Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for scanning. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of scanning are checked below.

L'Institut a numérisé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de numérisation sont indiqués ci-dessous.

- ☐ Coloured covers / Couverture de couleur
- ☐ Covers damaged / Couverture endommagée
- ☐ Covers restored and/or laminated / Couverture restaurée et/ou pelliculée
- ☐ Cover title missing / Le titre de couverture manque
- ☐ Coloured maps / Cartes géographiques en couleur
- ☐ Coloured ink (i.e. other than blue or black) / Encre de couleur (i.e. autre que bleue ou noire)
- ☐ Coloured plates and/or illustrations / Planches et/ou illustrations en couleur
- ☐ Bound with other material / Relié avec d'autres documents
- ☐ Only edition available / Seule édition disponible
- ☐ Tight binding may cause shadows or distortion along interior margin / La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure.

- ☐ Coloured pages / Pages de couleur
- ☐ Pages damaged / Pages endommagées
- ☐ Pages restored and/or laminated / Pages restaurées et/ou pelliculées
- ☑ Pages discoloured, stained or foxed/ Pages décolorées, tachetées ou piquées
- ☐ Pages detached / Pages détachées
- ☑ Showthrough / Transparence
- ☑ Quality of print varies / Qualité inégale de l'impression
- ☐ Includes supplementary materials / Comprend du matériel supplémentaire
- ☐ Blank leaves added during restorations may appear within the text. Whenever possible, these have been omitted from scanning / Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été numérisées.

☑ Additional comments / Commentaires supplémentaires: Continuous pagination.

THE

UPPER CANADA JOURNAL

OF

Medical, Surgical, and Physical Science.

FOR NOVEMBER AND DECEMBER, 1852.

ORIGINAL COMMUNICATIONS.

ART. XXIV.—*The Hip-Joint, considerations on its injuries and disease, deduced from Anatomy.* By S. J. STRATFORD, M.R.C.S., Eng., Toronto.

INTRODUCTION.

The injuries and diseases of the hip-joint, are often among the most complicated and undefinable, which the professional man has to deal with;—extremely difficult of accurate diagnosis—dreadfully degrading to the practitioner, should he, through ignorance or carelessness, fail in his judgment. Nay, he is accountable for the inevitable lameness and deformity which results, not only in a Court of Justice, but also to public opinion; while the hapless patient, a cripple for life, haunts him like an evil spirit, at every turn of the road, reminding him of his incapacity or negligence. What an incentive then, to the study of these diseases, especially when we are assured that there are some varieties which, even with the most profound knowledge and careful attention, will leave painful marks behind them. These accidents and diseases of the hip-joint should consequently form a study of paramount importance to the Surgeon, challenging in him the most profound and accurate knowledge of the anatomical structure, and

functions of the part—a knowledge, not the mere cram of a tyro—but a permanent and abiding impression of careful dissection, and inductive study. It must be the thorough conviction of every practical Surgeon, that from our just notions of the anatomy and physiology of the part, shall we draw our true impressions of its pathology; these will give a wonderful simplicity and ease of comprehension to our subject, that would otherwise certainly deceive and confound us. If then such knowledge is indispensable in practice, be assured that the consideration of the different structures, which enter into the composition of the hip-joint, should precede our reflections of its diseases; for from their nature and character, will be deduced the variety of symptoms, that as beacons must guide our judgment to a just conclusion.

ANATOMY OF THE HIP-JOINT.

The hip-joint is the most marked instance of the ball and socket-joint in the body—it possesses the greatest amount of motion, and carries the heaviest weights of any such character of joints. The head of the bone is the point or axis, on which the movements of the body centre—it has a continual and abiding motion—we cannot turn the limb, or incline the body, without causing more or less rotation of the head of the bone in its socket. Should we bend the trunk or turn the limb, the motion is not in the spine, or in the leg, but actually in this joint. Occasionally it bears the whole weight of the body, and not unfrequently a heavy load besides. During progression the load is continually transferred from one joint to the other—nay even should we turn in bed, the least movement of the body influences this joint, and although it often bears the whole weight of the body, it moves in all possible directions, with an ease and facility most wonderful. The knee-joint also, undoubtedly bears the whole weight of the body, but its movements are more confined, having but the action of the simple hinge, while that of the hip-joint, allows the greatest possible amount of motion, with the most perfect security to the articulation. Should then the hip-joint be diseased or injured, we can at once account for the horrid pain, the least movement of the body causes the patient, and shall observe that he lies fixed and stationary in bed, abjuring the least change of position, or shake of his bed.

The Acetabulum or socket for the head of the thigh-bone is formed in the centre of the os innominatum, or largest bone of the pelvis. In early life the bone is divided into three distinct divisions, which are united by intermediate cartilage, and all combined as in a centre. These several divisions are called the ilium, ischium and pubis. But in the adult they are all united into one bone, and together constitute the deep and firm socket for the head of the thigh bone. During the greater part of youth these parts

still have a cartilaginous union, are imperfectly ossified, consequently they have more vascularity than the full formed bone; hence may be one of the reasons of the greater tendency to disease at this period of life, while this formation admits the possibility, that these divisions may now be burst asunder by the forcible driving into the acetabulum of the head of the thigh-bone. Near this line of junction of these bones, we may see the deep and circular pit, which lodges a mass of fat, and gives attachment to the round ligament. The free edges of the acetabulum are eked out with cartilage, so as greatly to deepen its cavity; the upper part formed by the ilium, is the deepest and strongest, here the head of the thigh-bone lies deep covered by the broad and strong lips: here, too, rests the whole wait of the body when in the erect position; and we can easily understand that when a person falls from a height, and lights upon his feet, the greatest resistance is offered at this point, which being transferred to the neck of the thigh-bone, it not unfreqently yields to the impulse. Not so with the lower part, for not having to bear the weight of the body, the head of the thigh-bone is much more superficially lodged. Its margin is but partially formed of bone, and is filled in with ligament to complete the cup. Here, too, there being least pressure from the head of the bone, is situated that mass of fat, which serves greatly to amplify the lubricating apparatus of the joint; it used to be called the ligamentum mucosum. So large a joint requires to be constantly moistened with fluid to facilitate the movements, and the lining membrane of this apparatus has to be largely supplied with blood, and here, in a notch in the bone, we find the spot where the bloodvessels enter safe from pressure during the varied movements of the head of the thigh-bone. This deficiency of bone in the margin of the acetabulum, which is filled up with ligament, may be one of the reasons why luxation downwards into the thyroid hole may be more easy, although it is not more frequent, than upwards upon the dorsum of the ilium.

The head of the thigh bone differs in character from any other bone in the body. It is beautifully round, almost a perfect ball, except where it joins the neck. It is covered with a beautiful smooth and elastic cartilage wherever its surface touches the cotyloid cavity—this is also lined with a similar structure, and permits movement, with the greatest ease and facility. The head of the humerus, though of a somewhat similar character, and perhaps admitting of equal latitude of movement, has not the depth and strength or perfect form of the head of the thigh bone; for while the head of the shoulder bone is the smaller segment of a larger circle, and is, as it were, just laid against the glenoid cavity: this the larger segment of a lesser circle, is so entirely buried within the deep and firm cavity of the hip-joint, that even in the dead subject it requires considerable force to remove it from the socket,

even after the capsular ligament has been completely divided. Upon the superior face of the bone we see the dimble to which the round ligament is attached,—which direct attachment to the bottom of the acetabulum, may constitute one of the means to prevent luxation,—at the same time, by the vessels that course along it, it presents a limited and imperfect supply of blood to that very isolated structure—the neck of the thigh-bone.

The head of the thigh-bone is placed upon an extended neck, which is essential to its free movements. It is placed at an angle with the shaft of the thigh-bone in the most unfavorable direction. —from the oblique direction in which it bears the weight of the body, it removes the great trochanter to a considerable distance from the pelvis, and hereby constitutes a fulcrum for the more powerful action of the different muscles which surround, and produce the varied movement of this important joint. It is particularly worthy of remark, that when we stand erect, the weight of the body is fairly balanced between both necks of the thigh-bones, undoubtedly in a most unfavourable direction; but when we rest the body upon one foot, the neck of the bone becomes more direct, and its position is placed to bear the increased weight with more advantage to itself. This occurs in every movement of the body. As we walk each bone alternately bears the whole weight, and as it rolls in its socket, still beautifully maintains its direct position in the axis of the body. Our surprise, too, is not lessened when we observe that this transverse neck is the smallest, and most imperfectly nourished part of the thigh-bone, so that it must forcibly impress upon our minds the possibility of fracture of this part, from any direct impulse propagated from above, as in a great leap or on our unexpectedly alighting from a height on the feet. When this happens, especially in old people, whose bones are more brittle from the diminished amount of chondrine, fracture of this part is very liable to occur. And we should also observe that the neck of this bone varies in length, and obliquely, as we advance in years. In youth it is long, and placed obliquely; while, as old age advances, it becomes shorter, and more horizontal; thereby increasing the disadvantage under which old people especially labour, in these kinds of accidents. The round head of the bone, too, in youth is connected to the neck by cartilage—it has been said to be separated at this epiphisis by accident; but we have no very clear or direct evidence of the fact; and did it occur, it would, in all probability, either give rise to disease of the joint, and its distinctive character be lost in its stages; or, as no displacement of the bone would occur, the injury would, in all probability, get well without our recognizing its nature.

