perceived, an additional dose of from 0.2 to 0.4 grammes of the drug was given. The parasites were immediately driven from the blood of all of them; they have remained absent permanently from four of them. In two experiments, XVI and XVII, they have again recurred. In experiment XVII they have reappeared no less than five times at intervals of about ten days, although they have been immediately driven from the blood on each occasion by a dose of 0.3 grammes.

It has been known for some time that trypanosomes may acquire an immunity to any of the trypanocidal drugs: for example, if a trypanosome-infected rat is given insufficient doses of atoxyl, the trypanosomes will recur until, finally, they have become absolutely resistant to the drug and will survive the maximum dose which can be given to the animal without poisoning it. Strains resistant to *arseno-phenyl-glycin* can be produced in the same way, (8) and that is apparently what has occurred in experiment XVII.

The limits of the possibilities of atoxyl in the treatment of experimental trypanosomiasis are well known. It is rarely possible to cure

rats infected with *Trypanosoma brucei* by single doses of it. A fair number can be cured by thorough and repeated dosage. The rats treated by atoxyl as additional controls in this series of experiments did not survive. In animals treated by single doses of atoxyl the parasites reappeared and death followed. In one rat, weighing 70 grammes, which has received five doses of 0.5 ccm. of 5 per cent. solution of atoxyl, an atoxyl resistant strain of trypanosomes has been produced.

IV.

Summary.

Observations I and II show that doses of arseno-phenyl-glycin, large enough (0.3 grammes) to drive the trypanosomes from the blood at once, will hasten the death of heavily infected animals.

Only two of the rats, used in observation II, which received a dose of 0.2 grammes survived. The parasites later recurred in them; it is suggested that in these animals the trypanosomes probably were less completely destroyed than in those which died. Hence those which died may have died from a cause, such as the liberation of a cytotoxin, depending upon the destruction of the trypanosomes they had harboured. Similar observations have been made in the treatment of experimental trypanosomiasis by inorganic arsenic(9) and by antimony.(10)

Observation III shows that a proportion of early infections of rats by *Trypanosoma brucei* may be cured by a single dose of 0.2 grammes of arseno-phenyl-glycin.

Observations I, II and III taken together support the ground rules of the treatment of trypanosomiasis, that treatment should commence as soon as possible after the infection and that, despite the danger, the drug employed should be administered in full doses in order to minimise the danger of recurrences. If the parasites recur after the initial treatment, they, in a proportion of rats, may be permanently driven from the blood by repeating the initial dose.

By comparing the action of arseno-phenyl-glycin in these experiments with the results which may be obtained by the use of atoxyl, it is evident that arseno-phenyl-glycin is the more powerful trypanocide in the treatment of experimental infections of white rats by *trypanosoma brucei*.

EPITOME OF SUCCESSFUL EXPERIMENTS.

Experiment	*Type of Infection	Weight Initial	Weight Final	Date 1st treatment	Dose per kilo	Date recurrence	Dose	Remarks
X	+++	58	156	May 10	.2			No recurrence Nov. 24, 1909
XIV	+	75	117	May 11	.3			No recurrence "
				May 12	.2			
XXVI	++	72	96	June 10	.3			No recurrence "
XXVII	++	122	134	June 10	.4			No recurrence "
Giii	++++	80	105	June 10	.2	July 14	.4	Single recurrence, 34 days
XVI	++	78	115	May 10	.2	Aug. 5	.2	" " 85 "
XIII	+	71	146	May 7	.2	Aug. 13	.2	2 recurrences, 98 and 110 days
						Aug. 25		
XVII	++	91	148	May 10	.3	June 5	.3	4 recurrences
				May 12	.3	June 16	.3	No subsequent recurrence
						July 8	.3	Nov. 24, 1909
						July 20	.3	

*+Trypanosomes present. ++ Several in one field. +++ Many in one field. ++++ Crowded fields.

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THE MANAGEMENT OF NORMAL LABOUR.

BY

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First I desire to thank you most sincerely for your kind invitation to read a paper before you this afternoon.

Your request that I should discuss the "Management of Normal Labour" filled me with apprehension as to the success of my undertaking, for it is difficult to bring anything new before you in connection with this subject, while in the endeavour to make it interesting I may bore you with unnecessary detail.

Eutocia is defined as natural parturition, and is applied to labours which terminate without artificial aid and without injury to mother or child. Thus, strictly speaking, eutocia must be extremely rare, as injuries to the birth canal occur in a large proportion of women who are delivered of healthy children without artificial aid.

Ordinarily, normal labour means spontaneous delivery of a living child, which has presented in a vertex position, with the occiput rotating anteriorly.

Fortunately normal parturition takes place in an overwhelming proportion of cases. Sellheim states that normal labour occurs in 95 per cent. of all cases which come to term. This may be the case in Germany, but in this country the percentage of normal labours is not quite so high.

In this age of hurry and hustle, of ease and luxury, of chloroform and obstetric forceps, natural delivery is perhaps of not as frequent occurrence as nature originally intended.

To insure natural delivery, the pregnant woman should come under the physician's care early in pregnancy. This subject has been dealt with by my predecessors and I will not further enter into it.

In private practice, parturition should be conducted with the minimum disturbance of domestic routine. The essentials are privacy, absolute cleanliness of the patient and all that comes in contact with her, and no interference with nature's course. All these may be obtained with intelligence and foresight without entailing a serious strain on the family exchequer.

Paper read before the Franklin Medical Society, St. Albans, Vermont, September 30, 1909.

To treat every case of normal labour with the same rigid technique that should attend a laparotomy is a mistake. Race suicide is encouraged by converting what should be an incident in life into an imposing, and frequently a *terrorizing,* function.

It is desirable to give the nurse and patient written or printed instructions as to what should be provided. In making out such lists only those things which are essential should be included, as it is undesirable to add to the expense of the outfit. Simplicity should be the aim and not elaborate luxury.

With regard to the physician's obstetric outfit, it bears not infrequently an inverse proportion to his skill and experience; the more imposing the former the more inadequate the latter, and *vice versa.* Suffice it to say that the obstetric bag should always be clean and orderly. It should be kept ready for emergent use, and among other things should contain a pelvimeter.

The obstetric forceps, in my opinion, should *never* be employed to terminate labour until the pelvis has been measured. Such a precaution would save hundreds of lives per annum.

The *labour room* should be amply provided with clean bed linen, and should be a large, quiet, well-ventilated room, and if possible, should be so situated as to insure that the patient will not overhear all the noise of the domestic machinery of the house.

I am in the habit of giving directions that the room to be occupied should be thoroughly house-cleaned a few days before the expected date of confinement.

The labour room should contain, besides a bed, one low table, two ordinary wooden chairs, a slop jar or pail, and an old rug or some protective paper, to keep the carpet from being soiled.

The situation of the bed is important. Care should be taken that it is not placed so that a direct draught will blow across the patient while she is sleeping or nursing, the reason being obvious.

The mattress should be firm and clean, and the spring of the bed should be so arranged that the patient's weight will not cause it to sag materially. If the bed is very low, wooden blocks should be prepared for placing under its feet. Only boiled water should be employed in the labour room.

I will not go into detail about the making of the labour bed, but will state that clean fresh linen should be employed and the objectionable habit of using old newspapers to be placed under the patient as a pad cannot be too strongly condemned. Very good non-absorbent pads may be made of unbleached cotton, padded with ordinary cotton batting, one yard

square and three inches thick. These pads may be sterilized by being placed in the dry heat of an oven for half an hour, or steamed in a boiler.

Preparation of the patient for labour.—It is of the utmost importance in the conduct of labour that the lower bowel should be thoroughly emptied, therefore I make it a rule that no matter how often the bowels have been said to be moved, the patient shall have an enema after the labour has set in. Another essential is the thorough cleansing of the vulva and thighs. Other things are desirable in the way of preparation, but these are essential.

If the patient has not had a hot bath within 24 hours of the onset of labour and her condition permits of it, she should be placed kneeling or standing in a bath and her whole body cleansed with soap and hot water. I do not like to have my patients in labour sit down in the ordinary household bath and prefer the above method as less likely to lead to infection of the genital canal.

After the bath the pubic hair should be trimmed if necessary, and these parts, as well as the abdomen and thighs, bathed in a 1/2000 solution of bichloride of mercury, or a 2 per cent. solution of lysol.

From this time on, the patient should wear an aseptic vulvar pad. Should the labour be prolonged the vulva should be bathed in one of these antiseptic solutions each time the pad is removed for any cause.

Preferably the patient should be in a freshly laundered night gown, over which she should wear a freshly washed wrapper and clean stockings and slippers. Her hair should be carefully combed, brushed and braided.

These preparations usually occupy, profitably, the early period of labour, and if after this toilet has been completed the pains are not occurring with too great frequency, she should be provided with some simple occupation, such as sorting linen, manicuring her nails, or some little duty that may be of help to the nurse.

All nervous and excitable relatives and friends should, if possible, be kept away from the patient who should be entirely under the control of quiet, businesslike attendants.

It will be noted that no mention has been made of a preliminary vaginal douche. Its employment is unnecessary, as it has been amply established that the vaginal secretions are sterile and even bactericidal in action and hence a douche will do more harm than good. In fact, while speaking of douches, I may state that it is rarely, if ever, necessary to give a vaginal or intrauterine douche before or after labour whether operative or not.

The antepartum examination of the pregnant woman should always include a careful measurement of her pelvic diameters. This routine may only be omitted in the case of women who have previously been delivered at term without difficulty.

The examination of the patient in labour should be directed towards ascertaining:—

1st. The general condition of the mother. This should include the state of her heart's action and her temperature.

2nd. The position occupied by the child and the relation of the presenting part to the inlet of the pelvis.

3rd. The condition of the fœtal heart.

4th. The character and frequency of the labour pains, these usually giving satisfactory evidence as to the progress in labour.

All this information can be obtained without entailing the risk of a vaginal examination. In modern obstetrics internal examination has been relegated to a very secondary position in making a diagnosis of the conditions present, as it is conceded that every such examination, no matter how carefully performed, exposes the patient to risk of infection.

In normal cases a vaginal examination is rarely necessary. The diagnosis of the presentation and position of the fœtus can be made by abdominal palpation, and information as to the condition of the cervix can readily be ascertained by a rectal examination, the physician's hand being protected by a rubber glove or special finger stall.

My attitude toward vaginal examination in labour is that it should never be employed unless information can be obtained by it which cannot be secured in any other way, and that it should never be undertaken without fully appreciating the risk involved and carefully protecting the patient from such risks, by every means in one's power.

In normal cases, information as to the condition of the os uteri is all that one desires to obtain by an internal examination. When really necessary this can always be obtained by means of a rectal examination, but in the general run of cases one can judge fairly well by the character of the pains and also of the vaginal discharge. It is only in cases of delay in advance of the presenting part, or when other signs fail that such an examination is really necessary.

In modern obstetric practice abdominal palpation is chiefly depended on for diagnosis of presentation and position. The more skilful one becomes in the art of palpation the less does one require to make a vaginal examination.

The most important point in palpation is to ascertain what part of the fœtus is presenting at the pelvic inlet, and what relation the presenting

part bears to the inlet. Having defined the part of the fœtus presenting, one then notes whether it is *at, in,* or *below* the brim, in other words, the extent of the engagement in the pelvis of the presenting part. One may then proceed to locate the position of the back, breech and limbs. The position and rhythm of the fœtal heart should then be noted.

If the presenting part is found not to be engaged in the brim, it is advisable to take the external measurements of the pelvis. Should the external conjugate diameter be found to be less than 20 c.m. (8 in.) then a vaginal examination should be undertaken to ascertain whether the promontory can be reached, and if so the diagonal conjugate should be measured.

Should any flattening of the pelvis be present then the future course of events depends on the degree of pelvic deformity, the mouldability and size of the fœtal head, and the vigour of the uterine contractions.

It should be borne in mind that even in the presence of moderate degrees of pelvic contraction, such as are not uncommonly encountered, at least four hours of second stage pains should be permitted before interference is undertaken.

Our experience at the Montreal Maternity bears out the statement of Williams, of Baltimore, that from 75 to 80 per cent. of all cases of contracted pelves deliver spontaneously.

It is in just such cases as these that much harm is done by unwise interference which is often attempted by hurried practitioners even before the end of the first stage of labour has been reached.

One frequently finds in consultation practice that attempts at delivery have been made before the completion of the first stage of labour. It is an obstetric crime to rely on the forceps to complete dilatation of the os uteri. These instruments should never be applied until the os has been completely dilated either by nature's efforts or by suitably adapted artificial means.

During the first stage of labour the character and frequency of the pains usually indicate fairly well the degree of progress that is being made. The patient should be encouraged to bear her sufferings with fortitude, but her strength should be conserved as much as possible and she should be restrained from efforts at "bearing down," as in this stage such effort has practically no value.

If she is restless and hysterical full doses of chloral (gr. xv.) at intervals of four hours, I have found of service in securing quietness between the pains, without markedly interfering either with the frequency or vigour of the uterine contractions.

In the first stage, liquid diet is in order, to sustain the strength and

vigour of the patient. Albumen water is my favourite, though a cup of hot freshly-brewed tea has undoubted sustaining and stimulating qualities which should not be ignored.

The onset of bearing down or expulsive efforts usually indicates the beginning of the second stage of labour. Usually the membranes rupture at this time. The pains are usually so severe that the patient takes to her bed. The onset of these symptoms indicates the reclining position.

Usually, shortly after the rupture of the membranes, the discharge from the vulva becomes distinctly mucoid, which in itself is a valuable sign of the descent of the presenting part of the fœtus.

When such signs are present, or when the head is known to be engaged well within the pelvis, vaginal examination is unnecessary.

When in spite of expulsive pains the membranes have not ruptured an internal examination is required. If the cervix is found completely dilated, and only when this is the case, the sac of waters has served its purpose and matters may be hastened by its artificial rupture. This cannot be accomplished as a rule by the finger when rubber gloves are worn. A sterilized artery forceps or any other suitable instrument may be employed for this purpose and I can recommend nothing better than a large safety pin, which I constantly use.

The descent of the presenting part may be recognized as it approaches the pelvic floor by applying the finger tips to the perineum at the side and a little in front of the anus, and pressing them firmly inward and upward during the acme of a pain. By this procedure the firm hard head can readily be felt through the tissues.

Preparations for delivery are then in order.

In a convenient position, so as to be readily reached by the physician, should be placed a small table. On it are placed a basin of warm antiseptic solution, preferably 1 per cent. lysol, or 1/2000 bichloride, a supply of sterile cotton or gauze swabs, a few sterile towels, sterile ligatures and scissors for the cord, and the sutures and instruments required for the repair of perineal lacerations.

The patient is then placed in position. I prefer the left lateral as being more comfortable both for physician and for the patient. It also renders her movements more easily controlled and leads to less exposure than is the case when the dorsal position is employed.

I usually employ a Kelly pad covered with a sterile towel. This drains into a suitable receptacle at the bedside, which also serves for the reception of soiled swabs, etc. The carpet at the bedside may be protected by several layers of paper or an old rug reversed.

The patient's clothing is rolled up and secured by safety pins so as

to protect it from becoming soiled if possible. She is covered by a sheet, and a light blanket if required.

The vulva is then carefully swabbed with pledgets of cotton wrung out of lysol solution, care being taken to always swab from the pubis towards the anus.

Then freshly-boiled rubber gloves are drawn over the physician's hands. The hands should be disinfected just as carefully as though the gloves were not to be worn.

I prefer to use gloves for I find that they not only afford better protection to the patient, but since I have employed them I have not had trouble with sore hands, from the irritation of prolonged immersion in antiseptic solutions. One soon becomes accustomed to them and the tactile sense is soon educated. I prefer a moderately heavy red rubber glove, as being more durable and in every way more satisfactory than the thin gloves.

Chloroform anæsthesia I employ in every case when there is time to use it. The patient's face is smeared with vaseline to protect her skin, and a dropper bottle and mask are given to the nurse or assistant who administers the chloroform under orders of the physician, so many drops with the onset of each pain.

The mask is only applied during the pains except at the moment of birth, when complete anæsthesia is desirable. I have never seen any bad effects from chloroform so administered, and am certain it never leads to the occurrence of post-partum hæmorrhage.

At intervals during the second stage of labour the fœtal heart rate should be taken. The rhythm should be noted during a pain as well as in the interval between. If the rate is very markedly reduced during a uterine contraction, or if at any time it falls to about one hundred beats per minute, delivery should be effected as rapidly as possible, in the interests of the child.

Protection of the perineum.—Laceration of the perineum cannot always be avoided in spite of the most skilful treatment. He who says he has delivered a thousand or even a hundred women without laceration of the perineum having taken place, is either blind or is a direct descendant of that Ananias of unsavoury fame.

The strain upon the perineum involves four factors at least, the size of the head and shoulders; the elasticity of the maternal tissues; the width of the pubic arch; and the rapidity of the expulsion, not to mention the skill and judgment of the officiating accoucheur. Given a narrow deep pubic arch, a child of average size with a firm head, in a primipara over thirty years of age, and you have all the factors for a fairly extensive laceration of the tissues of the pelvic floor.

Lack of knowledge of the mechanism of the escape of the head from the vulva, associated with excessive manipulation and haste on the part of the accoucheur, may be put down as contributive factors in perineal laceration.

Too early extension of the head, which is brought about by premature efforts at delivery, usually result in the perineum giving away. Throughout the whole of the perineal stage of labour the head should be in complete flexion, so that the sub-occipito-bregmatic diameter may distend the vulvar ring at the moment of the escape of the head. Once the parietal eminences have escaped from the ring of the vulva, the whole head slips forward under the pubic arch. Flexion is to be maintained until the parietal protuberances have thus escaped. Throughout the perineal stage the occiput is pressed forward against the pubic arch, and escape of the head can only occur when the occiput has completely cleared the inferior border of the pubis.

