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ART. LVII. *The Hip joint—Considerations on its injuries and diseases, deduced from the Anatomy*, by S. J. STRATFORD, M.R.C.S., Eng., Toronto, *Continued from No.* 10.

FRACTURE OF THE NECK OF THE THIGH-BONE.
Continued.

In our last communication we endeavored to show that the direction of the force which operated upon the neck of the thigh-bone was extremely various, and that the effects produced upon the injured part were in exact correspondence with its nature and character: consequently, we plainly shewed, that indirect force operating upon the extended limb as by a powerful lever, having the bones of the pelvis for a fulcrum, would remove the head of the thigh-bone from the cotyloid cavity into a position agreeable to the direction of that force, rather than cause fracture of the part. So again, in the consideration of the operation of direct force, we maintained that the direction of that force might be infinitely varied—be applied in the radius of a circle—but that a plain distinction might be drawn of the nature of the injury from the mode of its application. Thus, when direct force was applied from without inwards, it would generally fracture the neck of the thigh-bone without the capsular ligament; and that a similar force propagated from above downwards, would be far more apt to fracture the neck of the thigh-bone within the capsular ligament. That, as in dislocation, a clear apprehension of these several points vastly assisted in the diagnosis of the nature of the lesion, which had happened to the part; so in fracture, we might gain a similar assistance, that would also direct the prognosis, which we might be permitted to advance upon this subject: hence the importance of the considerations of these distinctions must be self-evident to all who desire to study this matter correctly.

In pursuance of our subject we had pointed out that the operation of direct force—from without inwards—might produce *impacted fracture* of the neck of the thigh-bone—this portion of the thigh-bone operating as a wedge, and splitting up the upper part of the sha' of the bone among the trochanters. That a similar application of force might cause fracture, in which the bone was *not impacted*—was free to the operation and contraction of the muscles of the hip. Or, that a like accident might cause fracture of the neck of the thigh-bone, in which the trochanter minor might be included in the lesion, when it would produce a variety in the symptoms serving for its diagnosis. It now remains for us to proceed with the consideration of that same force when it has split up the upper portion of the shaft of femur, and has implicated the trochanter major—either separately—or in conjunction with the condition we have already indicated.

Further, if complicated with the fracture of the neck of the thigh-bone and trochanter minor, we have a separation of the trochanter major, by the wedge-like power of the fractured neck, which has been sufficient completely to break up the superior extremity of the shaft of the bone, we shall again expect a modification of the symptoms indicating the nature of the accident. The separation of the trochanter major, will render powerless the influence of many of those muscles which elevate the shaft of the bone upon the pelvis, or serve to rotate the thigh-bone outwards—did it so happen that the trochanter minor still remained attached to the shaft, as soon as the femur was elevated upon the hip, the action of the psoas magnus and iliacus internus muscles, would flex the thigh upon the body; but as this condition is seldom present when the injury to the shaft has been sufficient to separate the trochanter major, this symptom is not commonly present. In the variety of accidents we are now indicating, the glutei, the pectinalis and other muscles arising from the pelvis, inserted into the shaft of the thigh-bone, below the seat of the injury—then continue to elevate the femur, and to cause a shortening of the limb. In this variety of accident, however, the rotation of the toe outwards must cease to be a diagnostic mark of fracture of the neck of the thigh-bone, since all the muscles which especially perform this movement and cause the symptom, have lost their power—the pyriformis, the gemelli, the obturator externus and internus, as well as the quadratus femoris, which are inserted into the root of the trochanter major, and intertrochanteric line, have by the separation of these parts from the shaft of the bone, now ceased to influence its movements—so that in these accidents we find the foot may be inclined in either direction—its position remaining in whatsoever way the limb may have been placed. There is now no great prevailing muscular influence, permanently to command or preserve the direction of the foot—nevertheless, it may be remarked, that in all these cases, where the amount of injury has been so great, that intense pain and suffering shall be caused to the patient upon the least movement of the limb, this will often be a powerful inducement for all the muscles of the thigh to preserve the limb spasmodically in a state perfectly motionless, so that in all these cases the toe is always retained in the position in which it was placed in the first instance—it is inverted or everted, as the case may be. This I believe is one of the reasons of the contrariety of opinions expressed so frequently by surgeons with regard to evertion of the toe, as a diagnostic sign of fracture of the neck of the thigh-bone —and which consequently may be placed in either position by the manipulations of the surgeon, and should be particularly noted during all his investigations.

Fracture of the trochanter major from the shaft of the bone, or a separation at its epiphisis, may occasionally occur. This can alone be the effect of direct force applied to the part. It may, from the amount of injury to the soft parts, be attended with considerable obscurity; but cannot possibly be confounded with fracture of the neck of the thigh-bone. In this case there can be no shortening of the limb or impediment to the movement of the joint; except it be from the pain and swelling of the soft parts, for the coxo-femoral articulation is still perfect. On placing the hand upon the hip-joint, we find that the trochanter major is elevated above its normal position; being drawn up by the action of the glutei muscles, it is evidently moveable independent of the shaft of the bone. By pressure from above, and powerful abduction of the limb, we may be very likely to bring the separated extremities together. In case of fracture, we shall in all probability observe a crepitus; but in case of diastasis, this may not be experienced, as the friction would in all probability be between the surfaces of the soft cartilage. The evident want of continuity in the parts connecting the trochanter major with the shaft of the bone, which is particularly marked upon adduction of the thigh, will commonly prove a distinct indication of the nature of this accident.

These varieties of fracture of the neck of the thigh-bone, proceeding from direct force applied from without inwards, may happen at all periods of life, but are more liable to occur during youth and adult age; they form a marked contrast with that kind of fracture of the neck of the thigh-bone that proceeds from the application of force that has its influence from above downwards, which most commonly happens only during old age.

The application of a force to the neck of the thighbone, proceeding from above downwards may cause its fracture transversely within the capsular ligament. A person descending a stair makes a false step and comes to the ground at a greater distance than he had expected; he is thrown off his balance, so that the whole weight of the body falls upon the neck of the thigh-bone; perhaps the person is advanced in years, the neck of the thigh-bone has lost its obliquity, consequently the weight comes in a most unfavorable direction, while at this period of life the bone is abnormally brittle, it is snapped across by the sudden application of the weight, and the amount of the injury will be proportioned to the influence of these several causes. The impulse may cause a solution of continuity in the bony structure without lacerating the prolonged extension of the capsular ligament upon the neck of the femur, the *retinacula* of Weitbrecht; should such a lesion result, the action of the muscles might draw the shaft of the bone upwards to a trifling extent, and the consequence is, that the weight of the body suspended upon the fractured bone produces an angle in the line of the neck; causing, however, but little shortening, and seldom any crepitus, as the result of the injury. Should the injury be rather more extensive, should the bone and the fibrous covering be separated by the violence of the force, without tearing the free portion of the capsular ligament that surrounds the joint, we shall have a fracture of the neck of the thigh-bone within the capsular ligament. On our examination of the limb in this variety of accident, its length may be found somewhat shortened; the retraction of the bone upwards, however, may have been arrested, by the still perfect condition of the capsular ligament, and the weight of the body, if in the erect position, may still hang upon the tough and firm membrane. In consequence of the very partial removal of the femur from its proper position, the muscles acting upon the bone are but slightly disarranged in their actions, the limb for the most part retains its true direction —and as there is, in many cases, an absence of that swelling, pain and contusion of the soft parts, which was a prominent symptom in fracture of the bone, when it was dependant upon a force proceeding from without inwards, so in these cases the limb enjoys a greater amount of mobility than is permitted in the other varieties of these accidents. The hand placed upon the trochanter major may, upon rotation of the limb, distinguish the movement of the shaft of the thigh-bone to be describing a considerably diminished circle, and extension of the limb, combined with a similar movement, may distinctly indicate a crepitus; marks which, taken with the direction of the force, will clearly diagnose the nature of the accident. In this case there may be a slight eversion of the toe, but this is by no means marked or permanent, and the foot is much more under the will of the patient than in other varieties of fracture of the neck of the thigh-bone. While it is even possible that after a time the patient may be able to walk, leaning the whole weight of the body upon the tough and thickened capsular ligament, in those cases in which the accident has been misunderstood or greatly neglected; this, however, could not possibly happen without marked deformity for the rest of life.

Where fracture of the neck of the thigh-bone, the result of direct force proceeding from above downwards, shall occur, and be complicated with laceration of the capsular and round ligaments, and perhaps also attended with a forcing of the shaft of the femur high upwards among the muscles of the hip, the symptoms indicating the nature of the accident will again be modified. The greatly increased elevation of the insertion of the muscles rotating the thigh-bone outwards, will be called into powerful action—the limb will be remarkably shortened, the toe turned outwards, and the thigh flexed upon the body. In some of these accidents invertion of the foot is present, but in far the greater number of cases eversion is the position in which we most commonly find the toe. It has been attempted to account for this difference of position by the mode in which the neck of the thigh-bone has been fractured; but to our mind this difference of condition is dependant upon the position or seat of the fracture, upon the amount of the neck remaining attached to the shaft. When the portion of the neck is of considerable length, and the bone has been suddenly thrust upon the dorsum of the ilium, the action of the muscles will have an effect similar to that which occurs in dislocation of the thigh-bone upon the ilium; then the bone will be firmly bound down upon the haunch by the small muscles upon the back of the hip: the pyreformis, the gemelli, the quadratus femoris, and the obturatori. The action of these muscles will cause this accident closely to simulate dislocation, for which it is very apt to be mistaken. The toe is permanently inverted and the mobility so distinctive of the fracture of the neck of the thigh-bone is wanting; while the thigh is shortened and flexed upon the body. Should, however, the portion of the neck of the bone attached to the shaft, be particularly small, the effect here mentioned would not be produced; the rotator muscles would easily come into play, and produce their wonted influence as soon as the bone was raised upon the dorsum of the ilium, hence the toe would be everted, and the bone not being bound down upon the pelvis, would exhibit the mobility so diagnostic of these varieties of accidents.

In considering the accidents which happen to the neck of the thigh-bone from the influence of force proceeding from above downwards, we have clearly shown that solution of continuity in the neck of the thigh-bone is not an uncommon result, but that this accident usually happens to old persons; we should, however, not be ignorant that a similar influence operating on a very young person, may produce—not fracture of the neck of the thigh-bone—but a separation of the epiphisis, dividing the head from the neck of the thigh-bone. The rough handling of an infant by its nurse, who has perhaps seized it by the thigh to save it from falling, throws the whole weight of the body upon the neck of the thigh-bone; and the comparatively shallow cotyloid cavity at this period of life, acting upon the head, completely separates the neck from the head of the bone. This separation of continuity is for the most part unattended with rupture of the round or capsular ligaments, consequently with little displacement of the shaft of the bone, for the point of the solution of continuity is placed so deeply in in the cotyloid cavity, even in the infant, that the extremity of the neck still rests upon the margin of the acetabulum; hence, there will be no shortening of the limb—a somewhat increased latitude of motion may be present; but no crepitus or distortion of the parts will be observable. Such a case must be most difficult to diagnose, and did not excessive inflammatory action supervene, reunion would in all probability result, possibly without our ever knowing the positive nature of the injury which had happened—doubtless this often has been the case. Should the neck of the femur fairly pass without the cotyloid cavity, and freely move within the capsular ligament, the nature of the symptoms will closely similate those described in connection with fracture of the neck of the bone, occuring within the capsular ligament without solution of continuity of that structure; hence it is unnecessary to recapitulate them here.

Having fully considered every variety of fracture of the neck of the thigh-bone, agreeable to the nature of the force which has produced them, at the same time we have demonstrated the influence which the abnormal actions of the several muscles will have in each variety, it is well not to conceal from view that fracture of the neck of the thigh-bone will in actual practice often present a vast multiplicity in degree and character of the several results we have here detailed; a combination of results may cause a complexity of analysis in individual accidents that may produce confusion in its apprehension. But we feel convinced that if we have carefully followed the anatomical deductions, and duly considered the symptoms, which these have presented to us; that we shall, for the most part, be able to form a correct notion of the variety of the injuries which may be offered for our consideration. At all events, difficult and perplexing as these accidents are occasionally found to be by the practical surgeon, we surely must be convinced that a correct judgment of them is only to be obtained from a true knowledge of the anatomy and functions of the part, both in their normal and abnormal conditions.