Surrounding these parts, and completely inclosing them as in a cavity, is the strong capsular ligament. It is reflected from the external periosteum and margin of the acetabulum, to be inserted

into the base of the neck of the Femur, and encloses the whole joint as it were in a shut sack. The thickness of this ligament varies; upon the upper and its outer side it is very dense, and here, strengthened by the addition of ligamentous bands, it is singularly thick and strong; while on the inner and lower side it is so diminished in density that it does not possess one-fifth this strength and toughness. Unlike other ligaments of this character, it consists of fibres which interlace with each other in every direction,—so that the whole forms a structure of great toughness and strength, that must require an immense force to lacerate it; but dislocation cannot occur without its rupture—a fact that must impress the imagination with some idea of the force necessary to produce these accidents. While after some varieties of fracture of the neck of the thigh-bone, it is powerful enough to support the whole weight of the body resting upon the fractured bone.

Again, this cavity of the coxo-femoral articulation is completely lined with a serous or synovial membrane which closely covers the head and neck of the bone; is reflected on the capsular ligament, dips down into the cavity of the acetabulum; covers the round ligament, and is fully reflected over the fatty structure at the bottom of the joint. This structure consists of a basement membrane; is supplied with a system of blood-vessels, and is lined with epithelium cells, which produces the mucous exalation, that lubricates the whole surface of the joint.

The blood-vessels which supply the several structures of the hip-joint are, no doubt, sufficient to nourish and support it in a normal condition, although all bones covered and surrounded by a serous membrane seem to want the facility of supply, which is not wanting to those covered with muscular tissue: hence, when we find the fracture of the neck of the Femur to occur within the capsular ligament, no blood-vessels can arrive at the head of the bone, isolated at every part, except by the round ligament; and should this have been originally deficient, or accidentally torn, the head would be without nourishment, all vascular communication with the body would cease, and, as a consequence, the bone must die. That such has actually occurred, I have no means of proving; but it is a result which we should do well to keep in view.

The fatty matter or fimbriæ which lie at the bottom of the socket were once supposed to be a gland of peculiar structure, but are now found to be masses of fat, lurking in a sort of hollow, from whence the round ligament proceeds, doubtless acting, in some degree, the part of a cushion, so as to stop the vibratory influence of a blow upon the trochanter,—it lies hid, as it were, and is scarcely influenced by the motion of the joint,—it is covered with reflections of the synovial membrane,—it seems greatly to increase its extent, and to afford an abundant supply of lubricating fluid. These parts may doubtless be injured by a blow upon the

trochanter, driving the head of the bone deep into the socket, which not unfrequently gives rise to intense inflammatory action that ends in disease of the joint, and permanent lameness.

The round ligament, as it has been called, is rather triangular at its base in the colyloid cavity, but becomes round towards its apex, when it is inserted into the depression in the head of the Femur. The position and character of this ligament, would appear to be intended, to prevent the removal of the head of the bone from its socket—that it does so, in many cases appears sufficiently evident—but in others, it is so very lax, thin and powerless, that it is impossible to imagine it can have any such influence—while in some cases it is entirely wanting.

Moreover all these parts are covered with great and powerful muscles, which are intended to move the joint; so voluminous are they in character, that the bones can scarcely be distinguished through them; and when from injury, effusion has taken place in the parts surrounding the joint, great obscurity as to the nature of the accident may occur, by the hiding of the several prominent points that used to serve as marks to guide our judgment. In cases of fracture of the neck of the thigh bone, the limb is more or less powerfully retracted by the action of these muscles; while in dislocation they spasmodically act, with a force that confines the bone against the pelvis with a powerful effort, and will not permit the least movement. Again, when inflammatory action shall have occurred within the joint, the excruciating pain compels the muscle to restrain the least movement of the joint, and holds the bone with a spasmodic grasp that plainly indicates the intensity of the patients suffering. In disease or injury of the hip-joint, a thorough knowledge of the position and action of these several muscles is indispensible, and must materially facilitate our just comprehension of the pathology and injuries of the part; will point out the action of those muscles, which, when the bone is displaced from the acetabulum, will be shortened and relaxed, and form no impediment to its return into the socket; while it will also indicate the condition of others, which having the distance between their origin and insertion greatly increased, will be constantly and powerfully thrown into a state of spasmodic action, these will retract or turn the bone into some abnormal position: facts of vast importance in the consideration of this subject, and if duly studied, will afford us data of inestimable service, towards forming a correct diagnosis of the nature of the accident or character of the disease.

We may plainly perceive from the nature of the hip-joint, that the movements are great and varied, that it can execute flexion, extension, abduction, adduction, circumduction, and rotation of the limb, movements performed by various sets of muscles which, arising from the pelvis, act upon the thigh either singularly

or combined. We must also remember that when the thigh becomes a fixed point, the same muscles act upon the trunk and serve to move it in varied directions—thus in walking when the action is alternate—first the limb is moved in advance by the muscles which act upon it from the trunk, and when this is fixed firmly upon the ground, the same muscles act upon the trunk, and roll the pelvis upon the head of the thigh bone. For the most part these large and powerful muscles may be conveniently arranged according to their actions; some among them are intended to move the thigh backwards and outwards, such as the gluteus maximus, medius and minimus; while the second set moves it backwards and rolls it upon its axis, such as the pyriformis obturator externus and internus, gemelli and quadratus femoris; and lastly, those which move the thigh forwards and inwards, the psoas magnus, iliacus, internus, and pectinalis. Other muscles which clothe the limb, no doubt produce a more or less direct action upon the joint, but they do not seem so powerfully to influence the limb in its abnormal positions, and consequently will not require such minute attention.

The gluteus maximus arises from the back part of the crest of the ilium, from the junction of the ilium and sacrum, the sacro-sciatic ligaments, and from the os coxcygis. It is a large square and fleshy muscle, proceeding in an oblique direction downwards, is inserted by a flat and broad tendon into the root of the trochanter and line of the linea aspera, for about three inches of its outer side. This muscle forms the chief contour of the hip, covering up the other muscles, and when in action serves to extend the thigh upon the pelvis, and adduct it towards its fellow, but when the thigh is fixed it draws the pelvis backwards and inclines it to its own side. The gluteus medius is placed immediately below the former muscle, and is considerably smaller in size, thinner, and fan shaped, arising from the anterior and middle third of the crest of the ilium, from the semicircular line marked upon the dorsum of that bone, its fibres converging descend directly downwards and form a short flat, and strong tendon, that is inserted into the fore part, and top of the trochanter major. The muscle corresponds in action with the gluteus maximus, serves to increase its motive power, and to make it more perfect in its character, as an extensor of the thigh. The gluteus minimus is a thin, regularly radiated muscle, the deepest of these three muscles immediately next to the bone. It arises from the lowest part of the dorsum of the ilium, immediately above the part which forms the socket of the thigh-bone, and from the border of the sciatic notch. Its fibres converge downwards, cover the acetabulum and neck of the femur, and form a round strong tendon, which is inserted into the fore-part of the trochanter, and immediately above the neck of the thigh-bone. The use of this muscle is evidently intended still

further to increase the power of the two former glutei; it corresponds with them in action, but its fibres being deeper seated, are more confined in their origin, and much shorter—will be much more deficient in power, and its action must be simply that of an extensor of the limb.

Taken as a whole, these muscles present a most powerful means of keeping the body erect upon the thighs; enabling man to assume that position which so strongly characterizes him from the brute creation. We find this series of powerful muscles arising from one of the largest and most extended bones of the body, their fibres proceeding downwards from a very large segment of a circle, are inserted into the upper part of the thigh-bone, doubtless the separate contraction of each set of fibres approximating their origin and insertion, may either abduct, adduct or extend the limb, according to their position; but if they act consecutively they will serve to rotate the thigh-bone in its socket, move it in a circle upon its axis, and turn the toe outwards or inwards according to their individual action.

The great nerves and vessels, which make their exit from the pelvis through the sacro-sciatic foramen, issue beneath the pyriformis muscle, and descend through the space between the trochanter major and tuberosity of the ischium, are here covered and defended by these muscles, and must not be forgotten in our general consideration of the anatomy of this region. We must bear in mind that disease of the great sacro-sciatic nerve is often intensely painful in its character, the pain being greatly increased upon motion of the limb;—so much so, that the spasmodic regidity of the thigh, has been mistaken for disease of the hip-joint, especially when it has happened in young children.

