THE Dominion Medical Monthly
. . . AND . . .
Ontario • Medical • Journal

Vol. XI. TORONTO JULY, 1898. No. 1.

Original Articles.

No paper published or to be published elsewhere as original, will be accepted in this department.

ELECTROLYSIS IN THE TREATMENT OF NÆVUS.*

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As the practitioner is very frequently called upon to treat cases of nævus, and electrolysis properly employed offers greater advantages than any other form of treatment in the majority of cases, I have chosen for the theme of my paper the use of electrolysis in the treatment of nævus. I shall not attempt to consider the matter in an exhaustive manner, but it is necessary to make some observations of a preliminary nature before proceeding to consider in an intelligent way the treatment advocated. Under the term "Nævus" are embraced many deviations from the normal condition, of dissimilar structure and characteristics; perhaps, the classification of Van Harlingen is as free from objection as any, and his definitions also are commendable. As regards the skin, Van Harligen seems to recognize two chief divisions—nævus vasculosis, nævus flammeus, a congenital new-growth of the vessels of the skin; and nævus pigmentosus, nævus spilus, nævus verrucosus, nævus lipomatodes, and nævus pilosus, a group of hypertrophies of the pigment, with or without the involvement of other elements of the skin. He also alludes to nævus papillaris, nævus unius lateris, and nerve nævus, but these we shall not consider.

Of nævus pigmentosus, or pigmentary mole, Van Harlingen says it "may consist simply of a circumscribed pigmentary deposit in the skin, without hypertrophy of the connective-tissue elements or of the hairy system; or in addition to the excess of pigment there may be hypertrophy of all the cutaneous structures, especially the hair. When smooth on the surface and level, or nearly so, with the skin they have been called nævus spilus. When rough, uneven, and warty, they are called nævus verrucosus. Sometimes they are met with as thick, soft connective-tissue growths of variable dimensions, being then designated nævus lipomatodes. Sometimes pigmentary nævi are smooth and hairless; at other times they are more or less covered with hair. The smaller moles are often acquired, while larger hairy nævi are congenital." The same authority defines nævus vasculosus thus: "Vascular nævi are

*Read before the Toronto Medical Society, May 12th, 1898.

congenital formations composed chiefly of blood-vessels, which have their seat in the skin and subcutaneous tissues. They may be prominent, turgescent, erectile, or even pulsating, tumor-like growths (angioma cavernosum tumeur érectile), or they may be flat, non-elevated, well-defined or faint, smooth patches (nævus simplex). The latter is the 'mother's mark' or 'port-wine mark' of popular language. Angioma cavernosum is, in reality, rather a tumor of the deeper tissues than a disease of the skin. The superficial form of vascular nævus may be either congenital or acquired. The latter variety will be described under the head of Telangiectasis." The foregoing descriptions exhibit discrepancies, due perhaps to haste in the preparation of the article ("Nævus," in the "Reference Handbook of the Medical Sciences"); otherwise they are much clearer than the bulk of literature on the subject, and the classification given is the one to which I shall adhere in my paper.

Quain, in speaking of capillary angiomata says: "Microscopically, a nævus is composed of large capillaries, amongst which are seen arterial and venous trunks of larger size. Between the vessels are found connective tissue or fat, and sometimes the special constituents of the skin, such as sweat or sebaceous glands. It must be remembered that the nævus element enters rather largely into the composition of some other tumors, and notably of congenital moles (benignant melanoses)," and again, "Microscopically a cavernous angioma presents fibrous trabeculæ, lined with the characteristic vascular endothelium, and in parts, perhaps separated by layers of alveolar or any other tissue which the tumor may be involving." Quain uses telangiectasis as a synonym of angioma.

In the supplement to Ashurst's International Encyclopædia of Surgery, under the article "Tumors Angioma," we read "Gessler collected 1,178 cases of tumors of the blood-vessels, and found that seventy-six per cent. occurred on the head, eleven per cent. on the trunk, nine per cent. on the extremities, and three per cent. on the back. The disease is congenital in nearly all cases. He also found that it was more than twice as common in the female as in the male. (2.4)" Wyeth says, "The arterial and capillary cutaneous tumors are almost always congenital; the venous tumors are rarely so."

Of the forms of vascular nævus, the capillary is the most frequent, and the venous the least so. The different forms of nævi vary greatly as to color, size, shape and number; the pigmentary form may be of any shade from light fawn to jet black, in size from a pin head to a fœtal head; as a rule the smaller, the more regular is their outline, they may be single or multiple, covering the skin with hundreds of spots in reported cases; the vascular variety may be any color from the faintest blush to the deepest purple, from the size of a pin point to the extent of an extremity, or even half the body, in punctate spots, as a tortuous vessel barely below the surface, as a stain, or in the form of small tumors. Hutchinson reports a case of a child which had over one hundred nævi, all distinct and superficial.

Again I quote from Van Harlingen: "As regards the cause of nævus, the explanation given by Virchow, namely, superfluous vascular formations in those portions of the embryo at which junction of the various parts takes place, seems most plausible. A small quantity of matter left over, squeezed out between the joints, as it were, like superfluous building material, forms these nævi and the similar growths of lymphatics, hair, pigment, etc." Nævi frequently disappear spontaneously in the early months, or perhaps years of childhood; they also frequently remain in a stationary condition, but they quite as frequently grow very rapidly, both in size and extent; they are generally benign, but often cause serious inconvenience and great disfigurement. Wyeth says, "Moles, whether simple, hairy, or pigmented, are

benign. As a result of irritation they may inflame and become ulcerated, or may develop into malignant growths. Carcinomata, especially of the melanotic variety, are frequently described as having resulted from inflamed pigment moles. Alarming hæmorrhage has been known to occur from a mole more than usually vascular, in which ulceration has been established by friction of the clothing." And again: "J. Müller has reported a malignant (recurrent) angioma. A case of melanotic degeneration of a congenital nævus in a woman, aged forty, has been reported by Dr. Stiles." James Nevis Hyde, in Hare's "Therapeutics,' remarks: "In managing all such pigment anomalies one should never forget that there is always a scar left after removal of the disfiguring patch, and that, as in the case of warts, when treated after the fortieth year of life they may be followed by epitheliomatous or sarcomatous metamorphosis." The vascular nævi are also liable to undergo cystic degeneration, as well as ulcerative and suppurative, and may undergo spontaneous cure by ulceration, or by thrombosis; the fact that inflammation of a nævus generally leads to a cure, very naturally suggests that the work of nature should be imitated in the treatment of this condition; and most of the efforts of the practitioner have been along these lines, namely, the creation of an inflammatory process by an irritant introduced locally, or in some cases merely applied to the surface. As to any interference whatever, in the case of nævus, I think that the wisest course to pursue is this: When consulted as to the advisability of treatment, particularly in a very young child, it is well to keep the case under very careful observation for a few months; if the nævus should exhibit a tendency towards spontaneous involution in this time, interference may be unnecessary; if, on the other hand, it should exhibit a tendency to spread, immediate recourse should be had to some means to check or remove the growth, and first on the list, as a rule, I place electrolysis, *properly employed.* I advise early operation for several reasons, the case is more amenable to treatment than when the tissues are more matured, the operation is less prolonged, repetition of the operation may be avoided thereby, it will not be necessary to destroy as much tissue, the danger of sloughing and disfiguring cicatrices is much less, for milder currents may be employed with advantage, also if a scar should perchance result, it will be more apt to disappear as the child grows. These are some of the chief reasons why I advocate early treatment, if the other conditions are favorable. When catarrhal conditions of the mucous membranes are present, or where the skin is in an irritable condition or an eruption is present, it will be very unwise to proceed, and these conditions must receive attention before the operation is had recourse to, or healing will be retarded and suppuration set up and prolonged. The better the health of the child the more successful the result.

I will not attempt to enter fully into the chemistry of electrolysis, interesting though that phase of the subject is, but may be permitted to remind you that electrolysis carried to its limit means decomposition, though it means much more than that. The decomposition of electrolysis is also much more rapid than that of nature, and much more under our control. If two needles of a material which will not be attacked by the current or its products, are connected, the one with the positive, the other with the negative pole of a battery, and each thrust into a piece of meat, and the current turned on, a visible change in the tissue follows very shortly, bubbles of gas are seen around each needle, less numerous about the positive than the negative, provided the tissue is moist, for the presence of water is necessary for the process, and the more moist is tissue the better will it conduct the current, and the more readily will it be decomposed. After a short time it will be found that the zone of tissue

about the positive pole is drier than that about the negative, and other changes are apparent. But besides these it will be found, upon applying the proper tests, that the gases are of a different nature, that collecting about the positive pole being oxygen, while that about the negative is hydrogen; in addition it will be found that at the needle connected with the positive pole are the *acid* constituents of the compound salts of the tissue, while at the negative are the *alkaline or basic* constituents. As may be surmised from this the therapeutic effects of the two poles are dissimilar in many respects. Without stopping to give the reasons, I shall merely say in passing that where the positive pole is employed in puncture that it will have the action of an acid escharotic, while the negative will have the action of an alkaline escharotic. The cicatrix resulting from a positive puncture is firmer than that due to a negative puncture, is more liable to retract; that from the negative is more plentifully supplied with vessels, softer, more apt to disappear.

The indications for the use of the respective poles are briefly as follows: Where you wish to promote absorption, or to block up the capillaries, and thereby cause atrophy, or where a scar is to be particularly avoided, if possible, the negative pole is employed. Where you wish to remove redundant tissue, or to cause an artificial thrombosis, the positive pole is generally used.

A detailed description of the requisite apparatus is unnecessary; of course, the galvanic or continuous current is the one to employ, and everything must be in perfect order, some means must be provided for turning on, increasing and decreasing the current without shock to the patient; a meter to measure the current strength is absolutely necessary, and your fine needles must be suitably insulated and of the proper material. Where it is desired to employ the positive pole you must never use a needle of steel, or you will probably leave an indelible stain as a memento of your experiment. An alloy of iridium with platinum is the most usual material in these cases; with the negative pole the needle may be of steel.

Sometimes both needles are inserted in the tissue to be acted upon, this is called the bipolar method; in other cases one needle is inserted and the circuit is completed by an electrode held in the hand in the case of adults, and placed upon the back; usually in the case of children, this is called the monopolar method; the needle is generally termed the active electrode, the one by which the circuit is completed is termed the indifferent electrode. The inactive or indifferent electrode may be made of brass wire gauze, covered on its face with a layer of absorbent felt, and with a backing of sheet rubber, which serves the purpose of protecting the clothing from moisture, and also insulates the electrode on the surface which might come in contact with parts which it is not desirable that it should touch; this indifferent electrode should be thoroughly wet with warm water before applying and the superfluous moisture squeezed out. In the case of infants and young children I consider it advisable to operate under an anæsthetic, not so much on account of the actual pain of the procedure, but in order that the parts may be in as quiet a condition as possible; a sudden movement of the child might start a troublesome hæmorrhage, which might undo much of your work; undue crying might also act in the same way. In the case of an adult I rarely employ an anæsthetic, unless occasionally in the region of the eyelid, nose or some equally sensitive part. I have removed a papillomatous nævus from the eyelid of a lady at the level of the lashes, without using an anæsthetic, the lady being a most interested spectator through the agency of a handglass. I mention this to show that the operation is not necessarily

a very painful one. In children of an age to appreciate what is being done, the employment of a local anæsthetic may be sufficient, in some cases by inunction of oleate of cocaine (which I have not used for several years) or by ethyl chloride ; but anything of a freezing nature is undesirable as it puts the parts in such a condition that they do not conduct the current as well, and it also masks your work ; for these reasons I resort to it as little as possible.

We will now come to the subject proper of my paper, the electrolysis of nævus, and will consider it in its relation to the classification to which I have referred.

NÆVUS PIGMENTOSUS.

Nævus Spilus.—The monopolar method is used, the needle is attached to the negative pole, and insulated where it will come in contact with the skin. To lessen the chances for scarring, having used antiseptic precautions, the growth is punctured from the lowest portion in a direction upwards, and the needle carried through the upper side of the growth. Care must be taken to keep the point of the needle below the surface of the skin, not allowing the latter to become transfixed ; in the case of an infant, the inactive electrode, already described, has previously been placed upon and between the shoulders, and the infant is lying upon it ; in the case of an adult this electrode is held in the hand by its uninsulated portion and applied to the other hand just before commencing operations. The current is now slowly and very carefully turned on until a slight blanching of the parts is noticed, shock is studiously avoided, and a strength of from one to five milleamperes is usually sufficient ; as a rule, the less current you can do the work with, the better will be your result, the action of the current may loosen the needle so that care must be taken lest it fall out. When well loosened it may be slightly withdrawn and introduced through another portion of the growth, using the former precautions, and when all of the nævus has been subjected to the process, and is blanched, the current is turned off, the inactive electrode removed, and the needle carefully and slowly withdrawn. It is not advisable to prolong the operation beyond ten or fifteen minutes, the smaller nævi may require only a few minutes. Where little work has been done, frequent bathing of the parts with water, as warm as can be borne, will allay irritation, favor absorption and healing. Where the work has been more extensive it is well to gently cleanse the surface, dry thoroughly, and apply one or more layers of acetanilid collodion which may be renewed as often as necessary until healing is complete. Should the first operation prove insufficient to remove the disfigurement, it may be repeated as soon as healing is completed.

Nævus Verrucosus.—Here the growth is transfixed with the negative needle, from below upwards, at the level of the sound skin, observing the former precautions. In this case more current strength, as a rule, will be required and destruction of tissue will be more extensive ; it may be necessary to mummify the whole growth ; the resistance of the tissue varies much according to the amount of moisture in the growth ; the drier the growth the more current will be required ; but care must be exercised lest the process being carried too far, there will be a depressed cicatrix in the place of the former nævus. In this, as in all cases of nævus, experience will be the only guide, no hard and fast rule can be laid down that will be applicable to every case. One wise rule in all cases is, that it is better to do too little and repeat, than too much and repent.

Nævus Lipomatodes.—This likewise requires the negative needle to

transfix the growth in all directions, and a current of sufficient strength to mumify.

Nævus Pilosus.—Each hair will require removal before the nævus proper is attacked unless, as frequently happens, the removal of the hairs causes the blanching and subsequent disappearance of the nævus. The epilation is accomplished as follows: The hair to be removed is seized with epilation forceps, and gentle traction made; a very fine needle, or "pivot broach," held in a suitable handle and connected with a negative pole, is introduced to the bottom of the follicle alongside the bulb, the indifferent electrode is held in the patient's hand generally, the current is then turned on until small bubbles of gas are seen to issue from the seat of puncture, in time varying from a few seconds to a minute the hair will be found loosened; the indifferent electrode is then removed from the hand, the needle withdrawn and then the hair; if the follicle is seen to be adherent to the hair bulb and comes away with it, the operation has been successful, otherwise another hair will grow in that spot. If the indifferent electrode is not brought in contact with the patient's hand until the needle has been inserted into the next follicle, it will not be necessary to turn the current off and on each time a puncture is made. In some cases the needle has a device called an interrupter by means of which the circuit is made or opened while the needle is in the follicle, contact with the indifferent electrode being maintained throughout. Hairs should never be removed at one sitting which are closer than one quarter inch apart, and the operation should not be repeated until all redness due to the operation has disappeared. The parts should be bathed frequently in the interval with water hot as can be borne. If the epilation has not removed the nævus, it should be attacked when the hairs have all been successfully destroyed; the tissue below the skin may be found quite fibrous, and will be transfixed as described above. Where the interval between operations is prolonged, I generally keep the parts protected by a coating of collodion, renewed as often as it peels off.

NÆVUS VASCULOSUS.