The correct mode of treatment of fracture of the neck of the thigh-bone has long been a subject of constant discussion among surgeons, equally with neir varieties, symptoms and results. Two plans have especially been advocated at various periods with very considerable tact, each involving distinct and opposite principles. The one is the employment of the double inclined plane, completely flexing the limb, and relaxing all the muscles acting upon the fractured parts. The other is the use of the strait splint of Desault, which establishes a permanent extension of the limb, and thus overcomes the muscular contractility. These diametrically opposite intentions have been long and strenuously advocated by the several contending parties, in such cases; and each party have indiscriminately employed its favorite plan in all varieties of these accidents. From this inconsiderate adoption of the one method only, in a great degree, we believe, has resulted the frequent disastrous consequences so loudly and frequently complained of as the result of fracture of the neck of the thigh-bone. As we have already said, it must be perfectly clear to every considerate surgeon, that these two plans involve diametrically opposite principles, and that if their effects and influences are fully comprehended by the practitioner, they may without doubt be severally employed with advantage in some of the various kinds of accidents to which this part is liable.

The intentions required to be fulfilled in the treatment of fracture of the neck of the thigh-bone, is to place the divided portions in apposition, and if possible to keep them so until union may have taken place. The cause that impedes this intention is commonly the action of the muscles inserted into the various fractured portions. These actions and effects we have already endeavored to explain, while considering the nature and character of the symptoms present in each variety of these accidents; so that it now remains but for us to consider the means whereby we may most conveniently and effectually accomplish this indication. In all these cases the cause of retraction of the several fractured portions is by the action of the muscles inserted into them. This is obviously permitted by the solution of continuity of the firm osseous structure intended permanently to keep their origin and insertions at a normal distance. When this extensile power ceases to operate, as a matter of course, the least action of the muscular fibres have a tendency abnormally to approximate the fractured portions, and to cause distortion of the limb. In many of these cases the condition of inordinate nervous sensibility, which the injury causing the fracture has produced in the muscular apparatus, cause the different muscles influencing the fractured portions to act inordinably, which upon the least exciting cause is suddenly augmented, producing spasms —so that the state of rest which we desire to produce in the part is far less easily accomplished in one case, than in another. Again, doubtless the direction and character of the force producing the injury will, by the irregular action and great irritation which it produces in certain muscles, develope different amounts of nervous irritability in each, producing in some greater capacity for rest than in others. Thus, when the fractured neck of the thigh-bone is caused by force which proceeds from above downwards, the generality of muscles do not participate very greatly in the injury—consequently the limb is far more tolerant of rest; but when the fracture happens in consequence of force proceeding from without inwards, the injury and irritation to the muscles is usually so great that the nervous irritability is vastly exhalted—spasms being constantly present. These facts, therefore, must obviously have considerable influence in the treatment of the case, and in our opinion, should direct the mode of the employment of the extending force. Then again, the general tone of the nervous system, in the various patients presented to us, with fracture of the neck of the thigh-bone, will be a cause that will more or less influence the local part, at the time of the injury; for example, should the patient be of strong plethoric muscular habit and of powerful nervous development, our ability to accomplish a state of perfect rest will be far less easy than if he be a person of thin, weak, debilitated habit, with little nervous irritability. Due consideration of these differences, it appears to us, should form the principal guide to direct us in the employment of one or the other of the plans of treatment which we have above mentioned.

When the force has proceeded from without inwards, and the fracture has considerably implicated the superior portion of the shaft, as well as the neck of the thigh-bone; in all probability the soft parts have received a severe contusion, blood has been largely extravasated into the surrounding textures; so that great swelling and inflammation is the result—and when this accident happens in a subject full of health and vigor, then shall we find the muscles in a most irritable condition—often taking on a rigid spasmodic action that it would be futile to expect to overcome by force, and often dangerous to attempt. Here the use of the double inclined plane, properly adapted to the fractured limb, would seem to afford us the best chance of success; at least, it would serve to relax the greater amount of the muscles acting upon the limb, and by gentle and continuous influence, serve to keep the thigh-bone extended on the pelvis. In the application of this mode of extension we should prefer that the patient lie upon a firm hair mattress, with an opening in it for the passage of the evacuations. The double inclined plane should be a firm but moveable frame, in which the angle could be augmented or diminished at pleasure, somewhat longer than the patient's sound thigh, so that the weight of the pelvis keeps up the extension of the limb. The double inclined plane should be wide enough to hold both limbs, the injured one of which only need be fixed to the frame. Having placed the patient in a proper position and having measured the sound limb upon the frame, we should now, having made due coaptation and proper extension, place the injured limb upon the double inclined plane, so that it rests parallel to the sound one; we may give a slight rotation to the foot outwards and then properly secure the injured limb with sufficient straps, being sure that the apparatus is well lined with a firm and sufficient pad. At the same time that we keep the thigh flexed upon the pelvis by means of the double inclined plane, we should have the trunk elevated so as to relieve the influence of the psoas magnus and iliacus internus muscles, and by gentle evertion favor the muscles that rotate the limb outwards. In this position it is obvious we can apply the necessary means to be used to relieve the inflammatory action—be they cold applications or hot fermentations; at the same time that the limb possesses the advantage of perfect rest, and the bone is permanently and powerfully extended without the employment of direct force Did we in such a case attempt to use the long splint of Desault, we should have powerfully to extend the injured limb, and endeavor to keep it in such a state by main force; this could only be accomplished by a certain amount of violence, and would be sure to cause in the first instance more or less spasmodic action of the muscles, that would abnormally retract the fractured bones; at all events the long splint would cause great irritation to the injured parts, attended with vast pain and inconvenient pressure. The double inclined plane may at all events be used with considerable advantage in the first stage of these cases of fracture of the neck of the thigh-bone, until such time as the swelling and inflammation had subsided, after which, if it was preferred, the strait splint might be judiciously employed.

Had the force proceeded from above downwards, and the fracture of the neck of the thigh-bone have occurred within the capsular ligament, perhaps complicated with its laceration; in all probability it has happened in an old subject, and is unattended with much injury of the soft parts; in such cases, the causes that produce violent spasmodic excitement, and muscular retraction are in a very considerable degree in abeyance; we have also, generally, that absense of contusion, swelling and inflammatory action so marked in the variety of fracture of the neck of the thigh-bone previously described; consequently the strait splint of Desault may be advantageously employed from the first. The strait splint should consist of a light piece of wood, long enough to extend from the arm-pit to four or five inches beyond the foot; it should be well padded with a soft cushion, especially at those points at which pressure is most likely to occur. The splint should have two holes in it at the upper extremity, through which should be passed a well-padded strap, which passing between the legs and secured to the upper part of the splint forms the bones of the pelvis into a *point d'appui* for the extension of the limb. The limb is now to be extended to the same length as its fellow, placed in a strait line with it upon a firm mattress, having the toe slightly everted. The foot should now be firmly secured to the extremity of the splint by a bandage or laced stocking, extending round the ancle and attached to the lower extremity of the splint, so as to maintain the perfect extension of the fractured bone. To steady and maintain a condition of perfect apposition between the limb and the splint, a bandage may be applied around both, which at the same time that it secures the limb will keep the broken extremity of the bones in perfect apposition. A bandage may also be passed around the body and splint; this will be apt to maintain the just position of the splint and steady the support it yields to the limb. During the progress of the case, it will be necessary often to examine the length and position of the limb, and frequently to tighten the perineal band, passing between the legs, so as to preserve the necessary amount of extension. It is well, even in these cases, to support the shoulders of the patient with pillows, or to raise the upper part of the bed by a proper apparatus; this will relieve the tention of the psoas magnus and iliacus internus muscles. No very large amount of flexion of the spine can be permitted, with the strait splint, but still it is well to give these muscles every advantage in our power. The patient should have a rope attached to the ceiling with a cross-stick in it, to enable him to assist himself in every necessary movement. These means should be continued with care and attention for four or five weeks, when we may begin to allow the limb some degree of passive movement, and in fortunate cases, perhaps find we have secured a useful joint, with only a very slight degree of shortening and deformity. It must not be concealed, however, that in very many of these cases, complete bony union never takes place, while the patient is ever after troubled with lameness and considerable deformity.

(To be continued.)

ART. LVIII.—*On some Compounds of Urea, and on a new method for the determination of Chloride of Sodium and of Urea in Urine. By* JUSTUS LIEBIG, M.D., PH D., F.R S., M.R I.A.; Professor of Chemistry in the University of Giessen; Knight of the Hessian Order, and of the Imperial Order of St. Anne; Member of the Royal Academy of Science of Stockholm; Corresponding Member of the Royal Academies of Science of Berlin and Munich, of the Imperial Academy of St. Petersburg, of the Royal Institution of Amsterdam, &c. &c. &c.

Continued.

PREPARATION OF THE TEST LIQUOR FOR THE DETERMINATION OF CHLORIDE OF SODIUM.—In a small pipette, holding exactly 10 cubic centimeters of liquor when filled to a certain line in the narrow tube, 10 cubic centimeters of the chloride of sodium, just described, are measured off, and put into a small beaker; to this are added 3 cubic centimeters of a solution of urea, containing in 100 cubic centimeters 4 grammes, or in 1 cubic centimeter 40 milligrammes, of urea.

For the purpose of measuring this solution, a small measure is made of a narrow test tube, in which 3 cubic centimeters of liquor are measured off; the height of the liquor is marked by a scratch with a file; a few drops more or less are of no consequence.

The dilute solution of mercury, to be graduated, is now put into a buretto, the height of the liquor noted, and added drop by drop to the solution of chloride of sodium mixed with urea, whilst the liquor is kept in a rotatory motion. The test is finished as soon as a distinct precipitate is permanently formed in the liquor.

An opalescence of the liquor is not to be regarded; it is caused by a trace of foreign metals; it may immediately be recognized as not pertaining to the test, when, after its appearance, the cloudiness of the liquor is not increased by the addition of a few drops of the mercurial solution. This is not the case when the cloudiness has been caused by the urea compound; every additional drop of the mercurial solution then produces a cloud, by which the liquor is rendered more opaque than it was before.

If for 10 cubic centimeters of solution of chloride of sodium, 7.8 cubic centimeters of the mercurial solution have been required to induce the precipitate, the latter is too concentrated to admit of an exact graduation; it has then to be diluted with its bulk of water, and the test to be made a second time. Suppose 15.5 cubic centimeters of the mercurial solution have now been required to produce a cloudiness in 10 cubic centimeters of the solution of chloride of sodium mixed with urea; then to 155 volumes of this mercurial solution 45 volumes of water must be added, whereby 200 volumes of a solution are produced, of which 20 cubic centimetres indicate exactly 200 milligrammes of chloride of sodium, or 1 cubic centimeter 10 milligrammes.

If in the first trial 2.7 cubic centimeters of mercurial solution be required for 10 cubic centimeters of the solution of chloride of sodium, 5 or 6 times its bulk of water must be added before the first graduation is made. In short, the mercurial solution to be graduated should not be too far removed in concentration from the amount which it is ultimately to contain. The correctness of the measurements is finally controlled by a special experiment; the degree of cloudiness, permanently obtained on mixing 20 cubic centimeters of the test liquor with 10 cubic centimeters of the solution of common salt with urea, must be kept in view when making the real estimations.

In these quantitative determinations of chloride of sodium—a source of error easily avoided, however, by a little practice—exists in using too much mercurial solution, whereby the cloudiness is increased; or too little, whereby it is diminished. The test liquor, the preparation of which I have just described, is calculated for those cases in which no other salts besides chloride, and no excess of urea exist in the solution; it leads however to a slight error, when employed for determining the chloride of sodium in urine, inasmuch as it indicates a smaller amount in urine than really exists therein. This error is occasioned by the cloudiness; the index of the termination of the experiment, appearing somewhat earlier in the presence of much urea and other salts than without, inasmuch as the precipitate is less soluble in such liquids. A deposit of nitrate of urea and protoxide of mercury is, as a matter of course, not produced until the liquor is saturated with it; the mercurial solution always contains free nitric acid, which dissolves more of it than water, and this again more than a nitric solution of urea.

Since, then, urine generally contains more urea than has been added to the solution of chloride of sodium when graduating the mercurial solution, and this urea seizes part of the free nitric acid of the mercurial salt, forming nitrate of urea, the solvent power of the liquor for the precipitate is diminished, and the precipitate appears somewhat sooner—that is, somewhat less of the test liquor is required to produce the cloudiness. This error is completely obviated by adding 5 cubic centimeters of a cold saturated solution of sulphate of soda to the 10 cubic centimeters of solution of chloride of sodium mixed with 3 cubic centimeters of solution of urea, and then graduating the test liquor.

Nitrate of protoxide of mercury produces, with a solution of sulphate of soda, a yellow pulverulent precipitate of turpethum minerale. If the sulphate of soda contains chloride of sodium, the precipitate of turpethum, on addition of nitrate of protoxide of mercury, is not formed until the chloride of sodium is converted into sublimate; the solution of sulphate of soda therefore alters the experiment only in this manner, that the free acid of the mercurial salt combines with the sulphate of soda to form an acid salt, whereby the same effect is produced as by an excess of urea. On adding urea and then nitrate of protoxide of mercury to a solution of sulphate of soda, free from chloride of sodium, the liquor coagulates, even when tolerably dilute, to a gelatinous mass of a snow-white compound, containing sulphuric acid, urea, and protoxide of mercury; it is somewhat less soluble in water and sulphuric acid than the corresponding nitrate.