From our considerations of the normal actions of these muscles we can easily understand that should the neck of the femur be broken across, that bone will be drawn up on the dorsum of the ilium. The degree of this distortion will depend upon the positive seat of the fracture, was it within the tense and firm capsular ligament, it would be but little elevated above its natural position, but was it without that texture, and implicating the shaft of the bone, its retraction might amount to several inches, and the deformity be sufficiently marked by the eye. Was the head of the bone dislocated upon the dorsum of the ilium, the shaft of the bone would be thereby elevated above the plane of the acetabulum the origin and insertion of these muscles, consequently approximated; they would be relaxed and loose a great degree of their power over this bone. Such also, (but slightly modified), would be the case in dislocation into the ischiatic notch, but when we have luxation into the thyroid hole, the thigh-bone has descended, the distance between their origin and insertion is considerably increased, consequently they are in powerful action and serve to

retract, abduct and rotate the thigh-bone outwards. Again when the head of the bone rests upon the pubis, the plane of the trochanter is but slightly elevated, some fibres of these muscles will be in a state of contraction, while others will be more or less relaxed. The fibres arising from the os coccygis and sacrum will now roll the thigh-bone outwards and retract it backwarks. These facts are clear indications of the intense interest with which we must regard the action of these muscles, whenever the coxo-femoral articulation is the seat of injury.

The next set of muscles are those which flex the thigh upon the body, adduct the limbs and turn the toe outwards, these are the psoas magnus, iliacus inturnus, and pectinalis. The psoas magnus is a muscle that comes from the anterior part of the spinal column, and descends downwards passing over the edge of the pelvis, to be inserted into the femur; it serves with the iliacus internus to balance the muscles on the back part of the hip, and to preserve the equilibrium of the body. This long round muscle fills up the space upon the side of the spine, it comes from under the ligamentum arquatum of the diaphragm, arising from each of the lumber vertebræ in succession—the transverse process as well as the bodies—it then descends until it reaches the sacro-iliac symphysis, and is then united to the internal iliac muscle, descending with it under Poupar's ligament, to be inserted into the lesser trochanter, and root of that process. The union of this muscle with iliacus internus, and its insertion into the same spot, gives them the same mode of action, and has led many anatomists to consider them as part of one and the same muscle. The iliaens internus lies upon the concavity of the ilium. It arises from the inner lip of the crest of the ilium, the transverse process of the last lumber vertebra, adhering to the concavity of the ilium, as far as the brim of the pelvis, and to the fore-part of the bone under the spinous process—radiating it is gathered together and forms a tendon which slides over the os pubis as over a pulley; as soon as it has passed under Pompart's legament, its tendon united with the tendon of the psoas magnus bends obliquely round and downwards to be inserted into the trochanter minor of the os femoris. The action of these two powerful muscles, is to flex the thigh upon the trunk, and by the obliquity of their insertion, to rotate the bone outwards, as well as to adduct the limbs—but should the thigh be the fixed point, they will serve to bring the trunk forward and to bend it downwards. When the neck of the thigh bone has been broken, and is retracted upwards by the glutei, the action of these muscles serve to adduct and rotate the thigh, and to turn the toe outwards,—the action of these muscles is much more marked, when the fracture occurs without the capsular ligament and the bone rests high upon the ilium. In dislocation upwards upon the dorsum of the ilium, the distance between the edge of the pubis

where these muscles are reflected, and the lesser trochanter being considerably increased—these muscles are fully called into action, and serve, with another set, to fix and confine the head of the thigh-bone close to the pelvis. Was this bone free, they would now evert the toe, but being bound down tight upon the os innominatum, the head of the femur behind and the trochanter major before, the shaft of the bone is rolled upon itself, and is so fixed that the foot is permanently turned inwards, and from the lesser trochanter being now some distance round the femur, their action serves to advance the leg, and point the toe across its fellow. When the head of the bone is placed in the sacro-sciatic notch, a somewhat similar effect is produced; but when it is lodged in the thyroid foramen the distance between the point of deflection of these muscles, and the lesser trochanter their insertion, is diminished from the bone being rotated outwards,—was it not for the powerful action of the antagonist muscles, which serve forcibly to abduct and draw the thigh backwarks they might be somewhat relaxed. When the dislocation is upon the edge of the pubis, the relaxation is even more complete.

The pectineus is a broad, flat, quadrangular muscle arising from the crest of the pubis, and descending obliquely downwards and backwards, is inserted by a flat tendon into the lesser trochanter and linea aspera. The action of this muscle must considerably assimulate itself to that of the foregoing—bending round the thigh-bone, and being inserted some distance down, it must serve to pull the thigh upwards, to adduct it towards the central line, also to advance the bone, and to rotate the toe outwards. Under fracture of the neck of the thigh-bone, or when this bone is displaced from its socket in either of the varieties above mentioned, the action of this muscle must be similar to those of the psoas magnus and iliacus internus.

The third set of muscles which have a peculiar action upon the coxo-femoral articulation, and which it will be necessary for us to consider, are, for the most part, small muscles, having their origin in the very neighbourhood of the hip-joint; these are principally rotators of the joint, and, from the angle at which they are inserted, must be peculiarly powerful in the production of such movements of the limb. There are the Pyriformis, the two Gemelli, the obturator externus and internus, and the Quadratus femoris.

The Pyriformis is a muscle of a flat pyramidal shape, lying horizontally along the lower margin of the Gluteus Medius, but is partly separated from it, as it comes from within the cavity of the Pelvis. It arises by three or four fleshy digitations from the hollow of the sacrum and the sacro-sciatic notch. The fleshy fibres pass from their origin horizontally outwards and downwards, and form a round tendon which is somewhat connected with the neighbouring muscles, especially the Gemellus superior, and is

inserted into the back part of the upper edge of the great trochanter. The action of this muscle must be to pull the trochanter backwards, and raise it nearer to the ischiatic notch, consequently to rotate the thigh-bone outwards; it has an action similar to other small muscles which arise in this region, save that from its origin, being placed on a plane superior to its insertion, it seems to assist the glutei muscles, and is then partially an extensor and abductor of the limb. The great nerves and blood-vessels of this region are in connection with this muscle: some come out of the pelvis above it; others below—facts that should point out to us how liable they must be to participate in the injuries and diseases of the hip-joint. In fracture of the neck of the thigh-bone this muscle will tend to raise the shaft of the bone, and with its fellows be a powerful means of turning the toe outwards. We can easily understand, however, that when the trochanter-major is implicated in the injury. its insertion may be altogether detached from the shaft of the bone, when, as a matter of course, its influence must cease. This may account, in some degree, for the great disputes which Surgeons have long carried on with unseemly violence, as to whether invertion or evertion was a diagnostic mark of fracture of the neck of the thigh-bone. In dislocation of the head of the bone upon the dorsum of the ilium, the trochanter-major is advanced forward, as well as raised above its natural plane; so that we find the muscle upon the stretch, and as a consequence, with its fellows, it assists powerfully to bend down the bone upon the pelvis with a spasmodic action that defies our effort to evert the foot. When the dislocation is in the sacro-sciatic notch, the trochanter is neither so elevated or so much advanced: hence the tension of these muscles is not so great. When the head of the bone is placed in the thyriod hole, it is advanced forwards, the thigh is rotated outwards,—the plane of the trochanter is considerably depressed, but approaches towards the acetabulum,—in consequence of the change of position, the bone is here firmly held by the spasmodic action of the muscles, but not with that perfect immovability which is evinced when it lies upon the dorsum of the ilium. Should the bone rest upon the crest of the pubis, the action of this muscle and its congeners would still be of a similar character; but from the elevated plane of the trochanter, the pyritormis muscles would not be so powerfully excited into action as in its former situation.

The superior and inferior gemelli, altl ough they have been classed by Anatomists as distinct muscles, are scarcely more than accessory fasciculi to the obturator internus muscle. The upper one of these arises from the spine of the ischium; and the lower from the tuberosity of the bone. They are placed one on either side of the tendon of the obturator internus muscle, and form a grove for its reception, and as it advances completely envelop it,

and are inserted with it into the trochanteric fossa. The action of these muscles must correspond with that of the pyreformis, both in the normal and abnormal state of the coxo-femoral articulation; save that the point of their origin being lower than that of the former muscles, their power to elevate the bone will be lessened or entirely abnegated.

The obturator internus muscle arises from all the internal surface of the obturator ligament; from the inner edges of the thyroid hole, and from the bone which surrounds it. Its origin is both fleshy and circular; its fibres converge, and run along the os ischium; turn round that bone between the spine and the tuber ischii, over a cartilagenous pulley like surface; its tendon passing between the heads of the gemelli is inserted with them into the trochanter-major. Although this muscle arises within the pelvis, and passes immediately behind the coxo-femoral articulation, yet, as the tendon turns over the ischium, the direction of its action is completely changed, and it becomes allied to the muscles which we have just described, participates with them in the mode of action when the joint is in its natural state, and sympathizes with them in its altered condition.