Nævus Vasculosus Simplex.—This variety is the one most difficult to treat with success; great patience as well as great caution is necessary when the nævus is diffused in the form of a stain; it is wiser to attempt the removal of only limited portions at a time, otherwise much scarring may ensue. The negative electrode is usually a device holding a number of needles (sometimes twenty) set about a quarter inch apart with their points on a level; with this the naevus is punctured to a sufficient depth to penetrate the skin, and the current turned on until the skin begins to blanch; after about half a minute the current is again turned off and the electrode withdrawn and the parts bathed with the hot water. The effect of this treatment is to block up and destroy the capillaries which form the nævus; it should not be repeated until after an interval of about one month, when another portion of the nævus may be attacked. It should not be expected that the skin will assume a perfectly normal appearance, but much improvement should be looked for; here, again, great care is very necessary lest too much be attempted. Another method is to use a single needle as the negative electrode, and with it make a number of perpendicular punctures about a quarter inch apart. This is the method I prefer.

Where the nævus is composed of small dilated vessels which are seen ramifying on the surface, or as small prominences, the treatment is apt to be much more successful; here a single negative needle is used, we endeavor to insert the needle in the vessel, and block its lumen with the bubbles of

hydrogen gas evolved and so cut off the blood-supply to the part, and current sufficient to cause this is all that is called for; several spots may, with advantage, be attacked at the one sitting, provided the current has not been excessive. The operation should not be repeated until healing is completed. A protective dressing of collodion may be advisable in the interval.

Angioma Cavernosum.—In this variety I usually employ both positive and negative needle, carrying the needles a short distance from and parallel to each other, transfixing the growth just at the margin of the sound skin; current sufficent to partially destroy must be used, and here once more the greatest judgment will be required. Coagulation occurs, and in order that the thrombus may not be disturbed by the withdrawal of the needles, they should be removed with a twisting motion; the clot formed around the positive pole will be found to adhere to the needle, so that it is well to reverse the current for a few minutes (first turning it off); the bubbles of hydrogen gas liberated about what was formerly the positive pole will cause the clot to loosen, when the needle may be removed without disturbance of the clot and without causing hæmorrhage which would interfere with the success of the operation. A firm dressing of absorbent cotton and collodion is very important in these cases, renewed as often as necessary, and the operation should be repeated when all evidences of the former one have disappeared.

In many cases it will be found that there is considerable hypertrophy of the parts; here the positive needle may be employed with advantage to promote atrophy, while the negative needle transfixes or is inserted into the supply vessel in order that the bubbles of hydrogen may enter the vessel, be carried along by the blood-current and finally block up the capillaries, and so shut off the nutrition of the parts.

There is frequently a fibrous change associated with nævi that does not constitute a distinct type, although it is sometimes alluded to as such. The condition is amenable to similar treatment to that laid down above; when underlying the nævus proper, the tissue should be softened by the negative pole, absorption will thus be favored, and the material should disappear under electrolysis. A marked example of the efficacy of electrolysis, in what at first sight seemed a most hopeless case, was referred to me by Dr. J. A. Temple. It also illustrates the difference between correct and incorrect technique, as the case had the benefit of six previous electrical operations by another practitioner with little appreciable benefit. The child was one year of age; the left ear was full one-third larger than the right, and projecting. At the back of the lobe was situated an ugly, pendulous mass, while in front were three raised "strawberry marks," and a plentiful supply of very noticeably dilated capillaries. Chloroform having been administered, on careful examination I detected a spot on the back of the ear where, by pressure, I could lessen the circulation through the blemishes in front. In this I inserted a gold needle connected with the negative pole of the battery, while in the centre of the pendulous mass I inserted a similar electrode connected with the positive pole. Fifty milleamperes were used for seven minutes, and seventy-five milleamperes for eight minutes. That the negative pole had transfixed the supply vessels as intended was quite apparent, for the bubbles of hydrogen gas could be readily seen meandering through the dilated vessels in front and along the "strawberry spots." On turning off the current the needles were carefully withdrawn, and oozing controlled by pressure with iodoform-dusted pads. The sites of the puncture were then coated with iodoform collodion, which was renewed subsequently as often as necessary. The effect in this case was steady and progressive; the spots gradually paled; the pendulous mass atrophied; the hypertrophy of the ear became

less apparent, and the ear less projecting. No other interference was necessary, and to-day, the other ear having developed with age, there is little difference between them, certainly not sufficient to constitute a deformity. The case was treated June, 1893, and the above report was written in August, 1895. The case is cited at length as it presents many interesting features, and illustrates the indications for use of the respective poles. (It will be noticed that gold needles were employed. I now use irido-platinum ones.) In April, 1892, I operated upon a case referred to me by Dr. G. S. Ryerson. The child was eight months of age and had a very disfiguring vascular projecting nævus the size of a small bean on the left upper eyelid, and extending behind the orbit. Under chloroform anæsthesia, a negative needle was inserted in the growth on the eyelid, and carried in all directions through the nævus, using five milleamperes for forty-five miuutes. In July of the same year I employed a negative needle again to complete the blanching of the nævus, at this time using merely one milleampere for fifteen minutes. Last August I received from her father a photograph of the child, recently taken, in which not a trace of a nævus is to be seen. These two cases were each practically cured in one treatment (in the second case there was very little sign of nævus left after the first operation, and that little would have most probably disappeared in a short time without further interference, but the father was a physician and wished the second treatment.) The cases will represent what may be accomplished with electrolysis in treating nævus situated on such parts and of such extent that the use of the knife would be out of the question, and the employment of other means very hazardous; they also show the advantage of early operation; each, if left alone for a short time, would have no doubt resulted in deformities that would necessitate much more prolonged measures, with indifferent results, perhaps. But where a case has been allowed to go on until the person has reached years of maturity, and great disfigurement has occurred as a result, we may still accomplish much by electrolysis if patience and great care be exercised. In illustration of this, I submit the following instance: A young man of nineteen years of age was referred by his physicians for the removal of a very vascular nævus on the right upper lid, which had been there since birth; it was one and a quarter inches long and three-quarters of an inch across; the upper overhung the lower lid, the lower tarsal cartilage was atrophied and the eye almost closed from pressure by the hypertrophied upper lid; the nævus also extended for a short distance beyond the outer canthus, and there was a growth beneath the palpebral conjunctiva about three-eighths of an inch long, a quarter of an inch across, and about one-eighth of an inch in thickness; over this the conjunctiva was very vascular. On this case I operated six times in 1895, and three times in 1896, each time, except the first, under an anæsthetic; the affected eye can now be opened as widely as the other, and the atrophied cartilage was increasing in thickness when I last saw the case over a year ago. His physician wrote me in July, 1897: "There is still a varicose area on the upper lid and a little at the outer angle of the eye, but it is not at all increasing in size, and the result, as it is now, is to my mind most satisfactory," etc. The patient lives at some distance from Toronto, so that I am unable to say whether all traces of the nævus have disappeared by this time; but I have no doubt that any disfigurement which may remain could be removed by similar means to those outlined above. Many more cases might be cited in support of the claim for electrolysis in nævus, but time does not permit, and those above are fair samples of what may be accomplished by this means when proper precautions are taken and due judgment exercised.

A METHOD OF MAKING X-RAY OBSERVATIONS ON HOLLOW ORGANS.

By MORLEY CURRIE, B.A., M.B., Toronto.

The method involved is best illustrated by the following experiment:

A piece of furnace chain was drawn through a stomach tube until the eye was reached. Thus the rubber, which is itself partially impermeable to the X-rays, was reinforced by the metal chain which is completely impermeable. The tube was then swallowed by a subject and observations were made by means of the X-rays and fluorescent screen. The subject was about 5 feet 8 inches in height and weighed 170 pounds. The stomach was normal and contained a few ounces of fluid. Looking through the body transversly the chain could be very distinctly seen in the pharynx, and in the œsophagus to a point a little below the clavicle. As the tube was pushed in and withdrawn its point could be easily followed. In the neck each link of the chain was very distinct.

The Crooke's tube was then lowered to a point in a level with the stomach, and the subject turned so that he faced it. The stomach tube and chain were then seen by placing the screen at the inferior angle of the left scapula. The individual links of the chain could not now be distinguished, but the shadow was distinct. On pushing the tube into the stomach its point could be seen to emerge from the right side of the shadow of the vertebræ. It then glided smoothly downward and forward, and ultimatly the lower part of the tube rested upon the greater curvature of the stomach in an almost horizontal position. The tube rose and fell with each movement of the diaphragm. By means of a heavy piece of wire placed upon the skin of the abdomen the course of the tube could be marked upon the surface. The lowest point of the stomach was found to be two and a half inches below the tip of the ensiform cartilage.

The experiment furnishes an accurate method of marking the lower border of the stomach. By gradually filling the stomach through the tube its surface marking could be determined for any degree of distension. The possibility of watching the tip of the tube as it glides along the surface of the stomach suggests a method of observing irregularities of the organ due to congenital conditions, constrictions, tumours within or without the organ, etc. The extent of movement of the tube furnishes a means of determining the extent of the rise and fall of the diaphragm under different conditions. The facility with which the chain and tube are observed in the pharynx, and a large portion of the œsophagus should prove useful. Dilatations of the œsophagus could be examined by noting the various directions in which the point of the tube could be made to travel. In a case such as that of Luochka's, in which the dilatation had a circumference of 30 c.m., this would manifestly be very easy.

The course of the œsophagus is often altered by conditions such as aneurism, new growths, tubercular deposits, utro-pharyngeal and retro-œsophageal abscesses, etc. These would not as a rule be shown by the X-rays, but by watching the alterations in the course of the chain, their location could be determined, and in some cases their extent could be ascertained

This experiment is but one application of a general principle. The rectum, colon, urethra, bladder, vagina, uterus, nose and all cavities accessible from the

outside could be examined in a similar way. The chain used in the examination of the stomach could be seen from behind when placed in the anterior abdominal wall. It should, therefore, be easily seen if introduced into the colon. Unfortunately the rectal tube used in the only experiment made for rectum simply curled up in the lower end of the bowel.

A probe introduced into the nose can be clearly seen throughout the whole extent of the nasal cavities, as the surrounding bones are so thin that they are permeable by the X-rays. By means of the X-rays it would be possible, under the guidance of sight, to grasp with metal instruments impermeable foreign bodies placed deep in the nasal cavities; a similar manœuvre would be possible in many other cases. No experiment was made with the Eustachian catheter.

These experiments suggested that of introducing small bodies, impermeable by the X-rays, with the food of some animal for the purpose of observing the movements of the food in the œsophagus, stomach, and along the intestinal tract. The feasibility of this procedure was tested by placing a capsule, containing a few small shot, in the pharynx of a cat. The shot could be seen as they rapidly descended the œsophagus and entered the stomach. By turning the cat over, the shot could be examined from every side. The observation was continued for about fifteen minutes after the capsule dissolved. During this time the shot kept well together, and underwent very little change in position, which was probably due to an empty condition of the stomach. Lack of time prevented more extended observations in this direction.

Impermeable bodies when photographed by the X-rays are often greatly enlarged. In accessible hollow organs or cavities their size could be accurately determined by introducing beside them a body of known size. The recent excellent photographs of the pelvis will probably be followed by good photographs of vesical calculi, and in this case an accurate determination of the size of the stone would be very important.

In conclusion, I wish to thank Mr. J. C. McLennan, of the University of Toronto, who kindly placed at my disposal the excellent X-ray apparatus of the Physical Laboratory and assisted me in making the observations.

GYNÆCOLOGICAL NOTES FROM PARIS.

By A. LAPTHORN-SMITH, B.A., M.D., M.R.C.S. (Eng.),
Montreal, Canada.

APOSTOLI. As chance would have it, I found myself first at the clinic of Apostoli, who has attained such world-wide celebrity by his successful application of electricity to gynæcological therapeutics. Although his office is still at 5 Rue Notiere, near the Avenue de l'Opera, he has removed his clinic from its former dingy surroundings in the Rue des Pais to a much larger and more suitable place at 15 Rue Montmartre. Since my last visit here twelve years ago his views have changed but little. Most of what I wrote in my letters from Paris at that time is still true. I was greatly interested to see his splendid outfit of instruments and apparatus, and the honest and painstaking manner in which the records of his cases are kept; and I could not but be impressed each time that I visited his magnificent waiting rooms by seeing them filled with the highest class of patients from

so many different countries. His method must have some virtue in it to have stood the test of so many years. At his clinic he has three salaried assistants constantly taking histories and giving treatment, so that now he has more than five thousand cases, all carefully, and many of them most minutely, recorded. His clinic costs him personally over three thousand dollars a year. Although he still uses the constant galvanic current for the symptomatic cure of fibroids, and the fine faradic current for pelvic pain, he has added two other important elements to his installation. One, the static current, obtained from a Holtz machine; and the other, the Tesla current of very high tension and high frequency. The static is given in the form of showers or sparks, while the Tesla current is applied as the patient is reclining on a sofa or sitting within a solenoid or cage, the current passing all around him. Want of space prevents me from describing these currents more fully, so I must be content with a summary of my observations:

1st. Apostoli does not treat surgical cases with electricity. Each time that I attended his clinic I saw case after case sent to the surgeon, because these cases had either disease of the appendages or cancer of the uterus, neither of which he claims to cure by electricity. He wishes it to be distinctly understood, therefore, that electricity is an ally and not a rival of surgical treatment.

2nd. If I had any doubt, which I have not, as to the great value of electricity as a diagnostic agent in gynæcology, it would have been dissipated by what I saw at Apostoli's clinic. As the cases were brought before him, the assistants reported that in several of them there was intolerance of even small doses of forty or fifty milliamperes. Apostoli invited me to investigate them carefully with him, and by the aid of the clinical history and the physical examination I would have suspected diseased appendages in some and cancer in others. With the intolerance of electricity added, Apostoli felt so certain of the diagnosis that he then and there sent them to the surgeon for operation. He was much interested in a case of my own, bearing upon the diagnostic value of electricity. A young woman who had been treated by three physicians with electricity for a large fibroid tumor of the uterus, was rendered worse each time. Guided by Apostoli's advice I suspected pus tubes, and on performing laparotomy I found that what was thought to be a fibroid was a collection of four enormous abscesses of the two tubes and ovaries.

3rd. I saw demonstrated the important place occupied by the electrical treatment of ovarian pain, for which, so far, neither medicine nor surgery have proven very effective. And yet no other word than magical would express the effect of the *static* spark on tender ovaries. Cases which could not endure firm pressure on the ovarian region without crying out, declared after two or three minutes of application of the static spark, that the same pressure caused them no discomfort whatever. Some of these patients were seen for the first time while I was there and did not leave my sight for a moment, nor was a word spoken to them until the effect was produced; so that they did not know what was being done nor what was the effect expected. I cannot say how long the relief lasted, but Apostoli assured me that many cases, even including those suffering from ovarian pain after removal of the ovaries, had been completely cured by this treatment, which, he tells me, has taken the place of the current from the long, fine faradic coil.

POZZI, with whom I had the pleasure of spending a morning at the Broca hospital, is one of the most striking figures of the profession in Paris. Like our own Sir William Hingston, he is a senator and a knight (of the Legion of Honor), and he is also a full professor of the university. He is a tremen-

dous worker; his book on gynæcology being one of the most complete that has ever appeared. I was always puzzled to know how he managed to find the time to write such a work, and on expressing my curiosity he told me that he had obtained leave of absence from the university and from the hospital, and, taking many cases of note-books and monographs with him, went to Montpellier, where he shut himself up like a hermit for two years, writing for fifteen hours a day. I saw him do an abdominal hysterectomy, during which, in order to give himself more room to work, he first split open the fundus and enucleated a large, hard fibroid by screwing a specially made corkscrew into it. The remainder of the operation was exceedingly simple, because relieved of its load the uterus was easily lifted out, including the cervix, and the six arteries ligatured individually with catgut and the peritonæum closed. As far as I could learn, vaginal hysterectomy is gradually being abandoned in France, where it had its greatest stronghold, and Howard Kelly's method of abdominal hysterectomy is gradually taking its place, Pozzi getting the city council of Paris to build a one hundred thousand dollar operating theatre and laparotomy pavilion. It will be without wood—marble and cement throughout, so that each day it may be washed with a stream of bichloride solution with the hose.