The method of determining chlorine by means of a silver salt, is so exact that no more exact process could be said to exist; but the method of estimation with nitrate of protoxide of mercury, just described, is not inferior to that with nitrate of silver, as regards precision; it is applicable however only to neutral or very slightly acid or alkaline liquids, because an excess of acid prevents the precipitation of the urea compound.

The following numbers enable us to make a comparison of both methods; they refer to very dilute solutions of chloride of sodium, presenting but very slight difference in the amount of chloride of sodium:—

	Amount in 10 cub. cent. of the solution.		Estimated by Nitr. of Ptox. of Mercury.
I.	81.5 milligrammes	....	81.6
II.	80.2 ”	....	79.8
III.	82.7 ”	....	82.3

We observe readily that these numbers do not differ from each other in a greater degree than in the case of determinations made with standard solutions of nitrate of silver in the usual way.

The only advantage the nitrate of the protoxide of mercury has over the silver salts consists, as I believe, in the circumstance that the termination of the experiment is indicated by the commencement of the reaction. In using nitrate of silver the experiment is finished when no farther precipitate is perceptible; in this case the cloudiness of the liquor, the difficulty to render it clear in order to observe the end of the experiment, impedes the dispatch of the execution. In using the mercury salt, some dozen analyses may be made in an hour; hence this method is particularly applicable to technical purposes, for the estimation of chloride of sodium in Glauber's salts, and, after previous neutralization, in the soda of commerce.

In order to determine the chloride of sodium in urine, it is not necessary previously to remove the phosphoric acid contained in it. I have found a mixture of one volume of a cold saturated solution of nitrate of baryta, and two volumes of cold saturated baryta water, to answer this purpose very well. To two volumes of the urine to be examined, one volume of this mixture is added, and the precipitate formed filtered off; the liquor is alkaline, from the excess of baryta; this alkaline reaction must be removed by means of nitric acid.

For the experiment 15 cubic centimetres of this liquor are taken, corresponding to 10 cubic centimeters of urine; and for the measuring of it a small pipette is used, holding exactly this volume, when filled to the line, without subdivision. The liquor is put into a small beaker glass (the last drop adhering to the pipette not blown or taken off) and mixed with the mercury solution whilst it is continually being stirred.

When cloudiness ensues, the quantity of test liquor used is read off from the burette. Every cubic centimeter used corresponds to 10 milligrammes of chloride of sodium.

By this method I have made a large number of comparative experiments, with a solution of silver also graduated for 10 milligrammes of chloride of sodium in 1 cubic centimeter of water; and the following numbers may furnish a specimen of the precision of the first, and of its close approximation to the ordinary method :—

				By means of nitrate of Silver.	By means of nitrate of Protox. Merc.	
				Millgrms.	Millgrms.	
1. 10 cub. cent. of		morning urine	contained	115.4	115.0	Chloride of Sodium.
2. 10	,,	a child	,,	110.0	110.0	
3. 10	,,	after dinner	,,	161.0	161.0	
4. 10	,,	before dinner	,,	189.0	188.5	
5. 10	,,	,,	,,	74.0	74.0	
6. 10	,,	,,	,,	112.8	142.0	
7. 10	,,	after taking tea	,,	127.5	127.5	
8. 10	,,	,, beer	,,	27.7	27.7	
9. 10	,,	before bedtime after beer		25.0	25.0	
10. 10	,,	of same urine	,,	25.0	25.0	
11. 10	,,	of woman	,,	110.0	110.0	
12. 10	,,	of the same	,,	110.0	110.0	

The correctness and accordance of these determinations depends chiefly upon this point, that, in neutralizing the urine mixed with the baryta and nitrate of baryta, no more nitric acid is added than is just required in order to produce a feeble acid reaction. For this reason it is preferable to acidulate with nitric acid the whole filtrate, of which a small portion is kept back, and not the 15 cubic centimeters measured off for the test: one drop too much is of no consequence in 100 or more cubic centimeters of liquor, whilst if added to the small portion for the test, it would interfere with the precision of the experiment.

In determining urea in urine, the amount of chloride of sodium in it causes an error, which, for very accurate analyses, is obviated by previously removing the chlorine;

and in this case the determination of the chloride of sodium, by means of nitrate of mercury, serves to indicate the exact amount of silver solution graduated for the same quantity of chloride of sodium, which is to be added to the urine without further experimenting.

DETERMINATION OF PROTOXIDE OF MERCURY IN A SOLUTION OF NITRATE OF MERCURY.—On mixing solutions of nitrate of protoxide of mercury and phosphate of soda, a white flocculent precipitate of phosphate of protoxide of mercury is immediately formed, which on being left in the liquor rapidly becomes crystalline.

Solution of corrosive sublimate however may be mixed with the alkaline phosphate without producing a precipitate.

On adding solution of chloride of sodium to the mixture of the two former salts, before the precipitate becomes crystalline, the phosphate of protoxide of mercury formed immediately decomposes with the chloride of sodium, into sublimate and phosphate of soda, the precipitate formed disappears, and the liquor becomes clear and bright.

On this deportment I have based a method of determining the amount of protoxide of mercury in its nitric solution with tolerable precision. 1 eq. of phosphate of protoxide of mercury requires to redissolve it 1 eq. of chloride of sodium; if therefore the amount of chloride of sodium added be known, the amount of mercury in the mercurial solution is also known.

Since the equivalent of chloride of sodium is almost one half of that of protoxide of mercury, this method is not so precise and accurate as the determination of chloride of sodium by means of the mercury salt; inasmuch as a small error in the addition of the solution of chloride of sodium causes one which is twice as great in the calculation of the mercury. For certain purposes however, especially for those which I have in view, this method is sufficiently exact.

PREPARATION OF THE NORMAL SOLUTION OF CHLORIDE OF SODIUM TO BE EMPLOYED FOR DETERMINING THE MERCURY.—According to the equivalent of chloride of sodium and of the protoxide of mercury, 108 protoxide of mercury corresponds to 58.6 chloride of sodium, or 200 of oxide corresponds to 108.52 of the salt.

If therefore 20 cubic centimeters of a saturated solution of chloride of sodium be mixed with 566.8 cubic centimeters of water, we have 586.8 cubic centimeters of a dilute solution of chloride of sodium, containing in the whole 6368 milligrammes of chloride of sodium (viz., the amount contained in 20 cubic centimeters of the saturated solution); in 10 cubic centimeters there are therefore 108.52 milligrammes of chloride of sodium, corresponding to 200 milligrammes of protoxide of mercury (1 cubic centimeter of solution of chloride of sodium = 20 milligrammes of protoxide of mercury).

In order to determine with some accuracy the amount of oxide in a solution of nitrate of protoxide of mercury by means of this method, the solution should not be too concentrated, partly for the sake of measuring exactly, and partly on account of the limits of the reaction being more easily perceived in dilute liquors than in concentrated ones; it is desirable that the mercurial solution should not contain more than from 180 to 200 milligrammes of protoxide of mercury in 10 cubic centimeters.

In order to determine the concentration the following preliminary experiment is made:—10 cubic centimeters of the solution of chloride of sodium are mixed with 4 cubic centimeters of a cold saturated solution of phosphate of soda (the officinal salt), and to this mixture the mercurial solution is poured from a burette, until, on shaking, the precipitate does not any longer disappear. Suppose 2.4 cubic centimeters of mercurial solution had been used, they would then contain 200 milligrammes of oxide. This is too concentrated; 1 cubic centimeter of it contains upwards of 80 milligrammes of oxide, but the exact determination requires that 1 cubic centimeter should not contain more than 20 milligrammes; this solution should therefore be diluted with 3 volumes of water before the actual experiment is made.

Of this dilute solution of mercury, 10 cubic centimeters are now put into a beaker, mixed with 4 cubic centimeters of the above mentioned solution of phosphate of soda, and the graduated solution of chloride of sodium added from the burette; the solution is kept in constant motion, and the test added very slowly towards the end, until the white precipitate formed is completely redissolved.

The addition of the solutions of phosphate of soda and of chloride of sodium must follow in rapid succession; if but a few minutes elapse between the two additions, the phosphate of protoxide of mercury becomes crystalline, and does no longer dissolve, or at least with difficulty.

Moreover, the solution of mercury must not contain too much free acid; it contains the proper amount if, after the addition of the phosphate of soda, the mixture does not exhibit an acid reaction. If it has an acid reaction, it must previously be mixed with a few drops of carbonate of soda, until a basic salt is precipitated, which is redissolved by means of one or two drops of nitric acid.

It is a special character of this method that its errors depend chiefly on the circumstance of one or more drops of solution of chloride of sodium being added in excess, in order to redissolve the precipitate. The more chloride of sodium is used for a given volume of the solution of mercury to effect this end, the more oxide is supposed to be in this volume; the error in question increases, therefore, the amount of mercury found beyond the real amount. Since the phosphate of mercury is slightly soluble in the liquor, and since, finally, the solution of chloride of sodium is graduated with regard to this error, this discrepancy is generally very slight. If the method be reversed (viz. if the solution of mercury be poured into a mixture of the solutions of chloride of sodium and phosphate of soda), a slight excess of solution of mercury is always added, to make the precipitate appear, because it does not become permanent until the liquor is saturated with it. According to this mode of proceeding, therefore, the amount of mercury obtained is too low.

The determinations become still more exact if both methods are combined in the following manner.

(Method 1st). 10 cubic centimeters of the solution of mercury are poured into a beaker, 3 to 4 cubic centimeters of a solution of phosphate of soda added, and then immediately, without waiting till the precipitate has become crystalline, the solution of chloride of sodium is added from the burette, until the precipitate has disappeared. Suppose 12.5 cubic centimeters of the chloride of sodium has been used for this purpose, 12.5 cubic centimeters of the same solution are then measured off.

(Method 2nd.) 3 to 4 cubic centimeters of phosphate of soda added, and the same solution of mercury poured into this mixture from the burette, until a precipitate appears.

Suppose 10.25 cubic centimeters of the solution of mercury have been used for this purpose, then the true amount is as follows:—

There have been used for

I.	10.00 c. c. of sol. of merc.	12.5 c. c. of sol. of chl. of sodium.
II.	10.25 c. c. ,, ,,	12.5 c. c. ,, ,, ,,
	20.25	25.00

Now since every cubic centimeter of solution of chloride of sodium corresponds to 20 milligrammes of protoxide of mercury, the 25 cubic centimeters used indicate 20 × 25 = 500 milligrammes of protoxide of mercury, which are contained in 20.25 cubic centimeters of the solution of mercury.

The following experiments may serve as a critical illustration of this method :—

(*a*). 7.480 grammes of pure mercury and 24 grammes of nitric acid of 1.402 sp. gr. were put into a beaker, and evaporated in a water bath to the consistency of a syrup, then mixed with water so as to bring the volume of the liquor to 400 cub. cent. 10 cub. cent. of this solution contained, therefore, 187 milligrammes of mercury.

When tested according to method 1st, it gave 190.8 milligrammes.
,, ,, ,, 2nd, ,, 184.8

Mean 187.8 of Hgy.

(*b*). 6.993 of mercury dissolved in nitric acid in the same manner and diluted to 400 cubic centimeters; 10 cubic centimeters contained 174.8 milligrammes of mercury.

Found by Method 1, 177 milligrammes.
,, ,, 2, 172.4 ,,

Mean 174.7 of mercury.

(*c*). 8.321 of mercury dissolved in the same manner and diluted to 500 cubic centimeters; 10 cubic centimeters contained 166.4 milligrammes of mercury.

Found by Method 1, 170.2 milligrammes.
,, ,, 2, 163.4

Mean 166.8 ,, of mercury.

(*d*). From 10 cubic centimeters of a solution of an unknown amount of oxide there was obtained by precipitation with potassa, 1.436 grammes of protoxide of mercury, and by the test liquors in the mean 1.446 grammes.

(*e*). 31.669 of mercury dissolved in nitric acid in the manner described above, and diluted with 443 cubic centimeters of water; 10 cubic centimeters contained 772 milligrammes of oxide. 1 volume of this solution was mixed with 3 volumes of water; 10 cubic centimeters of this dilute liquor contained 193 milligrammes of oxide.

Found by Method 1, 192.5 milligrammes.
,, ,, 2, 183.0 ,,

Mean 187.9 of oxide.

Instead of phosphate of soda, pyrophosphate of soda, neutral chromate of potassa, and other salts which do not precipitate corrosive sublimate may be used..

As a matter of course, this method is only applicable to nitric solutions of mercury, containing no metals that are precipitated by alkaline phosphates from their hydrochloric solution. A separation of the mercury from many other metals may, however, be pretty readily effected by precipitating the solution of the mixed metals with phosphate of soda, then adding a solution of chloride of sodium in excess, and filtering; the mercury is dissolved under these circumstances, whilst the other metals remain undis solved in form of phosphates.