The next of these small muscles, and placed lowest in the horizontal plane, is the quadratus femoris. It is in shape like a parallellogram. It arises from the tuberosity of the ischium, and is inserted into the lower and posterior border of the trochanter-major and intertrochanteric line. Its action is similar to that of the muscles just described. It pulls the thigh directly backwards, and assists to rotate the bone outwards. When the head of the thigh-bone is placed in an abnormal position from injury or disease, the influence upon this muscle must strictly correspond in effect with those just adverted to. Except that when the trochanter is morbidly elevated, the inferior plane of its origin causes it to be more powerfully acted upon, than any of this set of muscles.

The last of this set of muscles which surrounds and moves the hip-joint is the obturator externus. It is situated on the outside of the pelvis, and exactly opposed to its namesake on the inside. It arises from the rami of the ichium and pubis, where they form the obturator foramen, from the obturator ligament, leaving room for the passage of the blood-vessels and nerves. It is a short muscle: its origin broad, and towards its insertion narrow, so that it is of a conical form. It is soon gathered into a round tendon which twists under the neck of the thigh-bone, between it and the pelvis, and is inserted into the deepest part of the digital cavity of the great trochanter. From the way that the tendon of this muscle winds around the neck of the thigh-bone, its action must correspond with the small muscles at the back of the hip; for although it arises in a plane anterior to the thigh-bone, still the direction of its power must be changed by the reflection of its tendon, which acts upon

the neck of the bone as on a pulley, so that it must tend to draw the trochanter backwards. In dislocation backwards and upwards it can scarcely escape being torn, stretched to its utmost extent, as it must be. It will always act as a most powerful means of restraining the movement of the bone in this abnormal condition; so also in dislocation in the sacro-sciatic notch it must experience great extention, and be liable to a similar adverse condition: but should the head of the thigh-bone be placed in the thyroid hole, or upon the crest of the pubis, the points of its origin and insertion will be so greatly approximated that the muscle will be completely relaxed.

In the above description I have endeavoured to indicate the normal and abnormal action of these several muscles which have a peculiar and direct action upon the coxo-femoral articulation. Doubtless there are other muscles which arise from the pelvis, and are inserted into the thigh-bone and leg, which have a general and secondary influence upon the articulation; but as their bearing does not seem directly to aid us in our diagnosis, a minute description may not be necessary. It may not, however, be unworthy particularly to note, that during inflammation of the hip-joint, we find all these muscles powerfully combined to steady and fix the articulation, preventing the least possible movement; for movement in this case would be attended with excruciating pain. As I have before remarked, during disease of the great ischiatic nerves, we have a similar state of rigid spasmodic action of all those muscles, producing an apparant immovability of the limb, which has been mistaken for disease of the hip-joint; and after this affection of the nerve has continued for a considerable period it has produced a shrinking of the muscular tissue from disuse, and a flattening of the prominence and contour of the hip, which has been exultingly appealed, to as a proof of disease of the joint.

Diseases of the Hip-Joint.

In the forgoing review of the nature and character of the hip-joint, it has been shown that the bones form a most perfect ball and socket joint; that they are clothed with a beautiful elastic cartilage; are covered and bound together with a firm fibrous ligament, while the whole joint is completely lined with a beautiful synovial membrane that constitutes it a shut sack; above all, it is surrounded and covered with numerous powerful muscles that perform the great and varied movements of which this joint is susceptible. We have so far seen all these several parts in a normal condition, working with ease, and almost without our being sensible of their extent or their character; but we must now contemplate them in an abnormal state, for we shall find that each of these varied tissues of the hip joint are liable individual disease: it may commence plainly in one, but after a time implicate all the other structures of the joint, involving all in indiscriminate destruction; so also may the accidents to which it is liable evince

great variety, and peculiar complexity of character. As a correct course of arrangement in the description of these complaints, I shall proceed from within outwards, and follow consecutively the varieties of disease to which each stricture is liable.

DISEASES OF THE SYNOVIAL MEMBRANE.

The lining membrane of the coxo-femoral articulation is liable to acute and chronic inflammation,—these may be followed by all the various consequences, the results of these diseases, similar in character to those which show themselves in other like serous membrane, such as hyperæmia of the vessels, the effusion of serum of coagulable lymph, the formation of pus; also ulceration and absorption of its structure; and it may likewise be the seat of the deposit of tubercular or cancerous matter.

INFLAMMATION OF THE SYNOVIAL MEMBRANE.

Inflammation of the synovial membrane is a disease of frequent occurrence. It may be idiopathic or caused by local injury, it may be local or dependent upon constitutional diathesis; and doubtless nearly every case will be more or less modified by such peculiarity. To enable us accurately to follow and appreciate the true value of the symptoms of this disease, a correct understanding of the character of the implicated structure is clearly necessary. The synovial membrane bears a great analogy to the serous structures in other parts of the body. It consists of a beautiful basement membrane which is more or less firmly connected by areola tissue to parts with which it lies in contact. The areola tissue constitutes the chief thickness of the structure, confers upon it great strength and elasticity, and is commonly known as the subserous tissue. The basement membrane consists of a yellow fibrous element, whose filaments interlace each other in every direction. The subserous tissue is freely traversed with blood-vessels and nerves, that serve to nourish and give sensibility to the structure. On its free surface we find a layer of pavement epithelium: this consists of cells that secrete or forms the true mucous fluid, which, with the serous exhalation of the basement membrane, is intended to lubricate the joint, and permit the free movement of one part upon another in every direction. This synovial membrane is spread over the inner surface of the capsular ligament, surrounds the ligamentum teres, dips down upon the cartilage which lines the colyloid cavity, and is reflected over the head and neck of the thigh-bone.

On the first outset of inflammatory action the patient complains of dryness of the part; says he can hear the joint *scrape*—perhaps this is of short duration; it doubtless depends upon the increased density of the blood which is sent to the vascular structure. The capillaries of the basement membrane now carry the red globules of the blood in increased quantity, and with greater velocity, the vessels dilate, the colourless corpuscles of the blood

line the inner surface of the walls of these dilated vessels. The red corpuscules still continue to float on, but are evidently greatly increased in quantity, with regard to the more fluid plasma of the blood; but after a short time complete stagnation occurs, and this even appears to extend to the artery, and the commencement of the vein: even now, however, some of the capillaries may still be pervious, and the blood moving with great rapidity through them. The dryness of the serous membrane in the first stage of inflammatory action doubtless depends upon the deficient amount of fluid plasma passing through the capillaries, so that the serum neither transudes the basement membrane, nor is it freely absorbed by the minute cells upon its surface: hence a marked deficiency of the natural secretion of the part, and dryness of the surface of the joint. When the circulation of the blood is perfectly normal in its capillary vessels, they are traversed with a considerable amount of thin serous fluid, mixed with the red corpuscles; and through the coats of these capillary vessels, a certain amount of the serous fluid transudes, and also passes the basement membrane, by the laws of endosmodic action—the mucous secretion in the joint being the denser fluid, hence its course; but when the distended vessels are filled with stagnant red globules, and their walls lined with the colourless corpuscles, the serum, now greatly deficient, ceases to pass through their coats: hence the deficient supply of the joint. Soon, however, this state of things is changed: the movement of the blood corpuscle may by degrees resume its course; the normal state of the circulation is again established, so that the lubricating fluid is plentifully supplied to the joint; and the disease is cured. Should the inflammatory disease increase, the natural consequence of the obstruction of the capillaries in the subserous tissue, is the effusion of the more fluid parts of the blood; it transudes from the circulating apparatus of the basement membrane, in all probability the coats of the veins, and spreading through the subserous tissue, traverses the basement membrane in considerable quantity, so that we have the fluid of the joint greatly increased in quantity; in some cases amounting to a species of dropsy, or hydrops articuli, as it used to be called. The cells on the free surface of the membrane are abundantly supplied with nourishment; consequently, their formation is now rapid, and the amount of mucous formed by them, and added to the secreted fluid, is so increased in quantity, so as, in some cases, to give the contents of the joint almost a gelatinous appearance: commonly, however, if the effusion is rapid, the secretion is but the fluid serum of the blood, with but little fibrine or lymph, and some of the salts of the blood in a state of solution. Again, at this period, we may find the increased activity of the circulation progressing with that rapidity, that rupture of the over distended blood-vessels is the consequence. The blood may escape into the subserous tissue, be effused into its meshes—it may