SEGOND is next in seniority to Pozzi, and is about forty-eight years of age. He is a man of great force of character and is making a marked impression on the progress of gynæcology in France. He was a strong advocate of vaginal morcellement of the uterus for pus tubes, fibroid tumors and all conditions in which both tubes and ovaries had to be removed. While visiting America a year ago he performed this operation eleven times before large assemblages of gynæcologists, and he did them so elegantly and quickly that he elicited the admiration of all who saw him operate. But though he came to show American surgeons what could be done with vaginal hysterectomy, they in turn showed him what they could do by the abdominal method, with the result that Segond became converted by those whom he came to convert, and ever since his return he has become so strong in his advocacy of Kelly's method as to carry all before him. They all, however, still remove the cervix, even when there is no suspicion of malignancy, their sole object being to obtain vaginal drainage which they think was the strong point leading to their great success in the vaginal method. In this, I think, they are mistaken, as it adds very much to the time required for the operation, several whom I saw doing it taking more time to arrest the vaginal hæmorrhage than was required for the ligature of the six arteries and the removal of the tumor. Moreover, I think it important to leave the *healthy* cervix to avoid shortening of the vagina, and, as a rule, there is so little to drain that it hardly justifies the opening of the vagina. Segond is a great admirer of everything American, and he told the large staff present that the finest hospital he had ever seen was the Royal Victoria at Montreal, and in his writings—which are very forcible and convincing in their style—he loses no opportunity of praising the skill of American gynæcologists. I saw him doing an abdominal hysterectomy for cancer of the uterus, in which he also removed the upper part of the vagina which was affected. He had great difficulty in stopping the bleeding. He admitted on my inquiring, that his experience with hysterectomy for cancer was very discouraging, as I suppose they have the same difficulty to contend with in France as we have, namely, the cases come to us too late. The above case was at the Salpetrière; the next one was at the Baudeloque, where I saw him remove a papilloma of the ovary with secondary grafts on the peritoneum and ascites. After removing the disease he placed a drainage tube and gauze packing on account of the

profuse oozing. He recognized the fact that gauze packing keeps in secretions but does not drain them. The third case I saw Segond doing was at a private hospital kept by the nuns, where he removed one tube and ovary from a young lady; but he admitted that it did not give very satisfactory results as he had often to operate them again later.

RICHELOT, as far as I could learn, comes next to Segond. I saw him operating at the St. Louis hospital, the dirtiest looking old barracks internally that I have ever seen. As this was probably not his fault I felt very sorry for him. I called upon him at his elegant private house, 32 Rue Panthievre, and although he was crowded with patients he received me most kindly and made an appointment for the next day. Everything during the operation was rigorously aseptic, which, of course, is the principal thing; but any stranger seeing *only* that hospital would have a very bad opinion of French hospitals. I was glad that it happened to be a vaginal hysterectomy for disease of both appendages, pus tubes, for that is his forte. He performed this operation beautifully in about the same time as we would take to remove them by the abdomen. They claim here that the uterus should always be removed when both ovaries are taken away. I also saw him perform a Schroeder operation, using a needle on a handle to pass the sutures. He did not, like Martin, of Berlin, pass a preliminary suture on each side to control hæmorrhage. At all the hospitals the feet and legs of the patients are bandaged up in a thick layer of cotton, well sterilized—an example worth following, as it helps to keep up the bodily temperature. To close abdomen, Segond uses through and through silver wire; Bouilly through and through silk-worm gut; and Pozzi three layers, two of burned catgut and one of superficial silk-worm gut.

DOYEES is said to be the equal of any, but he did not operate while I was in Paris.

BOUILLY operates beautifully at the Cochin hospital.

TUFFIER is a rising man.

My next letter will be from Berlin.

Reports of Societies

TORONTO MEDICAL SOCIETY.

The regular meeting of the Society was held May 19th.

Dr. T. F. MacMahon presided.

The minutes of the last meeting were read and adopted.

Dr. Morley Currie read a paper on the use of the X-rays in mapping out hollow organs. The device Dr. Currie used was made by passing a chain through a stomach tube, so that the end of the chain corresponded to the eye of the tube. The X-rays passed through the body would outline the chain, and so the amount of gastroptosis could be made out. Irregularities caused by growths could also be detected, whether in the pharynx, œsophagus, etc., or impinging on them. The same principle might be used in the examination of the rectum, colon, and nasal cavities.

Dr. Harold Parsons related his experience with the rays in connection with gall-stones. He considered Dr. Currie's scheme a good one, particularly in those cases where dilatation of the stomach could not be done.

Dr. Currie replied.

Dr. T. F. Webster presented a patient, a teamster aged 38, who had consulted him for some pain in the right hypochondria region. A tumor could be felt, which reminded one of a floating kidney. Shortly after, examination showed the tumor to have greatly enlarged and extended across to the left hypochondria region, being about two fingers' breadth in diameter in that portion of it to the left of the median line. Under purgation the tumor would lessen in size materially, and sometimes disappear altogether. At another time it could be felt in the right illiac fassa. Its size and character was now much as when examined first.

Dr. MacMahon discussed the probabilities, but would not give a positive opinion without a more extensive examination after the use of purgatives. Dr. Wilson had examined the growth when it extended across the abdomen. The tumor had not a fæcal feel.

Dr. Graham Chambers thought the condition might arise from an enteroptosis of the transverse colon, the sharp splenic flexure preventing the outward passage of the fæces.

Dr. MacMahon reported a case of angina pectoris, followed by dilatation of the heart. The nitrites were administered without much effect. Morphia gave relief. He did not try digitalis. Dr. MacMahon thought the condition was the result of sclerosis of the coronary arteries.

Case II. was that of a young man aged 30, with interstitial nephritis, who consulted him first some months ago for asthma. There was not much albumen in the urine; but casts were found. There was marked sclerosis of the arteries generally. There was no history of syphilis, alcoholism, or poisoning by lead. The patient was an electrician and had worked considerably among copper, which might, the speaker thought, have had something to do with the causation of the trouble. The treatment had been hot baths and iodide of potash. Much improvement took place, but by injudicious exposure during convalescence, an acute nephritis was grafted upon the chronic condition with a fatal ending.

Drs. Hay, Oakley, Oldright, Webster and Chambers briefly discussed the cases.

Dr. Wilson reported having ordered two drachms of thymol for a patient with tape-worm, ten grains to be taken every fifteen minutes until all was taken. The druggist by mistake gave trimal. After two doses he became sleepy, and when all was taken it was difficult to rouse him. He

slept many hours. Salts were administered, which probably carried much of the drug out of the bowel. He had found this remedy good for tape-worm. Drs. Adams and Chambers discussed the case. Dr. Chambers thought so much thymol would be injurious to the kidneys.

Nomination of officers for the ensuing year then took place.

Dr. Hay gave notice of motion, that he would move that the yearly fee of the Society be reduced to two dollars. Dr. Parsons gave notice that he would move at the next meeting that the meetings of the Society be held fortnightly instead of weekly.

Dr. W. J. Wilson gave notice that he would move: Resolved, that in the opinion of this Society no one should receive free treatment as an indoor patient in our public hospitals except those receiving hospital maintenance free. The Society then adjourned.

Special Selections.

THE CROONIAN LECTURES ON THE CHEMICAL PRODUCTS OF PATHOGENIC BACTERIA CONSIDERED WITH SPECIAL REFERENCE TO ENTERIC FEVER.*

By SIDNEY MARTIN, M.D., F.R.S., F.R.C.P.,
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LECTURE I.

I propose in the following lecture to discuss generally the nature and action of the poisons and chemical products formed by pathogenic bacteria, and to illustrate the subject by an investigation that has occupied me recently of the pathogenic action and the chemical pathology of the typhoid bacillus and of two other bacilli closely related to it.

Most of the poisons which are to be considered are substances which cannot be defined chemically, and this at the outset is a very great difficulty in an attempt to classify such poisons accurately.

The transformations which bacteria, both non-pathogenic and pathogenic, produce in substances are of great variety. Some non-pathogenic bacteria are concerned, for example, with nitrification, a process in which ammonia compounds are transformed into nitrates and nitrites. These bacteria are more or less specific, and although some pathogenic organisms have a somewhat similar action in this respect it is very slight. Another example of a similar character is the splitting up of urea into ammonia and carbonic acid by the micrococcus ureæ. These actions, however, are not of the nature of the chemical changes produced by pathogenic bacteria. The changes which bacteria produce in carbohydrate substances —for example, starches and sugars —are, first, the transformation of the starch into one or other kind of sugar, and the decomposition of the sugar into alcohol and acid bodies. such as lactic, acetic and butyric acids. Such changes are usually spoken of as those of fermentation, and are allied to

* Delivered before the Royal College of Physicians of London.

changes which occur in the digestive processes of the higher animals by means of the organic as distinguished from the organized ferments.

Some bacteria are capable of still further acting on the acids produced in the first-named fermentations; thus the bacillus butyricus can transform lactic acid into butyric acid with the formation of carbonic acid and hydrogen. These are again not the changes which are of the greatest importance in considering pathogenic bacteria. Although some pathogenic bacteria act on starches and sugars with the formation of acid bodies and gases, yet the products so formed play but a small part in the production of disease. Fats, which are largely present in the body and are taken in with food, are also broken up by bacteria of one kind or another. The products, however, from a pathological point of view, are of minor importance. From the albuminous substances, however, the third great class of organic substances that serve as food and act as important chemical constituents of the body, the pathogenic bacteria produce substances possessing important physiological actions. The albuminous molecule containing carbon, hydrogen, nitrogen, sulphur, and frequently phosphorus, is unknown as regards its chemical constitution. It is no doubt highly complex, and is capable of being broken up both by organic ferments and by bacteria into numerous bodies of the most complex nature. Although the actual constitution of the albuminous molecule is at present undetermined, it is capable of being transformed only in certain directions. Thus, by the action of mineral acids and alkalies with the aid of heat, white of egg or the serum proteids are transformed into acid and alkali albumin, which differ from the original proteid mainly in their solubilities in acid or alkaline solution. The acid form is precipitated by an alkali and *vice versa*, the precipitate being still capable of coagulation.

Like the original proteid, however, these bodies are capable of digestion. The digestive transformation which takes place in the stomach and small intestines consists in the change of these slightly soluble and coagulable proteids into more soluble and diffusible ones, the formation of the so-called albumoses and peptone. The important members of this class are soluble in water, are not precipitated by heat, and are capable of some amount of diffusion. They all give a bright pink color with a trace of copper sulphate solution and an excess of potash. True peptone differs from some of the albumoses in the fact that it is not precipitated by nitric acid. One of the characteristic albumose reactions, for example, of proto-albumose, is that the precipitate by nitric acid is soluble on heating the solution, comes down again on cooling.

Peptic digestion probably does not go farther than the formation of peptone, and results chiefly in the transformation of the proteids into albumoses. Pancreatic digestion, however, can split up the proteid molecule, or part of it, into crystalline bodies containing nitrogen, such, for example, as leucin and tyrosin.

This digestive action on proteids produced by organic ferments is also a feature of the action of some of the organized or bacterial ferments, except that the effect is more pronounced, and results in the breaking up of proteid molecule into many different non-proteid substances, which may be considered the final products of the digestive action.

This digestive action of pathogenic bacteria is, however, only a part of the question we shall have to consider. The chief cell of the peptic gland secretes pepsin, which is discharged in the gastric juice into the stomach cavity; the pancreatic cell secretes trypsin and other ferments, which are discharged into the small intestine with the pancreatic juice; and, therefore, in any digestive mixture obtained from the stomach or intestine

there is present, besides the products of digestion, the ferment or the active agent in the transformation. In the case of bacteria growing in an artificial medium outside the body or developing in the body, there is—in addition to what digestive products may be formed—a living bacterial cell, and any secretion which it may produce; and it will be seen that the body of the bacterium, as well as its secretion—whether this be of the nature of a ferment or not—are both of the highest importance in the consideration of diseased conditions and processes.

In bringing these aspects of bacterial action to your notice, it will be seen to what extent the products of their digestion of albuminous substances or the mere secretion of poisonous substances act in disease.

The study of putrefaction, which is produced by many different micro-organisms, has shown that—besides the production of albumoses as the early products of digestion—numerous chemical substances, or final products, are formed, some of which are not toxic, although many are highly poisonous.

It is not necessary to dwell on this part of the subject, except to say that the effect of these toxic bodies of putrefaction is (1) that of intense local irritation, whether they are injected under the skin or introduced into the digestive tract; and (2) an action on the central nervous system whereby, besides the production of muscular twitchings and clonic and tonic spasms, there is with many of them a tendency to the production of stupor and coma, ending in death. These chemical products of putrefaction, with, perhaps, one exception—that of mydaleine—do not cause a rise of body temperature, so that the fever which is observed in cases of poisoning by putrefactive products, such as those occurring in some cases of food poisoning, are due to other products of the bacteria. At one time similar chemical products or animal alkaloids, as they are called, were supposed to play a large part in the processes of specific infective diseases. Thus, Brieger isolated two bodies, tetanin and tetano-toxin, which were supposed to be the active agents in the production of the convulsive spasm of tetanus. He also isolated typho-toxin, a chemical body which was supposed to be an active poisonous agent in typhoid fever. The existence of these bodies has, however, not been confirmed by subsequent research. It does not follow, of course, that in all diseases such final products may not play a part in the production of the symptoms. As I have shown in anthrax, such a product is formed, and is one of the active poisons in the disease. Of later years, especially as the result of the study of the chemical pathology of diphtheria and of tetanus, the most active poison which is produced by the micro-organism is not of the nature of an animal alkaloid, but a substance which cannot be defined chemically, but only by the investigation of its physiological action.

Separation of Bacterial Poisons.

The three kinds of poisons which have been indicated must be borne in mind, namely: (1) The poisons secreted by the bacterium itself; (2) the products of the digestive action of the bacterium, that is, the albumoses; and (3) the final non-proteid products, which may be provisionally called an animal alkaloid. The first two poisons are precipitated from solution by means of alcohol; generally speaking, the last class of poisons is soluble in alcohol. In the separation of the first two classes of poisons by means of alcohol great care has to be taken that they are not exposed for too long a time to the action of the reagent, so that their toxic properties may not be diminished. The prolonged action of alcohol, for example, on pepsin, will diminish its activity;

and so it is found that its prolonged action on the poisons of diphtheria and tetanus greatly diminish their activity. Any method, therefore, in which alcohol is employed must be a rapid one, the poison not being exposed to its action for longer than a few hours.

Another method which is employed in the separation of these poisons is precipitation by means of saturation of the liquid with neutral ammonium sulphate. By this means all the proteids are thrown down with the poisons, and may be collected and redissolved by means of dialysis. To my mind, however, this method is open to grave objections. Ammonium sulphate is itself poisonous, and it is extremely difficult to remove the last traces of the salt, except after prolonged dialysis in the presence of antiseptics, which may be hurtful to the poisons. During the process of dialysis the solution becomes greatly diluted owing to the absorption of water from outside the dialyser; so that there is at the end a very dilute solution of the poison which has to be concentrated before it can be used. There is no advantage in this method, because although it gives rapid precipitation of the poison, yet the final product is not any purer than when alcohol is used as a precipitant. Other methods have been used by Brieger and others, whereby the poisons have been precipitated by the salts of heavy metals, which are got rid of afterwards by various means. Even in this case we are not much nearer the chemical identification of the poisonous substances.

Preparation of Secretory Products of the Bacteria.

The two best known examples of toxic secretory products of bacteria occur with the bacilli of diphtheria and of tetanus. They are produced by growing the bacillus in a medium made of sterilized extract of meat, to which 1 or 2 per cent. of commercial peptone and a small proportion of common salt are added. This is the ordinary broth peptone. It is a medium in which the proteids exist in a digested form, so that any digestion of the proteids by the bacterium does not take place, as it might do if serum albumin or white of egg were present.