The physician's duty is to see that the normal mechanism of labour is not interfered with by undue expulsive efforts on the part of the patient at this stage, and that sufficient time is taken for the gradual dilatation of the soft parts.

With the patient in the left lateral position there is nothing to be done except exercise a masterly inactivity until the caput appears at the vulvar cleft. The patient may be encouraged to bear down, and a few whiffs of chloroform administered with each pain.

Fæcal matter or mucus escaping from the anus should be swabbed off immediately to prevent contamination of the field.

There is no necessity for supporting the perineum with the palm of the hand or with hot cloths. Far better leave it alone and simply observe what is taking place, and if the head is advancing with too great rapidity the patient should be told to cry out, so as to release the pressure of the abdominal muscles.

The idea prevails that the perineum should be supported by the physician making pressure upon it with the palm of his hand during the perineal stage of labour.

As a rule such pressure does more harm than good. The tissues of the perineum are thus compressed between the descending head and the physician's hand, and are thus more likely to be damaged than if left alone. If the head is coming down too rapidly, pressure may be applied directly to it, instead of through the perineum.

As soon as the caput appears the forefinger may be inserted under the pubic arch without actually introducing it within the vagina, and the posterior fontanelle and occipital protuberance located, the width of

the head estimated, and at the same time its relation to the pubic arch noted. Thus if the head is small and the pubic arch wide but very little strain will be thrown upon the perineum. On the other hand, if the head is large and well ossified, and the pubic arch narrow, or pointed, the result will be that greater stress will be thrown upon the perineum, and laceration much more likely to take place.

With each pain the physician may place one or two fingers just under the pubic arch, and promote flexion of the head, and at the same time feel whether the parietal eminences are coming well down towards the vulvar margin.

Throughout this period the perineum should be watched, and if it does not distend readily, it is far better at the acme of a pain to do a median episiotomy. Usually I slip one blade of a blunt pointed scissors, having a cutting edge of about 1½ inches, between the head and the distended perineum. The scissors are then turned and one snip made. If this cut is well timed the head usually escapes with the next pain, as its result is the relaxation of the resistance to the escape of the parietal eminences from under the pubic arch. At the moment of escape, pressure should be made between the tip of the coccyx and the anus so as to maintain the flexion of the head, and not as it is commonly supposed to produce extension. This manœuvre is best carried out with the left hand placed over the patient's thigh, controlling the escape of the head from the vulva, while the right hand guards the perineum as it slips back over the face of the child. Extension of the patient's limbs at the moment of the escape of the head affords a certain amount of relaxation of the perineal tissues, and I think assists in preventing any extension of lacerations.

In favour of episiotomy it may be said that one has a clean-cut wound, the surfaces of which are more readily approximated by a single suture than is the case in an ordinary laceration. In my own experience I have never regretted having made an incision such as described above, and I have frequently been very sorry indeed that I failed to resort to it.

Immediately the child's head has escaped, the mouth and nose should be swabbed off so that the mucus shall not be aspirated in case efforts at respiration are made. The finger is then run about the child's neck to ascertain whether the cord encircles it. If it is present, it must be pulled over the head or tied and cut, or loosened sufficiently to permit the escape of the child. Usually the shoulders come down in a moment or two, the anterior shoulder pivoting under the pubic arch while the posterior sweeps over the perineum.

During this manœuvre the child's head should be carried well up over the pubic region of the mother, so as to release the pressure of the shoulder

on the anterior margin of the perineum. This can usually be accomplished with the right hand supporting the child's head and shoulder, while the left assists with the expulsion of the child by making firm pressure upon the fundus through the abdominal wall.

Immediately the child is delivered, the patient should be placed in the dorsal position, otherwise contaminated discharges may find entrance to the distended passages. In the dorsal position the weight of the uterus and placenta is sufficient to compress and more or less close the patulous vagina, etc.

Considerable discussion has taken place as to whether the cord should be tied immediately after the birth, or delayed until all pulsation in it has ceased.

It has been demonstrated that when the tying of the cord is delayed the initial loss of weight in the first few days is less than in those cases in which the cord is tied immediately.

My rule is to tie the cord when I am ready to attend to it whether pulsation has ceased or not; except in the case of feeble, ill-nourished children to whom the loss of even a few centimeters of blood is an important matter. These I do not tie until the pulsations in the cord have ceased.

Repair of lacerations.—As soon as possible after the child has been removed it is my habit to carefully examine the vulva for lacerations. This should be done in a good light and does not necessarily entail much manipulation of the parts. If any lacerations are found they should be sutured at once. I prefer to do this while waiting for the placenta to become detached. An anæsthetic is not usually required for ordinary tears. I use a large curved needle and prefer silkworm gut as suture material. Silk sutures I have found unsatisfactory, as they become impregnated with lochial discharges and infection of the wound not infrequently results. Catgut has the same objection and besides it often absorbs too rapidly.

The needle should not be inserted too close to the edge of the wound and should be carried well down to the base.

One requires a short needle holder in order to get the best results, even if the patient's buttocks are supported on a bed pan as is my custom, otherwise it is difficult to place the sutures properly, unless the patient is turned so as to lie across the bed with the feet supported on chairs.

The sutures should not be tied till the placenta has been delivered.

A common mistake is to tie the perineal sutures too tightly. This causes them to cut into the tissues which tend to become œdematous after the sutures have been placed, besides making them difficult to remove.

Management of the third stage.—Experience teaches one that the old saying, "The more haste the less speed," is extremely apt when applied to the management of the third stage of labour.

Normally the placenta becomes separated from the uterine wall within twenty minutes to half an hour after the birth of the child, and slips into the lower segment of the uterus.

The separation of the placenta is usually indicated by a change in the position of the fundus. Immediately after delivery the fundus occupies a position half-way between the umbilicus and the symphysis. When the placenta has become separated from the uterine wall, the fundus rises to the level or even above the umbilicus.

There are three signs available to indicate that the placenta has separated from its site. First, the above described change in the position of the fundus; secondly, what is known as Winckel's sign; if the extended finger tips are applied to the abdominal wall immediately above the symphysis pubis and pressure is made downwards and backwards, the cord will be drawn into the vulva if the placenta is still within the uterus, while if this is not the case the cord will be extruded for a short distance. Again, if the placenta is still adherent to the uterus, compression of the fundus between the fingers and thumb will cause a fluid wave to be transmitted down the cord. This wave is very easily felt when the cord is lightly held between the two fingers of the other hand.

My rule is to wait till I have ascertained that the placenta has become detached before making any efforts to express it.

The fundus is lightly held through the abdominal wall, the fingers of one hand being placed behind it and the thumb in front. Should the organ relax it is gently massaged until it is felt to contract, but no pressure is applied. When the placenta has separated, pressure on the fundus in the axis of the pelvic inlet is sufficient to cause its expulsion.

If in half an hour the placenta is still adherent to the uterine wall, Crede's method of compression is resorted to in order to detach and expel it.

Crede's method consists in compressing the uterus between the fingers and thumb of one hand applied as previously described, while at the same time firm pressure is exerted downwards in the axis of the pelvic inlet, *just after a uterine contraction has reached its acme and is beginning to subside.*

The latter point is important, for pressure so applied to a relaxed and flabby uterus fails to accomplish the object of the manœuvre, and may lead to inversion of the uterus, and very serious consequences.

Premature efforts at expulsion of the placenta before it has become

detached, not infrequently lead to incomplete separation of the organ and favour retention of the unseparated portions, giving rise to a whole train of evil consequences, immediate and remote, which I will not enlarge upon.

Retained placenta is an extremely rare event when the third stage of labour is managed as I have described. It is one of the most infrequent complications of labour in our experience at the Montreal Maternity.

The administration of ergot in the third stage of labour in order to facilitate the expulsion of the placenta is condemned by all authorities. It tends to produce tetanic contractions and thus favours retention of the organ.

If portions of membranes are found to be retained, or fail to come away with the placenta, should they be manually removed?

This question I usually answer in the negative.

My practise is to leave them, unless their retention gives rise to hæmorrhage, in which case their removal by introducing the gloved hand within the uterus is necessary, and is often very difficult.

These retained membranes usually come away about the third or fourth day without trouble. Should they fail to come away at this time, and the discharges become foul, then a hot intrauterine douche usually effects their removal without difficulty.

TRANSTROCHANTERIC OSTEOTOMY.

BY

A. MACKENZIE FORBES.

Surgeon to the Children's Memorial Hospital and Assistant Surgeon to the Montreal General Hospital

As the operations for the correction of deformities about the hip joint, known as transtrochanteric osteotomy, subtrochanteric osteotomy, or Gants' operation, are held somewhat in disrepute in this community I present this patient to-night.

The patient is now 22 years of age. He was treated for rheumatism in the knee for about three years, from the sixth year of his life; then the diagnosis of hip disease was made.

About a year after the diagnosis an abscess appeared in the region of the hip. This was opened. A sinus persisted for about three or four months. Then the patient was considered well.

The patient has been troubled with exacerbations of this disease, shown by abscess, at least every year, until the spring of 1908, with the excep-

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tion of one intermission of two years, when he had no symptoms whatever outside of those attributable to the deformities which were due to this disease and which gradually appeared.

He was referred to me by Dr. Blackader in March, 1908. He was then suffering from a discharging sinus leading to a flexed, adducted and ankylosed hip. He was admitted to the hospital on March 12th, 1908, where he remained for one month. On his admittance the sinus was opened and swabbed out, perfect drainage being assured. The sinus healed in the hospital, where his hip was kept at rest by fixation. Patient was discharged on April 12th, with instructions to live a quiet life, in open air, and to return in the autumn of the same year for an operation to correct the deformities which were both flexion and adduction.

The patient was readmitted November 15th, 1908. He reported that he had obeyed instructions as regards life in the open air; that he had increased in weight, and that his general health had been good since his discharge from the hospital.

Examination demonstrated no sign of activity of the disease in the hip. There was, however, three inches of actual shortening and 30 degrees of flexion and slight adduction.

The patient being anaesthetized, a transtrochanteric osteotomy was performed and the deformity corrected, patient's leg being slightly adducted and extended to a position of 10 degrees flexion. The patient was then placed in a plaster-of-Paris spica.

On December 15th, 1908, the plaster-of-Paris spica was cut down and the patient examined. The correction of the deformity was then perfected under ether anaesthesia and a new plaster-of-Paris bandage applied.

On December 31st, 1908, the patient was discharged with no sign of active disease and no deformity about the hip, although there was an actual shortening of between two and three inches, which was easily disguised by such a boot as he now wears.

The patient was asked to wear a Thomas hip splint for a few weeks. He returned to me October 1st, 1909. Examination demonstrated the above mentioned actual shortening, compensated for, however, as before. The flexion allowed, about 10 degrees, was demonstrable. The patient walked with an almost imperceptible limp. He says that he feels well and has been well, and is now on his way to the Northwest Territories, where he feels able to do a man's work.

COCCYODNIA.

BY

A. LAPTHORN SMITH, M.D.

Surgeon-in-Chief of the Samaritan Hospital, Gynæcologist to the Western Hospital and to the Montreal Dispensary.

Very interesting are these cases of pain at the very end of the spine. Although the writer has only recognized seventeen and operated on fourteen cases out of a total of fifteen thousand patients of whom he has records, he feels convinced that many others passed through his hands without his having noticed them. As he has not seen a paper on this subject in the medical journals for several years, it might be well to have our attention called to this very painful affection.

The earliest recorded case appears in the diary of Professor Smetius of the University of Heidelberg, who under date of October 27, 1588, made the following entry: "My wife has fallen backwards and so injured the coccygeal bone that she cannot sit without great pain, nor can she empty the bowels or bladder or cough without much distress."

In 1859 Professor Sir James Y. Simpson, who coined the name coccyodynia, while lecturing on this subject in Edinburgh, said that within three weeks he had seen at least ten cases of the malady in public and private consultation practice. For fear that his audience might think that he was exaggerating a little he explained: "When you have been made aware of the possibility of the occurrence of the complaint and when you have begun to look out for it, it is by no means very rare. Diseases like other subjects in nature sometimes seem rare, not because they are so in reality, but because our attention has not happened to be fully called to the recognition of them as they pass before our eyes. Of course it is a very unusual circumstance to meet with so many in so short a time; but it is not more wonderful than what often enough occurs in the experience of all surgeons in extensive practice, who find that during a short space of time they may have a succession of cases all presenting the same form of injury, as an epidemic, as it were, of fractures and dislocations, and that a long period may elapse before they again meet with a similar case." He adds that, while he had seen and recognized a great many of these cases, he had probably seen many others, also, the true nature of which he did not at the time understand.

Read before the Montreal Medico-Chirurgical Society, Oct. 15, 1909.

The writer of this paper could give another familiar instance of the same thing by pointing out that nobody had seen or even suspected a case of tubal pregnancy in Montreal up to twenty-five or thirty years ago. But by the attention of the profession being called to this most serious disease no less than fifty operated cases have fallen to the writer's share, with perhaps as many more to each of the other half dozen abdominal surgeons in this city. These cases were just as frequent fifty years ago, but they were neither suspected nor operated on, and their deaths were registered as deaths from heart disease or acute indigestion.

Although I have mentioned most if not all my fourteen cases of removal of the coccyx during the course of my clinical reports, I have never written a paper specially on this subject, and as the condition is a most distressing one, I believe that it would well repay us to make ourselves so familiar with its symptoms that we would not fail to detect it when it confronts us.

Symptoms.—Pain in the region of the coccyx whenever the patient sits down or rises, and sometimes even when she remains in the sitting posture. Most of the patients affected with it are obliged to sit on one hip or with only one side resting on the edge of a chair, or with the weight partially supported by a hand on the chair, and they are rendered very awkward and miserable in consequence. Some of them actually dread sitting down, so great is the pain then felt, while it is just as painful to get up or change their position. Some suffer most pain when walking, while others feel it worst during defecation or urination. In a word, whenever the muscles attached to the coccyx contract and pull upon it or when the little bone is pulled or pushed by the finger or is moved in any other way the patient suffers. Most patients suffer worse in winter or damp weather, so that they have been known to pass the whole winter in bed in order to lessen the pain.

Diagnosis.—If we would never fail to diagnose this condition then we must spend a few seconds in examining the coccyx whenever we examine a woman for pain in the lower part of the body. When we already have the first finger in the vagina it will literally not take longer than ten seconds to apply the other forefinger to the little bone from the outside, and move it backwards and forwards a few times. If there is anything wrong with the coccyx the woman will quickly cry out; in a bad case she will scream with the pain.

There is never any difficulty about feeling the bone even in the stoutest women. If it can be pressed upon or moved there is no coccyodynia. One reason why the condition so often escapes our notice is that patients are sometimes very indefinite in their description of their symp-

toms. Perhaps also through modesty they will complain of a pain in the back instead of saying that they have a pain at the very end of their spine, which would at once direct our attention to the real seat of the trouble. A few questions, however, as to what makes the pain worse will evoke an answer that any and all movements about the perineum aggravate it. If the patient is rheumatic, as she often is in these cases, she may very truly mislead us, so to speak, by saying that she has pains all over; while the very fact that a woman has been suffering for months or years and perhaps taking drugs for it would bring about a neuralgic condition of every nerve in the body.

Causation.—From the above symptoms it is evident that the trouble is located in the sacro-coccygeal articulation. Although the condition was for a long time considered as a neuralgia of the nerves of the coccyx, it would seem more likely, as it is generally recognized to-day, to be a rheumatic affection of the above joint. Many patients have attributed the beginning of their suffering to having sat on damp, cold ground, which in a person whose blood is saturated with uric acid, might well be a determining cause. But by far the greater number of cases of coccyodynia are due to an injury to the joint either by a fall on the back of a chair, the corner of a table, or even on the floor in such a way as to strike the end of the spine. Indeed there are cases on record where the bone has been put completely out of joint, causing such pain as to make the patient swoon.

Next to violence from without the most frequent cause is violence from within during parturition. In every case of labour the coccyx bends backwards so as to enlarge the pelvic outlet, but when the child's head is very big or when the pubic arch is narrow the head may then push the coccyx so far backwards that the anterior ligaments which bind the bone to the sacrum may be torn. Then one of two things happens: either the injury is cured by anchylosis, in which case there is no more trouble until the next delivery, when instead of dislocation there may be an actual fracture of the coccyx; or else there may be mobility, but with an inflamed joint, causing pain whenever the *gluteus maximus* or any other muscle attached to it contracts.

Treatment.—Until fifty years ago the only treatment was medicinal, and the patients received anti-neuralgic remedies, including morphine, until their general health was broken down and they had lost all hope of ever getting relief. Then its rheumatic nature was recognized and quite a number were relieved and a few cured by treatment directed against the rheumatic or uric acid diathesis. It would be amusing were it not so sad to read of all the things they used to do to one of these

sufferers, blistering, leeches, acupuncture needles and hypodermic injections of morphine. One successful case is reported of a very prominent old gentleman of his time, three hundred years ago, who, while going down the front steps, slipped on the ice and fell, striking his coccyx on the stone. He suffered great pain, but what troubled him most was that he could get no movement of the bowels. For this he was given aperients without avail, and by the fifth day his condition was serious. He was then advised that perhaps his spine was injured and that he should allow himself to be rolled and pushed and tumbled about as he lay on a wooden bed by two robust people. In the words of the chronicler "this was followed by the happiest results, for by the jostling the end of the os coccyx, which was bent inwards, was restored to its situation, and the obstruction being removed the bowels were moved *cum impetu summo*. It must be admitted that if the condition were not neuralgic at first it soon became so, because if the accident happened to a person in perfect health the pain and the treatment of the pain with long continued doses of morphine could hardly fail to bring about a general neuralgic condition. They made the mistake in those days of thinking that the pain was due to neuralgia, instead of the neuralgia being due to the pain and the treatment.