here remain; the blood globules may be dissolved and the basement membrane be highly coloured with the dissolved pematim that may occasionally give a tint to the fluid effused in the joint; or again the fluid forced into the dense basement membrane may so distend it, that some of the blood corpuscles shall pass through it by laceration of its fibres, and so become mixed with the serous fluid in the joint, and give it a red colour. I think this, however, but seldom happens, unless ulceration of the basement membrane has occurred, when the open mouths of the bloodvessels may bleed and it be mixed with the fluid serum. When the effused fluid become profuse in the hip-joint so as to distend the capsular ligament, although it cannot be felt to undulate, its swelling may be perceptible, through the muscles of the hip, and it may be distinguished both in the groin, and at the nates. As the disease proceeds, the parts in the immediate neighbourhood of the joint are now influenced in the conjestive action; the capsular ligament, the perichondrium, and even the areola tissue, without the hip-joints, participates in the hyperœmic action. The patient complains of a sense of weariness and lassitude down the limb, even amounting to pain, especially if the neighbouring nerves feel its influence. The pain is now acute upon the movement of the joint, is increased on pressure, or when the patient attempts to walk, or even allows the limb to swing loose, so as to operate on the inflamed surfaces. The pain, however, is not of that excruciating character which exhausts the powers of the patient, as when matter is formed in the joint, as when it exhibits the more serious influence which that product of disease is sure to produce upon the constitution; for after rest the pain in a great degree subsides. As the inflammatory action increases in intensity, the least movement of the socket produces excruciating pain, and a spasmodic condition of all the muscles of the limb occur—an effort of nature to preserve perfect quiet. Should this state of things last for a considerable period, or the disease become chronic, a wasting of the glutei and other muscles of the hip, is the result of this imperfect action of the muscular fibres. The bold contour of the hip is lost, and the parts are shrunk and wasting. The same necessity for a state of absolute rest causes the patient, should he stand erect, to rest the whole weight of the body on the sound leg; nay, even so great is the desire to prevent the least pressure of the inflamed surfaces one upon the other, that a curved position of the spine is also maintained while lying in bed,—the trunk is inclined upon the thigh, and all the muscles connected with the joint are perfectly relaxed. As a consequence of this position, the pelvis is changed from the horizontal line, and inclines towards the affected hip. The spine also is twisted, and one shoulder is raised higher than the other, so that one imagines from their appearance the diseased thigh is shorter than the other, but upon due examination we find that the length

of the limb is somewhat increased, sometimes by inches. The increase in the length of the limb is caused, doubtless, by the hyperœmic condition of the blood-vessels of the whole joint, and by swelling and effusion into its cavity. Now also the patient complains of a morbid heat in the part, which is often obvious to our sensations, while he also experiences more or less inflammatory fever, and other symptoms indicating constitutional irritation. Upon the application of proper means, the disease may now subside, the effused fluid be absorbed, and the joint regain its natural figure and mobility. A fact however of considerable importance in the character of this complaint is its liability to return whenever the limb is exposed to cold, or exercise in an extreme degree—nay without the evidence of any such reason, it is extremely liable to happen—while the causes that serve in the production, and persistance of this inflammatory action may doubtless be due to the state, and condition of the Blood; a peculiar dyscrasie as is evidenced by the appearance and character of the whole constitution.

Instead of subsiding, should the Disease still progress, the congestive stage becomes extreme or more or less complete stasis of the blood Corpuscle in the dilated capillaries has been the result during the oscillation connected with this retardation of the blood corpuscles, they apply themselves more close to each other—and in the complete stagnation of the blood, the vessel is entirely filled with blood corpuscles closely aggregated, forming an apparently homogenious mass—a state of increased plasticity of the blood, would at this period also appear to be a local condition partly dependent upon the separation and agglomeration of the red globules in the capillary vessels, a cause that must evidently interfere with the correct nutrition of the serous membrane, partly from the escape of the more fluid parts of the blood from the coats of the veins into the areola tissue; we find that in acute inflammation of any extent, this condition of increased plasticity pervades the whole system; if we draw blood at the very onset of the disease we find the blood without a marked buffy coat, but if at a later period venesection is employed, fibrine is found remarkably to abound in the system, and will continue to do so as long as the increased activity of the circulation, caused by the febrile or constitutional irritation, shall form an impediment to the due appropriation of the material intended for the nutrition of the several parts of the body, or at least until the derangement of the digestive apparatus, failing in its functions, shall have been a means of stopping the supply introduced into the blood—The local Hyperœmia having become more extensive, serous effusion permeates the veinous coats for a great extent of their surfaces, and the fluid parts of the blood remaining in the now intensely diseased structure contains a greatly increased amount of congulable lymph, it is however perfectly fluid as it passes through the coats of

the bloodvessels, it has been said to be the especial production of the arteries, while that of the serous fluid was said to be that of the veins, but in the capillaries I scarcely think that such a distinction can hold—escaping into the areola tissue according to the state of its plasticity it flows onwards and completely fills its meshes, surrounds each element of the several structures in close contact as fluid morter poured in between the stones—it coagulates and becomes more or less firm—or it transudes the basement membrane and is poured into the cavity of the joint, unfit for the nourishment of the epithelial cells, from its increased density; it covers the serous membrane with a plastic material that soon becomes firm—the layers of epithelial cells, have been shed, and under the false membrane are seldom renewed, so that the coagulated fibrine comes in immediate contact with that structure the basement membrane; or had there been previously considerable serum effused into the joint, this may be seen floating in it, in the shape of flocculent masses; the serum may afterwards or at least its more fluid parts have been absorbed, leaving the denser material behind. Such however appears not to be the case, should the plastic material pervade the whole structure of the serous membrane—for the meshes of the basement membrane filled with fibrine and its surface covered by the effused lymph, the fluid parts of the serum are enclosed in a structure forminga shut sack, that appears to have little exosmotic action; this amorphose material may form a cytoblastema for the development of the different cell formations, that follow as a necessary consequence in the progress of the disease. On the first commencement of congestion in the capillaries, the white globules of the blood, line the walls of the vessels, during the effusion of the plastic material above alluded to, these will doubtless in a greater or less extent be carried with it, contained in the mother liquor, the effused liquor sanguinis they present to us the source of the future development of the cell formations. No doubt the relaxation and dilatation on the one hand, and pressure from within the vessels on the other, the plasma will be pressed out from among the aggregating corpuscles and even these, upon a further increase of the forces may escape from the vessel in a very considerable quantity, and may constitute the exudation corpuscles. Gerber says that "the exudation corpuscles are in every respect the same as the lymph corpuscles; they generally form many superimposed layers, being laid flat one upon the other and so constituting membranes that resemble the tissellated epithelium, when the connecting medium has disappeared so that the edges of the primary round Corpuscle thrust against eachother, are thus rendered polygonal under the microscope, an ever increasing linear arrangement of the exudation Corpuscles, which are more intimately united at two opposite points in one line, by means of the connecting cytoblastema than any where else,is apparent." Doubtless the law of

analagous formation will influence the character of these exudation Corpuscles; so also will the state of the constitution, the positive condition of the mother liquor, and the nature of the diseased action have an influence upon the formation and growth of the cell. —In this instance the minute capillary vessels which have their seat in the subserous structure, a variety of areola tissue—hence the product of the formation we may anticipate will be of that discription, and this is fully proved by old adhesions between the serous surfaces—in this instance according to Vogel we find the exudation corpuscles "are nucleated primary cells which lengthen "at both ends, and assume a fusiform shape, the extremities of "these unite with one another, and then are formed long varicose "fibres. From these caudate cells arise the fibres of areola tissue; "a cell being converted into a single fibre, or else by assuming "a groved arrangement, and these groves deepening, and finally "splitting into a bundle of fibres."—Such doubtless is the process which is evinced in the devellopment of false membrane in the cavities of the joints. When such structure becomes persistent as may be observed in old adhesions, a certain amount of vascular organization is necessary to preserve the connection with the general system, and we can commonly observe vessels carrying red blood to pervade this new formation, when it has arrived at maturity, and the joint has in some degree regained its normal condition. At this time also the false membrane will be found covered with a synoveal or serous tissue, having true epithelial cells spread upon its surface, requiring the epigenesis of vascular structure to carry on the functions of the new developments. The epigenesis of these new blood-vessels appears to be clothed in a degree of mystery. Vogel declares that both the blood-vessels and the red blood itself which they contain—are developed in the very interior of the false membrane, without any connection with the old system—such however hardly appears consistent with the laws of analagous formation—it would rather appear that a certain amount of the blood globules having escaped from the ruptured vessel among the effused amorphose blastema, have arranged themselves in rows, which appears to be a law constantly presenting itself—their flat sides are agglutinated, the centre nucleus is removed, leaving the circumferance as the coat of the vessel: which being now hollow and in connection with the vascular system, becomes the carrier of the nutritive fluid necessary to the nourishment and support of the new formation.

(To be continued.)

Art. XXV.—*On the White Globules of the Blood in Diseases.* By James Bovell, M.D., Toronto.