After growing in the medium for a certain time—three weeks, a month, or longer, and after filtering off the bacilli through a porcelain filter, a clear sterile liquid is obtained which is extremely poisonous. This liquid when injected into an animal gives rise, in the case of diphtheria, to the characteristic symptoms of the disease—namely, a palsy which is mainly dependent on the degeneration of the peripheral nerves; and in the case of tetanus, to the characteristic symptoms of the disease. In this poisonous liquid no manipulation has as yet demonstrated the chemical identity of the poison. Such a liquid gives a copious precipitate with alcohol or saturation with ammonium sulphate, and this precipitate is itself highly poisonous, containing most of the poison present in the liquid, and consists almost entirely of the peptone which has been added to the liquid in the preparation of the culture medium with some of the salts of the broth.

An attempt was made by Roux and Yersin to isolate this poison by adding phosphoric acid and then lime to the liquid, the precipitate of calcium phosphate formed carrying down the poison. It was found that the small amount of this calcium phosphate mixture which killed an animal did not show any appreciable difference in weight from the amount of calcium phosphate present—that is, the amount of poison present was practically imponderable. This may also be appreciated by the statement that even as little as 1-25 c.cm. of the broth filtrate may kill a guinea-pig weighing 300 g. in forty-eight hours.

Kitasato also found in his experiments on the bacillus of tetanus that

the broth filtrate was poisonous in what were practically infinitesimal doses. It is evident that in these cases we are dealing with a poison which is at present quite outside the domain of chemistry; it cannot be expressed chemically, it can only be expressed from its pathological effects.

Separation of the Digested Products.

To obtain these it is necessary to grow the bacillus in a liquid containing either alkali-albumin, serum, or any of the liquids of the body containing proteids in solution. Extract of meat and salt (that is, broth without peptone) is with advantage added, as it thus makes a better culture medium for the bacterium. After the bacillus has grown in this liquid for three to five weeks, and it is filtered off through porcelain, the clear filtrate, after concentration at 40° C., is precipitated by an excess of alcohol, and the precipitate collected and redissolved in water, reprecipitated by alcohol, and after washing in alcohol and ether is dried over sulphuric acid. In this way a lightish brown powder is obtained, readily and completely soluble in water, and giving the reactions of albumoses—namely, the biuret reaction and the characteristic precipitate with nitric acid.

Some bacteria—for example, the anthrax bacillus—have practically no toxic secretion, and the albumoses are readily separated in as pure a form as can be obtained; but with others—for example, the diphtheria bacillus—where there is not only a secretory product, but also digested products, the powder which is obtained by the method thus stated contains not only the secretion, but also the albumoses. There are no chemical means of separating these secretory products from the albumoses, but some degree of separation may be obtained by keeping the solution of 60° C. for a longer or shorter period, whereby the secretory product is rendered inert. This is, of course, only a rough method, inasmuch as heat also damages, in some instances, the action of the albumoses.

Separation of the Final Products.

The third point is the separation of the final products. These final products are obtained in the alcoholic filtrate after precipitation of the proteids in solution. This alcoholic filtrate is evaporated to dryness at a temperature of 40° C., and extracted with absolute alcohol. The extract is filtered, evaporated again to dryness, and redissolved in alcohol. After filtration, and, if necessary, concentration, it is thrown into an excess of ether, which causes a precipitate, and the alcoholic extract may thus be separated into two parts, one of which consists of substances which are soluble in alcohol and insoluble in ether, and are precipitated by ether, and other substances—chiefly fats—which are soluble in ether and alcohol, but are insoluble in water.

This manipulation and separation of the substances is, of course, at present a very imperfect one, inasmuch as the substances so separated have not been obtained in a sufficiently large quantity, nor are their chemical characteristics sufficiently worked out to enable a definite idea of these characteristics to be obtained; but for the purposes of physiological experiment and of determination as to the general nature of the poisons produced by pathogenic bacteria, I have found this method of great value.

In the investigation of toxic products formed in infective disease, not only must they be studied by means of the artificial culture of the bacillus in suitable media, but a chemical examination of the body itself, especially as regards the blood, the spleen, and the liver, is necessary in order to determine whether the same products

are found in the body as in the artificial culture.

This study is of great value when the poisons have a specific action; for example, in the case of diphtheria and of tetanus; but in the diseases in which there is no specific symptom due to a chemical poison, it may be impossible to prove the identity of the poisons produced by the bacterium and those found in the bodies of patients dead from the disease.

Intracellular Bacterial Poisons.

The three classes of poisons just considered are described as extracellular bacterial poisons, but besides these, which are present in the culture fluid in which the bacteria are grown, poisons may be present in the bodies of the bacillus—intracellular poisons—and these have to be studied by means of other methods. One method is to kill the bacillus, which is grown in broth, by means of chloroform. If a few drops of chloroform are added to the liquid and shaken up, and allowed to act for twenty-four hours or longer, the bacilli are killed, so that, on testing, the liquid is found to be sterile. The bacilli are still suspended in the liquid, and after evaporation of the chloroform *in vacuo* the liquid may be used for experiment. Besides the bodies of the bacillus it, of course, contains any secretory poisonous product it may form. The results obtained by the injection of this liquid may be compared with those observed with a broth culture, also chloroformed, and from which the bodies of the bacillus are removed by centrifugalizing. The comparison of the two results enables one to observe the difference in the action between the poison contained in the body of the bacillus and the secretory product; between the intracellular poison and the extracellular.

Another method consists, after growing the bacillus on a large surface of agar, in scraping the culture from the surface and suspending it in a sterile salt solution. Some amount of extracellular poison may be present in this suspension as well as in the first case. In filtering a culture fluid through a Chamberland filter some of the toxic products may be held back by the filter itself, and this is the more likely to be the case if the solution contains a large amount of undigested proteid, for example—serum. The method of killing the bacillus in the fluid by means of chloroform and centrifugalization to get rid of the bodies of the bacillus is therefore a very important one in the investigation of the toxic products of the bacterium, as in this way the intracellular poisons of the bacillus can be investigated.

Toxic Action and Reaction.

The physiological action of these products may be investigated by studying the effects produced by their injection subcutaneously, into the peritoneal cavity, or into the venous system. As the result of the intravenous injection of poisons a more rapid effect is produced than by other methods, and observations may be made in rabbits as to the effect of the poison on the temperature, on the body weight and on the intestine (as regards the production of diarrhœa) as well as its effects on the production of microscopical lesions in the nervous system, the heart, liver, spleen and kidneys.

From the experimental point of view infective diseases may be divided into two great classes. In one of these the symptoms are only those of what we must call a toxæmia or blood-poisoning—that is, there is a fever in a greater or less degree, with great bodily depression, and loss of weight, with some alteration in the secretion of the glands, more evidently those of the kidney and the skin. At some period or other of this process the fever may be absent, and yet the process of poisoning may be progressive. In the second class of cases, besides the

symptoms of toxæmia, there are present during the acute disease, or following as sequelæ, specific lesions, mainly of the nervous system.

Examples of toxæmia without specific lesions occur in anthrax or malignant pustule, and in typhoid fever.

Examples of the second class are diphtheria and tetanus, in both of which, besides the toxæmia, there are specific symptoms referable to the nervous system.

The animals which have been used in the investigation are rodents (rabbits and guinea-pigs) between which and the higher animals there is a great gap, chiefly on the side of the nervous system. This point must be borne in mind in any deductions made upon the action of poisons upon the nervous system in rabbits.

The method of procedure in the experiments is as follows: The weight and rectal temperature of a healthy rabbit are taken for two days at least previous to the experiment. In this way an indication is obtained by the increase of weight in the animal, and by the regularity of the temperature as to whether it is healthy or not. The injection is then made, usually into the marginal vein of the ear, and the effect of poison on the temperature, body weight, etc., observed during the life of the animal. After death, or at killing, cultivations are made from the heart's blood, the peritoneal cavity, and the spleen or liver, to demonstrate the absence of bacterial action; and the nerves (the phrenic and branches of the anterior crural) are stained with osmic acid for the investigation of degeneration, and a portion of the left ventricle of the heart is also stained in the same liquid for examination of any change in the fibres. Bacterial poisons appear to have a specific action on the heart of the rabbit in the production of degeneration of the muscle fibre, a degeneration which is the expression of the cardiac failure so frequently observed in infective disease in the human being.

One important point as regards the action of these bacterial poisons must be noted, namely, that they have in many cases a very slow action; so that following on a single dose there may be some slight change observed in the temperature or in the body weight, which passes off. Subsequently, the animal either progressively goes down hill, and succumbs after a week or fourteen days, or longer, or there may be no apparent downward progress, and death occurs suddenly.

This slow action of the bacterial products is so common as to be noted particularly, and in some cases it precludes any exact investigation of their effects on the circulation of the blood within the time limits of an experiment.

Toxic Reaction.

Besides the poisonous effect of the bacterial products on the body whereby an injury is effected on the tissues, producing either alteration in function, with or without obvious degeneration of the tissue itself, bacterial products may produce what may be called a toxic reaction. This occurs most readily as the result of the injection into an animal refractory to the disease of small but gradually increasing doses of poison. There is no accumulation of the poison in the body, but there is a gradual increase in the blood and tissues of a substance or substances which are inimical to the poison or the bacillus—that is, under certain conditions they may prevent, when injected at the same time, the fatal effects of the poison on the bacillus.

These substances probably fall into two groups—(1) the antitoxic, which counteract the effects of the poison itself, and (2) the antimicrobic, which counteract the effects of the bacillus itself. In one and the same animal the blood may contain a substance or

substances which are both antitoxic and antimicrobic, such, for example, as occurs in the process of the formation of the diphtheria and tetanus antitoxic serums.

As an introduction to the investigation which I have more recently done, it will be well to discuss as examples the chemical and pathological processes which occur in anthrax, diphtheria and tetanus.

ANTHRAX.

I have previously shown, and subsequent experiment has only confirmed the observation, that the bacillus of anthrax produces in the body of an animal, the subject of anthrax, and in an artificial culture medium containing digestible proteids, a large quantity of albumoses, and also of a body which gives some of the reactions of an alkaloid. Both these classes of bodies are poisons, the albumoses producing fever and causing death in coma when given in large doses; the alkaloidal body, which is much more poisonous, producing no rise of body temperature, and causing stupor ending in coma and death in mice, guinea-pigs and rabbits. According to the dose given death may not be produced, but the stupor and coma may last for a certain time and then be recovered from.

The bacillus of anthrax is a typical infective micro-organism, and it is the chief example of the class of micro-organisms whose toxic products are the results of the transformation of the proteid solution in which it grows. Practically it produces no toxic secretion. If any is produced at all it must be in very small amount, inasmuch as when grown in peptone broth it imparts little or no toxicity to the liquid, as tested by injection after removal of the bacilli through the filter.

TETANUS.

This is quite different from the results obtained in the bacillus of tetanus. If this is grown in a solution of peptone broth under suitable conditions it is found to produce a highly toxic substance, which, as has been previously stated, is practically unweighable. This substance, which must be considered a secretion of the bacillus, possesses a characteristic physiological action in that it produces the characteristic convulsions of the disease tetanus. It is the chief toxic agent produced by the bacillus. Kitasato once found it in the heart's blood of a patient dying of tetanus. In a number of cases of tetanus which I examined chemically I did not find this poison, although perhaps this result is not of much value, as the method I employed would possibly destroy the somewhat sensitive toxin. I found in the spleen and blood of patients dying of tetanus albumoses in fair quantity which did not possess any other action than that of producing fever; they produced no convulsions, and did not cause death. I have previously stated that in one experiment I found that the ether extract of the spleen in tetanus produced convulsions when injected intravenously in rabbits. This undoubtedly occurred, but I am not at all sure that it is of very great significance; at any rate, I could not confirm the observation, and I do not wish to lay any stress on it. It must be considered at present that the chief if not the only active poison in tetanus is the secretion of the bacillus, which, when injected into the body after a certain period, produces convulsions.

With regard to the albumoses which are found in the body, in the spleen and blood of patients dying of tetanus, they are undoubtedly present. They may be in some cases the result of a mixed infection by the bacillus of tetanus and other bacteria, but they may be the result of the direct action of the tetanus bacillus or of its toxin, although the proof of this is at present wanting. I did not find that the tetanus poison had any digestive action.

DIPHTHERIA.

The chemical processes of diphtheria closely resemble those of tetanus. There is a secretory product which is formed when the bacillus is grown in peptone broth, and which is present in the membrane of diphtheria, and probably in the tissues as well. This secretory product possesses a characteristic action on the nervous system, causing in rabbits paralysis dependent on nervous degeneration. When the bacillus is grown in a solution containing digestible proteids, it digests these with the formation of albumoses and certain by-products. These albumoses, separated in the ordinary way, have a toxic action similar to, although not so powerful as, that shown by the secretory product. They are also found in the spleen and blood of persons dying of diphtheria, and possess a similar action. What part of the toxic action of the products is to be ascribed to the albumoses themselves is perhaps a matter of debate, inasmuch as the only method by which the physiological action of the secretory product can be separated from that of the albumoses is that of heat, which also affects the action of the albumoses.

What I have called the secretory products of tetanus and diphtheria are remarkably sensitive to heat; that of tetanus, for example, is completely destroyed by raising to a temperature below 80° C.; that of diphtheria is destroyed at a temperature of 60° C., and heating to lower temperatures weakens the action of the poison or alters its effects.

It is evident that the action of the powerful secretory products of pathogenic bacteria is unlike that of crystallisable poisons. First, they produce a large effect in very small doses; secondly, this effect does not always come on immediately after injection even into the venous system, but is preceded by a period during which no apparent change is occurring in the body; thirdly, the poisons are frequently selective in their action, affecting mainly the nervous system, on which they produce a profound effect. They may also disorganize the general nutrition of the body. Fourthly, they are very sensitive to heat and external conditions. Their injection into the body—their effect being preceded by a period of incubation—reproduces the action of the bacillus itself, so that one has to do with a poison which, although not living, produces a progressive change in the tissues of the body like the bacillus.—*Brit. Med. Jour.*

THE FORCIBLE CORRECTION OF THE DEFORMITY IN POTT'S DISEASE.