(*To be continued.*)

ART. LIX.—*On the presence of Starch in the blood of an Epileptic patient.* *By* S. J. STRATFORD, M.R.C.S., Eng., Toronto.

During the latter part of the last year (1853), a gentleman residing in Toronto, troubled with epilepsy, stated to me that he was desirous of having his blood examined by means of the microscope, hoping thereby that something might be discovered in it which might explain the cause of his complaint. Being fully aware of the great influence which the delayed excretions of the system exercised as blood poisons, I readily acceded to the request, thinking it possible that I might find some changes in the blood corpuscles, or in the deportment of the fluids, that might assist in the investigation, or serve to explain the cause. I proceeded to the examination, and having obtained some blood by puncturing the finger with a lancet; I took a drop of blood and placed it in the field of the microscope. My microscope is a Nachet's of from 450 to 500 diameters. To the drop of blood I added some well water of pure character. The red corpuscles rapidly endosmosed in the fluid, and soon broke up. After a short time I found left upon the field of the microscope many white corpuscles, and a number of cellular bodies, which I compared to starch corpuscles; they were of irregular size, with a minute nucleus; presented an apparent lamination, generally ova'e flattened and somewhat irregular in their outline; and bore all the appearance of these vegetable structures. Fancying that there might be some foreign matters obtained from the water which had become mixed with the blood, I requested a fresh supply of water in perfectly clean utensils, and used every precaution to obviate any accidental introduction of starch; yet upon placing some more blood upon the field of the microscope I still observed these bodies. One fact was evident, that if I put some of the blood under the microscope without the addition of the water, the blood corpuscles ran together and broke up, presenting the usual appearance of coagulated blood, without shewing any of the bodies I imagined to be starch corpuscles. When developed to their ordinary size, these bodies were about one 500th of an inch in diameter, which would make them far too large to pass the generality of capillary vessels. After some water had been added to the blood, these structures, not at first remarkable, after a time became very conspicuous, and were evidently fully developed by the water they had absorbed. The dense medium in which they previously existed was evidently not favourable to their increase of size; but as soon as the finer fluid had been added, they quickly enlarged, and eventually assumed the appearance which attracted my notice.

Greatly surprised, I mentioned the fact to my patient, telling him that I must be deceived by some unaccountable accident; and that the introduction of the starch into the blood must depend upon some fortuitous circumstances, as I had never heard of such a case before, and did not believe that a vegetable product like starch could exist in the blood of man. So convinced was I that the product in the field of the microscope was starch, that I obtained some flour and placed it under similar circumstances in the field of the microscope, its apparent identity was sufficiently manifest. Still fearing that there must be some mistake, I did not venture to imagine that there could be any reality in my discovery of starch in the blood of man, and consequently passed the matter over without further observation. At a subsequent period I discovered, with my friend Dr. Barrett, similar bodies, during our microscopic observations of the matter contained in the eye of a boy, which had been removed for fungus hœmatodes, and I have continually observed similar corpuscles in specimens of urine submitted to a similar test.

Having lately observed that Randolph Virchow had published in Virchow's Archiv Bvj. H. i, page 135, (September 4th, 1853), an account of his discovery of a substance presenting the chemical reaction of cellulose found in the brain and spinal cord of man, I mentioned the fact to my patient; told him that it was possible that the discovery which I had made of starch in his blood might be a reality; and consequently I thought it would be well to make another observation of the matters contained within his blood. Upon placing a drop of the patient's blood under the microscope it exhibited the same corpuscles, and I now resolved to test them with iodine; accordingly I made a watery solution of iodine and applied it to the drop of blood instead of the water previously employed, and found that every one of the bodies I fancied to be starch corpuscles became blue; some were of a light pinkish blue tint, while others became opaque and of a perfectly blue colour. To satisfy myself as to the precise character of these bodies, I now took some flour and mixed it with the weak watery solution of iodine, and precisely similar results were produced; therefore I consider that I am warranted in believing that the bodies I observed under the field of the microscope in the blood of the patient afflicted with epilepsy, were corpuscles of starch. That under ordinary circumstances, while floating in the fluid blood, these bodies are scarcely more than granules, and continue as such as long as they remain in the circulating system; but when they have been removed from the blood, or are submitted to a less dense fluid, that they then rapidly take up fluid and are readily developed into full sized starch corpuscles, and may be shown as such upon the field of the microscope.

While adverting to this singular fact, I will not presume myself to offer any reasons as to the physiological or pathological value of the conclusion that may be drawn from this circumstance, save that it seems to confirm the opinion advanced by Virchow, when he states, "that in the child I have as yet sought for it in vain, so that like the brain sand, it appears to arise in a later stage of development, and probably may have certain pathological imports" — as is evidenced by its occurring in the blood of a patient subject epileptic attacks. It is not impossible that the starch corpuscles found in the brain and other abnormal structures of the body, may have been derived from the blood and have been deposited in the diseased structures as one of the products of inflammatory action; at that period scarcely more than nuclei, but after they had been removed from the circulating system and obtain a thin serous fluid for their nourishment, they then become sufficiently developed, that they may readily be discovered in the animal structures as *corpuscles of Starch.*

REVIEW.

CLINICAL LECTURES ON PULMONARY CONSUMPTION.—By THEOPHILUS THOMPSON, M.D., F.R.S., *Fellow of the Royal College of Physicians, London; Physician to the Hospital for Consumption and Diseases of the Chest; author of Annals of Influenza. Prepared for the Sydenham Society, &c.*—Philadelphia: Lindsay & Blakiston, 1854; H. Rowsell, Toronto.

The work before us consists of a series of thirteen lectures on the Physical Signs of Consumption, delivered at the Brompton Hospital for diseases of the chest during the spring of 1851. The chief object aimed at in each case by Dr. Thompson has been to demonstrate the proportionate value of each symptom, and to instruct the student in the ready appreciation of their value and import. We can conscientiously certify that Dr. Thompson has succeeded in a plain, yet elegant manner, to illustrate the points of chief importance among the symptoms indicative of pulmonary consumption; and this he has done by a system of comparisons; so that when he has endeavoured to illustrate any particular truth, he brings together a variety of cases, points out the particular bearing of each, and thus indicates the true value of the sign. This is a most pleasant and popular method of conveying instruction, and is pretty sure permanently to fix the truth in the student's mind. The facts chosen are plainly not intended to support any particular theory, but simply result from observation and comparison at the bedside of the patient; hence the work, which is executed in Messrs. Lindsay and Blakiston's best style, must become a convenient text book, and will long remain an instructive synopsis of this widely spread and too commonly fatal malady.

The employment of the stethescope as a means of distinguishing the diseases of the chest has vastly facilitated the more certain diagnosis of consumption, and, taken with the other physical signs, renders the distinctive marks of the complaint almost certain. We can well remember that, not many years back, if a consumptive patient, in the first stages of the disease, applied to half-a-dozen of the best educated physicians in the city of London, he would assuredly obtain as many various opinions as to the nature of his disease—all perfectly different; in some, the liver—in some, the stomach—in others, the mind, was pointed to as the seat of the complaint—facts as wide as the poles asunder were gravely brought to demonstrate these ideas; but all are now dispelled by the march of science; and, thanks to a more logical system of deduction, the true diagnosis of this complaint may be rendered plainly manifest or be easily disproved. Consequently, remedial means may be employed at a period when they are most commonly found to be successful—in fact, the constitutional fault may be rectified before it runs on to organic disease.

Much as the stethescope has done for the diagnosis of consumptive diseases, it must be acknowledged that the excessive refinement, both as to the conception of the phenomena observed and of the distinctive appellations applied to them, have often served to create confusion in the mind of the student, and to render difficult the precision that should always be attained in recognition of each particular sound. The practise of auscultation demands the devotion of much valuable time and considerable labour, to attain a necessary familiarity with the various sounds indicative of the different symptoms; simplicity, as far as is consistent with truth, should assuredly be aimed at: hence Dr. Thompson has endeavoured to arrive at a systematic classification, which he has endeavoured to express in the English language; this, we apprehend, will commend itself to the pathologist. He thus describes the arrangement:—"In the attempt now made to simplify the subject I shall not include all the auscultatory sounds, but chiefly those of practical importance; which are most easily confounded in consequence either of some supposed similarity in their character, or of the ambiguous terms by which they are described. Percussion sounds, modifications of sound derived from the voice, cardiac, venous, and arterial murmurs, are omitted; since they are for the most part easily distinguished, and the terms by which they are designated are sufficiently expressive. It is undesirable to give similarity of name and juxta-position in arrangement to sounds perfectly distinguishable, and characteristic of diseases altogether different in their nature; as is often done, for example, with respect to crepitation of inflamed lungs, and the moist crepitation of consumption. With a view to avoid such inconvenient commingling of ideas, and to facilitate the comprehension of the subject in its practical application, I would venture to propose, as simple, distinct, and suited for clinical purposes, the following division into *bubbles*, *clinking*, *crepitation*, *crackling*, and *vibration*."

Dr. Thompson then explains that, 1. "*Bubbling sounds* are produced by air passing through secretion in the bronchial tubes, as peculiarly occurs in bronchitis." These sounds may differ in degree, from the size of the tubes, and in the minuter ramifications may become subcrepitating, but still consisting in the passage of air through secretion in vibratory tubes. 2. "*Clinking* consists of a series of sounds, five in number, exactly corresponding to the term, audible in some degree during expiration as well as inspiration." 3. "*Crackling*, a term which itself defines the sound, consisting of a few crackles limited to the period of inspiration." 4. "*Crepitation* consists of more numerous and finer sounds than crackling. It is confined to the period of inspiration, and is probably due to viscid secretion in the cell-walls, occasioning difficulty in their expansion." 5. "*Vibrations* of sonorous, grave, or cooing, sibilant, shrill, or whistling rhonchus sound, resulting mainly from vibration, and indicating flattening or narrowing of tubes, such as is common in chronic bronchitis."

We think that the distinction of the sounds thus demonstrated by the stethescope, in consumptive diseases, as advocated by Dr. Thompson, will clear away a great deal of useless confusion, and will facilitate the acquisition of their knowledge by the student; while it renders the impression of them upon the mind more permanent, the simplicity of the facts will, without doubt, soon commend themselves to general practice.

The disquisition now adverted to properly forms the subject of an introduction to the work in question. Proceeding then to the consideration of the lectures, we shall endeavour to afford a slight synopsis of the most interesting, and, if possible, present the various facts to our readers in as condensed a manner as possible.

In the first lecture Dr. Thompson sets forth the great value of the indications afforded by the movements of the chest. At page 32 he points out that "The two sides of the chest, when in a perfectly healthy condition, appear symmetrical in form, and similar in movement. A change in these respects, obvious to the practised eye, is usually induced by any serious disease of the lungs or pleura. Let me shew you proofs of this statement by introducing to your notice four patients:—the first with a view to exhibit the movements of the chest, natural in character, notwithstanding the existence of constitutional symptoms otherwise tending to mislead; the second presenting a condition of chest produced by pleurisy and pneumonia; the third manifesting the characteristic movements attending phthisis; and the fourth the peculiarities which in this respect characterize emphysema." The first case detailed was that of a patient troubled with hydatids of the liver; an ulcerated opening had occurred through the diaphragm and lung, and the cysts were, after much irritation and great purulent expectoration, discharged at the mouth; "at times he threw up pieces of the cysts, which he called gut, about a foot long, and was obliged to tear them from his mouth to prevent suffocation." The patient was sent to the Brompton Hospital under an idea that one lung was gone, from consumption. Dr. Thompson doubted the truth of the fact (although the patient expectorated great quantities of purulent matter), from the aspect of the chest; he says, "You see that during inspiration the expansion of the two sides is equal, and that it is quite free even in the sub-clavicular regions. Your eye witnesses truly these important particulars." We confess we cannot understand how it was, that after the great irritation and vast expectoration produced by the pressure of the hydatid cyst, in the structure of the lung, that the usual effects were not exhibited in the thoracic parieties. The effects of the cysts were to a certain extent similar to the deposit of tubercle; they were foreign bodies present in the lung; they produced and maintained irritation and disease until they were removed, must necessarily have caused destruction of the lung tissue; consolidation of the structure, and consequent depression of the walls of the chest, must have resulted; hence, *à priori*, we should not have considered this a favorable case to demonstrate the coincidence of the respiratory movements; it was, however, easily to be distinguished from the effects of consumption, and that was the point at issue.