It was only about fifty years ago that an effective treatment was found by Dr. Nott, who first severed the muscular and fibrous attachments to the coccyx, leaving the bone in place, but at rest. This was done subcutaneously with a tenotomy knife and without an anesthetic, and generally gave relief for a time at least. It gave such relief from a pain which was so severe that on one occasion when Sir James Y. Simpson was performing it on a lady from India, who had long suffered from coccyodynia and at last made the long journey to Edinburgh to seek a cure, an accident happened. I will let Sir James tell it in his own words. "I was dividing the last fibres of the coccygeal attachments when the slender knife gave way, and broke among the dense structures. I told the patient of it and she at once raised herself up in alarm to hear of the calamity, but before I had done telling her of what had happened she had had time in sitting up to discover that she had been cured of her disease and rejoiced at the discovery. She quickly replied, 'Oh, never mind, the pain is gone, let the knife remain.' And there, for aught I know, it remains to this day." Not only this one remained permanently cured but he reports several others, one "a lady who had been a martyr to it for twelve years past and who night and day used to suffer great pain whenever she made any movements of the body. Yet in her case isolation of the coccyx in the manner above described produced im-

mediate relief, and ever since the operation was performed, a fortnight ago, she has been perfectly free from pain."

Later on both Dr. Nott and Sir James Y. Simpson found that the pain returned as the muscles and ligaments became reunited to the bone. They then adopted the plan which we use to-day, namely, the complete removal of the bone at its articulation with the sacrum, which is the only treatment which gives a sure and lasting result. At least my own experience of removing the coccyx has been most satisfactory and the patients on whom I have performed this little operation have been the most grateful ones I have had, much more so, indeed, than those whose lives were saved by an early operation for cancer of the breast or uterus. I am at a loss to understand how the experience of a few operators could have been otherwise. Skeene reports two cases where the patients suffered a great deal for several months after the operation. On looking closely into his description one may perhaps find the reason; for he not only removed the coccyx but a considerable portion of the sacrum also. This I have never done nor can I see any object in doing anything more than to discover the coccyx at its articulation with the sacrum.

The operation.—A straight incision is made two inches long over the centre of the coccyx down to the periosteum; the skin is dissected back and held by retractors, while the knife is passed down one side of the little bone and up the other so as to sever completely the attachment of the gluteus maximus, coccygeus and levator ani of both sides, and of the sphincter ani in the middle. Then the bone is pressed sharply forward so as to put the interspinous ligament on the stretch, when it is easily divided and the joint opened. Then the rest of the ligaments holding it to the sacrum are cut, and there only then remains the fascia between it and the rectum. This is cut with scissors and the bone is lifted out with a light pair of bone forceps. Sometimes we get into the joint below the sacro-coccygeal one, in which case we have only to feel if there is a movable piece of bone remaining, and if so it is easily removed. There is rarely much bleeding, but when there is there is no difficulty in stopping it, first by packing for a minute or two with a very hot gauze sponge, and then if any little vessel continues to spurt it is better to put on a fine catgut ligature. When all oozing has been stopped we pack the cavity rather firmly with a strip of mild iodoform gauze, which is not removed for several days. The skin incision is closed carefully with silk-worm gut and a light dressing put on, because owing to the situation it must be changed frequently. The end of the iodoform gauze drain is left hanging out at the top of the incision, which is the lowest point for drainage when the patient is on her back. Two or three

quarter-grain hypodermics may be given during the next day or two if there is much pain, although many patients have stated that the pain after the operation was very much less than it had been for months before. The temperature generally goes to 101 the first evening, 100 the second, and is normal the third.

For my fourteenth and last case I am indebted to Dr. Robert Wilson, whom the patient consulted at the out-door department of the Western Hospital on July 10th and was admitted to my ward on July 13th. Mrs. M., 22 years of age; married two years; no children; had a miscarriage two months after marriage, which she attributed to a fall on the ice and striking the end of her spine. This occurred two years ago and ever since she has been complaining of severe pains in the region of the coccyx when she sits down or gets up, and sometimes even when she remains in the sitting posture. Sometimes she could only sit on the edge of a chair, as the slightest pressure on the end of the coccyx caused severe pain. She also suffered especially at the end of the act of urination and defecation. At first when I questioned her I almost failed to recognize the true condition, for she said the pain was in her back, and on making a pelvic examination I found a retroverted and congested uterus which would be enough to explain a backache. But happening to press upon the coccyx she flinched so much that my attention was called to it, and I found that she was the subject of coccyodynia as well as of nervous symptoms due to the retroversion. As there was some endometritis, we began by doing dilatation and curetting, then Alexander's operation of shortening the round ligaments, after which we removed the coccyx. I am a firm believer in doing all that has to be done at one sitting. The strip of iodoform gauze was removed on the fourth day, the stitches on the tenth day, she got up on the eighteenth day and went home on the twenty-first. Her physician has since informed me that the result has been all that could be desired, as she has had no pain or discomfort of any kind.

Many years ago I had a lady under my care who has since passed out of my hands. This lady suffered agonizing pain, as she believed, in the lower part of the rectum, for which she had consulted many surgeons in England without either they or I having recognized the true nature of it. We all looked upon it as some form of neuralgia, but I feel certain that the removal of the coccyx would have cured her. This agonizing pain would awaken her in the night and would last from four to seven minutes, during which the perspiration would break out in drops on her forehead. I tried many quick anodynes, including nitrite of amyl pearls, but nothing short of chloroform would have acted quickly enough. It

was no use to send for a doctor at the time, for the attack would be over before he could get there. She was afraid to acquire the habit, and therefore declined to take chloroform herself. This patient was exceedingly rheumatic, frequently having to call in a throat specialist for rheumatism of the throat. In the light of my present experience I would explain these mysterious attacks as follows. A little gas accumulating in the rectum would set up a reflex contraction of the sphincter ani; this would pull on the coccyx and the pain thus caused would start a spasm in the levator ani and other muscles attached to it. If this patient should ever consult me again I will urge her to have her coccyx removed.

In view of the importance of making a diagnosis I would urge the systematic examination of the coccyx whenever we are making a pelvic examination or whenever the woman complains of pain in her back low down. If the coccyx is found to be painful further inquiry will generally elicit the history of a fall upon the end of the spine. In most of my cases this was the history given and the coccyx was pointing forwards at about a right angle to the sacrum. In a few of them there had been no history of a fall, but the trouble dated from a severe instrumental delivery which left it bent backwards. It is quite natural for the coccyx to bend a little backwards so as to give a little more opening at the pelvic outlet, and for this purpose it is generally admitted that the coccyx is more moveable in the female than in the male. This may be the reason why coccyodynia is of much greater frequency in women; men are just as liable to fall upon the end of their spine as women.

A CASE OF MYASTHENIA GRAVIS.

BY

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In presenting this patient before the Society I might first say that Myasthenia Gravis is a disease characterized by general feebleness of the muscles, and also by their quick exhaustion on use, and the quick renewal on rest of what power they possess.

This patient is one of special interest, as, some of you may remember, he was shown here by the late Dr. James Stewart seven years ago. Dr. Finley had shown a similar case in the previous year. At that time, seven years ago, the symptoms were well marked and typical. He had right-sided ptosis and diplopia. There was paralysis of outward move-

Read before the Montreal Medico-Chirurgical Society.

ment of the left eye and of upward movement of the right eye. He had difficulty in mastication and in swallowing, especially after he had been eating for a little time.

The upper extremities were weak and became exhausted easily. On asking him to raise his arms to the shoulder-level after about 40 or 50 attempts he could raise them no more. After walking the length of the ward his legs became exhausted and he developed toe drop. If he looked at the ceiling for about two minutes ptosis increased in the right eye and developed in the left eye. If allowed to rest a few minutes he could again carry out the movements. In the morning, after the night's rest, exhaustion did not take place so easily. Subjectively, the patient complained of aching pains in the muscles, especially after fatigue. There was no objective sensory disturbance.

The electrical reaction of the muscles was typical. If the muscle were brought into tetanic contraction with a faradic current it soon became exhausted and would no longer react to this current, while it continued to react normally to galvanism. In fact, in spite of treatment, the patient was apparently in a very bad way. He was advised to live in the country, which he did, and he states that for the past five years he has been without symptoms. A few months ago, following severe mental strain brought on by the death of his son, he has again developed ptosis of the left eyelid and paralysis of upward movement of that eye, and just within the last week he has also lost the power of outward movement in the same eye. His extremities when he returned to the clinic were perfectly strong, grasp registering 100 on our strongest manometer, and he did not become exhausted with exercise, but there has been a noticeable and slightly progressive weakness since then, although it has by no means reached the paretic stage yet. The electrical reactions of the muscles are quite normal, and the nervous system is otherwise unaffected. Reflexes are all present and normal.

With the patient's consent, Dr. Keenan kindly removed a small piece of the left deltoid muscle under local anaesthesia. It was put immediately into Zenker's fluid and stained with haemotoxylin and eosin, and as a whole stained well. But some bundles of fibres stained very poorly. This does not seem to be an artifact in the staining, as these poorly stained fibres can be followed through a whole series of sections. They are in many cases surrounded by well-stained muscle fibres. They almost invariably show a longitudinal splitting of the fibres. In some places only individual fibres show this lack of staining property. In other cases a whole bundle of fibres show the same failure.

Numerous muscle fibres show an appearance as if a vacuole or sharply-

defined area of light colour lay in the fibre. This circular or subcircular vacuole, if it be such, appears in successive serial sections and therefore appears to have its long axis coincident with the long axis of the fibre. These areas appear a light pink, rather than colourless, although in some cases there is a colourless ring surrounding this pinkish centre, which is in turn surrounded by the ring of well-stained muscle fibre. Again, many fibres are seen with simply a poorly-stained centre, the periphery being well stained.

In other places only a more or less irregular area of the transverse section of the fibres is well stained and looks fairly normal, while the rest of the fibre does not stain, and shows the longitudinal splitting mentioned above. This also can be followed in the same fibre through a series of sections. The nuclei of the muscle cells appear normal in numbers in all the fibres, and stain well.

There is nothing abnormal to remark on in the vessels, and there is no sign of the collections of lymph cells which Buzzard has described.

Of interest in this connection are some slides from the various organs in cases of Myasthenia, which have been prepared for me at the National Hospital, London, England, through the kindness of Dr. Buzzard and Dr. Holmes, showing what Dr. Buzzard has named "lymphorrhages" in the muscles and various organs. These are small exudations of lymph cells between the muscle fibres. One can see also a change in the contour of some of the fibres with atrophy, and also a diminution in the staining power in some of the fibres. These are, Buzzard has found, a constant feature in the disease. Others also have found these "lymphorrhages." Weigert was the first to describe them in 1901. He looked upon them as metastases of thymus gland tumour, and while they may have been so in his case they certainly are present where no such tumour is present in the thymus or elsewhere. Buzzard has found in his eleven cases that frequently there is a persistence of the thymus gland.

Kaufmann found excess of lactic acid in the blood and urine and looked upon it as a fatigue product.

I am indebted to Dr. Bruere for the following exhaustive report on his examination of the urine, which he undertook while the patient was in the hospital.

Date	Amt. of urine in 24 hours	Total acidity	Total N.	Ammonia N.	Urea N.	Uric acid N.	P_2O_5
18/6/09	1460 c.c.	405.88 $\frac{n}{10}$ NaHO	11.262	0.662	9.292	0.193	1.788
19/6/09	1165 c c.	274.94 $\frac{n}{10}$ NaHO	10.487	0.433	8.944	0.153	1.409
20/6/09	1626 c.c.	465.03 $\frac{n}{10}$ NaHO	14.113	0.646	11.987	0.227	2.154

Not a trace of lactic acid could be found in 4000 c.c. of urine examined. The samples of urine were albumin-free and glucose-free. The nitrogen distribution was also normal throughout.

Knoblach's theory is ingenious. He points out that in many of the cases reported the muscles are stated as having a pale appearance and compares them to the white muscles one finds in chickens and rabbits, etc. As he says, they have a different physiological action from the red muscles. They react more quickly but cannot sustain an action as long. They initiate a movement, the red muscles carry it on. The white muscle produces more lactic acid and fatigues more readily.

It is probable, as Buzzard points out, that the symptoms of the disease are best explained by assuming the presence of some toxic, possibly autotoxic, agent, which has a special influence on the protoplasmic constituent of voluntary muscle.

For treatment, it seems to me, katabolic changes in the muscles should be lessened as much as possible, by rest, and deficient elimination of waste products increased by massage, oxygen inhalations, and so on.

INSANITY IN IMMIGRANTS.

BY

P. H. BRYCE,

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The charge having been made in some quarters that there was an unduly large number of immigrants being admitted to Canada, who became subsequently or were at the time of admission insane, it became a duty to endeavour to determine, as far as statistics were possible, what the exact situation was.

For comparison, it was necessary that comparisons of populations be made as regards age-periods, sex, nationality, etc., according to the last census. The population by age-periods was:—

Under	England and Wales 1901		Canada		United States	
15	32.4		34.0		34.4	
15—24	19.5		20.0		19.6	
25—34	16.1	47.8	14.5	43.6	15.9	47.6
35—44	12.2		9.1		12.1	
45—54	8.9		11.5		8.4	
55—64	6.0	19.5	8.2	25.3	5.3	17.7
65	4.6		5.6		4.0	

The notable difference at different age-periods in Canada, especially as compared with either England or the United States, points to the fact that if a small population, as a Canadian Province or Eastern State, lost during a 10-year period a notable number of its young population, or on

the other hand had added to it an abnormal number, it must be apparent that the proportion of persons normally present in any age-period would be notably altered. The first is the explanation of the excessive number of persons in the three later age-periods in 1901 in Canada, which had for 20 years been losing to the United States a notable number of young men and women, while, as will be seen in the figures for the three new Western Provinces, made up of a young population, the difference in the age-periods in the 1906 census, by an enormous immigration of nearly 100 per cent. over 1901, makes the variation from the normal even more marked. Thus:—

Age period	Canada 1901		Manitoba Sask. Alta. 1901		Manitoba Sask. Alta. 1906	
0—15	34.0		38.4		34.3	
15—24	20.0		19.2		21.4	
25—34	14.5	43.6	15.9	47.2	19.0	52.2
35—44	9.1		12.1		12.0	
45—54	11.5		7.0		7.3	
55—64	8.2	15.3	3.7	14.0	3.7	13.1
Over 65	5.6		2.3		2.0	

The causes of these differences are at once apparent if we note the number of children in an immigrant population. Taking the years 1905-6-7-8, it is found that of the 187,519 American immigrants to Western Canada, there were: men, 106,040; women, 40,359; children, 41,090, or an average of 21.91 per cent. of children of 14 years and under, as compared with, in a normal population, 34 per cent. This variation is even more marked in the immigration from Europe, etc., to the United States, which was for 1904-1908, but 12.1 per cent. in a total of over 4,000,000.

Having these primary facts before me it became essential that in any study of insanity in a given population the number of immigrants in each age-period be carefully compared with its relative population, and as up to the end of 1908 the total immigration returns to Canada were available, I attempted to study the effect of this immigration to the three Northwest Provinces of Canada, whose population had increased by almost 150 per cent. between 1900 and December, 1908.

It was especially difficult to determine the true population of Canadians and Americans in these provinces, because a very notable proportion of the immigrants had been from Eastern Canada, and of those from the United States many were returned in the census of 1906 as "returned" Canadians, although in the immigration returns many were given as Americans. Estimate had also to be made of the natural increase in the population of 1901 and of the immigrants of each successive year.

With the errors so far as possible eliminated in estimating population by nationalities, I was fortunate in being able to obtain a yearly return of the admissions into the several insane asylums from 1901 to 1908.

ADMISSIONS TO ASYLUMS IN MANITOBA, SASKATCHEWAN AND ALBERTA, 1900-1908

	Canadian	Eng.	Irish	Scotch	U. States	Ger.	France
Total for 9 years	759	353	80	106	149	56	53
Total of 1st 5 years	362	146	29	53	42	23	24
Total of 2nd 4 years	397	207	51	53	107	33	29

	British Possess.	Norway & Sweden	Austria	Russia	Italy	China and Japan	Unkn.	Total
Total for 9 years	13	133	145	95	3	6	31	1982
Total of 1st 5 years	4	54	55	43	1	1	4	840
Total of 2nd 4 years	9	79	90	52	2	5	27	1142

Comparing the admissions at the end of 1900 with those at the end of December, 1908, the fact is found that in one of the two asylums 40 per cent. of those present in 1900 were still inmates in 1908, and in the other 61 per cent., indicating not only the probably young age at which such were admitted, but also how, without any per 1,000 increase of insane, asylums do rapidly fill up. That is, with a total of 407 in the asylums in 1900 there were, including these, to the end of 1908, 1,982 admissions; but with a population increased by 150 per cent. in 1908, as compared with that in 1900, the admissions were 358, as compared with 142, as estimated per thousand population admissions in 1908 were .335, while those admitted in 1901 were .339 per 1,000.

It is of importance as regards the number of immigrant insane that the Canadians in the population of 1901 were 62 per cent. of the total population and in 1908 but 54. If a larger group be taken, as the first five years compared with the latter four years, which, with a population of just 1-7th more persons had 1,142 admissions as compared with 840 or with 961 if the population be made of the same ratio, it appears that there is a slight increase; but it will be observed that the movement of a portion of the 38 per cent. of the total population from below the 15 year age-period to that between 15 and 24, which was 8 per cent. of the total admissions in any year, and of those between 50 and 60 to the period beyond that, will fairly account for this increase. If we turn to the rate per 1,000 of admissions of different nationalities for the nine

years, and reduce them to an average for one year, we obtain the following:—

Nationality	Population	Admission per 1,000 to N.W. asylums; average of 9 years reduced to 1 year
Canadians	461,229	0.19
British Islands	185,401	0.32
British Possessions (total 1,533)	1,533	0.94
United States	218,347	0.076
Germany and Holland	18,132	0.34
France, Belgium and Switzerland	28,711	0.52
Austro-Hungary, Galicia, etc.	85,091	0.18
Russia and Finland	47,206	0.22
Italy and Spain	2,134	0.16
China and Japan	1,464	0.45
Others	1,497	2.30

What is worthy of remark in these tables is the relatively low rate of native Canadians and of Americans; but it must be remembered that of the latter probably a larger percentage are of Americanized-Germans, Scandinavians and their families than of the old Anglo-Saxon stock.