The forcible rectification of the deformity of the spine in Pott's disease is a subject which in France and Germany is awakening the widest interest. It has hardly found its way into American or English literature yet to any extent (*Journal* xxix. 745; xxx. 709) partly because it is all so recent and partly because each one hesitates to approach the subject in a critical way on the facts so far presented. The method is essentially one which requires the lapse of a considerable amount of time for the estimation of its real value. The method proposed is this: the patient is anesthetized, and lying on his face is forcibly pulled upon by one assistant on each arm and leg while the surgeon leaning over him presses down upon the deformity until it yields or he sees fit to desist. The patient is then laid on his back on a padded board or enveloped in plaster from his head to his pelvis, for some months. It is claimed by some writers that permanent improvement and almost cure of the deformity may be obtained in this way. We are taught, and analogy would lead us to believe, that trumatism to bones or joints affected

by tuberculous disease renders the tissues more vulnerable to the inroads of the bacillus and the general system more likely to be affected by generalization of the tuberculosis. The forcible tearing of tuberculous bone tissue has been again and again demonstrated to be risky and attended often by meningitis or general tuberculosis. For example, in twenty-seven cases of the forcible rectification of the deformity in hip disease recently reported by Raymond Sainton, five developed fatal meningitis within two or three months of operation. Objections on practical and theoretic grounds instantly occur: 1. Pott's disease is a tuberculosis of bone of the bodies of the vertebræ, and the deformity is secondary and is an incident. It has been regarded as in a measure conservative and as nature's preliminary to arresting the disease. The essential is vertebral tuberculosis, not deformity of the spine. Were the treatment proposed the eradication of the disease, it would take place on a different plane; but the measure deals only with a symptom and a result which is of itself distressing, and sometimes disabling, but which is on the whole fairly well controlled by early and efficient treatment. Other things being equal it is, of course, most desirable to improve or obliterate the deformity; but the essential of any rational treatment is first to cure the disease. 2. The question of the occurrence of bony repair to fill in the gap caused by the tearing apart of the bodies of the vertebræ is, of course, an essential one. If there is to be no bony repair the operation is useless. It is asserted (Ménard) that in Pott's disease bony repair occurs, not in the bodies of the vertebral column, but at the sides and back. But Regnault quotes a specimen in the Musée Dupuytren, where a gap exists in a diseased column, but the column is stable. One must remember, as shown by experiments on the cadaver, after rectification, that the gap to be filled may measure two to six centimetres or more. No pathologic evidence beyond the specimen of Regnault has been adduced to show that bony repair of the vertebral column of a character likely to support weight is likely to occur. Chipault, the modern originator of the method of forcible correction, and the predecessor of Calot, who seems to have reaped the glory, lays much stress upon ligature of the spinous processes in Pott's disease; not only does he ligature them after forcible correction, but as a routine method of treatment of Pott's disease in children, even before the occurrence of deformity, he advises "ligature by a silver wire of the spinous apophyses corresponding to the diseased region, a ligature followed by immobilization." A stout silver wire is twisted from one spinous process to another, so as to embrace and steady the whole area affected. After forcible correction Chipault has either wired the spinous processes together or has clamped the laminæ together by an appliance somewhat like Malgaigne's patella hooks. A column supported in this way has, he says, double the strength of the intact column. Upon this ligature Chipault insists as one of the essentials, not only of forcible correction but of all treatment of Pott's disease in the active stage. Relapse, without this is, he says, most likely to occur. Calot claims that bony tissue fills up the gap caused by the separation of the vertebral surfaces on the ground that radiographs show it, instancing one where there were seen two beams of bone stretched across the gap after an interval of three and a half months, eight to ten millimetres thick and two centimetres long. Again, he says that where the operation is done in two stages, weeks or months apart, distinct snaps of bony tissue are felt at the second redressment. Ducroquet has brought forward radiographs which are said to show bony repair of the gap in the vertebral bodies. The reproduction of these radiographs in

his (Calot) article is far from satisfying one that these statements are warranted by them. The general opinion is that the question of bony repair of the gap in the vertebræ must be regarded for the present as wholly *sub judice*. Such a process is not in line with the general behaviour of bone when affected by tuberculosis and disturbed by traumatism. It cannot be dismissed as impossible, nor can it yet be accepted as proved to have occurred after the forcible correction in Pott's disease. If bony repair of the gap does not occur the operation is of questionable ultimate utility unless the spinous processes are wired, as advised by Chipault. Among those who have reported relapses are Péan, Phocas, Tausch and Lorenz and Vincent. 3. One would suppose that such operations must be attended by risk of life, but the reported casualties are surprisingly few. The cord and membranes in experiments on the cadaver have not shown signs of injury. Ménard in correcting the deformity of the cadaver ruptured a prevertebral abscess which would have found its way into the mediastinum during life. Lorenz speaks of a case where an operation was undertaken to arrest a threatened paraplegia; permanent paralysis immediately followed of a severe type. In addition to these dangers, hæmorrhage, opening up of tuberculous foci, injury to intrathoracic vessels, etc., are advanced as theoretic possibilities. It is obvious that in old cases where union has occurred fracture of the spine will result from attempts at correction sufficiently forcible. Such an accident is reported by Malherbe, where a deformity has existed for eight years in a patient twelve and a half years old. The results quoted are surprisingly good. Calot comes first with 204 forcible corrections. There were no accidents, no deaths on the table. Two children died inside of three months, one of bronchopneumonia and one of meningitis. In eight cases of paralysis, six cures resulted within eight days. In one case partial paralysis came on some days after correction. Twenty of his operated cases walk already; but his end results are too recent to be worthy of serious consideration. He states that the X-ray shows the process of repair to be finished five to ten months after operation, sometimes requiring fifteen months. The criticism of Calot's figures made by M. Monod seems reasonable. In a critical report of the papers of Chipault, Calot and Ménard he made the statement that the statistics of Calot were too good, and for that reason would not carry weight. On the other hand, it must be remembered that Calot operates at Berck-sur-Mer under the most favourable hygienic conditions; and, as one of his critics said, could venture on things unsafe in cities. Chipault has operated for four years. He says there are many relapses, and that unless the apophyses are fastened together, practically all will relapse.

In England, Jones and Tubbey have done eleven reductions. In six they obtained immediate and complete rectifications, in five only partial. Lorenz has been already quoted with one case of paralysis, and at the same time relapse of the deformity. Jonnesco reported three deaths in thirteen reductions, one from chloroform, one death unexplained by autopsy forty-eight hours after reduction, and one death from bronchopneumonia after eight days. Most of the series of cases are, however, much more favourable. As far as figures go to show immediate dangers, one must admit that if representative cases are reported, the immediate results are altogether more favourable than could have been predicted on theoretic grounds. The limit of applicability is indefinite. Cases of three and four years' duration have been often corrected, and adults and children have yielded equally good results. Calot makes in doubtful cases traction of 40 to 80 kilograms; and if there is no yielding he stops. Very old cases

are obviously unfit for such operation. In two such cases, however, Calot has done a cuneiform resection of the posterior parts of the vertebræ and has thus accomplished reduction. This method, of course, diminishes the chest capacity markedly. The technique is simple, the patient lies prone and is pulled apart by strong assistants pulling on the arms and legs so as to distract the vertebræ at the seat of disease. Jeannel of Toulouse, and Vulpius of Heidelberg, use pulleys and bands for distraction in place of assistants, and the latter advocates suspension by the heels as the most available position for correction, and the application of the jacket. Calot advises as the first step of the operation the removal of the spinous processes of the diseased vertebræ through a longitudinal incision which is at once sewed up. This is advocated on the ground that pressure can then be made by the flat of the hand in rectifying the deformity, which is more accurate than pressure on each side of the spines; and it is said that sloughs are much less likely to form under the jacket. On the other hand, it is claimed that the removal of the spinous processes weakens the already diseased and unstable column. Traction of 20 to 80 kilos is made by Calot, according to circumstances, and then the surgeon standing over the patient presses downward on the boss with short jerks, exerting a pressure from 15 to 40 kilos. The deformity generally yields with a succession of snaps or suddenly and easily. The patient is then held with the spine overextended while a plaster cuirass is applied reaching from the top of the head to below the pelvis. This is changed every three or four months. Sloughs are likely to occur, especially on the occiput and over the boss. Recumbency of some months is advised, and the indication, according to Calot, for the upright position unsupported is afforded by the X-ray, which shows the formation of bone. All this seems to the American reader very indefinite and vague. Chipault lays the patient, after the operation, on an elaborately arranged board for hyperextending the spine.

Such is the literature as it stands. Lorenz and Ménard are the chief critics; Chipault, the real reviver of the method, is conservative and cautious; Morod is judicial and sceptic; the majority are enthusiastic. Theoretic objections are all very well; but every new operative method has had to meet them at the outset and either disprove them or be itself discredited. The operation attacks, not Pott's disease, but the deformity of Pott's disease, which is not the worst feature of the affection. It expects of tuberculosis of bone a reparative power and a behaviour in general which it does not possess in general. It is not apparently attended with much risk, but its real utility in *permanently* maintaining the improved position is yet to be proved. The operation is apparently not particularly dangerous. One need not use in all cases an obviously unreasonable amount of force, as advocated by Calot, but several gentle rectifications may follow each other. Paralysis may often be cured; the deformity may be largely corrected, temporarily at least, in recent cases; and in view of the decidedly unsatisfactory status of the present treatment of Pott's disease, the method is bound to be used, probably abused, advocated and decried until finally it finds its real level and is estimated at its true value. What that real value is no one can tell until much time has elapsed, time enough to show ultimate results. There has been yet no interval for the discussion of anything more than immediate results regarded in the light of the slow progress of tuberculosis of bone. Neither is it possible to say yet just which cases are best suited to this treatment. They must obviously be recent cases, that is, cases without anchylosis; and adults and children are apparently

equally amenable. Beyond this nothing definite can be said. The method is of value in one way, even if time should prove it in every other to be worthless, which is altogether unlikely. It has shown us that an ambulatory apparatus can be applied which shall hold straight even a vertebral column where the bodies of the vertebræ do not exist but where they only bound a gap. But this apparatus must include the head and shoulders. If this turns us aside temporarily from our routine of braces and jackets to remember that body weight can be supported elsewhere than on the vertebral bodies, if we are only willing to use sufficient apparatus, the method of Calot, or rather Hippocrates, will have helped conservative methods and given new energy to the efforts to prevent deformity.—Lovett in *Boston Medical and Surgical Journal*, March 10.

We notice also in the *Centralbl. f. Chir.* of March 26, a later communication on the subject from F. Lange, who recommends a cast after forcible rectification, which only extends from the clavicular to the inguinal region, as he has found the Calot corset not only clumsy, but almost sure to produce various disturbances in the circulation of the neck and head. The cast is applied especially tight in front over the upper half of the sternum and the front edge of the ilium, and behind, at the region of the lower ribs, with a large opening cut out over the abdomen. It holds the spine in perfect lordosis without interfering with the arms or out-of-door life of the child. He adds that physicians now should never allow spondylitis to progress to actual deformity, and maintains that all the benefit of reduction, except in extreme cases, is in straightening the healthy parts around the boss. This paragibbous rectification, as he calls it, while free from all the dangers of the actual gibbus reduction, is equally effective and can be performed without narcosis, which is especially dangerous in these operations. He even asserts that in many cases with perfectly satisfactory results, in which it was supposed the gibbus had been reduced, nothing but a paragibbous reduction had been accomplished after all, which could have been performed fully as well without the narcosis.—*The Journal of the American Medical Association.*

PUBERTY.

The subject of uterine cardiopathies is very generally overlooked in every-day practice. Kisch* calls attention to the reflex cardiac disturbances observed in women at certain crises of their lives—at puberty, at the menopause, just after marriage, and also during pregnancy and labor. These are palpitation, abnormal acceleration and slowness of the pulse, præcordial pains dyspnœa, and sense of oppression. In your subjects with these symptoms the external genitals may be non-developed; menstruation is established with difficulty, and is scanty and irregular. When these women reach the climateric they have a return of the same phenomena which appeared at puberty, especially if they have been weakened by several labors and profuse hæmorrhages. Simultaneously with the cardiac disturbances they are troubled with marked gastric irritability. These cardiac neuroses are undoubtedly due to the physiologic changes in the ovaries at puberty and the menopause, though they may be attributed to certain chemic changes which occur during the development and atrophy of the Graafian follicles. The condition is doubtless one of hyperesthesia of the cardiac plexuses. To some extent these cardiopathies seem to be hereditary, and are observed most frequently among the better classes. The treatment recommended

* Gaz. de Gynéc, June, 1896.

is hygienic and moral rather than medicinal.

(The question of bicycling for women, whether it be potent for evil or for good, is yet discussed. The discussion is passing through its last stage and it will take sometime yet for it to find its perfect equilibrium.) Evans* considers that eventually the use of the bicycle will tend to produce placenta prævia. The author thinks that from the physiology, tissue, and function of the perinæum it may be looked upon as a suppiementary uterus. Prolonged pressure upon the connective tissue can but lead to "condensation and atrophy," and to increase difficulty of perineal dilatation or more frequent laceration. Turner, in a series of papers in recent numbers of the *British Medical Journal*, has treated the whole matter from all points of view. The conditions under which this exercise should not be indulged in appeared to be—(1) during menstruation, and if possible for twenty-four hours preceding and twenty-four hours after the flow, (2) during pregnancy, although experience has shown that even during the first three months of that condition no harm has resulted from resort to the bicycle; (3) pelvic tumors, especially fibroids; (4) recent perimetritis, parametritis, or blood-exudations into the pelvis. (These are naturally only the more important conditions. Each case should be judged on its merits. No woman should ride a bicycle without first consulting her medical man, and should ride only when suitably dressed.)

E. D. Page† believes that the use of the wheel should be conservative. He claims that the principal muscles developed in its use are those of the leg and thigh; that little muscular development of the arms comes from it, as there is comparatively little use for the arms in cycling except in mounting and dismounting, as when one becomes thoroughly master of the cycle very little effort keeps it balanced and guides it, which are the principal uses of the arms in the erect position in which women ride. There is a fascination about bicycling that leads to immoderate exercise, and then it is positively harmful in a general way. As to the advantage to the muscles of respiration, it would appear to be limited and, in a sense, unnatural. These muscles, to receive their fullest benefit, must also have the freedom of action attendant upon the arms being free to move at the side, with the shoulders thrown back or erect; with freedom to take deep inspirations, and with all chest and all arm muscles free to move in any direction natural to each. With the slight bending forward and the constant extending of both arms in grasping the handles, the chest is perforce limited in its freedom: it is bound. The quickened respiration following exercise of cycling has not, therefore, the benefit claimed for it. The development, if any, would be a cramped, narrower chest, and the training of years of cycling will frequently result in naught else. The plea that those sitting the wheel aright would avoid this by keeping the back usually straight and doing all the bending at the saddle or at the junction of the thighs and body, is perhaps in a measure true, but the fact remains that the wheel is rarely ridden that way; it may be more frequently, however, by women. That the abdominal viscera may suffer from cycling is true. Page also teaches that the bicycle causes masturbation in women and girls, and that the saddle causes bruising and chafing of the labia. Also, that abortion is liable to be produced by wheeling, and in young girls there is a liability of narrowing the lateral diameter of the pelvis. (The above is an excellent example of what prejudice opposes to every innovation of any use whatever, and is a fair example of the absurd mistake made in an attempt to criticise something with which

* Am. Jour. of Obst., April, 1896.

† Brooklyn Med. Jour., Feb., 1897.

one is not practically familiar. The deductions are purely theoretic and have no foundation in fact. To begin with, all the criticisms are based on the supposition that the woman rides in a leaning forward (faulty) position, when, as a matter of fact, nine out of ten ride in correct position (upright). The criticism that the chest does not expand properly in riding because the hands and arms are partially extended is theoretically untrue, and practically is answered by the fact that with rare exceptions the chest measurements are increased after a few months' riding. It is unnecessary to point out to any rider the absurdity of the statement that the arms receive no exercise; it simply needs a trial of the instrument to demonstrate the contrary to be true. The efforts incident to balancing bring all the back muscles into full play in addition. The pleading for a functionally weak heart is specious. Every experienced rider knows that at first the heart is apt to be overcome by climbing very moderate grades. After short practice these same grades are climbed without the knowledge that they exist, and shortly thereafter considerable hills can be taken with small discomfort. This all means that the weak heart has had constant and increasing judiciously arranged exercise, and gradually strengthened until it is performing its proper functions easily and with increasing strength and vigor. The same may be said of the lungs and the quickened respiration.

Of course, the labia are bruised and chafed at first; but so is any other part of the body under similar experience. A loose shoe, an ill-fitting corset, or even a collar, will produce the same thing in other parts of the body; but in bicycling this is only incident to learning. The parts soon become accustomed to the pressure and the discomfort disappears. As to masturbation, the statement in general is untrue. We have investigated this subject closely and are convinced that it does not result.

The pleading that the perinæum is a supplementary uterus and that pressure on it causes placenta prævia is unworthy of discussion, as not a single fact is advanced in support of it. It is merely the unsupported belief of the author.

The bicycle is the most valuable addition to the therapeutics of women of the age. Properly utilized (proper saddle and proper position, with moderation as to speed and distances) it is worth all the drugs in the pharmacopœia together, especially in that class in which it is in some quarters condemned — neurotic, anæmic women with functional heart-diseases. In healthy women there is no contraindication.