"The next patient whom I place before you has a very different aspect of chest. Even those of my audience who are at a distance can tell me at once that the lower half of the right side of the chest is flattened and scarcely moves in respiration. You see that the apex of the heart beats close to the right nipple, instead of its proper situation, namely, two inches below, and an inch within that part. You form a surmise that the cause of these conditions is contraction from pleurisy, and further observation confirms the correctness of the suspicion conveyed to the eye. If the heart was displaced by existing effusion, you would probably see bulging rather than depression. You put your hand on the flattened portion of the man's chest, as the man speaks, and the vibration of the voice is distinctly perceived; effusion does not exist, for that would interrupt the communication and vocal thrill. You make percussion, and find dulness greater than the false membrane on the pleura alone would produce, but the dulness lessens as you proceed upwards to the apex of the chest. The cardiac dulness is displaced, but not extended: that from the liver extends too much on the left. Accompanying the first sound of the heart, a loud murmur is heard near the apex, but not in the epigastrium, nor in the right of the sternum above the cartilage of the fourth rib."

This very interesting detail is explained by the patient having received a blow upon the right side of the chest, causing pleurisy and consolidation of the lung; after which he experienced an attack of rheumatic fever and inflammation of the heart and lungs of the left side. The cardiac murmur indicated regurgitation from the left ventricle, hence proceeded the several attacks of hœmoptosis and occasional tightness of the chest, of which he frequently complained; these are marks sufficiently plain to prevent the case being mistaken for consumption.

"The next patient, George S——h, you observe, moves the right side of the chest moderately during inspiration, especially at the upper part, but the left side scarcely at all; you may suspect tubercular disease from the fact, and further examination confirms that opinion. Percussion yields a dull sound over the whole of the left side, and in the sub-clavicular region a sound is elicited which some of you will recognize as amphoric, like that produced by filliping the distended cheek, and doubtless arising from proximity of a considerable cavity full of air. If a small stroke be given below the clavicle whilst the patient's mouth is open, you hear the sound denominated by the French bruit de pot fêlé, resembling, as the designation implies, the noise produced by striking a cracked pipkin. You may imitate the cracked pipkin sound by doubling the hands together rather loosely, and striking the back of one of them against the knee in such a manner as to allow some escape of air. The production of this particular sound by percussion of the chest is doubtless owing to the proximity of a considerable cavity, having yielding walls, and free communication with one or more large bronchial tube, *** occasionally the cracked-metal sound is suspended, probably in consequence of the plugging of the bronchial tube by viscid secretion." The patient had an hereditary tendency to consumption, but had produced a degraded condition of his constitution from frequent attacks of syphilis, gonorrhœa, and the use of mercury, which laid the foundation of the consumption with which he was now evidently troubled.

"The last patient I have to introduce to you to day is Charles B——. As you watch the movement of his chest, let us remind you that the advance of either of the five upper or thoracic ribs in ordinary inspiration should vary from .02 to .07 of an inch, and in an extraordinary effort may extend to about two inches; while the four or five inferior ribs, which obey the influence of the diaphragm, move ordinarily from .25 to .30 of an inch, or in an extreme inspiration about an inch and a half. You will observe that the upper part of B——'s chest moves in correspondence with the rule; but the lower part, instead of advancing according to this rule, absolutely recedes. By means of Dr. Sibson's chest measurer, we may determine the exact amount of this deficiency of movement; or, if you have not had sufficient practice for the dexterous management of this instrument, try that of Dr. Quain, in which the sliding joints are dispensed with. Even this instrument however, excepting to those practiced in its use, is not more trustworthy than the eye. In practice, the attentive eye soon detects the difference of form and movement associated with the diseases to which I have referred; but it is doubtless a great advantage to be able to state to others, by the aid of an instrument, the exact amount of difference. If you strike this patient's chest, the sound elicited is clear, and you will have already recognized the characteristic movement of emphysema. The diaphragm, in contracting, affords space for the expansion of the lungs, but the pulmonary cells already filled cannot admit more air; atmospheric pressure, therefore, takes effect, and the ribs are forced inward." The man complained of cough, paroxysms of dyspnœa, and more or less shortness of breathing, demonstrating asthma evidently caused by chronic bronchitis and terminating in emphysema. It was plainly a spasmodic complaint influencing the nervous system that supplied the bronchial tubes and air cells, dependent in all probability on one or other variety of blood poisoning, such as oxylate of lime or uric acid, in the blood.

In the preceding pages we have been anxious to present an example of the effective style and simple method by which Dr. Thompson attempts to demonstrate his facts and impress them upon the mind of his audience. We have made lengthened extracts, but have contracted the matter to the utmost that the due comprehension of this subject would permit, and hope at a future period to follow out this interesting subject.

(*To be continued.*)

EDITORIAL DEPARTMENT.

INCORPORATION OF THE MEDICAL PROFESSION.

To the Editor of the Upper Canada Medical Journal.

SIR,—Allow me, through the columns of your valuable Journal, to draw the attention of the profession and the public to the following plan, whereby both may be effectually protected from the injurious practices of vulgar pretenders to a knowledge of the healing art.

At the outset, I may as well confess that I am no advocate for stringent measures, which shall exclude from the practice of medicine all but those who may wish to follow the teachings of any particular medical school; because such exclusion would be looked upon by some as persecution, and would consequently enlist the sympathies of the community in behalf of those so excluded; because, moreover, the present legally qualified members of the medical profession do not require any such protection—superior education, skill and usefulness being alone their sufficient safeguard: and finally, because the Legislature will not approve of a stringent enactment in favour of any one particular school; for experience has shewn such to be altogether inoperative.

Entertaining these views, I feel convinced that the Legislature, the profession and the public require some plan to be submitted, which may prove so liberal that many now illicitly practising medicine may readily become legally qualified; and yet sufficiently stringent to shield the public from the impositions of mercenary ignorance and presumption.

The grand difficulty hitherto experienced by the Legislature has been to determine the line of practice that shall be legally recognized. Hydropathist, Homœpathist, Thompsonian, &c., &c., each sets forth his own claims for approval. Under these circumstances, some compromise seems imperatively called for; and it appears to me that if a plan can be devised and successfully carried into execution, which shall insure even a limited education in the right direction, and concerning the necessity for which there can be no two opinions, it would indeed prove a boon to Canada. To this effect, I believe the following will be sufficiently near the desideratum.

Any candidate shall be permitted to present himself for examination before a duly authorised board, upon proof that he has attained the full age of twenty-one years, and that for two years and six months consecutively he has studied Chemistry, Anatomy and Physiology. If upon a patient, careful and thorough examination he be found fully acquainted with these several branches of knowledge, he shall be furnished with a certificate from the board to that effect, which certificate shall constitute such candidate a legally qualified practitioner of medicine. The plan proposed does not require an examination in any of the practical branches of the profession, but simply in those departments which constitute the foundation on which medical science is and must be built.

With regard to chemistry, all will readily admit the imperative necessity for its culture by those presuming to practice medicine; it is a natural science, and admits of no special interposition to suit individual bias. Nor is anatomy of less importance; we do not trust a watch, of even trifling value, for repair to the untutored skill of an Indian, wholly ignorant of its anatomy; he knows not how the propelling power is transmitted to its several parts; indeed he has never seen the inside of a watch; accustomed to determine the lapse of passing hours by the varying length of his own shadow, he comprehends not its purpose. Infinitely less should we be willing to trust our own corporal mechanism, when suffering the effects of violence and disease, to the rude manipulations of the unlettered hind, who, ignorant of its anatomy, knows not how the propelling power is transmitted; indeed, has never seen the inside of such a piece of mechanism.

Anatomy, like chemistry, admits of no special interposition, to suit individual bias.

A thorough acquaintance with the truths of physiology is not less essential for the successful practice of medicine: derived immediately from chemistry and anatomy, it forms part of the tripod upon which rests all medical deductions.

The candidate having successfully passed an examination on each of the proceeding subjects, he should be permitted to treat disease in accordance with the teachings of any school he might prefer; and I would punish any person practising medicine not having successfully undergone such examination so severely, that a repetition of the offence would rarely be attempted.

It should be the duty of practitioners to register their names, date of certificate and place of residence, in the office of the Clerk of the Peace of that district in which they might reside.

The present board of examiners should continue their functions; limited, however, to the above named subjects, until other medical practitioners of whatever sect, may obtain sufficient standing to warrant their names being added to the board of examiners as now constituted.

Finally, let all desirous of practising the healing art in Canada, irrespective of degree, diploma or certificate emanating from what source soever, be required to submit themselves to the same board for examination in the several branches above named; whose certificate shall alone entitle the holder to practice.

I have the honour to be, Sir,
Your most obedient servant,
PROTECTOR.

We readily commend the foregoing excellently written letter on the incorporation of the medical profession, to the consideration of the colonial legislature, the medical profession and the general public; we flatter ourselves it is one step onwards in the right direction. In the estimation of some it will appear like coaxing the legislature and the public into a proper course of action with regard to the rights of the medical profession; to others it may seem like "compounding a felony," for, if it be true that the public require bodily protection in the science of medicine against the ignorant and pretending, it must also be clear that they should have the full benefit of any legislative enactment that is designed to suppress quackery and encourage science. Nevertheless, if the state will oblige the student in medicine to be fully acquainted with the sciences indicated by our correspondent, we have but little fear that he will afterwards take the right road in the practice of physic. What is more, the public cannot possibly object to a complete and practical knowledge of the sciences being an indispensable requirement in any physician's education. An acquaintance with these sciences commends itself as the foundation of a liberal education in every man. To the physician the sciences of chemistry, anatomy and physiology are the bases on which rest all his future studies—the foundation of all experience in the healing art; they are simple every-day facts that we meet with at every turn in life, and are necessary to the interpretation of the simplest truths in a normal condition of matter. Such knowledge is necessary for the physician, and may be advantageous to the public. But we would ask why pathology may not be added to the list; as anatomy is a knowledge of the human body in a healthy condition, why may not the medical student be required to see and understand the human form in its diseased state? It is confessed that to understand disease, the medical student must comprehend the human body in the purity and simplicity characterised by healthy action; why then should he not be required to be familiar with it in a diseased condition—to acquainted with the changes incident to altered action or morbid production? The medical student should be as fully acquainted with the one condition as the other. It is only during the period of his tutilage that, in most cases, he can become acquainted with a knowledge of pathology. If this study be neglected now, how can we expect him to recognize disease at the bedside of the patient in after life? The conclusion is absurd that a man can become a physician without a thorough knowledge of this department. What is more, we maintain that a perfect knowledge of the body *diseased*, cannot militate against any of the medical dogmas fashionable at the present day, of which our correspondent is desirous of steering clear. It is a simple fact, that if a man is sick the physician must know the nature of the changes which produced the disease, or he cannot possibly treat them successfully. We believe that when these are fully comprehended, the medical treatment, guided by common sense, may be left in the hands of any intelligent man; we believe that if the nature and character of the disease are fully understood, almost any person can treat it correctly, if he has a perfect knowledge of the sciences indicated by our correspondent. Therefore, with a perfect knowledge of these four departments of medical science, we would willingly leave the treatment in the hands of any physician whatever. By this regulation also we believe that the public would be defended from ignorance, and the practice of medicine exalted as a science.

TORONTO GENERAL HOSPITAL.

In our last issue we were constrained to the unpleasant duty of laying before the profession and the public a series of communications which had passed between the Trustees of the Toronto General Hospital and ourselves, which point to the fact that we had been most unjustly and tyrannically treated. We then maintained that the trustees having made a by-law which had been duly sanctioned by the Governor General in Council, it became a law of the Province and required to be dealt with accordingly. As a Licensed Medical Practitioner, we were entitled to the benefit of that law, and could not be lawfully excluded unless the trustees passed a by-law to that effect; this they had the power to do; and from their peremptory order of the 20th May, we are led to expect that they had done so—as a matter of course, the by-law required the sanction of the Governor General within 30 days, agreeably to the 16 Vic. chap. 220. Feeling that it would be well to anticipate the action of the Board in this matter, we forwarded the correspondence above alluded to, to the Governor General, praying him not to sanction the by-law for our exclusion until a proper investigation of the matter had taken place. After a short time we received a communication from the Assistant Provincial Secretary; when we forwarded to the Hospital Trustees the following communication, from which, and from the extracts we have made, it is clearly shown that the Hospital Trustees have acted as unlawfully as they have tyrannically in this matter.

Yonge Street, Toronto, 24th June, 1854.

Sir—Having considered it my duty to lay before His Excellency the Governor General, the correspondence which has passed between the Board of Hospital Trustees and myself, relative to my arbitrary exclusion from the Toronto General Hospital, I beg to forward you for the information of the Board, the following extracts from a reply I have received from the Assistant Provincial Secretary:—

"In reply, I have to state that no by-law has been transmitted to His Excellency in reference to your exclusion from the Hospital, and that in the event of any such by-law being received His Excellency will not fail to cause a full enquiry to be made into the facts of the case, in order to ascertain whether such by-law should not be disallowed."

Also that, "If under the by-law of the Hospital now in force, you have a right to attend there, His Excellency is advised that you have your legal remedy against the trustees if prevented from so attending."