However, it has been remarked by others as well as myself that the Teutonic peoples, both German and Scandinavian, have in America a relatively high number of insane. What further is equally notable is that the Slav races, whether native Russians or Galicians, Poles, etc., have year in and year out a remarkably low percentage of insane, and the same may be said especially of the Italians.

Another rather remarkable fact is shown by the tables, viz., that of 1,982 admissions 1,274 were men and 708 were women. Compared with the ratio per capita it is found that while males to females in the population was:—

Census	Males	Females
1901	54.6%	45.4%
1906	57.6%	42.4%
The ratio of admissions was—		
1901	64%	36%
1906	66%	34%

The idea that life on the wide western prairies is especially fatal to the healthy mentality of women seems absolutely without foundation, and is, I trust, permanently exploded.

To make our tables yet more valuable I may give the ratio per 1,000

of admissions to the Northwest asylums, averaged to a rate per 1,000 population for one year:—

Age periods	Ratio per 1000 population at each age period
15—24	0.11
25—34	0.52
35—44	0.66
45—54	0.72
55—64	0.70
65 and over	1.05

The comparison of the percentage of admissions as compared with the percentage of population for the same period to the total is of much interest. For 1901-1906 the admissions between 25 and 44 were 58 per cent. of the total, compared with 44.2 per cent. for the same period in English asylums. For the period over 44 the percentage is 33 per cent. of the total, as compared with 39.8 for English asylums.

If we take the population percentage for the same age-periods, 25 to 44, we find in the Northwest Provinces it was 31 per cent. of the total as compared with 28.3 in England.

What, however, is very remarkable is that while in the Northwest Provinces the percentage of admissions between 15-24 was but 7 per cent. of the total, while the population was 21.4 of the total in 1906, the admissions in England were 13.4 per cent., although the population was but 19.4 per cent. of the total over 15 years. It would appear that the mental breakdowns in England were greater in the early period of life, and thus would reduce somewhat the number of insane.

In the period between 25 and 44 the figures for New York State show a similar rate to that of England. Assuming the great difference to be real and not accidental is it to be explained by the great difference in the proportion of urban to rural population in the two latter cases? These comparisons have an important bearing upon the total insane in any population, since while a high percentage, if under 15 years, tends to lessen the total admissions over a low percentage of population in this period, and a relatively high population in the years beyond 45 years tends to increase the total admissions, yet it is the population in the years 25-45 of stress, wage-earning and child-bearing which tells most directly in the total admissions.

As we have already seen, the percentage of the total population in England between 25-44 was nearly 5 per cent. greater than in Canada in 1901, but is almost exactly the same as in the United States in 1900. Hence it will be of interest to compare the rate per 1,000 of admissions in the three countries.

The following table taking New York State figures is illustrative:—

Average yearly admissions to asylums in different countries by age periods and rate per 1,000 population for each period.

N.W. Canadian Provinces 1900 to 1908 (average)		England 1902 to 1907 (average)	New York State 1904
Under 15	—	0.03	0.006
15—24	0.11	0.46	0.7
25—34	0.52	0.93	1.2
35—44	0.66	1.22	1.49
45—54	0.72	1.37	1.80
55—64	0.70	1.36	2.00
65 and over	1.05	1.53	2.80
Unknown age	—	—	6.00

Owing to the age-periods from which the figures of the 1901 census for all Canada are given they are not exactly comparable with the above, but the total insane were 3.07 per 1,000.

Accepting the figures for England as a standard we find that five, or one in 2,000 population, were admitted in a year to asylums there. If the population for New York for 1900 be taken for a divisor then the admissions, taking these for 1904, were 0.91 per 1,000 annually, but if we take the population increase of New York cities for the four years as it was given for 1904, at 10 per cent., then we reduce this to 0.80 per 1,000.

The admissions for the Northwest Provinces with their 150 per cent. increase, chiefly through immigration, reduced to an average, give 0.27 per 1,000, or about one-third those of New York and one-half those of England.

To illustrate how much care must be taken in comparisons, the following table is given of the official insane in different countries:—

Country	Year	No. per 1,000 in asylums	Class included
England	1903	3.40	All notified lunatics
Scotland	1903	3.63	All in asylums, prisons, etc.
Ireland	1903	4.90	Does not include those in private houses
Canada	1901	2.38	All present during census year
France	1904	1.77	Inmates of institutions
Germany	1903	1.91	Inmates of all asylums
Norway	1902	0.80	" " "
Sweden	1903	0.97	2.35 by examination, 1.54 official insane notified
Denmark	1901	1.40	1.57 official
New York State	1903	3.39	All inmates of asylums at a fixed date
Massachusetts	1903	2.88	" " "
Michigan	1903	2.15	" " "
Wisconsin	1903	2.47	" " "
Minnesota	1903	2.13	" " "
Austria	1901	0.51	In asylums
Italy	1899	1.09	"

How inadequately expressed is the exact situation as judged by these figures may be seen in the fact that in those western states, Wisconsin

and Minnesota, where the foreign population in 1900 was 60 per cent., chiefly Teutonic and a young population, the asylum admissions are greater than Germany and three times as great as Norway and Sweden, while they are four times greater than in Austria and twice that of Italy.

It will be recalled that in the Canadian West the Teutonic immigrants admitted to asylums per 1,000 averaged, Germans, 0.34; Norway and Sweden and Denmark, 0.52; so that it is plain that the clearest distinction must be made in comparison between the official insane and the insane by census enumeration. Further it must not be forgotten that it is only the 15-24 year age-period, of all ages prior to 25 in which insane are found, so that an immigrant population with its relatively low child population will always show higher in the rate per 1,000 of population than it normally should.

How hospital and asylum accommodation is the chiefest factor in increasing the official asylum population is seen in different states. Thus the ratio of increase of insane in the asylums of New York was from 1880 to 1903, 62.5 per cent.; Wisconsin was from 1880 to 1903, 35.9 per cent.; Minnesota was from 1880 to 1903, 66.5 per cent. The latter, however, was relatively lower to start with in 1880, the rate being 1.46 as compared with 2.76 in 1903. The comparative study must, however, be much further refined if we wish accurate information. Thus the statistics of the Metropolitan asylums of London for 1907 are not instructive. Patients admitted were, 5,285 (or corrected for transfers, 3,554). This made an actual decrease of 43 over 1906. Of the attacks in 1907: 1,512 were first attacks of less than three months; 417 were more than three and less than 12 months; 651 were not first attacks of less than 12 months' duration; 46 were less than 12 months but not known of first attacks; 522 were more than 12 months' duration; 278 were unknown duration; 126 had congenital signs of insanity; six not insane. The percentage of first attacks to total admissions in 1907 was 55.3 per cent.

In pursuing my investigations into the asylums themselves in Canada I found that the transfers and repeated admissions of the same person, as seen in London, practically precluded the use of the year by year admissions as a basis of accurate comparisons.

But apart from this the problem, especially in the older provinces, was complicated by the fact that the place of birth if outside Canada caused the insane person to be registered as foreign-born, while he was often classed as an immigrant without the fact being mentioned that he was

admitted perhaps as a senile dement of 70 years and had been 50 years in the country.

Again in certain of the asylum districts, into which for departmental purposes Ontario is divided, the population is largely rural and have had between 1900 and 1908 few immigrants. In such it was found that the native-born Canadians in 1905-1908 gave a higher percentage of admissions than 1901-4—or about 90 per cent. in the latter, as compared with 77.7 per cent. in the former in the Brockville district. Superficial examination would lead us to the conclusion that the native-born Canadian was increasingly becoming insane; whereas the fact really was that year by year the old settlers foreign-born are dying off and the native-born is yearly increasing in the population. The same was shown in the French-Canadian population in the asylums of Quebec.

The fact is that a study of the insane in the foreign-born in America is only of any value where it is taken as we have done in Manitoba and studied it by age-periods. This was especially seen in Ontario, where there are eight asylum districts, and comparisons of admissions to each of these by ages was made. For instance, the Toronto district which probably receives 50 per cent. of the annual immigration to the province, as New York City does, was compared with the old Brockville district. The admissions per 1,000 were higher in the youngest population period in Toronto, and in the oldest in Brockville, than in any of the other districts. But while Toronto had nearly 50 per cent. more per 1,000 population for the age-period, 15-24, than Brockville, the latter had actually four times as many admissions per 1,000 for the period over 65 years.

What is further of great interest is that the Northwest Provinces, with a population increase in eight years of 150 per cent, mostly by immigration, as compared with that to Ontario of but 1-10 of the population, had but slightly more insane in the 15-44 age-period in the second group of years, this being that to which immigrants almost wholly belong.

As a matter of fact the total admissions in Ontario in 1907 over 1905 was but 47, and outside of Toronto there was in five asylums an actual decrease of 31 admissions. As a matter of fact there seemed but one province, that of British Columbia, where, during the four-year period of 1904-1908 the increase in admissions to the asylum of English-born immigrants seemed disproportionate to the total of immigrants who are known to have entered the province.

But the subject is one of extreme importance, and the existence and enforcement of immigration laws are alone likely to prevent the ingress of persons who are undesirable aliens.

SACRO-ILIAC STRAIN.

BY

J. APPLETON NUTTER, M.D.

Since the time of Hippocrates the condition of relaxation of the pelvic joints has been noted and discussed. The etiological factor has been childbirth, to which, it is true, the condition of pregnancy has sometimes been added. The subject of pelvic relaxation has received but scant courtesy at the hands of writers of systematic obstetrics. A search of medical literature reveals a few scattered allusions and occasional monographs by such eminent authorities as Winckel, Cazeaux, Trousseau, Smellie, Luschka, Cruveilhier, Velpeau and others.

To give a modern example, Whitridge Williams, in his Textbook of Obstetrics, speaks of spontaneous rupture of the pelvic articulations during labour, and states that pregnancy also may cause an increased mobility of these joints, due to the greater vascularity of the parts. This unusual mobility during pregnancy is taken advantage of by Dr. Walcher, who, in 1889, reported the increase in the anteroposterior diameter of the pelvis due to the nutation of the sacrum, when the so-called Walcher position was employed. This position, it will be remembered, was one of strong hyperextension of the thighs, the legs from the hips hanging free over the edge of a table, by means of which the iliac bones swung forward to the full extent of their motion on the sacrum, and so the pelvic inlet was enlarged. It must be noted that the condition of relaxation of the symphysis pubis was for long held to be of much greater importance than that of sacro-iliac disturbance. As a matter of fact, the reverse is the case. We may sum up briefly by stating that until the appearance of Drs. Goldthwait's and Osgood's paper in the *Boston Medical and Surgical Journal* for May, 1905, the condition of sacro-iliac and pubic relaxation was recognized, but only in its relation to parturition and pregnancy, and was treated by recumbency, bandages about the thighs, or in severe cases by appliances resembling heavy and close-fitting trunks.

This highly important study was entitled "A Consideration of the Pelvic Articulations from an Anatomical, Pathological and Clinical Standpoint," and was soon followed by papers at the hands of other surgeons, confirming and amplifying their conclusions. In June, 1907, Dr. Goldthwait read before the American Medical Association a second paper, entitled "The Pelvic Articulations, a Consideration of Their Anatomical, Physiologic, Obstetrical and General Surgical Importance."

Since the appearance of these papers the sacro-iliac joints have rapidly assumed the prominence to which they are entitled, and their importance from surgical and medical, as well as from obstetrical standpoints, has been recognized by the profession. Inasmuch as in Montreal nothing has yet been done to bring the subject before your notice, I have taken the liberty of putting together the salient features of sacro-iliac strain, which is much the commonest type of sacro-iliac disturbance of any kind. This is done in the certain expectation that many will find in this condition an explanation of obscure cases of leg and back pain, in many instances diagnosed sciatica, lumbago, etc. In fact, it is probably true that the majority of cases of sciatic pain have their origin in irritation at the sacro-iliac joint, an irritation which can in many cases be relieved.

It is, of course, recognized by all that any paper upon this subject must draw largely upon the studies mentioned above, and to these I refer any who wish a fuller exposition of the subject.

Anatomy.—The normal motion at the pubic articulation consists simply in a slight up-and-down play, and should be present in both sexes and at all ages. It will readily be seen that this motion depends entirely upon sacro-iliac movement, and can only be exaggerated if a corresponding exaggeration obtains at the sacro-iliac joints. We may, indeed, dismiss relaxation of the pubic symphysis as a cause of pelvic instability. The pubic bones have but little importance in this direction, and their principal function is to serve as a source of attachment for the abdominal muscles. The pelvic ring may, indeed, be lacking anteriorly, and no disability be present. This has been shown clinically in cases of exstrophy of the bladder associated with pubic deficiency, and other instances have been reported where the pubic bones have been found wanting, without symptoms. Full activity, even uncomplicated pregnancy and parturition, is possible in the absence of the pubic bones.

On the other hand, the joints (synchondroses) between the sacrum and the iliac bones are of decided importance, not only from their unprotected nature and consequently liability to trauma, but also as a result of their close proximity to the highly-sensitive nerve roots which form part of the lumbar and sacral plexuses. The opposed joint surfaces are broad and flat and covered with cartilage, the irregularities and depressions in each corresponding, so that the bones are indeed in contact but are not fused together. In some cases fine fibres unite portions of the auricular surfaces, in others pockets of synovial-like material are found.

The sinuous form of the opposed articular surfaces, together with the bulky posterior sacro-iliac ligament, constitutes the chief strength of

the joint. The sacro-iliac articulation is not immovable, as is sometimes stated. A small amount of motion is normally found here, the sacrum moving forward and backward around a transverse axis, passing through the middle of the bone at its second piece. If, as in the Walcher position, the sacrum moves backward above, the pelvic brim is enlarged. At the same time its lower extremity, with the coccyx, will move forward, diminishing the pelvic outlet. From a study of these joints it is evident that pelvic stability depends largely upon their integrity. They are protected by weak anterior and strong posterior sacro-iliac ligaments, and by numerous muscular attachments. Yet the joints are noteworthy in presenting no bony foundation in the shape of a socket, which might give them greater stability.

In the immediate neighborhood of the sacro-iliac joints are structures of the highest importance. The lower lumbar and upper sacral nerve roots, forming portions of the lumbar and sacral plexuses, are in close proximity. Those roots, which together make up the great sciatic nerve, unite directly over the lower part of the articulation. It is easily seen how undue mobility of the joint, or more so how a slight subluxation of the joint, may cause irritation of this great nerve and hence sciatic pain. But the great sciatic, though it seems to be the most susceptible, is not the only nerve that may be irritated. Close by are the obturator, with its area of cutaneous sensibility high up in the inner aspect of the thigh, the small sciatic supplying the back of the thigh, and giving branches to the perineum, the internal pudic to the genitalia, and others. Any one of these nerves, or all of them, are at the mercy of the sacro-iliac joint, and may be the source of referred pain from irritation where they cross the two bones. Although mechanical lesions alone are under consideration to-night, it may not be amiss to suggest that many intractable sciaticas are due to osteo-arthritic deposits at this joint. They would lie immediately beneath the nerve, and could easily be the cause of permanent irritation and pain.

Etiology.—In pregnancy, parturition, probably even at menstrual periods, owing to increased vascularity the ligaments relax and motion is increased at the sacro-iliac joints. As a result of parturition, the condition is more likely to have been caused by dystocia. To these may be probably added pathological conditions of the pelvic organs, such as uterine displacements, new growths, etc., which by causing pelvic engorgement soften the ligaments and allow more than normal motion. It must be noted that it is at times difficult if not impossible to state in a given case whether we are dealing with a simple physiological increase of motion, or with actual relaxation. However, it must be remembered that cases of this nature (i.e., those associated with pregnancy, etc.) are

rare when compared with those caused by mechanical strain of the joint. It has remained for Goldthwait and Osgood to point out that the sacro-iliac articulation may be, and frequently is, strained in men and in children. In fact, cases due to trauma far outnumber all other lesions of these joints.

The first and commonest type of sacro-iliac strain is that seen the result of a sudden effort, where a man, for example, is helping to lift some heavy object and suddenly has to bear the whole burden alone. This often produces the so-called "stitch" or "crick" in the back, with pain referred to the lower spine. The pain is indeed often referred quite definitely to the region of the posterior superior spine, which marks the sacro-iliac joint. The pain is due to rupture of some of the fibres of the ligaments, and if this be severe enough increased motion may be permitted, partial luxation possibly resulting. Please remember that there is nothing in the nature of the joint surfaces to strongly prevent luxation, nothing but the slight depressions and elevations which you all remember on the auricular surfaces of the ilium and sacrum. In ordinary cases the ligaments will simply be severely strained, and the sacrum will soon recover its normal seat. Whether increased mobility, luxation or merely strain result, the nerve roots in the vicinity, and especially those which actually cross the joint, will be irritated. It is to these that we owe the most intractable feature of sacro-iliac strain, for to the distribution of these nerves pain is referred. Among these nerves the great sciatic is the most readily irritated, and hence the frequency of sciatic pain as a symptom of this condition. Under such circumstances the futility of treatment applied to the back of the thigh is apparent.