Theilhaber* recommends cycling in case of amenorrhœa, especially when the uterus is undeveloped. Dysmenorrhœa of nervous origin in young girls and sterile women is often relieved. In endometritis the writer has seen no result, either favorable or unfavorable, from this form of exercise; in the hæmorrhagic form he advises against it on theoretic grounds. It should be forbidden in chronic as well as acute gonorrhœa, in salpingitis, and in subacute and chronic peritonitis of whatsoever origin. Flexions and versions do not constitute a contraindication; in fact, cycling is often recommended for patients with these conditions with the view of relieving nervous symptoms and strengthening flabby muscles rather than actually relieving the displacement. This may account for the good results claimed in some cases of partial prolapsus. The use of the bicycle is inadmissible by patients with fibroid and ovarian tumors. The writer noted rapid increase in the size of fibroids in two women who rode contrary to his advice. Bladder troubles are usually aggravated by cycling, though on this point there is some difference of opinion. Hæmorrhoids are sometimes relieved, but are sometimes made worse,

* Munch. med. Woch., No. 48, 1896.

especially when improper saddles are used. Such benefit as may be experienced is usually due to the relief of constipation. Women ought not to ride during menstruation, though the writer admits that several of his patients have done so without injury. Pregnancy is a positive contraindication. Two of the patients who disobeyed his injunction, aborted, but a third went on to full term, though she had a retroflexed uterus and prolapsed ovaries. In general, he approves of cycling in moderation. H. Macnaughton Jones* calls attention to the fact that cycling may have an injurious effect on women at the time of the menopause, and should not be indulged in except on the advice of a physician, especially if the patient is anemic and has functional cardiac trouble. He doubts the propriety of women with retrodisplacements of the uterus riding, with or without pessaries; this applies especially to anemic young girls. Hæmorrhoids are aggravated, and coccygodynia may result The writer recommends a pneumatic saddle, so constructed as to support the ischia, but not to press upon the external genitals or the coccyx; there should be no projection under the pubes. He approves highly of this form of exercise, which he regards as far superior to massage.—*The American Year Book of Medicine and Surgery.* (Gould).

LAPAROTOMY AS DESCRIBED BY A NOVELIST.

The opportunities that a more or less commonplace surgical operation affords for a newspaper story are too familiar to be a matter for serious comment. Various authors have utilized such procedures to augment the realism of their narratives, and the literary value of such detailed reports has depended upon the observation and vocabulary of the writer who is likely to edify if not to instruct a professional reader.

In a recent number of the *New York Herald* a letter was published from its correspondent, Mr. Richard Harding Davis, one of the younger American writers, who described a laparotomy for gunshot wound performed by one of the clever young operators of the naval medical corps. It is scarcely necessary to state that Assistant Surgeon Spear, who is the son of a well-known and distinguished medical officer of the navy, was in no way responsible for the unexpected prominence given to his very successful operation.

"I received a cablegram while I was on the *New York*," says Mr. Davis, "asking me to relate how her crew behaved in the action at Matanzas. I did not answer it because I thought there were a few things the American people were willing to take for granted, and because the bombardment at Matanzas was no test of the crew's courage, but of its marksmanship. There is a story, however, that illustrates the spirit of the men on the *New York*, and which answers, I think, any queries any one may make as to how they might behave in action.

"Taylor, a young gunner's mate, was shot on April 26th by a revolver. It was an accident, but it is possible he was more seriously hurt than were any of the six wounded men who went through the seven hours' battle at Manila, for the ball passed through his arm and into his right side, and came out nearly a foot away under his left armpit. Assistant Surgeon Spear said that if he had tried to dodge the vital parts in Taylor's body with a surgical instrument he could not have done it as skilfully as did the bullet, which was neither aimed nor guided by a human hand. It was this junior surgeon Spear who performed the operation, while the fleet surgeon, Dr. Gravatt, watched him and advised. It was a wonderful operation. It lasted nearly two hours, and it left the layman uncertain as to whether he should admire the human body more or the way a

* Med. Press, Nov. 4, 1896.

surgeon masters it. What they did to Taylor I cannot tell in technical language, but I know they cut him open and lifted out his stomach and put it back again and sewed him up twice. He could not get wholly under the influence of the ether, and he raved and muttered and struggled, so that at times two men had to hold him down. Just before the surgeon began to operate the boy gave the chaplain his mother's address, and reached out his hand and said, 'So long, chaplain.'

"He was a typical New York boy. He came from Brooklyn, but nevertheless he looked and talked and thought as you would expect and hope that an apprentice from the St. Mary's training ship would look and talk and think. His skin was as tough as a shoe which had remained long in the salt water, but it was beautifully white and spotless, like a girl's, and the contrast it made with the skin that the sun and wind had tanned was as sharp as the stripes on the flag.

"When the second part of him was sewn up, Taylor was carried to a cot and lay there so still that I thought he was dead. They had to inject strychnine into his veins to keep his heart beating. But a minute later he opened his eyes and turned them to the operating table, where, he remembered in a half-drunken way, they had placed him two hours before. His eyes were dazed with the ether, his lips were blue and his face was a ghastly gray. He looked up at the four figures leaning over him, their bare arms covered with his blood, and back at the operating table that dripped with it. What had happened, who had attacked him, and why, he could not comprehend. He did not know that parts of him which had lain covered for many years had been taken out and held up naked, palpitating and bleeding to the ruthless light of the sun, to the gaze of curious messmates crowded at the end of the sick boy, that these parts of himself had been picked over and handled as a man runs his fingers over the keys of a piano, and had then been pushed and wedged back into place and covered over as one would sew a patch on an old sail, to lie hidden away again for many, many years more, let us hope.

"He only knew that some outrageous thing had been done to him—that he had been in a nightmare, in hell—and to Taylor, still drunk with ether, these men whose wonderful surgery had saved his life were only the bloody assassins who had attempted it and failed.

"He was pitiably weak from loss of much blood, from the shock of the heavy bullet that had dug its way through his body, from the waves of nausea that swept over him, but the boy opened his eyes and regarded the surgeons scornfully. Then he shook his head from side to side on the pillow and smiled up at them.

"'Ah, you'se can't kill me,' he whispered. 'I'm a New Yorker, by heavens! You'se can't kill me.'

"That is the spirit of the men who sunk the Spanish fleet at Manila, and of the crew of the warship that is named after the city of New York."
—*N.Y. Medical Journal.*

OVER-PRESSURE IN EDUCATIONAL LINES.

The development of the race is affected to an enormous degree by the conditions surrounding the young throughout the peried devoted to acquiring an education, and the matter of regulating hours and studies in proportion to the physique and mentality of the student cannot be too highly esteemed. Years ago the one idea was to stuff the pupil with so many facts in so much time, and the teacher who best succeeded in this cramming process gained the palm as an educator. To-day he is *facile princeps* whose pupils while learning do not fall under the strain, but com-

plete the scholastic training in physical condition better than at the beginning. It is for this reason that the institution which holds athletic records is apt to have the greater attendance, for *mens sana* is of but little avail *ex sano corpore*.

Many experiments have been made by noted physiologists in the line of obtaining exact knowledge on points correlated, the inventions of Mosso for the measuring of nerve and muscle force being of inestimable value in elucidating obscure or, rather, abstruse points. A Dr. Kemsies, the headmaster of a large German school, became particularly interested in the relative fatigue value of different school classes, and utilized the methods of modern science in determining whether over-pressure existed among his pupils.

He followed a method which appears to be in accord with those of the latest school of experimental physiology, somewhat on the lines before touched upon by Mosso, Sikorsky and Laser. These latter had found the time at which mental fatigue became apparent by examining the results of the lessons in dictation and arithmetic, and noting the point at which the mistakes began. By examining the whole class they found that the onset in time of mistakes of spelling or want of attention in arithmetical problems was fairly constant in the majority of the class.

Dr. Kemsies asserts that he has obtained a more scientific result than this mere averaging of detail by employing the ergograph, an instrument invented by Mosso. In this instrument the half supinated arm is attached to a horizontal support, and a cord from a ring which is worn on the middle finger is passed over a pulley and carries a weight proportionate to the average strength of the finger in extension. The hand is kept in position by two cylinders into which the first and third fingers are inserted.

The successive elevations of the weight made by flexing the middle fingers are recorded by the arm of the instrument, making a tracing upon a revolving cyclinder. In this manner curves are produced which show the fatigue of the muscle. Mosso demonstrated that the fatigue curve was characteristic for each person, and used the term kilogrammeter to express the amount of work done by the muscle, estimating also mental fatigue, in so far as it affected the general nutrition of the body, in the same terms.

Dr. Kemsies used the ergograph systematically for a year in two large schools in Berlin, taking curves before and after lessons, noting the particular lesson in order to get a comparative idea of the effect of different branches upon the pupil. The general result was that the pupils showed the greatest amount of fatigue after gymnastics, mental exercises following in this order: Mathematics, foreign languages, religion and history. Least fatigue was evidenced after natural history. The fatigue passes off again for two hours after its commencement, if the lesson has been changed.

This apparently demonstrated that the best plan is to assign short lessons to each pupil and to alternate them in character in order to enable the mentality to regain its resiliency. Gymnastics particularly should never succeed or precede hours of study, even for the sake of making a change of work, but should have time in a separate half day devoted to them, while mathematics should only be followed by subjects probable to interest, such as natural history. Still, pedagogues claim to have had experimental results in a somewhat different line from these scientifically obtained, and perhaps a more thorough demonstration of cause and effect would be well before any too great change is made in existing methods.—*Medical and Surgical Reporter.*

LYMPHATISM AND ITS TREATMENT.

Dr. Gallois states (*The Med. Week.*, V. p. 597) that, according to actually prevailing views, lymphatism may be defined as predisposition to scrofula. Scrofulous individuals of old would now be described as suffering from adenoid lesions, which appear to be the anatomical condition of scrofula, just as nephritis is of uremia or cardiac lesions of asystolia.

Lymphatism, properly so called, which is a lower degree of scrofula, is characterized by an almost typical symptom, viz., pallor, that is to say, anemia. It may be looked upon as the state of an adenoid patient, whose cervical glands have not as yet become infected. Besides adenoid lymphatism, there is also pseudo-lymphatism, just as there is pseudo-chlorosis. Such is, for instance, dyspeptic lymphatism.

Our conception of scrofula and lymphatism should, therefore, be as follows: Children with cervical adenitis, characteristic of scrofula, are almost invariably of an adenoid disposition; the grave general condition, the diathesis, is secondary to the local lesion; the nasopharyngeal lesions, more particularly the adenoid vegetations, represent an anatomical condition which opens wide the gate for infection.

Before deciding on any treatment, it should be ascertained beyond question that one has to do with a case of adenoid lymphatism, not of pseudo-lymphatism.

The nasopharyngeal affection may be treated by medical or surgical measures. In the former case, a teaspoonful of the following solution is administered after each meal:

Iodine	1 gme. (15 grn.)
Potassium Iodide	2 gme. (30 grn.)
Water	200 gme. (7 fl oz.)

In the second case, the adenoid vegetations are extirpated.

The lymphatic state, which comprises three elements, anemia, dyspepsia, septicemia, is treated in the following manner:

For the anemia, recourse is had to the administration of iron iodide; for the dyspepsia and anorexia, bitters are prescribed, especially quinine or gentian. At each meal, for instance, a teaspoonful (in the case of a child between five and ten years of age) may be given of the following mixture:

Syrup Cinchona, or Gentian	200 gme. (5 fl. oz.)
Tincture Iodide	2 gme. (30 min.)
Potassium Iodide	2 gme. (30 grn.)

Lastly, the septicemic or latent toxi-infective state is treated by Fowler's solution, iodoform pills, and cod liver oil.

It is self-evident that these various methods should be associated with life in the open air and at the sea, gymnastics, hydrotherapy, etc.

To prevent lymphatism from passing into scrofula, it is necessary to attend to prophylaxis against infection. Asepsis of the nasal cavities should therefore be assured by the use of the following ointment:

Vaseline	30 gme. (1 oz.)
Boric Acid	6 gme. (90 grn.)
Aristol	0.5 gme. (8 grn.)
Menthol	0 1 gme. (1½ grn.)

The boric spray, antiseptic gargles and Weber's douche under low pressure may also be employed. Since infective symptoms usually make their appearance in patients with adenoid tendencies in the course of an intercurrent contagious disease, children's parties, balls, etc., should be abstained from. Lastly, steps must be taken to prevent the propagation of an infection of the nasopharynx to the face, eyes, etc. The path to the lips and nares should be protected by a rather thick layer of borated ointment. The conjunctiva

should be washed either with borated water or with a 1 : 10,000 solution of mercury cyanide.

Generally speaking, the most scrupulous cleanliness is recommended. Daily baths should be taken, with light douching after each bath.—*American Medico-Surgical Bulletin.*

MORE ABOUT THE ETHICS OF ADOLESCENCE.

Dr. C. C. Mapes, of Louisville, has sent us, in connection with our leading article on this subject which appeared in the *Journal* for May 14, two papers written by him and entitled "Higher Enlightenment *versus* 'Age of Consent,'" which were published in the *Medical Age* for February 25 and August 10, 1896. The line taken therein is substantially identical with that of Dr. Salter's paper and our comments thereon, but the subject is carried much farther, and many collateral issues are dealt with in an able and, to us, very convincing manner.

Dr. Mapes, taking as his text the agitation for a raising of the "age of consent" in women, says: "What is needed primarily is not so much a law governing the age of consent as a higher standard of morality for both sexes, and an earlier and more comprehensive knowledge of the laws of procreation, together with a better understanding of the significance of the passions and emotions more or less directly dependent upon them, as well as the consequences that follow their transgression, gratification, or perversion."

The author points out that sexual appetency belongs equally to the male and female, and in establishing legislative acts governing this question both must be considered, and the young man needs protection against the wiles of the designing *demi-mondaine*, who is often below the age of eighteen years, quite as much as the young woman against the vicious man. The author says that it seems incomprehensible how a fond, loving mother, who would never dispatch an adolescent daughter upon a mission fraught with innumerable physical dangers without first warning her fully and in detail, can yet allow the same daughter to pass from childhood to womanhood, to mingle with men of the world in what we term "society," where far graver dangers from a moral standpoint may be encountered, in utter ignorance of all physiological facts pertaining to herself as a human being, and without an adequate training in sexual morality. He affirms that it is far more exceptional for a woman attaining the *vita sexualis* who has been so trained, to yield to the wiles or threats of a would-be seducer than for one not so trained, and he adds: "Literally, the age of consent should mean the age of understanding. When *vita sexualis* has been established—*i.e.*, that period in the life of the adolescent female when evolutionary changes in the sexual apparatus make apparent the difference between male and female—she is practically as much a woman, and as capable of differentiating between right and wrong, when applied to sexual relations, as she ever will be, provided she has received the careful early training necessary to a complete understanding of her physiological being."

Dr. Mapes says, in reference to the mode of enlightening children: "I would suggest, however, that the first lessons be not deferred until the children have gained erroneous knowledge, if I may be allowed the expression, elsewhere; that they be taken into the garden among the plants and flowers; into the orchard, among the budding or blooming trees; into the fields or yards, among domestic animals: from each a valuable lesson may be deduced. Let them study the bud as it progresses, bursts, and unfolds its tiny petals;

explain how and why the seeds grow when planted in the soil. Let them witness the procreative act between their animal pets, and tell them what it means, using as a comparison the observations you have made upon plant life. Let them follow with watchful care the pregnancy of their female pet to term, explaining to them the different stages of embryonal development. And, finally, let them witness the female undergoing the pangs of parturition, giving them the correct reason for everything in relation to cause and effect, answering their questions frankly, simply, and truthfully, although at the time they may appear of no material consequence."

Why, in these days of widespread knowledge, the traditional preference of the past for ignorance in sexual matters should still obtain is a mystery. Is it possible that it is only another phase of man's domination over woman, maintained through the centuries by keeping her in the Stygian darkness of ignorance from which she is only now beginning to emerge into the bright sunshine of a fuller knowledge of life and all that it means, and that it has its mainsprings deep down in an unworthy motive?

This question is prompted by the recollection of some remarks we read in a recent number of a French medical exchange bearing upon our present subject. The writer asked the question whether it would be preferable to marry one of these enlightened women—theoretically enlightened only, he was careful to observe—or the traditional young French innocent, who is supposed to be in a state of absolute ignorance as to everything that will be expected of her in the marriage state. For his part, he says, he agrees with the practice of his country and prefers the latter; and for this preference he gives his reasons in a vivid picture of the delights of ravishing his young wife of all her little "innocent chasti-ties" (of ignorance or illusion) one by one. To our mind, far from such a conception being conducive to any phase of morality, it is in itself an example of bestial licentiousness that degrades the "lawful" exercise of a legitimate and honorable impulse, an impulse that should provoke not shame and confusion, but tender devotion and *reverence* inexpressible, to the level of the brothel.—*Ed. N.Y. Medical Journal.*

PHYSICAL TRAINING IN PUBLIC SCHOOLS.