One of the ablest Physiologists of the day—Mr. Carpenter has for some time advocated the opinion that the White Corpuscles of the Blood were truly assimilating cells, whose office it is to

prepare the pabulum for the growth of the tissues. "It is well," he says, "to observe, that this process, which constitutes the act of organization, may be clearly made out in the higher plants and animals, to consist of two stages; the first of these being the further preparation or elaboration of the fluid matter, by certain alterations, whose nature is not yet so clear, so as to render it *organizable*, or fit to undergo *organization*: the second being the act of organization itself, or the conversion of the organizable matter into the solid texture. Thus for example we do not find that a solution of dextrine (or starch-gum) is capable of being at once applied to the development of vegetable tissue, although it is identical in composition with Allulose; for it must first pass thro' a stage in which it possesses a peculiar glutinous character, and exhibits a tendency to *spontaneous* coagulation that seems like an attempt at the production of organic forms. And in like manner, the ALBUMEN OF ANIMALS is evidently not capable of being applied to the nutrition of the fabric until it has been first converted into FIBRIN." And Mr. C. continues to point out that by the action of vital force akin to that of Catalysis, a new arrangement of the particles of Fibrin again takes place, "producing substances which differ both as to structure and properties from the materials employed."

Now if we examine into this question carefully, employing only the light which Mr. Carpenter has thrown upon the history of histological formations, it seems impossible that one single element of the Blood only can be employed in the process of nutrition; and in morbid Epigenesis we have abundant proof that such is not the case.

In animals as in plants—observes Mr. C—there are two principal modes in which cells may be developed; viz., within the cavity of a pre-existing cell, or in the midst of a plastic fluid or blastema for the latter. "The material which is required is one containing *Fibrine*, a substance which, although closely resembling albumen, if not identical with it, in chemical composition, differs from it in possessing the tendency to pass spontaneously into a solid condition when withdrawn from the living vessels, and to assume, in thus coagulating, a more or less distinct *fibrous* arrangement. In fact we may regard it as albumen undergoing the first stage of Organisation and Vitalisation. The degree to which this process has already taken place, *affects the formative power of the fluid blastema*; thus we find that the coagulated lymph thrown out for the reparation of injuries, *possesses it* in a higher degree than *does the ordinary plasma of the blood*, or liquor Sanguinis. So that whilst the latter is only ready for appropriation by tissues already existing, the *former possesses* in itself the power of originating *new tissue*, when placed in favorable circumstances to do so. This tissue may consist of little else than simple fibres, or it may contain

fully developed cells, intermingled with these according to the circumstances under which it is developed.

Is it really true, as stated by Mr. C., that the coagulable lymph thrown out for the reparation of injuries possesses the formative power in a higher degree than *does the ordinary plasma of the blood?*

By reference to Mr. Paget, and to his Reviewer, we shall find that the "formative power of the effused plasma is only apparently higher since that of the solids is lowered, or even in abeyance.

Surely then it is not correct to say that the formative power is possessed in a higher degree by lymph thrown out for the reparation of injuries. To build up an argument, therefore, for the essentiality of Fibrin to nutrition, on the behaviour of that substance after its abstraction from the body, or its exudation under diseased states, is untenable: for it seems probable, observes Mr. Carpenter in his General Physiology, that the animal tissues have less *converting* power than those of plants; and that not only each tissue, but each *part of the same tissue* selects some different material from the blood. For there are certain morbid matters, whose presence in the blood is manifested by the perversion of the nutritive process in certain spots of the body only, these spots being similar in size and situation on the two sides; so that it would seem that the only parts of any tissue which are really identical in composition, are those which occupy symmetrical positions or opposite sides of the body. "Now in the healthy state, as in those diseased conditions which afford more striking exemplifications of this principle, every part of the body, by taking from the blood the peculiar substance which it needs for its own nutrition, thereby removes from it a certain part of its constituents which would interfere with the nutrition of the rest of the body if retained in the circulation, as in the case of the exterpation of one gland throwing back on the system a quantity of urea &c., the remaining organ enlarges itself there being an increased cell growth for the elimination of the salts of the urine.

Whether the principles advanced by Mr. Simon be really true or not, it is at all events evident that the opposite doctrine which attributes to the *white* corpuscles the office of elaborating fibrin, and to fibrin the sole agency in building up the tissues may be legitimately questioned, and ere we attempt to silence Mr. Simon's views it would be well to ascertain that no discrepancies exist in the generally received theory. It may be that the term "excrementitious" applied by Mr. Simon, conveys more than was intended; for there are parts of the fabric into which fibrin enters largely, and in those very parts whose office is to give elasticity or support, and whose life is low and their nutrition slow, they undergoing but little change. "As every component part of the most completely organised fabric has an individual *life* of its own,

so must each cell have a limited duration, quite irrespective of the fabric at large, except in so far as they may tend to increase or diminish its functional activity. That this duration varies greatly in the different kinds of tissue. Now, in those tissues whose function instead of being *vital* is simply *physical*, as in the case of parts that afford mechanical *support* or resist *tension*, or supply *elasticity*, we find their term of existance prolonged with the general life of the animal.

The same indisposition to spontaneous change, as Mr. Carpenter remarks, shows itself in the simple fibrous tissues which after their *first formation* seem to require but little maintenance, their *chemical composition* being such as indisposes them to spontaneous decay, and their functions in the econemy being purely physical. Hence when these tissues are formed by the transformation of cells, it seems as if these cells, in becoming connected into fibres had almost entirely parted with the distinguishing attributes of vitality, and had thus passed into a condition *in which no necessary limitation is imposed on their continued extstence.* It may be stated as a general rule, that the duration of an organized structure *is very* closely related to the activity of its vital manifestations; and that, this, again is related, on the one hand, to the character and attributes of the tissue, and on the other to the condition in which it is placed." If the Fibrin of the Blood be then, the "prepared pabulum" out of which all the tissues are formed, and if it be susceptable of passing into the higher grades of developement, it seems surprising that it should be so generally found in parts of low degree of vitality, as in forming the animal structure of the egg-shell and of the shells of molluses,—tendon, and fibrous tissue,—where it occupies so low a scale of vitality and takes rank with those structures whose constitution preserves them from decay. Whenever a higher manifestation of vital force is necessary, when the tissue is in the ascending scale of developement, instantly we discover in the blastema "dimly shaded minute dots; and as it is acquiring further consistence, some of these dots seem to aggregate themselves so as to form little round, or oval clusters, bearing a strong resemblance to cell-nuclei," until a more perfect tissue be formed.

Besides the fact that the cell is not of one structure throughout, but behaves as regards its cell-wall, cell contents and nucleus, differently to various re-agents; we have now others which prove that the function of nutrition cannot go on, unless there be also an amount of those other constituents of the Blood, albumin and fatty matter; for as the researches of Dr. Bennett, and Dr. Thompson have shown, in Phithisis there is no difficiency of fibrin, but on the contrary, a preponderance; and so soon as Cod-liver is taken, and the foundation "of good molecular base" laid, as quickly does the nutrition of the body go on, and the fibrin falls to its healty standard; the *red-blood increasing* as the fibrin diminishes.

It is also stated to be a law, that for a blastema to be capable

of developement, it is necessary that it should be in contact with a living tissue. To effect this, it is necessary that there should be a connecting or attaching medium, and without doubt the fibrin of blood is the best and surest instrument for attaining such an end, and is, in the language of Mr. Simon, the scaffolding by which the tissues are built up.

To be Continued.

Art. XXVI.—*Case of Radical Cure of Prolapsus Ani.* By Thos. Deazeley, L.R.C.S.I., Professor of Surgery, Trinity College, Toronto.

In the month of December, 1849, I was consulted by a Mrs. N——, who had been the subject of prolapsus ani for nearly twenty years, during the whole of which time she was unable to walk even the shortest distance, for the moment she attempted to do so, the bowel protruded.

She occupied an easy chair during the day, and was carried to bed at night. Her general health did not appear to suffer much; her bowels were regular, but at each motion the gut descended and required to be carefully replaced before she could bear to be removed. She had never suffered from piles. Around the margin of the anus there were a number of folds composed of thickened integument and very loose cellular tissue, the sphincter offered little resistance to the return of the rectum when protruded, the whole of the coats of which appeared to descend, nor did it afterwards contract with sufficient firmness to retain the bowel in its place, when the erect position was assumed and progression attempted. There was no disease of the rectum itself.

A dose of castor oil was ordered, and after the bowels had been well freed, I excised the whole of the redundant folds which occupied the margin of the anus and directed her to remain in bed. On the third day she had a motion from her bowels without the rectum descending; on the following day she was able to walk through her room without any difficulty; in a few days, however, the mucous membrane began to bag downwards after each motion, and was returned with more difficulty than before the operation. After the bowels were again well freed with castor oil, I passed a speculum ani into the rectum, with a fissure two lines wide and two inches long on each side; this of course left exposed two portions of the mucous membrane, equal in size to the fissures in the speculum; to these I applied the actual cautery, the remainder of the rectum being safely guarded by the speculum itself. This operation cauterised two lines of the mucous membrane, one on each side; the speculum was now turned half way round in the cavity of the rectum, so as to expose two other lines at equal distances between the first; to these the actual cautery was also applied: thus four lines of the mucous membrane were easily cauterised without the slightest injury to the surrounding parts.