A second type of sacro-iliac strain is that brought on gradually by anything causing disturbance of the normal relation of the spinal curves. Interference with the lumbar curve means generally interference with the sacrum in its relation to the ilia, and this may mean simple strain of the sacro-iliac ligaments or actual displacement of the sacrum. If the lumbar lordosis remains absent, with the patient erect, it generally means the latter.

Such a condition is frequently seen after prolonged recumbency, for example, after typhoid fever, or fractures, where as a result of general muscular and ligamentous relaxation the lumbar curve is lost and the spine is quite straight. The sacro-iliac ligaments have had to stretch considerably to permit this flattening, the elevations on the auricular surfaces are trying to accommodate themselves to strange depressions, for the sacrum has swung backward above as a result of over-straining its ligaments.

Post-operative backache will be more familiar to the surgeons. Lying on a soft mattress, the buttocks sink deeper than the rest of the trunk, giving support to the lumbar spine. On the rigid operating table, however, the lumbar curve is unsupported, and after prolonged anaesthesia it often has given way. Here, as above, the strain falls largely on the sacro-iliac ligaments, and the well-known backache results. It must not be assumed from the foregoing types that every case of sacro-iliac strain is associated with loss of the lumbar lordosis. Many cases will right themselves gradually, if aided by a pillow under the lower spine, and the lumbar curve will return. In some, however, the sacrum has become fixed in an abnormal relation to the iliac bones, and must be replaced if the pain is to be relieved. In other cases the strain is the result of heavy and prolonged work involving the use of the lower spine, without acute trauma. In these cases we may assume that constant and severe use of these joints has brought about a condition of undue mobility and hence strain. In another class we may put the cases due to long sitting in a lounging position, as witness the backache at the end of a long railway journey. Here the patient has been practically sitting on his lumbar spine and straining his sacro-iliac ligaments until they ache. In other instances long standing will bring on a strain of these joints.

Another class is composed of cases where the weight of the body is unevenly distributed between the two legs, as in hip disease, fracture of the neck of the femur, scoliosis and inequality in the length of the legs.

Lumbar (Pott's) disease, by interfering with the lumbar curve, may be a cause; in other cases obesity, pendulous abdomen and large abdominal tumours have caused strain of this joint.

Symptoms.—Pain is the principal symptom of sacro-iliac strain. This is as a rule both local in the neighborhood of the sacro-iliac joint, and referred down to the leg or foot by irritation of the lumbo-sacral nerve roots. The local pain is the more constant in its appearance, and is to be attributed to the strained ligaments and the efforts of the weakened muscles to overcome laxity here. It is usually associated with tenderness over the posterior superior spine, and may vary from a dull ache to excruciating torture. It is often almost constant, and is not as a rule benefited by recumbency, owing to the strain which this position throws upon the joint in question.

The referred pain shows a marked preference for the distribution of the great sciatic nerve, and almost every case of sacro-iliac strain has been at first diagnosed sciatica. The small sciatic, however, may show signs of irritation by pains down the back of the thigh, and symptoms referred to its upper and inner aspect show interference with the ob-

turator. All of these nerves are, as to their origin, close to the sacro-iliac joint, and capable of being irritated by undue mobility or sacral displacement.

Limitation of Motion.—By this is meant that those motions which throw a strain on the sacro-iliac joint are limited by pain. This is most characteristically seen when an attempt is made to flex the thigh of the affected side with the knee extended. The hamstrings, which have their origin upon the tuberosity of the ischium, are thereby stretched, and by pulling upon the ischium they tend to move the sacro-iliac joint. This causes pain, as a rule, and spasm of the hamstrings prevents further flexion. This movement of flexion is the only one at the hip principally concerned in the question of sacro-iliac disturbance. Ab- and adduction and extension are painful only when pushed to extremes. With regard to the spine, the patient characteristically stands with the body inclined away from the affected side, and lateral bending is limited. The erector spinæ can be seen and felt to be in spasm. Forward bending in the erect position is limited by spasm of the hamstrings, but with the patient sitting down with the knees flexed the hamstrings are relaxed, and motion is much more free. It is upon this sign that we depend in the differentiation of spinal disease from sacro-iliac disturbance. In both the spine is held stiffly, but a patient with spinal disease will maintain his stiffness of attitude whether sitting or standing, with his knees extended or flexed.

The patient is usually disabled and walks with a pronounced limp. He rises with the spine held rigidly, and gets about with extremely guarded motions. In fairly acute cases he is unable to take a long step forward on the affected side, as this, through the hamstrings, puts a strain on the joint. The leg soon shows disuse atrophy. There is usually no swelling at the joint, but in some cases crepitus can be made out here. This is best elicited by placing the thumbs upon the posterior superior spines, and having the patient raise his feet alternately, as though marking time.

With regard to the more remote consequences of sacro-iliac disturbance, it seems fair to assume that prolonged relaxation of the pelvic joints may bring on a corresponding weakness and relaxation of the muscles attached to the pelvic ring. The abdominal muscles, it will be remembered, play an important rôle in furnishing support to the abdominal viscera, and if weakened it is not difficult to understand how enteroptosis may result. The feeble back and belly muscles in turn add to the pelvic relaxation, and so a vicious circle is formed. It does not appear fanciful to suppose that in some cases of loose or misplaced viscera, accompanied, as is usually seen, by pendulous and relaxed ab-

dominal walls and an unstable pelvis, the condition may be more radically treated by attacking the loosened pelvic joints than by operations directed towards individual organs. It may be repeated in this connection that a pendulous and heavy abdomen is a well-recognized cause of sacro-iliac strain.

Diagnosis.—In general this does not present any unusual difficulty. The two most important signs are perhaps (1) pain and tenderness, usually without swelling, at the posterior superior spine, accompanied by (2) a leg pain often referred to the distribution of the great sciatic nerve, both of which are increased by flexing the thigh with the knee extended. The nerve itself is not tender, as would be the case in sciatic neuritis. With the patient lying supine, the knees kept extended, the leg on the affected side cannot be elevated to the normal extent, owing to hamstring spasm and pain. If the knee is flexed the leg can be elevated freely. Standing with the back bared, the body will usually be seen to be inclined away from the affected side, and in this side the lumbar muscles will be seen and felt to be in spasm. Forward bending of the back while in the erect position will soon be checked by painful spasm of the hamstrings. With the patient seated, this motion will be considerably more free, though still probably restricted. Side bending will be found limited, more so away from the affected side.

As to the demonstration of undue mobility at the sacro-iliac joint, it must not be thought that this is essential to a diagnosis. As a matter of fact it is more commonly found that there is restricted motion due to muscle spasm, and some cases show under certain tests restricted motion, under others motion to an abnormal extent. The test which has given the best results in my own experience consists in standing behind the patient, grasping the iliac crests, one in each hand, the thumbs covering the posterior superior spines, and having the patient raise the feet off the floor alternately. Undue mobility can be appreciated after some practice, and in two cases I have felt and heard crepitus under my thumb on the affected side. Another test of sacro-iliac mobility consists in placing one hand flat againt the sacrum and holding the pubic bones between the thumb and fore finger of the other hand, the patient raising the feet from the floor alternately. As before, one does not have to demonstrate undue mobility to establish a diagnosis of sacro-iliac strain.

A history of great strain while bending the back is, of course, suggestive, but a gradual onset, and the absence of acute trauma must by no means exclude the condition. In two of my cases there was a history only of heavy laborious work of a nature which would involve a strain of the sacro-iliac joints. In addition, loss of the lumbar lordosis is to be regarded as a probable sign of a sacrum that has swung back too far

at its upper end, and as a potential source of sacro-iliac strain. When accompanied by sciatic pain a flat back is extremely suggestive of sacral displacement.

Treatment.—Like all other joints, if the sacro-iliac articulation is strained it needs support, and if the bones are displaced they need reposition. In the great majority of cases there is no displacement, and support for the strained joint will quickly relieve the pain. This indication can be fulfilled in various ways. In acute recent cases strapping the pelvis will be found to give much relief. To do this we employ four or five two-and-a-half inch strips of adhesive plaster, going below one anterior superior spine to the other across the sacrum and buttocks. Pressing the iliac crests together tends to separate the joint surfaces, so care must be taken that the strips exert most of their force low down, at the level of the great trochanters. The strapping should be applied tightly, and needs renewal every three or four days. This method furnishes a therapeutic test of considerable value, and is a favorite procedure in outdoor treatment. It can quickly be applied in the office or clinic, and the relief usually at once felt, if it is applied properly, is an indication that the diagnosis is correct. Such patients are generally more comfortable at night if a small pillow is placed so as to support the lumbar spine.

In cases of long standing, where the treatment will probably extend over several months, a form of support which has been personally found useful is a wide non-elastic webbing binder, kept from wrinkling by the insertion of light steels, and lacing at the back. In males this generally requires perineal straps to keep it from working upward, in women it is attached to the corset. Another form of support which is well recommended consists in a pair of heavy woven elastic trunks, also lacing up the back. Both of these supports are made more efficacious by attaching a firm pad where it will press the upper end of the sacrum forward.

As has been said, at times the condition of the joint is one of subluxation. When this is present no support to the pelvic ring will give more than partial relief, for the sacrum needs to be replaced. A flat back, with obliteration of the lumbar curve, usually warns us of this subluxation, and to overcome it we endeavor to get the lumbar spine back into the hyperextension and to keep it there. At times the sacrum will slip into place by putting a firm pillow under the hollow of the back, at other times success is obtained by hanging the patient's body, face downward, unsupported, between two tables, thus getting forcible hyperextension. An anaesthetic with forcible manipulation is rarely necessary. When the hyperextension has been obtained, the bones are usually held in place by a low plaster-of-paris jacket, embracing

the pelvis, or better combined with a spica. After lying in this a few weeks, until the acute symptoms have d'sappeared, a light spinal brace is applied. This must maintain the lumbar curve, put firm pressure against the upper end of the sacrum, and at the same time give support to the pelvic ring. It will be worn for some time after all pain has left, and will be gradually discarded.

It is to be recognized that these conditions of sacro-iliac strain are accompanied by muscular relaxation, which is, of course, increased by the pelvic support. To overcome this weakness as soon as possible, exercises, massage and stimulating bathing are to be employed.

Following is a brief report of five cases from my own practice and the Montreal General Hospital during the past few months. It is to be noted that all are adult males.

Case 1. Male, 45 years old; laborer in sugar refinery. Complains of pain and tenderness at right sacro-iliac joint and through the right buttock. Onset without acute trauma a month previous. Crepitus and undue mobility felt at left posterior superior spine on raising leg from the floor. Body tilted to sound side. Limps badly. Pain markedly relieved by strapping. Fitted with canvas binder with perineal straps, which gave great relief.

Case 2. Male, 22 years old. Work involves much leaning forward and bending the back. No acute trauma. Sciatic pain had lasted nine months in spite of stretching the nerve, injecting sterile water, etc. Unable to work. Marked pain and tenderness at left posterior superior spine, and on raising leg crepitus and undue mobility of sacro-iliac joint are easily made out. A tight canvas binder gave immediate relief, but he finds that it chafes his thighs when working. An elastic support is being prepared for him.

Case 3. Male, 30 years old. On stooping to lift a heavy stone, aided by a companion, he was suddenly compelled to bear the whole weight alone. Felt something give in his back, and suffered excruciating agony for nearly a fortnight. Has recurrent attacks of sciatic pain, and still shows pain and tenderness over sacrum. When examined showed little but the local tenderness. No undue mobility made out. The nature of the onset and the location of the pain made the diagnosis of sacro-iliac strain very probable. Was not treated, as was leaving town.

Case 4. Male, 50 years old. Complains of severe pain referred to right sacro-iliac joint and down the right thigh to the knee. Brought on by heavy lifting, something giving way in his back. Shows typical restriction of motion at sacro-iliac joint due to spasm of hamstrings. Cannot raise the leg high in the air with knee extended, but with knee flexed it

can be raised much higher. Pain and tenderness subsided in a few weeks with pelvic support.

Case 5. Male, 30 years old. Aching pain with tenderness in sacro-iliac articulation, patient putting his finger on posterior superior spine when asked to show where pain was located. Associated with deformity of corresponding leg, ankylosed by old hip disease. No referred pains whatever. Immediate cause seemed to be undue amount of bending forward at an unsuitable desk. Pain was not helped by recumbency unless a pillow was put under lumbar curve. Subsided in a few days by avoiding prolonged desk work.

TWO CASES OF CHOLESTEATOMA OF THE MIDDLE EAR. RADICAL MASTOID OPERATION WITHOUT REMOVAL OF THE CHOLESTEATOMA MATRIX, (SIEBENMANN'S METHOD).

BY

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In presenting the following cases I wish to bring to your notice a method of dealing with cases of chronic suppurative otitis media, complicated with cholesteatoma, which has been advised by Siebenmann of Basel and practised in his clinic for many years with very satisfactory results.

Cholesteatoma is recognized as a most important and dangerous complication of middle ear suppuration, damaging the hearing and exposing the patient to grave danger of an intracranial complication. The predisposing causes of such a condition are severity of the original middle ear inflammation, leading to destruction of the normal lining, a more or less extensive destruction of the drum membrane, and chronicity of the discharge. To these must be only too often added neglect on the part of those in charge of the child, so that the ear is not encouraged to heal even to the extent of local cleanliness being secured.

Types of such severe inflammation are seen especially as complications of the infective fevers, such as scarlatina and measles. Virulence of infection is purely relative to the resistance of the individual so that delicate or strumous children are especially predisposed.

The pathology of the process consists of a destruction of the normal mucosal lining of the middle ear spaces and its replacement by an epidermal layer usually by direct growth inward from the skin lining the external auditory meatus. Such a process is a perfectly normal attempt

at repair, and, if the middle ear spaces are small and the destructive process limited, it forms an ideal healing. Where the destructive process has been extensive and continues after the epidermisation has entered the middle ear spaces the epidermal layer tends to desquamate and the exfoliated masses are added to the other products of inflammation. This gives to the discharge its characteristic offensive odour. Technically, there may be a difficulty in drawing a line between an ear healed by epidermisation and cholesteatoma, but in practical clinical work a little care in the examination overcomes the difficulty. The destructive character of cholesteatoma has been universally recognized, but authorities have not all been agreed as to the explanation of the process, or as to the best method of treatment. It has been commonly taught that where such a cholesteatomatous condition was met with during operations on the mastoid it should be thoroughly eradicated. Siebenmann, after extensive histological studies, concluded that the matrix of the cholesteatoma was not an invasive or pathological epithelial growth, but a natural attempt at repair, and that the destruction of bone about these cavities was due solely to increased pressure during periods of retention. Retention of discharges is very liable to occur in these cases by the blocking of the natural exits with masses of exfoliated epidermis.

Siebenmann's method of treatment consists in the free exposure of the middle ear spaces by the radical mastoid operation without disturbing the matrix, which, under these conditions, quickly assumes a healthy character not to be distinguished histologically from the lining of the cavity after the ordinary radical operation.

Advantages of the method are many: (1) The time of healing is greatly shortened, epidermisation being often complete in three or four weeks, whereas three or four months is a good average for the ordinary radical.

(2) There is a minimum interference with the bony walls of the cavity, so that there is less tendency to exuberant granulation and narrowing of the cavity.

(3) There is a minimum interference with the inner wall of the tympanum and so less danger of lessened hearing after operation.

It has been urged against the method that the tendency to exfoliation persists and that relapses are apt to occur. This has not been found true in Siebenmann's clinic, as I had an opportunity to observe in old cases returning for inspection after a period of absence varying from a few months to a year. In the present cases the result has been, I think, eminently satisfactory:—

Case 1. M. McD., aged fifteen years, referred to me on October 8th,

1908, by Dr. Peters for treatment of a suppurating ear. As in so many such cases, very little intelligent information could be obtained as to the onset or course. The statement was that the ear had been running for about a year; no date of onset could be fixed, as there had been no acute symptoms as far as she remembered. The patient had not noted any loss of hearing, pain in the ear or headache. Past history contained nothing of moment beyond an attack of measles at the age of five years, which was most probably the starting point of the otitis.

Examination showed a large polypus filling the left meatus almost completely, and around this escaped a very foul smelling purulent discharge. The right ear was normal.

Functional examination showed hearing normal on right, but reduced almost to complete deafness on left, conversational voice being heard only at a distance under one metre. The tuning fork reactions showed, Weber referred to left, Rinné positive on right, negative on left side. The nose and throat showed an atrophied adenoid, but nothing of moment.

On October 9th the polypus was removed under cocaine. The left drum membrane was found to have a large perforation involving the posterior upper segement, from which the purulent discharge poured freely, reappearing quickly after swabbing. The site of origin of the polypus was not visible, lying evidently within the attic or antrum. The lower margin of the perforation was adherent to the inner wall of the tympanum, and the epidermal layer was seen extending upward on the inner wall towards the auditus. The Eustachian tube was found patent, but not in free communication with the diseased region. Hearing was greatly improved by removal of the polyp, so that conversational speech could be heard up to three metres. The polypus was examined histologically, but showed only inflammatory tissue.

On October 12th, 1908, the attic was washed out, a large amount of pus and epidermal scales being removed. The diagnosis of cholesteatoma was made and radical operation advised but refused. Conservative treatment was continued, but with little effect, the discharge remained profuse and offensive. On one or two occasions cholesterin crystals were found in the washings from the attic.

On December 7th fresh granulations appeared in the perforation, and the hearing diminished to a distance of 1.5 metres, so that the radical operation was urged more strongly and accepted.

By the courtesy of Dr. Birkett, the patient was admitted to the Royal Victoria Hospital and a radical mastoid operation performed on December 14th, 1908. A large cholesteatoma cavity was exposed. The opera-

tion was the usual radical except that the matrix of the cholesteatoma was left undisturbed, being merely swabbed off and freed from polypoid granulations by picking the latter off with forceps. At the first dressing the discharge was rather profuse, but this quickly disappeared. The line of union behind the ear looked healthy at first dressing, but broke down and required a secondary suture on the seventh day.