The care of the body has been, up to comparatively recent years, strangely neglected in the Public Schools of this country. It has been considered a quite sufficient educational training for the young to cram and overload their brains with a quantity of matter difficult to digest, and in two many instances, even when assimilated, of little use in after-life. Numbers of delicate, highly-strung children have broken down under the strain, and the dreary daily grind of the monotonous cramming system, undergone in unhealthy surroundings, has developed many of the nervous diseases to which the present generation is so peculiarly susceptible. What does knowledge profit a man, if in the gaining of it he loses the still more precious gift of good health? The nations of the old world, notably Greece and Rome, understood and appreciated much more clearly than do the people of these times the harmfulness of unduly forcing the mind to the lasting hurt of the body. The gymnasiums of ancient Greece probably reached, in the methods of training the young, a higher ideal than have any of the educational systems now in vogue. In the face of this condition of affairs, it is pleasing to note that the people of America are rapidly becoming alive to the pernicious effects of developing the

mind at the expense of the body. The more rational mode of educating the young would appear to be that of so training the body and mind that both advance as far as possible at an equal rate. Thus, if a child is of weak constitution, but possessed of unusual mental capacity, it should be the aim of his teacher to strengthen his physical powers and until that object is accomplished to let the mind take care of itself; on the other hand, if the reverse is the case, to adopt contrary methods. The individuals should be studied separately, and children should not be lumped together in a body and put through the same course without regard to their different temperaments, dispositions and constitutions. It is now about ten years since German gymnastics were introduced into Public Schools of this country; since then physical training has held a place in the curriculum of almost all the large cities of the East. The report of the director of physical training in Public Schools of Washington has lately been published. According to this report the beneficial results of systematic daily exercise have been marked; but, as the writer of the paper truly remarks: "It is impossible to test the full measure of success or failure of our efforts. It is in the remote future, with school days long past, that the lasting influence of such work will be felt by the individual child." However, one thing seems certain, viz., that the introduction of physical training into the Public Schools of America is a step in the right direction; and, if intelligently carried out, should result in producing a stronger race mentally and physically. The fact should not be forgotten, though, that physical training may be abused. Gymnastics should not be permitted to take the place of play, but rather the two should go hand in hand.—*Medical Record.*

THE SOLDIER'S SHOE.

In all armies it has been recognized by the ablest commanders that to a large extent success depends upon marching power, and marching power upon a suitable shoe. This subject is considered of such importance in England that the Secretary of State for War, Lord Lansdowne (*Lancet*, May 7th), in addressing the assembled members of the medical profession at the Mansion House, in a speech devoted to matters of the highest import to the future of the army medical service, made the following remarks: "These campaigns are useful because they not only call attention to our strong points but also to our weak ones, and I am told that the Egyptian campaign has this one weak point which I ought not to ignore. I refer to the matter of the army boot. I am not going to admit that the army boot is a bad boot. I believe that it is a thoroughly serviceable article, but it appears that it does not resist the insidious effect of desert sands. In saying a word about the boots I must say a word about the wearers. General Gatacre in the march of his brigade to the front covered a distance of no less than a hundred and forty-two miles in five days, an average of over twenty-eight miles a day. That, as a feat of endurance, I think, is something for a British soldier to be proud of. In the future I hope we shall be able to discover a boot which even General Gatacre and the Egyptian desert will not be able to wear out." Equal distribution of pressure, free play for the foot, absence of friction on movement, imperviousness to sand and moisture, and a wide welt sole to furnish entire support of the foot in place of leaving it partially slung, as it were, by the uppers as though the foot were in the loop of a strap, are the great essentials for the soldier's shoe.

THE DOMINION · MEDICAL · MONTHLY
. . AND . .
ONTARIO MEDICAL JOURNAL

EDITOR.
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Vol. XI. TORONTO, JULY, 1898. No. 1

"THE NEW SANITARIUM FOR CONSUMPTIVES."

It would seem entirely unnecessary to discuss the advantages of such an institution. With our present knowledge of medical science, there is only one place for consumptives, and that is by themselves. Consumptives have no more right to wander all over the face of the country than people with other contagious diseases. We take the greatest precaution in cases of scarlet fever and measles, both diseases not usually considered of a very fatal character, while practically no precaution is taken with phthisis, a disease almost invariably fatal.

Any project which has for its object the removal of this class of patients from the wards of the general hospitals or from the homes of the poor, looking towards their segregation and care, in an institution especially devised for the purpose, has our hearty support, but let it be a public institution, subject to Government inspection, with a staff chosen by the physicians of the city or county, and not a private corporation under the guise of charity.

A gentleman who called on us stated that at the Gravenhurst Institution patients were supposed to pay and if they did not pay they got out. This would seem an ideal nineteenth century "charity," or it may be, on the other hand, a case of how these "charitarians" love one another.

"THE EXAMS."

Of all the good things said by President Britton in his address before the late meeting of the Ontario Medical Association none was of greater importance than his epigrammatic sentence: A head full of knowledge and a worn-out nervous system are but poor qualifications for the coming mothers of Canada's sons. He then went on to speak of the splendid school system Ontario has, but declared that from a physician's standpoint it is handicapped with a defect of such magnitude as to alarm him who weighs well the possibilities of the future. The first seven or eight years of life, he went on to say (he should have doubled the time), should be free from care and worry, and devoted exclusively to such pleasurable pursuits as shall conduce in the highest degree to the development of bone and muscle. Then he facetiously observed that parents and teachers leap for joy when a five-year-old manifests his precociousness, and the nervous little monster is held up by his attenuated arms in the sight of his phlegmatic and sanguine classmates as a paragon of perfection angelic to behold; and adds that it would be much better were he making mud pies and wearing out his pantaloons in the physical activities of childhood.

With this we perfectly agree, and Dr. Britton's criticisms might with equal force be applied to the regimen of high schools and universities. A teacher of entrance pupils not a hundred miles from Lindsay, Woodstock, Aurora or Sarnia, exults in the fact that he has succeeded in shoving his whole class through the "exam," and feels now that his re-engagement at $325 is assured. Is this education?

The big collegiate institutes not a hundred miles from London, Hamilton or St. Catharines, with sixteen "pushers," hustle on these twelve-year-old monsters through their institutions, cramming great gobbets of knowledge of seventeen subjects into their anæmic cerebrums, terrorize them with "exams," and glory in leading the provincial van in having turned out more raw material for the pedagogic and university mills than any other. Is this education?

Then the oracular and fossiliferous professoriate of the universities, normal schools and colleges, take these pale wrecks (as many of them are) and pour in the profundities of a discarded metaphysics, the dry and unpractical abstractions of the higher mathematics, the horribilities of Latin prose and the Greek verbs in mi; beside the more useful, but immense, quantities of scientific lore, modern languages and English; and graduate them by "exams."—the finished product of our magnificent and unrivalled school system. Is this education? Seriously, Goliath must be slain.

Besides Dr. Britton's above remarks a very strong presentation of the case was made by Dr. Ferguson, of London, Ontario; and many medical men present corroborated the views of these gentlemen. We do hope to see fewer subjects taught; "exams," as now conducted, abolished to a great extent; prohibition of attendance of children under seven from the common schools; shorter hours and longer holidays for those over that age; and greater attention to ventilation and lighting and sanitation generally. We can only at present point out some general lines along which improvement should take place. If attention is strongly given to this matter many specific plans will be evolved whereby the evils will be remedied.

Editorial Abstracts.

MOBILITY OF TUBERCLE BACILLI.

SCHUMOWSKI.—Mobility of the tubercle bacilli. (*Cent. f. bakteriologie*, v. 23, 1898, p. 838). In freshly prepared drop cultures Schumowski saw the tubercle bacilli move slowly across the field. As this movement ceased after forty-eight hours he concluded that it is not a Brownian movement. He was unable to prove the presence of flagellæ.

STROPHANTHUM.

STAHR.—Therapeutic use of strophanthum. (*Therap. monatsh.* 1898, p. 245). From a clinical study of the use of strophanthine in cardiac and other cases Stahr comes to the conclusion that Merck's crystalline strophanthine per os is not a very powerful poison and can be given with impunity up to 20 mg pro die. 1. That in doses above 15 mg it increases diuresis. 2. That it is not cumulative. 3. It has no untoward action, and 4. that patients notice that the attacks of palpitation of the heart lessen—but he is undecided as to whether it is merely due to the rest in bed.

ANTITOXIC PROPERTIES OF THE CENTRAL NERVOUS SYSTEM.

BOMSTEIN.—Antitoxic properties of the central nervous system. (*Cent. f. bakter.* Abt. 1, v. 23, 1898, p. 584.) Guinea-pigs and rabbits, which are sensitive to the diphtheria poison, were bled to death and the remaining blood washed out with 0.6% Nacl, the brain and cord were then ground up to an emulsion and mixed with the diptheria toxine in vitro. On injecting this sterile mixture into animals they promptly die. In other words, in the central nervous system, there was no neutralizing body, contrary to what has been proved by Wassermann and Takaki for the tetanus poison.

TYROSIN AS A VACCINE FOR VIPER VENOM.

PHISALIX.—Tyrosin, a chemical vaccine, for the venom of vipers. (*Soc. de Biol. compt. rend. hebd.* 10s. v. 5, 1898, p. 153). Tyrosin which was isolated from various plants—as the dahlia tubercles—mushrooms, etc., was injected into guinea-pigs and 24 to 48 hours later a lethal dose of the venom of vipers. They suffered from no symptoms of snake poisoning. This immunity is marked at the end of twenty-four hours, and can last twenty-five days. If it is injected simultaneously with the tyrosin death is only delayed—so that it is not an antitoxine. If the two are mixed in a test tube the mixture is as toxic as the venom itself, therefore it is not a chemical antidote. He considers it as a new chemical vaccine for viper venom, and that it is interesting from being the first example of the plant juice possessing immunizing properties to a venom.

BIOLOGY OF THE GONOCOCCUS.

LAITINEN.—Contributions to the knowledge of the biology of the gonococcus (Neisser). (*Cent. f. bakteriologie Abt.*, 1, 1898, v. 23, p. 874). For the cultivation of the gonococcus the author prefers human serum or cystic or ascitic fluids mixed with bouillon or agar (Keefer's formula) to the new nutrose-pig-serum-agar of Wassermann, which he considers uncertain. Probably the cystic fluids are more suitable than the ascitic and their alkalinitry should best correspond to 12 to 25 c.c. of normal caustic soda pro mille. The gonococci live on this medium fifty-one days During the

first day on the cystic bouillon medium the reaction becomes acid, but later more and more alkaline until the gonococci died. The sterilized cultures cause both a local and systemic reaction and the toxic body seems to be closely associated with the body of the organisms.

PROTOZOA IN BLOOD AND ORGANS IN LEUCÆMIA.

LOWIT.—Protozoa in the blood and in the organs of leucæmic persons. Preliminary notice. (*Cent. f. bakteriologie*, v. 23, 1898, p. 206.) In the blood from the fingers of four cases of mixed leucæmia, Louit found, especially in the momonuclear leucocytes, protozoa, which probably belong to the acystosporidia. While it is a leucocyte parasite, yet extra cellular forms occur, mainly as the amœba form, yet some have the sickle shape. Puncture of the spleen showed the parasites in the splenic cells. In one case in which *intra vitam* they were long searched for, the heart blood *post mortem* showed a few encysted forms, while the spleen gave numerous extra cellular ones. On the contrary, the blood and lymphatic glands of four cases of lymphatic leucæmia showed no parasites. Lowit leaves the question as to whether we can speak of an hæmanœbra leukæmia for his later work.

MICROORGANISMS SIMULATING TUBERCLE BACILLI.

MOELLER. — On microorganisms which are morphologically and tinctorially like the tubercle bacillus. *Kobert's-Goerbersdorfer veroffentlich.* v.i. p. 168. Starting from the idea that such a widespread organism in the animal kingdom as the tubercle bacillus and which grows on vegetable matter (potato covered with glycerine) should be found on plants Moeller placed a closed flask with timothy grass (phileum pratense) and sterile water in a thermostat for fourteen days when the covers showed bacilli which resisted acids, and were morphologically like the tubercle bacilli. He is uncertain as to whether they were the tubercle bacilli or a related species. Further details are yet lacking. In the dung pit of cow stables and in the fresh evacuations of cows which were negative to the tuberculin test and also in the evacuations from horses, goats, pigs and especially mules, he also found a slender bacillus similar to the tubercle bacillus and staining by Liehl-Neelsen's method. These bacilli grow luxuriantly in the thermostat upon the fluid squeezed out of the fæces. Inoculations proved negative.

USE OF A NEW ALBUMEN PREPARATION.

STRAUSS.—On the use of a new albumen preparation, "Tropon," in the nourishment of the sick. (*Therap. Monatsh.*, 1898, p. 241.) This new preparation is practically a pure albumen, analysis showing from 83-97.2 albumen. The aqueous extract yields no biuret on Trommer's test, therefore no soluble albumen or carbohydrates. It is a fine, greyish brown, meally-like powder, which is insoluble in water and is without odor. It digests well in artificial gastric juice. In conditions where large pieces of food would irritate or be impossible, as in œsophageal stenosis, or gastric secretory insufficiency, or typhoid fever, and owing to its being a fine powder, tropon can be used with advantage as a concentrated nitrogenous food. One advantage over other new artificial foods, as nutrose, eucasin, etc., is its cheapness, one kg. of albumen in form of tropon costing, in Germany, four marks ($1.00). Twenty to sixty grams pro die were administered without irritative symptoms. It is best given in milk—one drachm of tropon freshly stirred up with one-half litre of milk. It can also be used with chocolate, or in the form of zwieback, and may be taken for months without opposition

from the patient. Uric acid determination shows a lessened uric acid output. Therefore, as it is not a neuclein, it may be useful in gout or nephrolithiasis.

BIOLOGY OF THE TUBERCLE BACILLUS.

ARONSON.—Biology of the tubercle bacillus. (*Berl. klin. woch.* 1898, p. 484). Starting from Unna's observation that by means of micro-chemical reactions fat could be proved in tubercle bacilli, the author tried to isolate this hypothetical fat. He used the cultures on glycerine bouillon. These were dried and extracted in a return condense with a mixture of five parts of absolute ether and one of absolute alcohol. From this was obtained a yellowish brown mass which amounted to 20 to 25 per cent of the dried bacilli; it contained 17 per. cent free fatty acids, while the remainder was not fat but wax. As other bacilli the diphtheria also contain bodies soluble in ether, and as these extracts from the tubercle and diphtheria bacillus stain with carbol fuchsin, he suspected that the specific relation of bacteria to aniline dyes was due to similar bodies. The stained extract from diphtheria bacilli is readily decolorized by acid alcohol, while that from the tubercle bacillus is very resistant. Most of this wax does not lie in the tubercle bacillus itself, but is a product of its secretion, as one often finds bacilli enclosed in red masses. This extrabacterial wax may be removed by ether, and now on grinding up the bacteria themselves the extract shows the typical color reaction, so that we are forced to the view of a resistant bacterial capsule. This solubility of the wax may, perhaps, render the bacilli harder to find in sections. If to the ether alcohol extract some HCl is added and the whole is boiled some time, the resistance to acids after staining disappears. On the contrary, most of the toxine is contained in the body and can easily be extracted by boiling under pressure with dilute caustic soda. It is not injured by a temperature of 105 to 110 degrees and does not contain albumen. On injection into guinea-pigs it kills, the post-mortem showing merely great emaciation. He claims to have immunized a horse with it.

GALL OF HYDROPHOBIC ANIMALS AS AN ANTITOXIN.