Under these circumstances it must be plain to the Board that the by-law which was proposed relative to my exclusion from the Hospital, and tyrannically acted upon by their order of the 20th of May, before it received the sanction of the Governor General, according to the statute 16 Vic. ch. 220, is void as a law to all intents and purposes. Consequently, I respectfully require to be informed by the Board, whether, if I comport myself agreeably to Hospital rule 4, section 7, I shall be refused admission into the Hospital by their direction.

I have the honor to be, Sir,
Your obedient servant,
S. J. STRATFORD.

J. W. Brent, Esq., Sec'y H. B. T.

To this communication the Trustees did not deign to return an answer—wilfully confirming the wrong by persistence in their error.

We have received ample proofs that a very considerable portion of the medical profession and of the public deeply sympathize with us in our determination to maintain our own rights and one of the privileges of the medical profession in this matter. As a proof of this fact, we transcribe the following remarks which appeared in the *Quebec Mercury* of the 1st of July last.

"BATS AND CORRUPTIONISTS IN TORONTO.

"We cut the following correspondence from the Toronto North American, by which it will appear that there are 'bats' and corruptionists in Toronto as well as there once were in London, but which, thanks to the press, have been broken down, and are now about to be crushed away by medical reform. Toronto has only followed the example of Quebec in closing the doors of its hospitals against more talented and fearless men than their own medical officers. No man is fit for the discharge of the important duties of visiting physician or surgeon to a public hospital that dreads the presence of any professional man during the regular visiting hours. Fancy Cooper, or South, or Green, or Liston, or Lizars, or Syme, or Laenec, or Louis, or even among ourselves a Douglas or a Campbell, afraid of the presence of any human being during the hours of visiting or operations! The idea would be too absurd to entertain in the present day, even in a country town. We are quite of Dr. Stratford's opinion, that the cause of what we will designate as the outrageous and unwarrantable course of the authorities of the Toronto General Hospital, was the reporting of Dr. Beaumont's lecture on aneurism. We have attentively perused everything on the subject contained in the Upper Canada Medical Journal, and we think that Dr. Stratford's conduct throughout has been as manly, ingenuous and liberal, as Dr. Beaumont's has been the reverse. Dr. Beaumont first consented to the publication of his lecture and then repented, as he says in a letter addressed to Dr. Stratford, dated 21st February, 1854—'I had stated that I should be willing to correct the notes of a clinical lecture which I gave on a case of Traumatic Carotid Aneurism, *if such notes were tolerably accurate.* The proof which you have sent me contains a great deal *which I did not say,* and gives very incorrectly and imperfectly parts of the lecture, as well as the quotations from Guthrie. The editorial remarks in reference to myself, which you have thought proper to make, preclude the possibility of any further communication with you." Whew!—So because Dr. S. has dared to differ in opinion with Dr. B., his high mightiness (and we know neither of them personally, and have therefore no bias in our judgment) takes the pet and refuses to do what he had engaged to do. Worse still, like the dog in the manger, he would neither correct the lecture himself, nor lend the only copy of Guthrie then in Toronto so as to enable Dr. S, to correct the quotations—Dr. B. having 'withheld the book after it had been lent by Dr. Widmer.' Notwithstanding all Dr. Beaumont's petulance, however, Dr. Stratford gives him full credit for his operation, as, after stating his reasons for differing in opinion with Dr. B., he says—'Still, however, if experience shall prove that the treatment is correct in this case, and it would appear most favorable for the trial to test the truth, the greater credit will be due to Dr. Beaumont for adopting it;' and subsequently, Dr. S. having had an opportunity of seeing the case (that so much pains had been taken for several weeks to prevent him from seeing), he candidly and generously says—'The result of this case is certainly a signal illustration of the principles laid down by Mr. Guthrie, that in little over seven weeks from the time Dr. Beaumont commenced the treatment of this aneurism after Valsalva's method, the tumour should have disappeared. The case does Dr. Beaumont infinite credit,' &c., &c., &c. Now what more does the latter want? Is the penalty upon any one who presumes to differ in opinion with him to be exclusion from the wards of the Hospital? Shame upon you, gentlemen! Shame upon you! Open your doors wide and at once, and admit your magnanimous, learned and independent confrere. Professional ethics are against you, common sense is against you, justice is against you, humanity is against you, and public opinion is against you. Change your policy at once, or your General Hospital will go the way of your Lunatic Asylum, and then the best thing you can do will be to merge the two establishments into one."

We have incidentally learnt that the medical gentleman who has condescended to view our conduct in so favourable a light, is of high professional standing in Canada East. The eulogiums, we fear, are undeserved; but the audacity and tyranny so evident, has naturally excited his indignation, as it has of a very considerable portion of the profession. It has called forth expressions of disapprobation from many other sources, of which we shall gratefully avail ourselves at a subsequent period.

If we slightly pass the facts of the case in review, it will be plainly seen that the Board have no charges against us that they dare to make public; it is also shown that the Board has acted contrary to law as well as to justice. It may also be seen that if we had unconsciously committed any error, that we were ready to make ample apology, but of which no notice was taken. Such has been the action of the Board; and, agreeably to the promise we have given, we shall in due season forward for the consideration of His Excellency the Governor General a full report upon the Toronto General Hospital.

We also now desire to show that with the medical officers themselves we have used every honorable means in our power to call them to a sense of the injustice they have heaped upon us. We have written to the resident medical officer, pointing out the facts of our wrong, and offering to compromise the matter in any honorable manner, but all without any better feeling on their part; like the Hospital

Trust, they returned us no answer, thence adding insult to injury. Corporate bodies are technically said to have no souls, hence such a course is what we might naturally expect from them; but from the medical officers, and some of them professing to belong to the medical department of Trinity College, we certainly had hopes of a greater courtesy or more decided indication of a better condition; but alas, our fond anticipations have failed, and we begin to fear that they must be individually and morally in as bad a state as the Hospital Trust.

From the facts of the case, it must be evident that the Hospital Board do not intend to give us justice, and that the medical officers cowardly shelter themselves behind poor old Dr. Widmer (who in this instance personifies the Board), perfectly content that he shall bear the disgrace of this unmanly and dastardly conspiracy against the rights of the medical profession; consequently we mean to go to the fountain of all this ill-feeling, and to the best of our ability show to the profession and the public that the said medical officers of the Toronto General Hospital—Drs. Beaumont, Hodder, &c.,*—are unworthy the position they hold, not only for the baseness of this conspiracy, but from the way they treat the unfortunate patients committed to their charge. Determined to make every movement with frankness and candour, we transmitted to the resident medical officer at the Hospital a letter to be laid before the parties, setting forth the fact that we were desirous of settling this unpleasant affair in an amicable manner, rather than of proceeding to extreme measures—*to this we have received no reply*. We then transmitted a communication stating that we consented to stay proceedings upon the following terms:—"That they (the said medical officers) send a declaration to the Board of Hospital Trustees that they will resign (as they did when they called for our exclusion) unless the Board rescind the order for our exclusion from the Hospital, dated the 20th of May; and that the

* We desire it to be understood, that it is to a moiety only of the gentlemen attending the Toronto General Hospital that we are indebted for this persecution;—to the remainder we tender every acknowledgment for their universal courtesy and attention.

Board pass a by-law declaring that no licensed medical practitioner shall be prevented visiting the Hospital without receiving a copy of the charges made to the Board against him, and of being afterwards heard in his own defence, if he desire it." That if they were willing to accept these reasonable terms, we were willing to forget and forgive our injuries and settle the matter. We also transmitted to the gentlemen a copy of one of the many cases in which we design to *show them up* before the profession, of which the following is a copy, and we now publish it, as they obstinately refuse reconciliation upon any terms :—

AWFUL TRAGEDY.

ACT FIRST. SCENE FIRST.

Scene in a small room off the corridor in a certain Hospital not one hundred miles from Toronto.

DRAMATIS PERSONÆ.

The would-be Esculapius of Canada.
A Professor of Midwifery—the hospital bully.
An ex-Professor of Surgery in the late Canadian Stincomalee.
An ex-Professor of Midwifery—a dear old soul.
A poor woman, aged about 45, with an immense polypus tumour of the womb.
Several officials peeping, but ashamed to be seen in the melée.

Poor woman placed upon a table—Chloric Æther being exhibited. This excited her—made her more sensitive to pain, without producing insensibility, or numbing her sensations.

Ex-Professor of Surgery, with an instrument for tying polypus of the womb, too ingenious to be used, endeavoring to place a ligature round the neck of the tumour. After trying a long time without success, obtains a pair of midwifery forceps, introduced them into the womb, and having fixed them on the tumour pulls with all h[illegible] might as though he expected to tear away the tumour—but all i[illegible] vain—the poor woman struggling and screaming with all her power, "You're pulling my g—s out—you're pulling my g—s out."

Hospital bully delighted—winking, smiling and chuckling, to see his former enemy in a scrape—urging him to further exertions, without endeavoring to save the poor woman from unnecessary torture.

Esculapius cursing and swearing that the ex-Professor of Stincomalee should let the poor woman go, as she was dying upon the table. Ex-Professor of Midwifery pitying the poor woman and praying that they would cease to torment her, for he could expect no good from such treatment.

In a very few days the poor woman dies.

SCENE SECOND.

Dead House—Sectio Cadaveris.

Shows a very large polypus tumour of the womb, with a very small neck, that any tyro in surgery could have put a ligature around, when the tumour would have come away—the poor woman in all probability have lived, and done well.

N. B.—Do not show this to Coroner King, or he will have the poor woman's bones exhumed, and an inquest held forthwith *pro bono publico.*

(*To be continued.*)

MEDICAL BOARD.

After the Medical Board had finished its sitting, we applied to the Secretary of the Board for a list of the gentlemen who had passed their examinations, but he did not condescend to give us an answer; consequently we have been under the necessity of selecting from the *Carleton Place Herald* the names of the individuals who are to receive a license from the Governor General.

"The present session of the Board has been characterized by more harmony and good feeling than the previous one, with the exception of the first day of their meeting, when a well-known member attempted to kindle the smouldering fires of strife, but his contemptible conduct of late has rendered him utterly powerless in that quarter, and he did not show himself again during the remainder of the session. Of fourteen candidates that entered their names, two withdrew, four were rejected, and eight were enrolled among the sons of Esculapius. The following are the names of the successful candidates:—Lawrence McLauchlin, *Fingal;* James Kennedy, *Toronto*; Thomas W. Poole, *Carleton Place;* Charles Tozer, *Aylmer;* Jas. W. Chadwick, *Princeton;* (the above are from the Toronto School of Medicine); Thomas Wheeler, *New York;* Thos. Benson, *do.;* and Alexander Patella, *Caledon.* The last named gentleman is from Trinity College."

SELECTED MATTER.

A COURSE OF LECTURES ON ORGANIC CHEMISTRY.

Delivered in the Laboratory of the Royal Institution of Great Britain, by Dr. A. W. Hofmann, F.R.S., Professor of the Royal College of Chemistry.

Lecture X.

SACCHARINE SUBSTANCES.

The substances which I brought under your notice in the preceding Lectures are all capable of being produced by the ordinary processes of the laboratory. To-day I have to call your attention to a series of compounds, the formation of which is still a secret, which at this moment, the living organism possesses alone. These compounds, equally interesting for their remarkable diffusion both in the vegetable and animal kingdoms, for their extensive application, and for the variety of products which are derived from them by chemical changes, are known under the collective terms of saccharine substances, or sugars. The saccharine substances are very distinctly characterised by their properties, by their composition, and by the changes which they undergo under certain conditions. They are all extremely soluble in water, to which they impart a taste more or less sweet; they consist of carbon, hydrogen, and oxygen, and contain the two latter elements in the proportion in which they form water. Lastly, under the influence of certain substances which are themselves very prone to decomposition, and which are generally termed ferments, they undergo a remarkable alteration, the products of which are carbonic acid and alcohol. We shall presently return to this peculiar decomposition.

There are generally distinguished four different varieties of sugar, which may be readily recognised by their physical properties. They are—cane-sugar, uncrystallizable sugar, (fruit-sugar,) grape-sugar, and milk-sugar.

The progress of science has lately led to some farther subdivisions, especially since the deportment of sugar-solutions, under the influence of polarised light, has been made the subject of a more minute investigation.