On January 9th, 1909, the patient left the hospital with the retro-auricular wound healed, and on January 30th, six weeks after the operation, epidermisation was complete. Hearing on the left side was improved, so that whispered speech could be heard at 1 metre and conversational speech at a little over three metres. The ear was kept under observation until the 5th of July, 1909, and remained quiet and absolutely dry.

Seen again October 30th, 1909, after an interval of four months, there was slight accumulation of epidermis at the bottom of the cavity, but hardly more than one sees after the ordinary radical operation.

Hearing has remained the same as when last tested.

Case 2. I. C., aged seventeen years (Out-Door No. 8105, R.V.H.), came to the Outpatients' Department of Dr. Birkett's clinic on May 21st, 1909. The complaint for which she sought treatment was sore throat and stuffiness of the nose.

Examination revealed an adenoid of moderate size and a slight grade of chronic rhinitis. In the routine examination a much more important condition was found in the left ear, which showed chronic suppuration, with a very foul discharge. The right ear showed considerable destruction of the drum, but was healed and quiescent. On inquiry, the patient stated that she had had an attack of measles seven years before, with suppuration of both ears. The left ear had bothered her a great deal for several years after, discharging a great deal, and there had been recurring attacks of severe earache. During the past few years there had been no pain, so that the ear had not attracted much notice, although discharging.

The functional examination showed the hearing on the right, two metres whispered voice, and conversational speech over four metres. On the left, 1.5 metres whisper and conversation also over four metres. Weber test was referred to the right. Rinné's test was negative on both sides. The right drum membrane showed destruction of the posterior half with exposure of the inco-stapedial junction. The left drum membrane was swollen and no details could be made out. A perforation of the posterior upper segement gave free access to the region of the attic, from which came a moderate amount of thin pus and epidermal debris

with very foul odour. On washing out the attic, pus and epidermal scales were brought away but no cholesterin crystals were found.

On May 26th the adenoid was removed with nitrous oxide anaesthesia. Conservative treatment with attic irrigations lessened the discharge, but did not stop it. There was a slight amount of sinking of the inner end of the upper wall of the meatus, which did not decrease under treatment. After two months of conservative treatment a radical mastoid operation was advised and was performed on August 5th, 1909. A cholesteatoma cavity of moderate size was exposed. The details of the operation were the same as in the former case. The matrix did not show the same grade of inflammation at operation and the healing was very rapid. Primary union was obtained in the retroauricular wound, and there was practically no discharge from the wound after operation. Epidermisation was complete on August 25th, three weeks after the operation. Hearing was improved after the operation and has remained so up to the present. Whispered voice can be heard at three metres on the left and slightly over three metres on right.

I wish to express my thanks to Dr. Birkett for the opportunity of reporting these two cases from his department, and for the opportunity of operating on Case 1, and to Dr. Jamieson for the opportunity of operating on Case 2.

ACUTE ANTERIOR POLIOMYELITIS WITH AUTOPSY.

BY

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Acute Anterior Poliomyelitis, although a common enough disease, is in itself so seldom the cause of death that our knowledge of the pathological changes is still very limited. The following two cases, which occurred early in the epidemic lately affecting the northern central part of this continent, should be of interest.

Case 1.—Seen in consultation with Dr. Fraser Gurd. G. L., a well developed boy, aged 10 years, had been spending the summer with his parents among the Laurentian lakes, and, previous to the onset of the present illness, had enjoyed perfect health. Early on the morning of the 5th of August he complained of headache, and his mother noticed that his breathing was more rapid than usual. He had spent some time the previous day, which had been very hot, swimming, and then lying out on the roof of the cottage in the sun where there was a little breeze. Just about sunset he and some friends paddled some considerable distance down the lake, but on the way back after sunset, he did not paddle

but lay in the bottom of the boat; he was scantily clad in the light clothes he had worn during the heat of the day, and on being asked, said that his feet were cold. During the day of the 5th of August, the pain in the head and the back of the neck continued, his temperature was 100 F. and he would take no nourishment. The following day he had developed a flaccid paralysis of the lower extremities with loss of reflexes, the arms also were paralyzed, especially the left. Beyond the pain in the head and neck he did not suffer and his mind was clear, respirations still very rapid, but the temperature had fallen to normal and he took some light nourishment. The next day there appeared to be some improvement in the arms, but otherwise no change from this out, except that the respirations became more and more difficult. When he was seen for the first time by Dr. Fraser Gurd, on the 5th day of the disease, there was paralysis of the lower intercostals and the diaphragm; life seemed to be dependent on the extraordinary muscles of respiration solely, and as was to be expected the patient died that night of respiratory failure. The autopsy was performed by the writer and Dr. Gurd at the home of the parents, 10 hours after death. The brain and cord were removed, the other viscera could only be examined *in situ*, and showed no abnormality. Unfortunately we had not the facilities for bacteriological examination. There was nothing to be noted about the calvarium; the dura was of normal colour and glistening, there was no congestion of it either over the cord or brain. On removal the brain looked large for the size of the head; it weighed 1550 gm.

The superficial vessels are not particularly engorged, but the surface of the brain has a peculiar slightly bluish-grey colour, on section the edge everts showing the small capillaries of the cortex somewhat engorged in places.

Hardened in 5 per cent. formalin, on section nothing abnormal is to be noted beyond the slight general congestion of the vessels.

Cords.—The dura was covered posteriorly with a thick layer of fat; the dura itself looked healthy and glistening and was not engorged. On palpation through the dura, the cord felt extremely hard, especially over the lumbar and dorsal regions. On opening the dura, the vessels of the pia-arachnoid were slightly congested. The whole cord from the lower end of the cervical enlargement to sacral segments has the appearance of having been wound up carelessly but tightly with fine thread, showing everywhere little irregular ridges and bulges, evidently the swollen cord structure bulging through the meshes of the pial tissue. There was some slight cloudiness of the pia-arachnoid over the posterior surface. On section, the edges evert to a marked degree, and the

anterior horn region looks softened, swollen, and almost diffluent, that is in the lumbar, dorsal, and to less extent, the lower cervical region.

The microscopical appearances in the two cases are to all intents and purposes identical, and will be described later together.

Case 2.—The following is from Dr. McCrae's notes.

E., aged 24, single, engineer: admitted complaining of weakness, loss of appetite, pain in the right hip, and inability to use hands; seven days previously he had developed a sore throat, but worked till the second day before admission. On this day he went to bed. For these seven days, he complained of headache, at first frontal, then occipital, and finally the pain was in the neck. The day before admission he vomited thrice; was constipated; reported difficulty in thinking; on day of admission had dyspnoea when lying down.

His previous history is uneventful, save for a severe attack of neurasthenia at the age of 16 (several months' treatment).

On admission to the Royal Victoria Hospital at noon, his temperature was 99, his pulse 76. He could not hold a cup in his hand, his grip was weak. His breathing was jerky and abdominal; his pupils reacted to light and accommodation; there was no nystagmus; the fields of vision were normal; pharynx was sensitive; throat was clear; some pain was complained of in the neck on throwing the head forward. Dermatographia was marked; there was no tenderness of spine or hips; the abdominal reflexes were equal and active. Hands: grip was weak, semiflexed; the wrist and elbow reflexes were not obtained; knee jerks were lessened; Kernig was 135° on both sides; there was no Babinski; no Oppenheim; no Achilles obtained (tried when lying on his back); the sensations to rough tests were normal; all movements of the legs were normal except lifting, which was done weakly and with tremor. About 3 p.m., the temperature was 99, the pulse 76, the dyspnœa had increased; the accessory muscles of respiration were used; the jaw dropped at every inspiration.

At 7 p.m. when he was seen by the writer, in consultation, the condition was as described above. The respirations were about 65 and abdominal in type, the temperature was 99, the pulse 56. The patient did not present much cyanosis, and in spite of the extreme dyspnœa, the accessory muscles of respiration were not in action. At the same time it was interesting to note that the patient could use the sternomastoids voluntarily, to some extent at least, in turning the head on the pillow.

The left knee jerk was obtained but weakly. The muscles all contracted well to mechanical stimulation, for instance when struck with

a percussion hammer, and showed a condition of myœdema—that is, when they were struck or pinched, a slow localised contraction of the muscle occurred, giving rise to a small ridge, which disappeared again after twenty or thirty seconds. The muscles all reacted well to faradism.

At midnight the patient's temperature rose to 100 3/5 and the pulse 76. Cerebration was apparently quite clear. He died suddenly at 3 a.m. of respiratory failure.

At autopsy, which was performed 8 hours after death, the following conditions were noted:—The skull was of moderate thickness. The dura was firmly adherent to the vertex: sinuses free. The pia over the vertex was cloudy, with one small, quite thickened and white area on the left hemisphere about the middle, close to the longitudinal sinus, and in the immediate anterior extremity of the right frontal lobe was another, each measuring about 5mm. in diameter. The superficial vessels in the vertex were slightly congested. The pia over the base appeared normal but there was more marked congestion of the vessels over the brain stem. There was no thickening of the pia on the superior surface of the cerebellum. The brain weighed 1525 gms.

Cord:—The spinal dura appeared normal. On palpation, the cord at the lumbar enlargement was hard and felt like a lead pencil. In the dorsal region this was not noticeable, but in the upper part of the cervical region it could again be felt through the dura. On opening the dura there was no particular congestion of the anterior surface, but the posterior surface was congested, especially in the lumbar region and over the cervical enlargement. On the posterior surface there were numerous irregularly shaped hard pearly white plaques, almost cartilaginous in hardness. There was a slight tendency, especially in the lower dorsal and lumbar region, to a wrinkled appearance in a transverse direction, as if a fine thread had been wound irregularly but tightly about the cord. This is probably due to œdema of the cord. On section, in the lumbar region there was a moderate amount of eversion of the edges of the cord, and there was apparently a softening of the anterior horn on the left side. In the dorsal region this eversion of the edges, on section, was even more marked, and the grey matter was softened and indistinctly demarcated. There was congestion of the substance of the cord about the grey matter in this region.

The bacteriological examination, for which I am indebted to Drs. Klotz and Tytler, was as follows:

P.M. 94-09. Bact. Lab. No. 1867.

At autopsy cultures were made from (1) the heart's blood, (2) peri-

cardial fluid, (3) liver juice, (4) spleen juice and (5) cerebrospinal fluid.

At the same time smears were made from the various fluids collected and were examined in stained specimens. Organisms were found in the heart's blood, pericardial fluid and cerebrospinal fluid. The organisms from the different regions were alike morphologically, but were most abundant in the cerebrospinal fluid. These organisms appeared as cocci, occurring in pairs and occasionally in tetrads. A few were flattened but most of the organisms were spherical. The majority of the organisms were decolorized by Gram's method, but some resisted decolorization after the nuclei of the leucocytes were decolorized. The cerebrospinal fluid was distinctly cloudy and showed a large excess of leucocytes.

Cultural.—Organisms were found in the cultures taken from (1) the heart's blood, (2) pericardial fluid, (3) liver juice and (4) cerebrospinal fluid. No growth was obtained on any of the media on the first day. On the second day a growth appeared in plain serum water in all inoculations save those of the spleen juice.

Organisms could also be found on blood serum and blood agar media, although there was no macroscopic evidence of growth. Organisms were also found in the sediment of the dextrose broth tubes. Transfers made from the inoculated media to new tubes proved unsuccessful, save where serum water was used. In this latter medium three generations of the organism were obtained, but at the end of a week no further transfers grew on freshly inoculated media.

The organisms which were obtained in the cultures were morphologically similar to those noted in the direct smears. Most commonly the cocci were seen in pairs and not infrequently the individuals were much flattened towards each other. Here and there tetrads were noted. As a rule the organisms were larger than those seen in the direct smears.

The organisms stained well with the ordinary stains and with Gram's method were decolorized with some difficulty. It was found that after decolorizing five minutes some of the organisms still remained positive, while many had given up the stain.

Microscopically in both cases the picture was identical. There was active congestion of the spinal meninges and grey matter of the spinal cord, not only in that part but in the posterior horns as well. The blood vessels were distended, and some capillaries were ruptured with extravasation of the red cells. The perivascular spaces and the grey matter were filled with emigrating leucocytes. There was considerable

exudation of serum throughout the tissues. All varieties of degenerative change can be seen in the ganglion cells. Most cells have disappeared entirely, some are shrunken up, have lost their nuclei and stain deeply. Other cells appear like shadows of their former selves. Having lost their nuclei, they are in the process of being absorbed by leucocytes, which are clustered around them in great numbers. Others again appear swollen and pale, and the nucleus is dislocated to the side of the cell. In both cases the extent of the lesion is almost identical. In the medullary region there is active congestion of the meninges and the interstitial tissue, with the emigration of leucocytes, but the cells appear to be unaffected. In the upper cervical region, the congestion is more marked and the destruction of cells is practically complete, both in the anterior and in the posterior horns. The same may be said for the dorsal region, only at one level in both cases the cells in Clarke's column remain apparently unaffected.

In the lumbar region the same condition is present and it is only in the sacral region that one again finds cells retaining more or less their normal appearance, though here also many of them are in various stages of degeneration and demolition.

There would appear to be little doubt that we have in this disease a general infection affecting more particularly the spinal nervous system, the meninges, and not as is commonly stated the area of spinal grey matter supplied by the anterior spinal artery, but practically the whole of the grey matter and the white matter immediately surrounding it. The result is degeneration and atrophy of the ganglion cells and interstitial tissue. It immediately suggests that if the posterior horns are affected why do we not get sensory loss?

In my opinion it is a question whether we do not get sensory change. I have at present under observation a patient, aged 46, suffering from acute poliomyelitis, who, while otherwise perfectly typical, showed at first a slight impairment of sensibility to all forms.

The disease usually affects young children where testing sensibility, when only a relative impairment is expected, is utterly impossible.

Regarding the treatment, in the early stages, in fact immediately on the appearance of the paralysis, or indeed before this if such a development is suspected as likely to occur, as for instance during an epidemic, Urotropin seems to me to be indicated; we know that it is excreted into the cerebrospinal fluid and has there some antiseptic action; it should be useful then in the early stages. In the later stage, when the paralysis is established and is no longer progressive, i.e., during the first week or two after the onset, potassium iodide in small doses to aid in the

absorption of the œdema and exudation into the tissues of the spinal cord, should be of service.

Whether lumbar puncture is indicated or not I am not prepared to say. It does no harm if carried out aseptically, and if not too much fluid is withdrawn and if the fluid could be obtained very early in the disease, that is immediately on the onset of the paralysis, we might learn something as to the etiology of this disease.

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CANADIAN MEDICAL ACT.

Let us hope that we are near the end of the controversy over Dominion registration and inter-provincial reciprocity in degrees.

In 1890 Dr. T. G. Roddick entered Parliament for the express purpose of promoting legislation to establish a Dominion board of registration, a council which would deal with all matters relating to the medical profession and make it possible for a graduate, after satisfying the council's demands, to practice anywhere in Canada. The bill was passed at the session of 1902, but among the conditions attached was one making it necessary for all the provinces to agree to the proposal. Four provinces then passed concurrent legislation to allow them to take advantage of the provisions of the act. A variety of circumstances prevented the same concurrence in the other provinces, and thus the measure has been rendered inoperative.

The present conditions are unsatisfactory. There are nine examining boards exercising jurisdiction in the different provinces, and the graduate must satisfy each of these as to his qualifications before he may practice in that particular province. Four western provinces, having tired of waiting for the act to be put in operation, were a short time ago about to establish a federation of their own, which would effectually divide the East from the West.

To avoid this calamity a conference was held in Montreal on November 16th, to consider a resolution passed at the annual meeting of the Canadian Medical Association in Winnipeg in August last, when

certain representatives of all the provinces of Canada were instructed to confer with Dr. Roddick in regard to the Act, in order to obtain any amendments necessary from the Federal House to make the Act acceptable to all the provinces.

The representative nature of the meeting may be judged by the names of those who were present, namely: Dr. T. G. Roddick, of Montreal, who presided; Drs. F. J. Tunstall, Vancouver; R. J. Blanchard, Winnipeg: W. Spankle, Wolf Island, Ont., representing the Ontario Medical Council: F. N. Starr, Toronto; R. W. Powell, Ottawa; Murray McLaren, St. John,; J. W. Daniel, M.P., St. John; John Stewart, Halifax: Geo. M. Campbell, T. L. Sinclair, Halifax; S. R. Jenkins, Charlottetown; E. P. Lachapelle, Montreal; H. S. Birkett, Montreal; L. P. Normand, Three Rivers, and A. C. Simard, Quebec, representing the Medical Council of the Province of Quebec.

The present proposal, we believe, is to seek authority from Parliament to make the Act applicable to such provinces as desire it, and allow those provinces which so desire, to remain under the present regulations. Thus the sacred principle of provincial rights will be maintained.

Under the British North America Act complete authority is reserved to the provinces to deal with all matters pertaining to education, professional and otherwise. They are free to deal in any manner they consider best, and if they choose to act jointly that also is within their rights. If any single province should see fit to act separately, no one questions its right to do so. It cannot, however, interfere with the liberty of action possessed by other provinces.

If Prince Edward Island, to take an example—though any other province would serve equally well for the purpose of illustration—were to decide that its interests would be best served by restricting the practice of medicine within its area to its own licencees, isolating the hinterland of the Canadian Federation, the remainder of Canada, so cut off from that privilege, could not very well object, but must bear the embargo as best it might. We do not imagine, however, that the practitioners of that province, important as it undoubtedly is, would go the length of forbidding Ontario and Quebec from making the arrangements separately or mutually which might appear best to them. In this there is a lesson for other provinces as well.