FRANTZIUS.—The gall of animals with hydrophobia as an antitoxin to hydrophobia. *Cent. f. bakteriologie.* v. 23, 1898, p. 782.) From the serum of immunized and non-immunized animals substances have been obtained which would neutralize the effects of inoculation with the virus of hydrophobia, but these bodies were too weak for use in man. Frantzius thought he could find more powerful bodies elsewhere. Based on the idea of Koch that in cattle plague the gall serves as an immunizing agent, he hoped to find antitoxitic bodies there. He injected subdurally in rabbits the gall of a rabbit dead from hydrophobia, and found it did not kill. These animals were subsequently inoculated with an emulsion of the cord of hydrophobic animals, when all died. He therefore inferred that subcutaneously it possessed no immunizing properties, and that it was not a curative agent. Later he injected into the anterior chamber of one eye a lithal dose of the virus of hydrophobia, and into the other the gall of an hydrophobic animal, and found the incubation period prolonged. He then mixed in vitro equal parts of an emulsion of medulla of animals with their gall. Now, on inoculating this into healthy animals, they all (nine) survived; but if the gall of healthy animals is used, no neutralizing action results, so that he infers that during hydrophobia antitoxic bodies occur in the gall. This may posssbly serve as an explanation of the cases of spontaneous recovery.

ORTHOFORM.

The hope of obtaining a compound with the local anæsthetic properties of cocain, but devoid of its toxicity, led Einhorn and Heinz to dissect pharmacologically the cocain molecule and study analogous compounds. Ehrlich believed that this anæsthetic action was only associated with such cocain bodies in which the ecgoninester is associated with definite acid radicals called anæsthesiophores. He ascribed importance to the presence of the COO CH_3 group. Einhorn and Heinz came to the conclusion that it was a characteristic of all amido-oxy-esters. The one which most attracted their attention was p-amido-m-oxy methyl ester of benzoic acid, or, as they named it, Orthoform. The m-amido-p-oxy methyl ester of benzoic acid has also similar properties. Orthoform is a white, tasteless and odorless crystalline powder which is only slightly soluble in water. To this lack of solubility orthoform owes some of its virtues, as only a small quantity at a time is absorbed, and thus the anæsthesia is kept up for hours or even days. It is a base and forms salts. The hydrochlorate, which is soluble in water, has been used internally, but is not well suited for application to mucous surfaces, as its acid reaction produces slight irritation. Orthoform does not act well through intact skin or mucous membranes; it is necessary that the nerve trunks themselves be exposed. Therefore, it is useless in sciatica and neuralgic affections. The substance should be applied in fine powder or in form of an ointment to secure uniform and thorough application. The anæsthetic action comes on in 3 to 5 minutes, and lasts on an average of thirty-five hours. Of course, if the surface is secreting freely, the powder may be washed away, and thus its action be only transitory. It seems to have a selective action on sensory nerves as taste is still retained. Orthoform has been especially recommended in the treatment of burns and transplantations. Here, beside its anæsthetic action, its germicidal properties and power of lessening secretions come into play; 10-20% ointment or the powder inself can be used. Detailed experiments as to its antiseptic powers are lacking. Kalbenberger merely states that muscle covered with orthoform and then placed in the thermostat does not putrefy. On account of its lack of poisonous properties it may be used with impunity, even 60 gm. a week have been applied to wounds in man without ill results. It has also been successfully used for tubercular laryngeal ulcers, and in fact for all painful wounds, as after tooth extraction, etc. In cases of ulcers exposed to friction, Yonge recommends a saturated solution of orthoform in collodion, but as this is rather painful it is best to first anæsthetize the ulcer with cocaine or orthoform in powder before applying the collodion. Internally it has been used for gastric ulcer and carcinoma of stomach. Each dose for internal use is ½ to 1 gm. of the base or its hydrochlorate several times a day. Theoretically it would be an excellent application in acute gonorrhœa if used in form of ointment or anthrophore. No doubt it will lessen the use of morphine after painful wounds. It is manufactured by Meister, Lucius & Bruning in Höchst am Main. Einhorn and Heinz, *Munch. Med. Woch.* 1897, p. 931. Kallenberger, *Munch. Med. Woch.* 1898, p. 261. Klaussen, *Munch. Med. Woch.* 1897, p. 1289. Yonge, *Brit. Med. Journ.*, 1898, p. 362.

THE INFLUENCE OF IODINE ON THE CEREBRAL PRESSURE.

V. ZEISSL.—On the influence of iodine on the cerebral pressure. (*Archiv. f. derm. w. syph.* 1898. *Festsch. gewid.* F. J. Peck, v. 2, p. 417). A few years ago the author found that by injecting a solution of iodine in sodium iodide into the cardiac end of the jugular vein œdema of the lungs

ensued. This œdema was due to a direct action on the pulmonary vascular walls. He now endeavors to find out if it acts similarly upon the brain. A washout canula penetrating the dura and connecting the cranial cavity with a Basch manometer, was fixed tightly in the skull, and at the same time the blood pressure was registered from the central end of the carotid, while the peripheral end was used for injection. The solution used was iodine pure 4 gm., sodium iodide 4.20 gm. and distilled water 200. The control injection of sodium chloride 0.6% and sodium iodide 5% caused a slight but temporary rise in blood pressure, with slight rise in cerebral pressure, followed by rapid fall, while iodine solution caused at once a slowing of the pulse followed by a marked rise in blood pressure accompanied by a very great rise in cerebral pressure. Now while stimulation of the sciatic nerve or compression of the aorta or strychnine cause a rise in cerebral pressure, coincident with the rise in blood pressure, yet this rise does not compare with that from iodine, the latter being three or four times as great as that due to a mere overfilling of the cerebral vessels. It still causes a rise after chloral. If an opening is first made in the membrana obturatoria then the iodine may cause no rise in cerebral pressure, so that we are forced to the view that here also a transudation of fluid from the vessels occur.

THE NEUTRALIZING OF THE TOXICITY OF TOXINES BY THE DIGESTIVE JUICES.

NENCKI, SIEBER AND SCHOUMOW, SIMANOWSKI.—The neutralizing of the toxicity of toxines by the digestive juices. (*Cent. f. bakteriologie.* Abt. 1, 1898, v. 23, pp. 840, 880.) While it is known that a certain dose of toxines as those from the diphtheria, cholera or tetanus bacillus and certain albumens, as abrin and ricin when injected subcutaneously cause death, yet much larger doses may be given per os or per rectum without injury. Ransom states that 300,000 times the minimal lethal dose of tetanus toxine may be injected into the stomach of guinea-pigs without injury, and about half this amount per rectum. The reports vary as to the ability of the digestive secretions to destroy them. While acids weaken the diphtheria and tetanus toxines, yet still they are less active than normal when taken through the alkaline mucous membrane of the rectum and on direct injection into the duodenum. After injection of the diphtheria toxine into the mesenteric vein, the animal dies with all the typical symptoms as soon as after the same dose into the jugular vein, so that the neutralizing of this toxine is not due to the liver. It was suggested that the toxines pass through the gastro-intestinal tract unabsorbed, but after 100 times the lethal dose of the diphtheria toxine, the fæces filtered through a chamberlain filter did not kill, likewise the urine, even after 100,000 times the lethal dose of the tetanus toxine. Again at times even 100 times the lethal dose of the diphtheria toxine may render the animal ill. It is probable that the digestive enzymes only slightly change the toxine molecule, somewhat as they do albumen into albumose. These products derived from toxines are called toxoses or toxoids and may be absorbed. Next the walls of the stomach, small and large intestines were ground up with 0.6% sodium chloride and filtered through a chamberlain filter; these sterile filtrates on mixing with the diphtheria toxine and injecting proved to have distinct but not constant neutralizing powers. This was especially marked in the case of the extract from the walls of the small intestine, and least for those from the gastric walls. As during investigations on the cattle plague they found that mucin solution destroyed red corpuscles, they suspected that per-

haps this neutralizing action was due to mucin. Experiments, however, were negative. Sterile extracts of other organs as of the liver, lungs, brain and supra renals were tried, but proved to have no action on the diphtheria toxine. Now, if to a toxic dose of diphtheria toxine one adds pancreatic juice and the mixture is injected at once, the animal survives. The action of the pancreatic enzyme, however, is more energetic if the mixture is placed in the thermostat 16 to 24 hours. Sterile gastric juice acts similarly but more weakly. That this action is not due essentially to the acid of the gastric juice or the alkali of the pancreatic secretion is proved by the fact that even after neutralization both preserve this action. Aqueous extracts of the pancreatic gland also have this power. On the contrary, the pancreatic juice had only a slight action on the tetanus toxine (14 out of 18 animals dying), while on the other hand, gastric juice has a more marked action (7 out of 14 surviving), but now, if to the mixture of pancreatic juice and tetanus toxine gall is added, all animals survive. Perhaps it may be possible to render virulent bacteria avirulent by the addition of pancreatic juice or bile to their media. This work throws a new light on the digestive juices, and explains why pathogenic bacteria may remain in the intestine without injury to the organism.

LOCAL TREATMENT OF NEURALGIA.—Menthol, Guaiacol āā 1.0.; alcohol. absol. 18, applied 2 to 3 times a day on cotton.—*Therap. monatsh.*, 1898 p. 360.

Physician's Library.

Diseases of the Stomach. By WM. W. VAN VALSAH, M.D., Professor of General Medicine and Diseases of the Digestive System and the Blood, New York Polyclinic; and J. DOUGLAS NISBIT, M.D., Adjunct Professor of General Medicine and Diseases of the Digestive System and the Blood, New York Polyclinic. Octavo volume of 670 pages. Illustrated. Cloth, $3.50 net. Philadelphia: W. B. Saunders, Publisher. Toronto: J. A. Carveth & Company.

This book will be found above all a practical one. Although constituting a valuable contribution to scientific medicine, it is intended primarily as a working guide for the student and practising physician. To this end the chief attention is devoted to the most approved methods of diagnosis and treatment. Beginning with a classificatory introduction, a chapter is devoted to diagnosis and diagnostic methods and one to general medication and treatment. After this the various diseases are taken up in order and treated in a logical way, beginning with the etiology, and passing through the phases of pathology, clinical description, diagnosis, differential diagnosis, prognosis, and treatment. The methods of examination given and the apparatus recommended, while sufficient for special advanced stomach-work, are not too elaborate and complicated for the general practitioner. Indeed, the needs of the practising physician are kept constantly in mind throughout the book. The subject of treatment is presented in such a way as to leave no doubt in the reader's mind what course to pursue in a given case. Although numerous authorities are cited, the authors are perfectly clear as to what their experience has found most useful, and they do not hesitate to recommend a definite course of procedure under definite conditions.

There is an unusually complete and detailed presentation of the important subject of dietetics. The nutritive value of the various foods is fully discussed together with their special application in diseased conditions of the stomach. The diet lists for each disease are extremely full, and are so arranged that selections can readily be made to suit individual cases. This book will prove the most practical treatise on the subject yet published, providing especially for the needs of the student and the general practitioner.

The Elements of Clinical Diagnosis. By PROFESSOR Dr. G. KLEMPERER, Professor of Medicine at the University of Berlin. Authorized translation from the seventh German edition, by NATHAN E. BRILL, A.M., M.D., and SAMUEL M. BRICKNER, A.M., M.D. With 61 illustrations. New York: The Macmillan Co., 66 Fifth ave. Toronto: Tyrrell's Book Shop, 12 King St. W. Price $1.00. 1898.

In these days of frequent discoveries and constant improvements in diagnostic and clinical methods, a work on this subject must be frequently revised if it would be up to date. In this respect, Professor Klemperer has certainly complied with the necessary conditions, his book having passed through no less than seven editions, in the German, in as many years. In this his latest edition he has added a chapter on the Rœntgen Rays as Diagnostic Aids, and indicates the already practical value of this very recent and important discovery. Besides discussing the latest methods of diagnosis, the Professor greatly enhances the value of the work by concluding each division with a few paragraphs on the chief symptoms of the ordinary diseases affecting the part of the system under consideration. Both student and general practitioner will find in this a ready and valuable little handbook of reference.

An American Year Book of Medicine and Surgery. A yearly digest of scientific progress and authoritative opinion in all branches of medicine and surgery, drawn from journals, monographs and text books of the leading American and foreign authors and investigators. Collected and arranged, with critical editorial comments, by eminent American specialists and teachers as: Samuel W. Abbott, M.D., John J. Abel, M.D., J. M. Baldy, M.D., Charles H. Burnett, M.D., Archibald Church, M.D., J. Chalmers DaCosta, M.D., W. A. Newman Dorland, M.D., Louis A. Duhring, M.D., Virgil P. Gibney, M.D., Homer W. Gibney, M.D., Henry A. Griffin, M.D., John Guiteras, M.D., C. A. Hamann, M.D., Thompson S. Wescott, M.D., Howard F. Hansell, M.D., Barton Cooke Hirst, M.D., E. Fletcher Ingals, M.D., Wyatt Johnston, M.D., W. W. Keen, M.D., Henry G. Ohls, M.D., William Pepper, M.D., Wendell Reber, M.D., David Riesman, M.D., Louis Starr, M.D., Alfred Stengel, M.D., G. N. Stewart, M.D., J. R. Tillinghast, Jr., M.D. Under the general editorial charge of GEORGE M. GOULD, M.D. One handsome imperial octavo volume of about 1200 pages. Uniform in style, size and general make-up with the "American Text Book" series. Cloth, $7.50 net; half morocco, $8.50 net. (Sold by subscription.) Philadelphia: W. B. Saunders, Publisher. Toronto: J. A. Carveth & Co.

It is with more than usual pleasure that we review this valuable work. Our German contemporaries, more especially, have for years had their "jharbuchs" to which they turn and find contained therein all the progress of every science. This work

of Gould's is the first thorough effort, to our knowledge, to supply such a medium for English readers, and we may say that he has done it thoroughly and well. There is not a department of medicine and surgery which is not fully and carefully treated. We trust that future editions, however, will give more space to the chemical side of medicine, as undoubtedly it is along these lines that the science of medicine must advance. It would be difficult to find a better staff of collaborators than appear in the "Year Book," and certainly if the profession would take the trouble to acquaint themselves with the store of information that is contained in this work, the volume next year will be two volumes, if we use an Irishism, which we are very apt to do. The article on Puberty we reproduce in this number and advise its careful consideration. Gould's Year Book has the advantage over a post-graduate course that you listen to all the leaders at once.

Brief Essays on Orthopædic Surgery. Including a consideration of its relation to general surgery, its future demands, and its operative as well as its mechanical aspects, with remarks on specialism. By NEWTON M. SHAFFER, New York. New York: Appleton & Co., Publishers.

This, as the title indicates, is a monograph of about eighty pages, literal rather than practical.

Diseases of the Skin: Their Constitutional Nature and Cure. By J. CROMPTON BURNETT, M.D., author of "Ringworm, its Constitutional Nature and Cure." Price, cloth, $1.00. Philadelphia: Boericke & Tafel, Publishers.

PAMPHLETS RECEIVED.

"Diagnosis on Abdominal Disorders." By JOSEPH EASTMAN, M.D., LL.D., Indianapolis, Ind.

"Solution of the Proprietary Medicine Question." By C. C. FITE, M.D., Reprint from *The Philadelphia Medical Journal, 1898.*

"Some Cases of Brain Surgery." By HAL. C. WYMAN, M.S., M.D. Detroit, Mich. Reprint from *The Medical Age*, March 25, 1898.

"The Treatment of Specific Urethritis." By F. WALTER BRIERLY, M.S. M.D., Philadelphia, Pa. Reprint from *The Hahnemannian Monthly*, June, 1897.

"Internal Cerebral Meningitis Chronica." Notes on a diagnosis and treatment. By ELMORE S. PETTYJOHN, M.D., Alma, Mich. Reprint from *The Journal of the American Medical Association*, April 2, 1898.

"A Preliminary Report on a Method of Overcoming High Resistance in Crookes' Tubes; a possible step towards maximum radiance." By WM. W. GRAVES, M.D., St. Louis, Mo. Reprint from *The American X-Ray Journal*, April, 1898.