Effusion of fibrine into the submucous cellular tissue, and adhesive inflammation between the mucous and muscular coats followed, and a radical cure was the result. The sphincter after a short time completely recovered its tone.

Art. XXVII.—*Disease of the Kidney, consequent on Disease of the Bladder, in a Child.* By Edward M. Hodder, M. C., &c.

August 26.—James A——, aged 9 months, born of mulatto parents, has, up to the present time, appeared to enjoy good health. The child is fat and robust, and is now brought to me in consequence of his bowels having been in an irritable state for the last two or three days.

He is not weaned: has no fever, pulse natural, tongue coated and white, bowels not tender on pressure, stools slimy and offensive, but not frequent. Ordered—Ol. Recini, immediately to be followed by powders containing Hydr: cum Creta, Pulv: Ipecac: and Pulv: Rhei—ter die.

September 2.—The mother brought the child to me this morning, saying that he appeared griped in his bowels, and that the stools were rather costive and light-coloured. The powders which had been ordered on the 26th ultimo quickly relieved the state he was then in, and he had continued well until to-day. He now appears to suffer pain occasionally in the bowels, but which is not increased upon pressure: pulse quick, skin moist and comfortable, tongue white. Ordered a powder composed of Calomel and compound Jalap immediately, and Calomel and Ipecac: to be given every night and morning.

September 3, 7 P. M.—I have just been sent for, to see the child, who appears to be suffering great pain: his breathing is quick, head bedewed with perspiration, skin warm but not hot, pulse small and frequent. Bowels were not freely acted upon by the powder of yesterday. He appears to strain violently every few minutes, and he has passed his urine regularly. He is not inclined to take the breast, the stomach does not reject its contents, and he prefers being left in the cradle. Supposing the tenesmus to arise from the Calomel which had been given, I ordered a full dose of Oil, with an Injection, and warm fomentations to the abdomen.

September 4.—He is much in the same state as yesterday morning, none of the symptoms being relieved; the countenance is indicative of pain, the respiration hurried, bowels have not been freely relieved, pulse very quick, no tenderness on pressure in any part of the abdomen, and he made water freely this morning at 9, A. M. A more active aperient was ordered, the injections and fomentations to be repeated.

3, P. M.—About two hours ago the child was attacked with

convulsions, which continued for an hour, after which he became quiet but insensible, in which state he still continues. Head hot, pupils dilated and insensible, pulse still frequent, and sharper than it has ever been; his breathing is hurried, and the bowels have been copiously moved. I now bled him to ʒiiss, but the lips becoming blanched, the bleeding was immediately stopped. No other change took place in any of the symptoms until half-past 10, P. M., when he died suddenly, no other convulsion having taken place.

September 5.—Post mortem examination sixteen hours after death. Chest perfectly healthy. Abdomen, stomach, liver, and intestines presented no abnormal appearance whatever. The right kidney was enormously enlarged, of a greyish, mottled appearance, and weighed, when deprived of fatty and cellular tissue, three ounces and ʒiss. The left kidney was also enlarged, and presented the same appearance as the right, but not in so marked a manner; both ureters were filled with urine, and fully as large as the little finger. The bladder was not increased in size; it felt hard, and was adherent to the anterior surface of the rectum to the extent of ¾ of an inch. This adhesion was of recent date, as moderate traction was sufficient to separate them. The surfaces in contact were in a state of ulceration, except at the circumference: through that in the bladder the urine could be forced by gentle pressure, the openings, however, being numerous and extremely small. The ulcer on the corresponding portion of the rectum was superficial, not extending deeper than its peritoneal coat, but beyond this the intestine was much thickened by the deposition of lymph.

On cutting into the bladder it was found thickened to an inordinate extent, particularly its mucous and muscular coats, the latter being upwards of ¼ of an inch in thickness. The mucous coat was corrugated, softened, and very pale. The kidneys, ureters, and bladder contained 1½ oz. of highly albuminous urine, but unfortunately the vessel in which it was received being upset, no more minute examination of the urine could be made.

Every other organ in the body was in a perfectly healthy and natural condition.

The mother of this child told me that she had lost two other children at about the same age, and as far as she could judge under similar symptoms, but no post mortem examination of them had been made.

It is evident that the adhesion between the bladder and rectum was an effort of nature to relieve herself, by an artificial opening, of a quantity of urine, which, in consequence of the diseased condition of the bladder, was pent up until decomposition took place, and by its then irritating qualities, acted as an extraneous body.

THE

UPPER CANADA JOURNAL

OF

Medical, Surgical, and Physical Science.

FOR NOVEMBER AND DECEMBER, 1852.

TORONTO, DECEMBER 15, 1852.

GENERAL HOSPITAL, TORONTO.

We have been given to understand that the Trustees of the General Hospital have it in contemplation to make some important alterations in this Institution: what the exact nature of those changes are to be, we are not yet authorised to state. Deriving a pretty good income (something like £100 per annum) from Students fees, it has been deemed necessary to make provision for lessening the pressure which has been thrown on the present Staff by the great increase of Students, by appointing other officers to aid in the responsible duties which devolve on the Hospital attendants. The Honble Dr. Widmer zealous and active as ever in the discharge of his duties, has, we believe, been mainly instrumental in effecting this desirable change; and it is to be hoped that the good intentions of the Trustees wil be carried out by the combined exertions of the Old Staff, and those new Members yet to be appointed. If actuated by a sincere love for Science, the Members of the Staff of the General Hospital may effect much towards the advancement of the Medical Profession in this Province; let the moral and intellectual advancement of that Profession be their grand aim; and all minor difficulties and hindrances, to harmonious and hearty co-operation will vanish. The whole Profession in Upper Canada

is interested in the General Hospital, and the eyes of all are directed to it as the School of Practical Education for this part of the country: very naturally therefore the conduct of those who are entrusted with the heavy responsibility of moulding the plastic mind of youth is anxiously watched, and much interest displayed in their progress as teachers. In the commencement of every great undertaking, difficulties are sure to fall in the way; but these serveing but to nerve and stimulate to renewed exertion bring at last success. So we trust it will prove in the instance before us.

The Hospital affords ample opportunity for Clinical Instruction, and is capable of accomodating as many Patients as the justly celebrated Meath Hospital. There was a time when the Staff of that Institution were known only within "the limits of the City of Dublin," now their fame is the commen property of the Profession, and their world-wide reputation the great attraction for Students. Patient industry and above all, brotherly union and self-sacrificing devotion to Science, raised those men to the high position which they occupy. And if it is the desire of those priviledged to hold the honorable office of Physician or Surgeon to our Hospital, to advance Medical Science in Canada, they must endeavour to emulate their brethren in the Mother-land, and laying aside *self*, join hand in hand for the furtherance of the common good.

The Medical Profession in Toronto, have lately been enjoying a great treat in the Microscopical demonstrations of Dr. Goadby, formerly of the Royal College of Surgeons, in London. The Dr. has exhibited an immense number of the most beautiful prepartions of animal and vegetable tissues; to the production of which, and to the study of Minute Anatomy, he has devoted very many years. The Dr. has also discovered and adopted a new mode of injecting the diffierent vascular stucture, which under the Miscroscope are rendered peculiarly distinct, and have been the admiration of all beholders. The necessity of arranging his preparations in a mode suitable to their exhibition by the Microscope, also compelled him to employ a perfectly new manner of preserving anatomical specimens, and this he has rendered suitable to the preservation of every variety of structure either as a wet or dry preparation. The Dr. has been earnestly solicited to afford some explanations and descriptions in writing, of the several plans and methods he has adopted to secure such beautiful results—and the consequence has been that he has engaged to furnish the proprietor of the "Upper Canada Journal," with a Practical Treaties on the Art of Making and Preserving Microscopical and other Preparations, with numerous illustrtions; which will printed in a neat neat demy 8vo. Pamphlet, consisting of batween 100 and 150 pages, at the low price of five shilling per copy.

The methods indicated are extremely simple and easy of accomplishment, so that we doubt not they will be found of inestimable value by all who desire permanently to preserve specimens in Natural History, as well as in Comparative and Human Anatomy.

We notice by the Papers received from the West Indies, that Yellow Fever—Thphus Icterodes,—was very grievously afflicting the people of Barbados, Martinique, and some of the other Islands. And it was noted by the French Military Medical Staff and by the Medical men at Barbados, that the increase and virulence of the Epidemic was influenced in a marked manner by the Wind; the disease being aggravated and increased as long as it blew from the South. This is an observation which is very important to have made, and it is to be hoped that attention having been once drawn to the fact, that in future in all Epidemics greater attention will be given to Meteorological Phenomina occuring at the time.