The truth is that we in the East are under a misapprehension about our own importance. We must find an outlet for our graduates in the West, where there is a large community which speaks our language. The West has room enough for its own and does not require access to our field.

DR. OSKAR KLOTZ' PROMOTION.

Dr. Oskar Klotz, assistant pathologist at the Royal Victoria Hospital and lecturer in pathology in the McGill Medical Faculty, will sever his connection with these institutions at the end of the year to accept the professorship of pathology in Pittsburg University.

Whilst we congratulate Dr. Klotz that his brilliant attainments have won a wider recognition, we regret that the profession in Montreal is to be deprived of his immediate services. Especially will he be missed by the Editorial Board of this Journal. He gave of his best promptly and cheerfully.

The college and hospital authorities here made efforts to retain the services of Dr. Klotz, but the importance of the new position was too strong an inducement. It carries with it the supervision of the pathological department of the eight hospitals connected with the University of Pittsburg.

Dr. Klotz is a graduate of Ottawa Collegiate Institute, and the medical school of Toronto University, and he spent some years in Europe, studying his special subject. He came to Montreal seven years ago and his original research work in the Royal Victoria and at McGill has gained for him a broad reputation.

Dr. Klotz is the youngest son of Dr. Otto Klotz, Dominion Astronomer at Ottawa, and has two brothers in the medical profession, Dr. Max Klotz, of Ottawa, and Dr. Julius Klotz, of Lanark.

INSANITY IN IMMIGRANTS.

The paper by Dr. P. H. Bryce, Chief Medical Officer, Department of the Interior, is a very important contribution to this subject, which has given from time to time occasion for discussion both in medical journals and in the daily press.

The studies on the subject which have appeared in medical journals have been prepared from the materials in the hands of the superintendents of asylums, but as indicated by the studies in Dr. Bryce's paper, it has been necessary, in order to deal fairly with this difficult problem, to collect with all the care possible, not only the total insane immigrants which have appeared officially in the several institutions of the different provinces, but also to study them both as regards the dates of their coming to Canada, their total number in relation to the total immigrant population and their relative proportion per 1,000, as compared with the insane in the Canadian population. The study has been especially extended to the population of the three Northwest

Provinces, Manitoba, Saskatchewan and Alberta, since, as is pointed out, not only have these been the recipients of the great part of the influx of immigrants during the past eight years, but also, owing to the relatively small numbers of previous population there, and the fact of two censuses, 1901 and 1906, having been taken during the period studied, (1900-1908) it has been possible to make the study a detailed one; the figures of the asylums, the Immigration Department and the Census Bureau supplying a range of information which is seldom attainable for such a study over so extended a period.

The population estimate has been made with unusual care, and Dr. Bryce seems to have endeavoured to eliminate every element likely to make for error in the population basis of calculation. Having provided for natural increases, the elimination, as far as possible, of native-born Canadians from old Canada, or as "returned" Canadians from the United States, it became a relatively easy matter to determine the rate per 1,000 of insane both in the total immigrants and in the immigrants by nationalities.

It is a matter for some surprise, when we remember that the total insane in Canada during the last census was 3.07 per 1,000, and those in asylums in Ontario, 2.5 per 1,000, that the total admissions of all persons to the Northwest asylums was so low a rate per 1,000, it being 0.339 for the census year 1901, and 0.335 for the census year 1906. But what is yet more remarkable is the fact that if the population estimated to the end of 1908 of 1,037,990 be taken and divided into the total admissions (1,982) during the nine preceding years, and assuming that all these are still alive and in the institutions instead of probably 40 per cent of them having recovered or died, the rate is even then only 1.9 per 1,000.

Dr. Bryce does not fail to point out the partial explanation in the relatively younger population amongst the newcomers. On the other hand this is balanced largely by the relatively smaller number of children in any given number of immigrants, the total actual coming to Canada being about 20 per cent. under 15 years, as compared with 35 per cent. in any normal population.

The study by nationalities is of interest, especially as illustrating the very high standard of health in the young Canadian and United States population, that for Canadians being only 0.19 admissions per 1,000 for a single year (the total admissions for nine years being reduced to an average), while that of immigrants from the United States was only 0.076. This latter is explained by the fact that in the census of 1906, all returned Canadians, if going insane, would be classified as Cana-

dians because born in Canada, while they would be in the immigration returns classified as from the United States.

While it is notable that amongst the European peoples the British and German have a rate of 0.32 and 0.34 per 1,000 respectively, those from Scandinavian and the French speaking countries are distinctly higher, being 0.52 and 0.50 respectively. In part this is due to the fact that in smaller number the average of error is more liable to be greater, but there can be no doubt that, as compared with the peoples of Austro-Hungary and Russia, the latter are remarkably free from insanity, their rate per 1,000 of admissions being only 0.22 and 0.16.

An incidental fact, but still one of the most interesting brought out, is that in both 1901 and 1906 the male admissions to the Northwest asylums were distinctly greater in proportion to their numbers than were females, indicating, as Dr. Bryce states, that neither relatively nor comparatively is it true that the so-called lonely life of the prairie is seriously productive of insanity, as has been so popularly stated by those who least understand the purposes of the pioneer couples who go to the prairies. In fact, it is the history of the early pioneers of old Canada over again, and illustrates how the very demands for the output of physical energy have their resultant in a physical vigour beyond what is to be looked for in city life. Indeed, if we are to judge from statistics, there is developed, even in immigrants from the urban centres of Great Britain, a hope which is distinctly stimulating, and tends to build upward rather than towards enervation and mental unbalancing.

The remarkable differences between the total admissions in a single year to asylums as compared with the rate per 1,000 in England and New York, speaks volumes not only for the type of immigrant but also for the rural life which most in the new provinces live. The rate of annual asylum admissions is 0.5 per 1,000 in England and 0.80 in New York State, and only 0.27 per 1,000 in the Northwest Provinces. Brief but pointed references are made to the effect upon asylum admissions of the immigration in the older Eastern Provinces. The figures for Ontario asylums, it is pointed out, as published hitherto year by year, have not been of a character to make exact general comparisons of value owing to *repeat* cases and *transfers*. But the necessity for greater care in the comparative study of asylum admissions is seen, where, in 1908, the asylums of Ontario outside Toronto actually had fewer admissions than they had two years previously, while in Brockville, as representing the type of asylum for a rural district, the percentage admissions of Canadians increases year by year, the same as was found in the French asylums of Quebec.

Remembering that in the Northwest the population is now over 1,000,000 and increased in eight years 150 per cent, while old Canada has increased notably, especially in Quebec and Ontario, it is not possible, with so large an influx of people from many countries and many social stations, that the tragedies of life shall be wanting, or that with the stress of life in a new country and under novel conditions here and there mental break-downs will not occur; but we can congratulate Dr. Bryce upon presenting figures which we confess put a new face upon the whole problem; and should it appear, as indicated in his last report as Medical Officer of Immigration, that practically every insane immigrant arrived within two years has been deported, then Canada seems to be receiving much which goes to increase national development without paying any physical penalty therefor.

Reviews and Notices of Books.

SELECTED PAPERS ON HYSTERIA AND OTHER PSYCHONEUROSES. By PROF. SIGMUND FREUD, Vienna; authorized translation by A. A. BRILL, Ph.D., M.D., chief of Nervous Dispensary, Beth Israel Hospital; Clinical Assistant, Dept. of Psychiatry and Neurology, Columbia University; Assistant in Mental and Nervous diseases O. P. D., Bellevue Hospital; Assistant visiting physician, Hospital of Nervous Diseases, New York. Published by the Journal of Nervous and Mental Diseases Publishing Co., 64 West 56th St., New York.

This work is the fourth of the Nervous and Mental Disease Monograph Series and maintains in every way the high standard set by its predecessors. The papers of Prof. Freud have been well selected to give a clear, interesting and concise idea of his psychoanalytical and "cathartic" method of treating the various hysterias, phobias, and obsessions. They illustrate well also his views on the sexual origin of the acquired hysterias and of what he has termed the defense neuroses. The translation, in spite of Dr. Brill's modest remarks in the "foreword," is perfectly excellent. Anyone who has attempted to read Freud in the original, will appreciate this fully. While we realise that the details of Prof. Freud's technique might be modified to suit the personality of the physician, his method of analysing his cases and his views on the etiology of the conditions will be found to be extremely suggestive. They will give a much needed interest to the care of these usually troublesome patients. We can sincerely recommend the study of this small volume to all who are interested in the study of the functional nervous disorders.

C. K. R.

OUTLINES OF PSYCHIATRY. By WILLIAM A. WHITE, M.D., Superintendent Government Hospital for the Insane, Washington, D.C.; Professor of Nervous and Mental Diseases, Georgetown University, Washington, D.C.; Professor of Nervous and Mental Diseases, George Washington University, Washington, D.C., and Lecturer on Insanity, U. S. Army and U. S. Navy Medical Schools. Second edition, revised and enlarged. New York, The Journal of Nervous and Mental Disease Publishing Company, 1909. Price, $2.00.

In this the second edition of this work which appeared only a year ago, the article on Paranoia has been to some extent rewritten, and those milder forms referred to recently by Gierlich and Friedman given a place. In the article on General Paresis, the pathology and microscopical anatomy is taken up more fully and the recent diagnostic tests are mentioned.

Polyneuritic psychosis is discussed more fully and the forms of mental disturbances in Epilepsy, Cerebral Tumor, Lues, and Arteriosclerosis touched upon. These latter subjects are taken up much too briefly. It seems to us that where his space was so limited, the author would have been wiser to have omitted these altogether, as, in our opinion, they detract from the high standard set by the rest of the work. Apart from these subjects the work is excellent, giving one a clear, concise, and practical view of mental diseases. We can recommend it highly both to students and general practitioners.

C. K. R.

IMMUNITY AND SPECIFIC THERAPY. By W. D'ESTE EMERY, M.D., B.Sc. (London). H. K. Lewis, 136 Grover St., London, 1909. 12s. 6d.

This is clearly one of the best and most succinct outlines of the theory and practice of immunity in the English language. The author has given a clear exposition of the various phenomena of immunity. In a general introductory chapter the various terms and expressions used in serological studies are explained, so that the reader can follow the line of thought as it is carried out in the succeeding chapters. The author has given due credit to the various exponents of the theories of immunity and in the light of his own investigations has given them their proper weight. Not alone is the theoretical side of the subject discussed, but the practical method by which immunity is gained in the tissues is well demonstrated. The value of each type of immunity is discussed in connection with individual organisms.

The book in our opinion could be read with great pleasure by every

practicing physician. Moreover, the volume forms an excellent basis of study for the student. There is a valuable bibliography of the references consulted, appended to each chapter.

STUDIES IN TUBERCULOSIS. By HENRY CLARKE, M.A., M.D. (Cantab.), Liverpool. At the University Press. Archibald Constable & Co., Ltd., London, 1909. $1.25.

This study was prepared as a thesis for the degree of Doctor of Medicine, at the University of Cambridge. The author, a physician, pathologist and city councillor, has compiled some practical information regarding consumption. The subject matter has been arranged in three sections, the Diagnosis, the Prevention, and the Treatment of Tuberculosis.

In the forty-four pages of reading matter we find nothing original, but the author has, nevertheless, clearly arranged the salient points governing tuberculosis, and in a simple manner has directed the method in which a systematic attack must be made against the white plague by each municipality and the physician.

COMMON DISORDERS AND DISEASES OF CHILDHOOD. By GEORGE FREDERIC STILL, M.A., M.D., F.R.C.P., Professor of Children's Diseases, King's College, London. Oxford Medical Publications. Toronto: D. T. McAinsh & Co. Cloth, price, $4.50.

This book was reviewed in the October number of the JOURNAL. The name of the Canadian agent and the correct price are now supplied.

AN INVESTIGATION INTO THE MECHANISM OF THE PRODUCTION OF BLACKWATER. By J. O. WAKELIN BARRATT, M.D., D.Sc., and WARRINGTON YORKE, M.D. Annals of Tropical Medicine and Parasitology, Vol. III, No. I, 256 pages. 82 illustrations. University Press, Liverpool, 1909. Price, 10s. 6d.

This investigation reports the results of the work done in Nyassaland by an Expedition sent out by the Liverpool School of Tropical Medicine in 1907 to investigate Blackwater Fever. The authors approach the problem before them in a very thoughtful manner and the questions connected with their research have been studied in logical sequence. The report gives a most authoritative review of our present knowledge of the obscure disease called Blackwater Fever.

It has long been known that, in some cases, quinine may precipitate an attack of hæmoglobinuria. For this reason, the action of quinine and its salts upon the red blood cells was observed. It was found that while they were able to hæmolyse red cells *in vitro*, it would be impos-

sible for quinine to hæmolyse the red cells during life because it is impossible for the drug to ever become sufficiently concentrated in the blood to have this action. It was also determined that the red blood cells of blackwater fever patients are not more susceptible to hæmolysis by quinine bihydrochloride than are the red cells taken from a healthy individual.

These facts, added to clinical and other observations made by the authors, have convinced them that quinine should be given in blackwater fever if its administration be required by the presence of malarial parasites.

The appearance of hæmoglobin in the urine in paroxysmal hæmoglobinuria is determined by causes other than those which produce hæmoglobinuria in blackwater fever because the authors were successful in showing that no hæmolysin, nor absence of antilysin, occurred in blackwater fever; consequently, it is possible for them to assert that "the hæmoglobinuria of blackwater fever is not dependent upon hæmolysinæmia."

It was not certain whether free hæmoglobin occurred in the plasma of patients suffering from blackwater fever. The authors investigated a number of cases and they found that an increased amount of dissolved hæmoglobin occurred in the blood plasma of most, not all, cases of blackwater fever while hæmoglobin was present in the urine. This fact is particularly interesting because the authors produced experimental hæmoglobinæmia in rabbits and found that it was accompanied by a hæmoglobinuria intimately dependent upon it.

Suppression of urine is one of the most fatal and one of the most usual causes producing death in blackwater fever. It is shown that during blackwater fever large numbers of casts, many of them containing compact masses of coarse, black granules, are passed with the urine. By a series of splendid illustrations, it is demonstrated that the suppression of urine in blackwater fever is of mechanical origin and is produced by a blocking of the uriniferous tubes by plugs composed of "densely com-"pacted, dark, reddish granules, identical with those passed with the "casts during suppression." The presence of this granular material appears to be the sole pathological condition arising in the kidneys of patients dying from simple hæmoglobinuria.

The advisability of relieving suppression produced in this way by incision of the kidneys is discussed. While there is not much hope of saving the life of the patient in which the operation has become necessary, it is the opinion of the authors that incision is justifiable in from 24 to 48 hours after the onset of suppression of urine.

An attempt was made to determine the mechanism of the production of blackwater fever. So many factors entered into the consideration of the question that the authors were unable to reach a definite conclusion; as we have already indicated, the hæmoglobinuria is accompanied by, and is the result of, an accompanying hæmoglobinæmia.

J. L. T.

TREATMENT OF THE DISEASES OF CHILDREN. By CHARLES GILMORE KERLEY, M.D., Professor of Diseases of Children, New York Polyclinic Medical School and Hospital, etc. Second revised edition, octavo 629 pages, illustrated. Philadelphia and London: W. B. Saunders Company, 1909. Cloth, $5.00 net; Half Morocco, $6.50 net.

That the first edition of this book was so rapidly exhausted proves that it has supplied a real want. Most textbooks are too profuse for general use by the busy man, and he welcomes a manual which will give him the information he wants and the help he needs in a concise and simple fashion. That is just what Dr. Kerley's book does, and it is therefore more suitable for the general practitioner than for the student or the specialist. A very useful chapter is that on Gymnastic Therapeutics, and the illustrations give a good idea of the various measures recommended. Infant feeding is treated in a simple, common sense way and is a welcome relief from the elaborate articles which have been so fashionable of late years. It seems as if the pendulum were swinging at last towards simplicity and that pseudo-science, for a time at least, had had its day. The directions given are clear and plain, the tone of the book dogmatic, and while we do not agree with the author in many things, we feel that he has the courage of his convictions and tells us just what he himself would do under certain given circumstances. There is too little of that strong personal element in many textbooks nowadays; too often they aim at being encyclopædic rather than practical guides to men who are in doubt or difficulty.

PRIMARY STUDIES FOR NURSES. A Textbook for First Year Pupil Nurses, by CHARLOTTE A. AIKENS, Detroit. Illustrated. Philadelphia and London: W. B. Saunders Company. Canadian agents, The F. J. Hartz Company, Ltd., Toronto.

This book contains sound instruction and good advice for women beginning their career as nurses. A nurse who is acquainted with all that this book contains would certainly be well instructed. In addition to matters of more purely medical interest there is an excellent section upon cookery. There is a large number of questions formally set forth

which should prove of great value to nurses who desire to test the extent of their knowledge. We venture to recommend this book as one which will prove entirely satisfactory.

A Practical Treatise on Diseases of the Skin. For the Use of Students and Practitioners. By J. Nevins Hyde, A.M., M.D., Professor of Dermatology and Venereal Diseases in the University of Chicago, Medical Department (Rush Medical College). New (8th) edition, thoroughly revised and much enlarged. In one very handsome octavo volume of about 1137 pages, with 223 engravings and 58 full-page plates, in colors and monochrome. Cloth, $5.00, net; leather, $6.00, net. Lea & Febiger, Philadelphia and New York, 1909.