The most definite of all the sugars is the ordinary sugar—the sugar *par excellence*—chiefly derived from the cane,—hence called cane-sugar,—but also from beet-root and from the maple-tree, and existing in a great variety of plants. Cane-sugar is remarkable for the facility with which it crystallizes. The cane-sugar of commerce is called sugar-candy, or loaf-sugar, according as it has been allowed to assume the shape of well-defined crystals, or to crystallize in a confused mass. A third variety of cane-sugar is what is used by confectioners under the name of barley-sugar. It is obtained by heating sugar to about 160° C. (320° Fahr.), and pouring the fused mass on a marble slab, when it solidifies into a transparent, glass-like substance, which is amorphous sugar. When kept for some time it gradually loses its transparency, and becomes crystalline again. The crystalline and the amorphous sugar have exactly the same composition; it is represented by the formula—

$$C_{12}\ H_{11}\ O_{11}$$

If a solution of cane-sugar be boiled for some time, it undergoes a perfect change. On evaporating the solution it no longer crystallizes, but dries up to a syrupy mass, which when dried in the water-bath, differs from cane-sugar, by containing one equivalent of water more; its composition being

$$C_{12}\ H_{12}\ O_{12}$$

It is the formation of this uncrystallizable sugar which is particularly dreaded by the sugar manufacturer. On this account, the juice expressed from the cane, after having been boiled for a very short time in order to coagulate the albuminous substances, is concentrated at the lowest temperature; and most expensive and complicated machinery, such as air-pumps, etc., have been constructed, in order to diminish the loss arising from this source; for it is impossible to avoid it altogether. The uncrystallizable sugar thus produced is known by the term "molasses."

The same change which a solution of cane-sugar undergoes when boiled for some time is produced even more readily by the action of dilute acids upon it. Sulphuric acid and hydrochloric acid produce this effect very readily. The organic acids act more slowly, but ultimately give likewise rise to the formation of uncrystallizable sugar. It is necessary that the acids employed should be very dilute, for concentrated acids produce another series of changes. By concentrated sulphuric acid, as is well known, sugar is carbonised.

A variety of sugar, perfectly similar to that produced by boiling, or by the action of acids upon cane-sugar, if not the same, is found in the juice of many fruits, which, like grapes, cherries, currants, etc., are remarkable for the quantity of free acid which they contain. The juice of these fruits, separated by ebullition from the albuminous constituents, and freed by convenient processes from the organic acids present, yields on evaporation a gum-like residue, which has the same composition as the sugar derived from cane-sugar by the action of acids. The two substances are probably identical; for they not only agree in their chemical composition, but also in their physical characters, especially in their deportment with polarised light, on which they act in an absolutely different manner from cane sugar—uncrystallizable sugar reflecting the plane of polarization towards the left, while cane-sugar exerts a deflecting action towards the right.

The uncrystallizable sugar, whether produced by boiling or treating with dilute acids a solution of cane-sugar, or whether obtained directly from the juice of fruits, undergoes a farther change. A concentrated solution becomes gradually crystalline; but the form of the small granules which are formed essentially differs from that of cane-sugar crystals, from which the new sugar differs, moreover, by its composition which is represented by the formula—

$$C_{12}\ H_{14}\ O_{14}$$

This new sugar is generally called grape-sugar, probably because it was first obtained from the grape; but, since it is not the direct product of the grape—since it may be obtained from a variety of other fruits equally well; moreover, since as we have seen, it may be likewise produced from cane-sugar, I follow the proposal of M. Dumas, who first adopted the term *glucose* for this substance. Besides, this sugar has been met under several other very remarkable substances, to which I have to direct your attention by and by. On comparing the composition of glucose with that of cane-sugar, it is evident that the former contains three equivalents of water more; and the change which the cane-sugar undergoes consists simply in a gradual assimilation of water. I say gradual, because it is first converted into uncrystallizable sugar; and it is by no means improbable that a farther modification exists between the latter and glucose, as indicated in the following diagram—

Cane-sugar	$C_{12}\ H_{11}\ O_{11}$
Uncrystallizable sugar	$C_{12}\ H_{12}\ O_{12}$
(?)	$C_{12}\ H_{13}\ O_{13}$
Glucose	$C_{12}\ H_{14}\ O_{14}$

The formula

$$C_{12}\ H_{14}\ O_{14}$$

represents the composition of glucose when dried at the common temperature. At a higher temperature it loses water; when dried at the temperature of boiling water, it loses two equivalents of water, and becomes

$$C_{12} \; H_{12} \; O_{12}$$

It has then the composition of uncrystallizable sugar; but it has undergone no change, as is proved by its optical deportment, (glucose, like cane-sugar, reflecting the plane of polarisation towards the right,) and the readiness with which it crystallizes again when re-dissolved in water.

In its chemical properties, glucose differs in a great many points from cane-sugar. I have already alluded to the difficulty with which this substance crystallizes. It is far less soluble in water than cane-sugar, 100 parts requiring at least 150 parts of cold water, while 100 parts of cane-sugar dissolve in less than forty parts of water; hence, its sweetening power is far inferior. In the dry state, these two sugars are readily distinguished by their aspects; but even their solutions may be readily recognised by chemical means. Solutions of these two sugars have the power of preventing the precipitation of certain metallic oxides. Thus, a solution of sequioxide of iron, and of protoxide of copper, are no longer affected by potassa, when previously mixed with a solution of sugar. In the case of copper, deep azure blue transparent liquids are obtained in this manner. If the copper be kept in solution by glucose, the blue liquid, after standing a few minutes, more readily, on gently warming it, assumes a deep orange colour, which gradually turns brick red. The protoxide of copper is reduced by this process to the suboxide, the sugar combining with half its oxygen, whereby its elements are more or less burnt. The cane-sugar solution, when treated in the same manner, undergoes no change; only, when heated to ebullition, a deposit of suboxide of copper gradually takes place. Ebullition with potassa likewise enables us to distinguish the two varieties of sugar. Cane-sugar is not affected by the caustic alkalies: while glucose, under the same circumstances, undergoes a series of changes, in consequence of which it assumes a deep brown colour.

In other respects the two varieties greatly resemble each other. When treated, both lose the elements of water, and furnish a substance known by the term of caramel, which contains two of water less than cane-sugar, and five less than glucose—its composition being

$$C_{12} \; H_9 \; O_9$$

This substance, which has a deep brown colour and a peculiar flavour, is still soluble in water; it is used to a considerable extent for colouring and flavouring liquids. The action of nitric acid upon both sugars is also perfectly alike, the product being in the first place a peculiar acid, saccharic acid, then oxalic acid, and lastly, carbonic acid. All the oxalic acid now consumed in the arts is manufactured by the action of nitric acid upon the inferior varieties of sugar. Lastly, as has been already mentioned, both cane-sugar and glucose exhibit the same optical deportment, although in different intensities.

I have alluded to the extensive occurrence of glucose, both in the vegetable and animal kingdoms. It is, as I have stated, furnished by a great many plants, especially by those whose juice is of an acid character. The whitish deposit upon dried raisins, figs, or French plums, consists of glucose which has been gradually formed by the action of the acids present in these fruits, upon the uncrystallizable sugar which they originally contained. If fruits which contain a great deal of free acid are preserved by cane-sugar, it is frequently found that nearly the whole of the latter is converted into glucose. In all the cases which I have pointed out, glucose exists in the free state in some plants; however, it is found in a peculiar state of combination, from which it is released only by the action of chemical agents. Thus, the bark of the willow contains a crystalline substance called salicin, which is remarkable for its composition and properties. Under the influence of acids, this body splits into salicylous acid and glucose. A similar substance, populin, is present in the leaves of the poplar, which has even a more complicated composition, consisting, as it does, of benzoic acid and salicin.

In the animal kingdom, likewise, glucose is frequently met with. The white granules which are deposited from bees' honey consist of pure glucose, and the same substance constitutes the sugar which is found as a morbid constituent of urine in diabetes mellitus.

I have still to mention a production of glucose which presents particular interest, and to which I must devote a few moments before leaving this subject. Among the prominent constituents which may be separated from plants, there occur two bodies, which, by their composition, are closely related to the sugars. These substances are cellulose and starch: the former constituting the greater part of the cellular tissue of the plant; the latter forming the substance with which the cells of a great many plants are filled. It is not my object to give here a full description of these remarkable substances, which at present interest us only in their relation to sugar. The composition of cellulose and starch is represented by the formula

$$C_{12}\ H_{10}\ O_{10};$$

i. e., they have the composition of glucose, less three equivalents of water. Now, experiment has proved that these two compounds may be converted into glucose with the greatest facility. It suffices to boil them for a sufficient length of time with dilute acids, in order to produce this metamorphosis. This transition, however, is not immediate. Starch when converted into glucose, passes like cane-sugar through a series of stages. If the action of acids be interrupted as soon as the starch or cellulose is completely dissolved, the liquid furnishes, on evaporation, a gum-like residue, which re-dissolves in water, but is insoluble in alcohol,—a property which enables us to precipitate the same body by the addition of alcohol. This substance is called dextrin, from its more powerful action on polarised light, which like cane-sugar and glucose, it deflects towards the right. It may be obtained from starch by other processes—for instance, by the action of heat; and is now manufactured, on a large scale, as a substitute for ordinary gum, which it is capable of replacing in many applications. It is better known by the commercial term "British gum."

Dextrin has exactly the same composition as starch and cellulose, from which substance it differs, however, essentially by its properties. Dextrin readily undergoes a farther change by the influence of acids. If the acidulated liquid be boiled for a short time, the dextrin entirely disappears, for the solution no longer yields a precipitate by alcohol. It now is found to contain sugar, and on standing, crystals of glucose are actually deposited. If we compare the formulæ of starch and glucose, and if we bear in mind the gradual assimilation of water which is observed in the transformation of cane-sugar into glucose, we feel inclined to think that the formation of the latter body from starch may be preceded by that of cane-sugar and uncrystallizable sugar. However probable this conjecture may appear, it is not fully corroborated by experiment; for, although the solution seems to contain uncrystallizable sugar at a certain period, all attempts to arrest the action at the stage at which the starch has assimilated only one equivalent of water—in other words, to produce cane-sugar from starch—have hitherto entirely failed. Here, then, a chemical problem of intense interest presents itself, the successful solution of which could not fail to reward the happy experimentalist by a fortune of colossal magnitude.

In the several transformations effected by means of sulphuric acid, which I have had to bring under your notice in this lecture, this acid plays a most extraordinary part. Its action obviously differs from that observed in ordinary chemical processes. If you precipitate a barium-salt by means of sulphuric acid, the amount of baryta capable of being thrown down stands to the aid employed in an unchangeable relation, which is expressed by the comparatively simple ratio of the equivalents of the two substances. After the reaction has taken place, the acid is in a state of combination; that is, it is no longer capable of producing the same effect. In the action of sulphuric acid upon starch and upon cane-sugar, a very different deportment is observed. An extremely small quantity of sulphuric acid is able to convert 50, nay, 100 times its own weight of starch, and after having performed this task, we find it uncombined in the liquid, ready to do the same work over and over again. Chemists have as yet vainly endeavored to explain these changes in a satisfactory manner. The sulphuric acid in this case appears to act by its presence only—by its contact with the substances under decomposition, and hence the terms, "*contact-actions, contact-effects, catalytic processes*," which you frequently meet with in chemical writings; words, of course, which are intended only to convey the meaning, that in the present state of our knowledge these actions cannot be explained. The progress of science has, however, thrown much light even on these recondite processes; and I may have to return to this subject in one of the following lectures, in order to show you that several successful attempts have been made.

The action of acid is not the only mode in which starch may be converted into sugar. There is another process, which appears even more enigmatical. The germination of seeds gives rise to the formation of a peculiar substance, which is capable of changing starch in exactly the same manner as dilute acids do; producing in the first place, dextrin, and ultimately glucose. The chemical composition of this substance, which is generally called "diastase," is unknown, because all attempts to prepare it in a state of purity have hitherto failed. If germinated barley be rubbed to a powder, and exhausted with water of about 30° C., (86° F.,) and the filtered liquid be mixed with absolute alcohol, a yellowish-brown flaky precipitate takes place, which contains the active principle—but the analysis of which has not led to concordant results; in fact, all that is known about it at present is, that it is very rich in nitrogen. You are all aware that the germination of barley is carried out on a large scale, for the purposes of the brewer. He thus obtains what is generally called "malt." For this purpose, the barley is left for some time in contact with water, whereby the grains swell up considerably. In this state it is left exposed to the atmosphere in localities the temperature of which should be under the command of the operator, much heat being evolved during germination. An air-temperature of 7° C. (45° F.) is found most convenient, but the temperature of the germinating mass is scarcely less than 15.5° C. (60° F.) The air is frequently renewed, and the thickness of the layers in which the barley is heaped up diminished in the same measure as the germination advances. As soon as the length of the germ nearly equals the size of the grain itself, it is known from experience that the largest amount of diastase has been produced. The farther progress of the germination is then interrupted by drying the seeds at a high temperature in a kiln, whereby the vitality of the grain becomes destroyed. The malt produced in this manner contains now, in addition to the diastase, a certain quantity of dextrin and sugar, produced by the action of the newly formed diastase upon the starchy matter of the seed. The remainder of the starch is readily converted into glucose by digesting the malt with water, at a temperature of 71° to 76° C. (160° to 170° F.), an operation which is called *mashing* by the brewer, and which furnishes a clear solution of dextrin and glucose, called *sweet wort*, and ready to be submitted to a farther transformation, which I shall mention by and by.