This being the eighth edition of this treatise on diseases of the skin no words of praise are necessary to recommend it to the medical profession. The present edition bears only the name of Dr. Hyde on the frontispiece, but in the three preceding editions it was associated with the name of Dr. Frank H. Montgomery, whose untimely death last year was so much lamented by his dermatological brethren. Owing to the rapid growth of dermatological science it has been found necessary to add 250 pages to this volume, to include tropical skin diseases in a separate chapter, and to write new articles on such subjects as prurigo nodularis, the fourth disease, neuralgia paræsthetica, lichen spinulosus, Fordyce's disease, leukæmia and pseudo-leukæmia cutis, brown moth dermatitis, and many others. There have also been added 24 new plates and 120 new engravings. The book keeps up its character as a sound textbook and practical work of reference, and can be recommended as a most scientific treatise on dermatology. The illustrations are exceedingly good and most of the 58 plates are examples of what illustrations of skin disease should be. We heartily advise every one who wishes to have a modern scientific treatise on dermatology to possess himself of a copy of this work.

F. J. S.

Clinical Studies for Nurses. A Textbook for Second and Third Year Pupil Nurses, by Charlotte A. Aikens, Detroit. Illustrated. Philadelphia and London: W. B. Saunders Company. Canadian agents: The J. F. Hartz Co., Ltd., Toronto.

Miss Aikens will be remembered as the author of "Primary Studies for Nurses." The present volume is intended rather to serve as a handbook for the nurse who has already been trained and desires to prosecute her studies further. The book contains over 500 pages and shows

in its preparation a large experience and a wide range of reading on the part of the author. The arrangement of material is done with much skill and as a textbook is quite equal in authority to those which are provided for advance students of medicine.

THE MORPHIA HABIT AND ITS VOLUNTARY RENUNCIATION. By OSCAR JENNINGS, M.D. (Paris). London, Baillière Tindall and Cox; Paris, Brentano, 1909.

The preface to this book opens with a statement of "fact," that one medical man out of four is a drug habitué, usually a morphinist; that the proportion of medical addicts to the total of cases is in some statistics as high as 90 per cent., and that one-fifth of the mortality in the profession is said to be caused by morphinism. We take the liberty of contradicting the author. The volume is devoted in a large part to recording the experience of patients in their own words, who are striving to rid themselves of the habit. There is much interesting reading in the book; or rather, it might be interesting to those who are addicted to the practice of taking morphine.

THE PRACTICAL MEDICINE SERIES, Vol. IV., GYNÆCOLOGY. By EMILIUS C. DUDLEY, A.M., M.D. and C. VON BACHELLE, M.S., M.D. The Year Book Publishers, Chicago.

This volume opens with a discussion of the general principles of gynæcology of a practical nature, dealing with the problems the gynæcologist has to deal with every day. Diagnosis, technique and practical therapeutics, including local and lumbar anæsthesia; the technique and after-treatment of laparotomy; serotherapy and the opsonic index in gynæcology and passive hyperæmia and some of the latest methods of operating. The various infections of the female generative organs are dealth with, their differential diagnosis and treatment, with special reference to tuberculosis of the pelvic organs, and the various complications, particularly those of appendicitis, pyosalpinx and intrapelvic abscess. Malformations, tumours of the pelvic organs, their diagnosis and the technique and merits of the various operations for their eradication are discussed, hysterectomy and hysterotomy, together with displacements, disorders of menstruation and sterility.

Vol. V, OBSTETRICS, by JOSEPH B. DELEE, A.M., M.D., and HERBERT M. STOWE, M. D.

This little work contains, in reference form, the most recent advances made in the various problems presented to the busy practitioner. The physiology, pathology and diagnosis of pregnancy and abortion are first

taken up, followed by the latest experience in dealing with the various hæmorrhages and toxæmias of pregnancy. The work on eclampsia deserves special mention. Labour and the puerperium, operative obstetrics, and the treatment of puerperal sepsis complete this handy little volume.

Vol. VI, GENERAL MEDICINE, by FRANK BINNINGS, M.S., M.D., and J. H. SALISBURY, M.D.

This is a most useful volume and deals with the acute infections, typhoid, malaria, kala azar, cholera, Rocky Mountain spotted fever, Malta fever, glanders, dysentery and tuberculosis of the digestive tract. This is followed by a full review of the very latest methods of diagnosis and work on diseases of the stomach, intestines, liver, pancreas and peritoneum.

Vol. VII, PEDIATRICS, by ISAAC A. ABT, M.D., and MAY MICHAEL, M.D., and ORTHOPEDIC SURGERY, by JOHN RIDLON, A.M., M.D., and A. STEINDLER, M.D.

In the first part of the volume diseases of the new-born are taken up, the hygiene and dietetics of infancy, the various diseases of infancy and childhood, rickets, tuberculosis, syphilis, diphtheria, scarlet fever, whooping cough, measles, infection from vaccine, influenza, meningitis, typhoid, rheumatism and diseases of the gastro-intestinal tract. The serum treatment and lumbar puncture in epidemic cerebro-spinal meningitis are deserving of special mention.

In the second part orthopedics is taken up in a most thorough manner, including diseases of the spine and other joints and such conditions as Volkmann's ischemic paralysis, ischemic contracture, tuberculin in joint tuberculosis, the iodoform plug, osteitis deformans and myositis ossificans.

PHYSICAL DIAGNOSIS, by RICHARD C. CABOT, Assistant Professor of Medicine in Harvard University. Fourth Edition, revised and enlarged. With five plates and two hundred and forty figures in the text. New York: William Wood and Company, 1909.

This work was written in 1905, and its rapid progress in editions shows that it has proved satisfactorily its claims. The changes in text and plates from the last edition are slight, and the work as a whole has been commended in these pages before. Its value in enhanced by the *personal* character of the book, in that the author will not write upon methods that are outside his experience. With a view to making a good book better we would mention that plate 200 is inadequate and that there is a badly-mixed paragraph on page 536.

DORLAND'S AMERICAN ILLUSTRATED MEDICAL DICTIONARY. By W. A. NEWMAN DORLAND, M.D. A new and complete dictionary of terms used in medicine, surgery, dentistry, pharmacy, chemistry, nursing and kindred branches; with new and elaborate tables and many handsome illustrations. Fifth revised edition. Large octavo of 876 pages, with 2000 new terms. W. B. Saunders Company: Philadelphia and London, 1909. Flexible leather, $4.50, net; indexed, $5.00 net.

This is the fifth occasion upon which we have had the pleasure of mentioning a new edition of this well-known dictionary. It contains new tables and many fresh illustrations and about 2,000 new terms. The book is compact, well printed and easily read. It has long ago passed out of the experimental stage and may now be regarded as a thoroughly reliable authority.

Retrospect of Current Literature.

MEDICINE.

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

J. MAHLENBREY: (Erlangen Medical Clinic) "The presence of tryptic ferments in the Gastric Contents." (*Zentralblatt für die gesamte physiologie und pathologie der Stoffwechsels*). N. F. IV Jahrg.: 1909.

In view of the unreliability of the Cammidge's reaction as a test of the pancreatic function, this paper upon the Boldyreff test for trypsin seems worthy of consideration.

Historical.—Pawlow, in 1908, noted that when oil was introduced by a fistulous opening into a dog's stomach, one to two hours later one could withdraw an emulsified fluid containing bile and pancreatic juice.

Boas, in 1899, succeeded in obtaining by means of an ordinary stomach tube or special instrument in healthy persons, but more especially after obstinate vomiting, a mixture of bile, gastric and pancreatic juices, in which trypsin and steapsin were present.

Boldyreff, in 1907, studied the conditions under which a regurgitation of the intestinal juices occurred. He found that both fat and acids attracted the bile and pancreatic juice into the stomach. This author held that a combination of these substances, as a fatty acid in oil, would increase this reflux action, and proved his contention experimentally in animals. In the next place he applied this method with success to himself and another individual. He therefore considered that this method

could be made of diagnostic importance; further, that when a fat dietary was given, gastric digestion occurred chiefly through the pancreatic juice; thirdly, that the free acids and pepsin of the vomitus or gastric contents, especially after a test meal rich in fat, may be marked by the regurgitation of the alkaline pancreatic juice, which neutralizes the acid and so prevents peptic activity; finally he suggested the possibility of a tryptic digestion of the gastric mucosa as a cause of ulcus ventriculi.

Volhard, in 1907, reported that in 9 of 11 normal persons the oily gastric juice had a tryptic action. His pupil, Faubel, found a positive result in 22 of 37 cases examined. Volhard then studied three pathological cases (viz., carcinoma of the pancreas, acute enteritis and pancreatic diabetes) and found the tryptic ferment to be absent. In one case the autopsy revealed pancreatic atrophy.

Levinsky recommended the weakening of the gastric acidity by an alkali as a preliminary measure. He believed that the absence of the tryptic ferment signifies a pancreatic insufficiency, or a mechanical obstruction to the reflux of the pancreatic juice into the stomach (as in "hour-glass" stomach).

Ehrman and Lederer concluded from a large series of examinations that in achylia and anacidity the pancreatic function is not, as is usually considered, injured but possibly may be even more active than normal. If, however, hyperacidity be present the findings of tryptic ferments are negative (or very slightly positive in cases in which sodium carbonate has been previously given). Further, he believed that the mechanical influences of the passage of the tube, the gagging and the external pressure to the abdomen, are at least aids if not the cause of the reflux of the pancreatic juice, and not merely the fatty oil.

Koziczkowsky, in 1909, gave his support as to the value of the Boldyreff test for the pancreatic function, but recommended the use of 250 grains of cream instead of oil.

Method.—One gives to the fasting patient 100-200 c.c. of a 2 per cent. solution of oleic acid in olive oil, or even pure oil; this may be drunk or introduced by the tube. The gastric contents are removed in one-half to one hour, with the patient in the horizontal position. If nothing is obtained the tube is again introduced in one-half to one hour. The contents are allowed to stand and the pancreatic juice is pipetted off; 10 c.c. of fluid are sufficient for the necessary tests. Three parallel tests are made in an acid, alkali and neutral medium.

Volhard recommends the use of 200 c.c. of olive oil, which he removes in half an hour, when one can recover 50-100 c.c.; the oily fluid is removed from the watery juice by a separating funnel.

Levinsky suggests that half a teaspoonful of magnesia usta be given 20 minutes after the olive oil, to diminish the gastric acidity.

To demonstrate the tryptic ferments, Boldyreff uses Metts tubes (i.e., capillary tubes of coagulated egg albumen), and Volhard an alkaline casein solution of known strength. Upon the completion of the tryptic digestion Volhard adds a similar amount of HCl to all the test tubes, then precipitates the casein by means of sodium sulphate; the increase of acidity of the filtrate as a result of the tryptic action (due to liberation of the amino-acids and lower proteids) is titrated by means of sodium hydrate solution.

Fuld and Gross make use of a method, the principle of which is that casein, which is readily soluble in weakly alkaline solution, is reprecipitated by acidifying with one per cent. acetic acid. The casein solution contains 1.0 grain casein puriss. in one litre of one per cent. sodium carbonate solution, which is well shaken with chloroform to prevent bacterial fermentation. One uses 10 c.c. of this solution.

Abderhalden and Schittenhelm make use of polypeptides, especially glycyl-l-tyrosin, to demonstrate the presence of trypsin in the gastric contents; two grams of the former are added to 5 c.c. of the filtered juice when, if trypsin be present, the peptide is hydrolyzed into its components and the tyrosin is liberated as a crystalline percipitate. Later they recommended, for reasons of economy, the use of silk-peptone, which is a snow-white powder containing 45 per cent. of tyrosin.

Author's Researches.—He first tested the powers of resistance of pancreatin to the gastric acidity by giving a test breakfast—2.0 grams of pancreatin and 30.0 c.c. of a 0.1 per cent. soda solution. He found that in four cases the pancreatin had completely, and in two cases almost completely, disappeared. Hence he concluded that the gastric acidity must be neutralized before the administration of the olive oil.

Author's Method.—First a test breakfast was given to determine the total quantity, the physical characters, the total acidity and the percentage of free HCl. Next morning 150 c.c. of 2 per cent. oleic acid in olive oil were given by the stomach tube or swallowed by the patient. Prior to this a teaspoonful of magnesia usta (magnesia oxide) was given; 20 minutes later a second dose was given; three-quarters of an hour after the administration of the oil the gastric contents were removed; the amount varies from 50 to 70 c.c. and is of a greenish-yellow color. The gastric juice and oil are separated by means of a separating funnel; the juice which quickly falls to the bottom of the funnel is examined in the usual manner.

To determine the ferment content, 3 c.c. are placed in six test tubes:

to three to be tested for pepsin HCl is added (0.4 c.c. HCl for 1 c.c. of juice) and to the three to be tested for trypsin, sodium carbonate is added (0.3 c.c. n\n $NaHCO_3$ for 1 c.c. of gastric juice). To each series one adds (1) fibrin flakes, (2) Metts rods, (3) 5-10c.c. of casein solution. These six tubes are now placed in a thermostat for four hours.

In 41 examinations there were 38 positive findings. Of the three negative results two are explained by the non-administration of the alkali and the consequent destruction of the trypsin by the acid; in the third case there was a marked gastroptosis and hence a condition resembling an hour-glass stomach. In certain of the 38 positive cases there was an attendant hyperacidity, which was neutralized by the alkali, and hence the tryptic ferment was not destroyed. In other cases there was subacidity or even anacidity with well-marked tryptic digestion. The author strongly advises the use of several tests for trypsin, e.g., fibrin, Metts rods and casein, as every gastric juice will not act to all three in the same way. This difference in reaction depends, according to Bayliss and Starling, upon the presence of a special ferment, "erepsin," which acts only upon peptone, casein and fibrin, but not upon coagulated albumen. Sawitsch explains the difference rather by the difference of the concentration.

Finally, the author tested the Ewald-breakfast for the presence of trypsin, and found it negative in six cases; hence he believes that the oleic acid-olive oil is necessary for the regurgitation of the pancreatic juice.

He concludes that it is certain that in the Boldyreff method, if accurately used, we have a valuable diagnostic aid as to the proper function of the pancreas.

C. P. H.

Society Proceedings.

MONTREAL MEDICO-CHIRURGICAL SOCIETY.

The second regular meeting of the Society was held Friday evening, October 15, 1909, the President, Dr. W. Grant Stewart, in the Chair.

LIVING CASES: RESULT OF EXENTERATION OF THE ORBIT.

G. H. Mathewson, M.D., presented this case, showing the cosmetic result of this radical operation. The whole eyeball had been removed together with the outer two-thirds of the eyelids for rodent ulcer.

PATHOLOGICAL SPECIMENS: ACUTE ANTERIOR POLIOMYELITIS.

C. K. RUSSEL, M.D., showed two specimens of the cord from patients dying of this condition, a report of which appears in this number of the Journal.

C. K. RUSSEL, M.D. I have not yet seen Dr. Spiller's report of these cases. It is merely from the specimens of these two cases that I came to the conclusion that the disease was far more widespread than was ordinarily supposed. The destruction is greatest in the anterior horns certainly, but spreads to the posterior horn as well, and even the surrounding white matter shows congestion and infiltration. Undoubtedly the cerebrum can be affected and we know it often is; we have seen the pons, too, and the medulla. I have had cases of facial paralysis in infants. I know that Dr. Shirres had similar ones, which are undoubtedly, I think, anterior poliomyelitis. We have another case at the hospital where there was paralysis of the motor fifth on both sides, the seventh on the left and the 12th or hypoglossal, besides his left arm had been paralysed and some of the neck muscles. I was very much interested to hear of this dog and I think it is not at all unlikely that it is the same condition; I know that when I was at Queen Square Hospital we had two or three cases of infantile paralysis in patients who had come from South Africa, and they reported an epidemic there which attacked dogs and other animals as well as human beings. To give some idea of the extent of the epidemic I may say that at the Royal Victoria Hospital we have coming up for treatment at the clinics every week twenty cases, and on the last Monday we had four new ones; they had occurred during August. It seems to me that the epidemic is receding at the present time, as it usually does in other reported epidemics; the greater number of cases have fallen in July and August. Referring to the cartilaginous flakes in the cord in the second case, I have also seen a great many, especially at the National Hospital at Queen Square, where the brain and cord were taken out in practically every case. It struck me that we saw this condition present there much more frequently than at other general hospitals where I have been, and it seemed to me that it is more common among patients who are suffering from nervous diseases. This would perhaps account for Dr. Shirres seeing it so often, being interested, as he is, especially in nervous diseases.

SACRO-ILIAC STRAIN.

J. APPLETON NUTTER, M.D., read the paper of the evening, which appears on page 832 of this number of the Journal.

W. G. TURNER, M.D It is with great interest that I have listened

to Dr. Nutter's paper this evening because it brings forward a question which has been very much talked of recently, especially in Boston. In the clinic at the Royal Victoria Hospital cases of the type described have presented themselves and we have been trying to classify the condition. Two main types are presented. In the first class there is stiffness of the back and a varying degree of tenderness over the sacro-iliac joints. In some cases, especially those which give a crepitus on examination, there is almost complete disability; in others a condition closely resembling a mild lumbago with or without pain down the sciatic or obturator nerve. In the second class of cases there has been found a tenderness over these same joints, but on examining the lumbar region there is tenderness along the exit of the nerve roots and an increase of the lumbar lordosis. We have found it necessary to vary our treatment accordingly. In the first type strapping, a pelvic support, or a corset fitted with the latter may be indicated; in the second type a fitted corset must be worn or even a plaster-of-paris jacket.

Certainly a certain number of lumbagos can be explained by the above condition, where the cause is found either in some condition in the sacro-iliac or in some strain in the lumbar vertebral column.

J. Appleton Nutter, M.D. I hope at some future date to present to the members of the Society some living cases which will demonstrate the mobility in these cases, which is perhaps not familiar to many.

IMPRESSIONS OF THE 16TH INTERNATIONAL MEDICAL CONGRESS AT BUDA PEST.

R. H. Craig, M.D.

This paper will appear in the January number of the Journal.

COCCYODYNIA.

A. Lapthorn Smith, M.D., read this case report, which appears page 815 of this number of the Journal.

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RETROSPECT OF LITERATURE

MEDICINE