The mode in which diastase exerts its action upon the starch is not better understood than that of the acids. We are at present only in possession of the fact; but this fact is of so much importance, both in a practical and theoretical point of view, that I must not omit to exhibit it to you experimentally as far as possible. The conversion of starch into glucose is too slow to admit of its performance in a lecture-experiment; but its transformation into dextrin takes place with great rapidity, and becomes at once perceptible. For this purpose, I will introduce an infusion of malt (*i. e.* diastase) in lukewarm water into a vessel filled with starch-paste, the temperature of which is kept as near as possible at 71° C. (160° F.) After the lapse of a few minutes, the change becomes manifest by the liquefaction of the mass. Now, if you have time and leisure to follow the reäction by testing from time to time portions of the solution with iodine-solution, which as you know, produces a blue coloration as long as any starch is present, you will find that the intensity of the colour is rapidly diminished, and that soon a point is reached when the perfect cessation of coloration indicates the total transformation of the starch into dextrin. The passage of the latter into glucose is not perfectly accomplished before the lapse of several hours.

In order to complete the description of the several sugars which I have enumerated, it remains to say a few words regarding the saccharine compound found in the milk of the mammalia, and which is generally called milk-sugar, lactin, or lactose. A few words, however, may suffice. Milk-sugar is always obtained from the milk after the butter and cheese has been separated. One or two re-crystallizations renders it perfectly pure. The milk-sugar which we meet in commerce is nearly all prepared in Switzerland.

Milk-sugar has the same per centage composition as uncrystallizable sugar. Chemists are, however, in the habit of representing it by the formula

$$C_{24}\ H_{24}\ O_{24}$$

because it is capable of exchanging 5 equivalents of hydrogen for an equivalent amount of lead,—a quantity which would lead to fractions if the simpler formula

$$C_{12}\ H_{12}\ O_{12}$$

were assumed.

Milk-sugar is readily distinguished from cane-sugar and glucose by its being far less soluble in water—1 part of milk-sugar requiring as much as 5 or 6 parts of cold water. In alcohol it is perfectly insoluble, and the aqueous solution is slowly precipitated by alcohol. The most characteristic difference, however, is observed if milk-sugar be treated with concentrated nitric acid. In this reaction, milk-sugar is converted into a peculiar crystalline acid (*mucic acid*), which is difficultly soluble in water, and which, both by its composition and properties, essentially differs from oxalic acid, which, as you know, is the product of oxidation of the other sugars.—*Medical Times and Gazette.*

ON THE LOCAL APPLICATION OF THE VAPOR OF CHLOROFORM.

In an article in the *Dublin Quarterly Journal*, Dr. Hardy gives several examples of the application of the vapor of chloroform to the vagina and neck of the uterus, in painful affections of these parts, by means of an instrument which he has invented for that purpose. The following are his conclusions:—

"In observing the effects of chloroform as applied locally in the form of vapor in the above cases, I have endeavoured to obtain as correct a notion of it as possible, in order that a true estimate might be arrived at of its value as a remedy. Besides the cases here recorded, I have applied the vapor locally to various other forms of irritation. One of these in particular I was anxious to know its action in—namely, *pruritus pudendi*, a disease exceedingly troublesome and unpleasant to the patient, and for the relief of which she is often very reluctant to ask a remedy until she is forced to do so. I have used it in a case of this kind in the person of a very intelligent patient, who for a length of time had been annoyed, particularly on the approach of a menstrual period, by this distressing complaint, for which she made use of various remedies. The vapor of chloroform, she informed me, afforded her relief from her uneasy sensations. On referring to one of the cases (Case V.) detailed, it will be seen that there was a very severe sense of scalding in the vagina, which seemed to depend a good deal on uterine irritation.—Knowing the heat caused by the vapor of chloroform, I feared this patient would have suffered severely from its application; but, on the contrary, she was quite relieved of it; so in *pruritus pudendi*, arising from a similar cause, the like results have been obtained as in her case.

"In future investigations as to the effect of the vapor of chloroform when locally applied coincide with the results already observed in the series of cases herein detailed, it seems reasonable that the following conclusions be considered deducible :—

"First. That in many forms of disease attended with pain or irritation the local application of the vapor of chloroform will frequently act as quickly in affording immunity for suffering as though inhaled in the usual manner.

"Secondly. That the vapor locally applied is not attended with any unpleasant effects (save the sensation of more or less heat) either at the time or subsequently, and it is therefore eligible under circumstances contra-indicating its use by inhalation.

"Thirdly. That as a remedy, its local application is preferable to the use of opium and most narcotics in spasmodic and painful affections, particularly of the uterine system, owing, first to its freedom from causing derangement of the digestive organs, and secondly, to its greater rapidity of action."—*N. Y. Journal of Medicine.*

ON THE TRANSMISSION OF SENSITIVE IMPRESSIONS IN THE SPINAL CORD.

By Dr. Schili.

Dr. Schili read an interesting paper and performed some interesting experiments before the Academy of Sciences, at its last meeting, on the transmission of sensitive impressions in the spinal marrow. In men, and the superior orders of animals, the brain sends into the interior of the vertebral column a nervous prolongation, vulgarly called the spinal marrow; an organ whose importance is evidently exhibited by the careful armor of bones which protects it, and by the grave disorders superinduced by every injury received, militating against the integrity of its functions. Anatomy divides the spinal marrow into several distinct parts—a double and a symmetrical organ, whose right and left moieties are separated by a limit traced by nature, a sort of furrow (there are two, one anterior the other posterior) which the anatomical student has but to follow with his scalpel, to divide the spinal marrow into two parts. Each of these parts is divided into three chords, so that there are in all six medullar ribbons—two anterior, two posterior, and two lateral. Nor are these all: when the marrow is transversely cut, the student may observe that the right and left moieties are held together by a connecting substance, which is called the central gray *commissura*, from its being less white than the rest. Here anatomy ends, and here physiology takes up the theme and endeavors to add new light to the subject. It may not be so sure as anatomy; it is a progressing, a new science; but how great interest is now felt in its least discoveries, as it tries to explain the operation of the organs, or, at the least, to exhibit the use of the different parts?

One of the most important facts discovered by the experiments of vivisection is the unquestionable difference existing between two sorts of nervous fibres; these being exclusively affected to sensation and those to motion.—The reader will remark the word fibre, and not nerve, is used, for by a very remarkable singularity of organization, most of the nerves which are ramified in the different parts of the body are mixed nerves—*i. e.* groups of two sorts of fibres so confounded together that they cannot be separated; it is only in a very limited portion of their route the fibres of the same species are assembled together. Take at will in the body of a man any nerve large enough to be followed easily towards its origin; the student will be led to the spinal marrow, their common origin, and he will recognize that the nerve is implanted in it by two roots (and not very large) placed behind each other. Of these two roots, the anterior is formed of fibres used to excite motion; in the posterior root, on the contrary, all the fibres are exclusively destined to sensation. Pinch the former in a living animal, there will be convulsive movements; irritate the second, and the animal shows by his cries the pain he suffers; but if the student tries this experiment, some *centimetres* only further from the conjunction of the two roots, both of these effects will be produced together, for he will at the same time be operating on both species of fibres.

This admirable discovery of Sir Charles Bell has engaged physiologists to endeavor to ascertain whether the marrow itself is not formed of motive and sensitive parts. Their conclusions clash. It appears indeed the motive power belongs to the anterior chords, and sensibility to the posterior chords; but these characteristics are not so distinctly defined as in the pairs of nerves which emanate from these same chords; for the two opposite regions of the marrow are far from being anatomically isolated (as the two species of roots are); besides, the whole organ is subject to reflex actions, which, while they do not equal those of the brain, make the marrow something more than a nerve, and exhibit an intimate union between the parts; lastly, there exists in the centre of the marrow a grayish substance, whose functions had not heretofore been defined, and which might lead to difficulties in the experiments which could not readily be understood. This is the leading object of M. Schili's memoir. After having been persuaded that the posterior chord, raised and detached from the rest of the marrow, for a certain distance, felt and transmitted sensitive impressions, he made on the grayish substance a series of experiments, which demonstrate that like the whitish substance, it transmits the inpression of pain; but when he irritated the substance itself he ascertained that it remained completely insensible.

"This was the most conclusive experiment he exhibited before the Academy of Sciences. On the table of vivisection there was a rabbit, on which he had made the ablation of the posterior chords of the marrow for a certain distance; below the section the marrow remained intact, and it was so sensible the animal cried when any thing was placed in the least contact; it was evident the impression passed by means of the gray substance which had been reserved; and yet this greyish substance might be pricked, cut, cauterized or galvanized, without exciting the least sensation; consequently, M. Schili affirms as demonstrated, that the grey substence, in itself, may serve as a conductor to impressions brought by the posterior chords."

At the same *seance* of the Academy of Science, M. Schili exhibited the phenomenon of the rapping spirits. He acquainted the Academy of Sciences that having been called to visit a young German girl, who pretended to be possessed of a rapping spirit, he really heard "raps" in the body of the girl; but a close examination convinced him that the "raps" were analagous to the noise made by cracking the fingers, and that they were produced on a level with the ancle bone, by the tendon of one of the muscles of the leg: the young girl had practiced herself to displace the tendon at will, and to make it fall with noise to the bottom of the socket, while at the same time, no exterior motion betrayed what was going on; it was only when he pressed his finger behind the external malleolus at the moment of the "rap," as skilful as the Foxes—as skilful as if he had been one of those fortunate mortals whom a benignant fate blessed with birth in the favored town of Rochester.

ERGOTINE.

[Read before the Medico-Chirurgical College, July 1, 1854, and ordered to be published.]

According to Bonjean, Ergot contains two active principles, essentially distinct and constant in their effects, to wit: an active poison and a powerful and useful remedy; the first is an oil, very soluble in cold ether, and insoluble in boiling alcohol, and in which exists the toxicological properties of Ergot; the second he denominates Ergotine, which is a dark red extract, very soluble in cold water, and possessing in the highest degree the precious obstetrical and hæmostatic properties that it has always been acknowledged Ergot possessed. The very different nature of the two products of Ergot, permits their easy separation, and we are enabled to obtain the remedy entirely free of the poison. Thus, then, does the oil of Ergot and Ergotine contain in themselves all the properties, whether medicinal or toxicological, of Ergot, and it was for this discovery that the Pharmaceutical Society of Paris honored Mr. Joseph Bonjean with a gold medal, at their meeting on the 21st of December. 1842. Ergotine has been generally considered as one of the most useful acquisitions that has for a long time enriched therapeutics. The good results that are obtained in affections against which medicine has frequently been ineffectual, has already spread its use in different regions of the globe, and every day practice confirms the marvelous properties that its author attributed to it from its first discovery. Ergotine is one of the most powerful specifics known against hemorrhages in general; it is equally approved of in menorrhagia and bloody flux, in epistaxis, and in spitting and vomiting of blood, and hæmaturia, &c. It has also been employed with good results in cases of spermatorrhœa, and in troublesome periodical vomitings of blood, and in diseases brought on by a deranged state of the nervous system, that have resisted other remedies. Moreover, it promotes uterine contractions, and causes to cease the hœmorrhages that succeed parturition; as well as prevents them when administered some time previous to this event. Ergotine presents an immense advantage over Ergot in the quantity that can be administered at discretion in a dose, without the fear of resulting in any of those accidents that is caused by Ergot taken in its natural state. Dr. Chevallay, professor of medicine in Chamberg, administered five drachms of this extract in the space of five hours to a woman who would infallibly have succumbed to a most terrible attack of menorrhagia, if it had not been for this auxiliary, which in two days afterward was completely suppressed, and the woman finally recovered. After this, many celebrated doctors have endeavored to extend the use of this remedy, and to this end Dr. Arne, of the Paris Asylums, has used it with happy effect in some chronic affections of the uterus. Drs. Sacchero and Teissier, professors of medicine in the university of Turin. Dr. Mosca, and some other practitioners connected with hospitals of the same capital, have used it with happy success in chronic and acute pain, from which we conclude that Ergotine has direct action on the mucous surfaces, when found in a state of super-excitation or active hyperœmic; it is also useful in dry and obstinate coughs, with or without spitting of blood, which so often accompanies consumption. Dose from 20 gr. to 1 oz., according to circumstances; given in pills or solution.

Mode of Preparing Ergotine.—Powdered Ergot one pound, and as much water as it will absorb (cold water), and allow it to stand for twelve hours; then place in a porcelain or glass percolator, and pour over it successive portions of cold water, until the menstruum passes through the mass colorless; the liquid thus obtained is to be evaporated by means of a water bath, unto the consistence of an extract. This extract is the Ergotine of Bonjean.

E. Donnelly, M. D.