We notice that Dr. McDonnell of St. Patrick's Hospital, Montreal, has been appointed on the Commission to inquire into the management of the Mariene Hospital. We may expect therefore a good report.

"Spontaneous Combustion.—A child, in Fredericton, a few days ago, burned its leg against a stove. The mother immediately applied linseed oil and cotton wool, with a tight bandage over all; in a short time the screams of the child induced the mother to remove the bandage, when it was discovered that the cotton wool had taken fire, and had considerably increased the size of the burn."

Finding the above in one of the Journals of the day, we insert it; for although we are much inclined to doubt the actual fact as *expressed*, yet as Spontaneous Combustion is known to have occurred on board a ship, in cotton which had become accidentally moistened with oil, it is certainly possible

MONTHLY METEOROLOGICAL REGISTER, at

Latitude, 43 deg. 39.4 min. N. Longitude, 79 deg. 21.5 min. W.

Magnet	Day	Barom. at 32° reduced to Sea Level. 6, A.M.	2, P.M.	10 P.M.	MEAN	Temperature of the air. 6, A.M.	2 P.M.	10 P.M.	MEAN	Elasticity of Vapour. 6 A.M.	2 P.M.	10 P.M.	MEAN
						°	°	°	°				
c	1	29.856	29.852	29.861	29.862	41.9	61.4	53.8	53.4	0.282	0.388	0.343	0.339
c	2	.894	.855	.861	.870	49.2	67.8	60.6	59.6	305	514	474	431
cd	3	.871	.824	...	....	56.1	63.9	.....	....	410	536	...	...
c	4	.717	.568	.588	.624	53.1	65.2	45.4	54.9	371	319	215	294
c	5	.548	.504	.521	.491	42.6	57.1	51.7	51.2	231	326	289	284
c	6	.252	.257	.424	.311	48.2	70.5	49.8	57.2	277	291	291	295
ac	7	.140	.469	.371	.410	45.7	59.6	57.1	51.6	225	431	407	373
b	8	.429	.567	.676	.559	55.6	61.0	51.5	56.7	403	374	264	394
b	9	.516	.310	.215	.347	49.3	54.6	55.6	53.2	341	396	413	381
b	10	.226	.353	....	....	59.1	64.9	...	....	465	462	...	...
b	11	.760	.678	.561	.666	42.8	56.4	19 9	49.8	255	283	289	28
c	12	.785	.645	.713	.601	51 1	52.6	35.7	47.5	351	377	158	31 1
a	13	.524	.769	.728	.771	31.1	49.2	37.8	41.1	190	329	207	223
a	14	.633	.539	.569	.567	37.8	50.7	42.4	43.6	213	245	226	255
ac	15	.598	.651	.744	.672	38 8	43.4	34.1	38 9	189	136	158	158
ac	16	.835	.884	.877	.875	30 9	44.7	34.5	36.6	158	200	165	178
c	17	.804	.580	....	....	39.1	54.5	....	....	228	394	...	...
c	18	.453	.141	.338	.337	49.2	64.3	52.0	55.2	320	449	263	321
c	19	.767	.863	.598	.850	41 4	51.8	37 3	43.4	239	223	205	219
c	20	.903	.818	.779	.839	32.2	49.6	42.1	41.9	177	261	247	226
c	21	.733	.641	.566	.638	39 5	51 9	48.5	48.4	236	342	290	293
a	22	.641	.758	.844	.764	15 8	48.9	39.1	45.1	269	249	208	232
cb	23	.903	.857	.793	.851	35.5	48.8	35 2	40.2	161	250	185	209
ba	24	.749	.561	....	....	29 8	57.1	....	....	141	338	...	...
a	25	.655	.693	.929	.775	41.6	56 7	39 6	45.1	218	367	176	230
c	26	30.010	30.032	.954	30.018	33 0	44.0	44.0	39 1	149	174	201	167
c	27	29.848	29.791	.761	29.799	40 6	49.2	50.7	47 3	213	318	347	293
ac	28	.731	.711	.657	.687	52.4	57.1	49.3	52.6	358	443	236	347
cd	29	.674	.645	.546	.622	49.7	46 6	46 7	47.5	320	290	283	264
c	30	.439	.423	.181	.430	46.0	47.9	46.3	46.4	283	308	295	291
c	31	.464	.433			46 0	51.3			287	302		
	M	29.669	29.647	29 638	29.639	13.58	54.27	45.79	48 09	0.261	0.319	0.267	0.282

Highest observed temperature 70°.7, at 2 p.m. on 6th } Monthly range
Lowest registered " 23 .8 at a.m. on 13th } 46°.9

Mean highest observed temp. 54°.50 } Mean daily range:
Mean registered minimum 39 .60 } 15°.69

Greatest daily range, 26°.5, from 4 p.m. of 6th to a.m. of 7th.

Warmest day, 2nd. Mean temperature, 59°.57 } Difference,
Coldest day, 16th Mean temperature, 36 .58 } 22°.99

13h, 8h. 23m., p.m., brilliant Meteor in South—time of flight fully 2 seconds.

The "Means" are derived from six observations daily, viz:—at 6 and 8, a.m.; and 2, 4, 10, and 12 p.m.

The column headed "Magnet" is an attempt to distinguish the character of each day as regards the frequency or extent of the fluctuations of the Magnetic declination, indicated by the self-registering instruments at Toronto. The classification is to some extent arbitrary, and may require future modification, but has been found tolerably definite as far as applied. It is as follows:—

(*a*) A marked absence of Magnetical disturbance.

(*b*) Unimportant movements,—not to be called disturbance.

(*c*) Marked disturbance,—whether shewn by frequency or amount of deviation from the normal curve,—but of no great importance.

(*d*) A greater degree of disturbance,—but not of long continuance.

(*e*) Considerable disturbance,—lasting more or less the whole day.

(*f*) A magnetical disturbance of the first class.

The day is reckoned from noon to noon. If two letters are placed, the first applies to the earlier the latter to the later part of the trace. Although the declination is particularly referred to, it rarely happens that the same terms are not applicable to the changes of the horizontal force also.

Toronto, October, 1852.

H. M. Magnetical, Observatory Toronto, C. W.—OCTOBER, 1832.

Elevation above Lake Ontario, 108 feet.

Humidity of Air				Wind			Rain: inches
6 A.M.	2 P.M.	10	Mn	6, A.M.	2, P.M.	10, P.M.	
.88	.73	.85	.81	NE b E	E b S	Calm	.....
89	78	92	81	Calm	SE bS	Calm	inapp.
93	93	..	..	Calm	S	SSW	0 350
93	53	72	7	Calm	W b S	Calm	.....
85	71	77	7	Calm	S	Calm	.....
84	40	80	6	Calm	W b S	Calm	inapp.
90	86	89	8	Calm	E b N	NEbE	0 700
93	71	97	8	EbN	NWbN	ENE	0.220
97	91	90	9	E	E b N	ESE	1.450
95	80	..	.	S	W b N	WNW	inapp.
94	63	81	82	Calm	SEbS	Calm	.....
96	97	75	91	Calm	W b N	Calm	.....
97	95	92	89	NW	W b N	Calm	.....
95	89	89	90	NE b N	Calm	NW b N	0.020
81	49	79	68	WNW	NWb N	NWbN	.....
52	69	82	81	NW b N	W	Calm	0.005
96	73	..	..	S	SSW	NE	inapp.
93	77	69	75	E b N	SW b W	W b N	.....
83	59	95	79	NNW	NNW	Calm	.....
97	75	93	86	NE b N	E b S	Calm	inapp.
98	80	89	88	Calm	E b S	N b E	0.155
95	73	88	79	NW b N	N b W	Calm	.....
78	74	91	81	N	S b E	S b W	.....
85	74	..	..	N b E	S b W	Calm	inapp.
84	64	73.	76	NNW	N b E	NNE	.....
75	66	70	70	NE	E	E	.....
85	92	95	90	E b S	E b S	ESE	0.120
82	97	74	88	Calm	SSW	N b W	0.210
91	92	90	90	NE	ENE	E b N	1.825
92	94	95	93	E b N	NNE	E b S	0 190
94	81			ESE	SSW	Calm	0.005
.90	.76	.85	.83	Miles: 3 10	Miles: 6.34	Miles: 3.00	5 280

Sum of the Atmospheric Current in Miles, resolved into the four Cardinal Directions:

North.	West.	South.	East.
1379.66	1671.35	497.96	1146.51

Mean velocity of the wind—4.47 miles per hour.
Max. velocity—18 9 miles per hour, from 8 to 9 p.m. on 18th.

Most windy day—29th: mean velocity—10.52 miles per hour.
Least windy day—2nd: mean velocity—083. ditto.

Hour of greatest mean velocity—noon: mean velocity—6 58 do.
Hour of least " —10 p.m.: do. —3.00 do.
Mean diurnal variation—3.58 miles.

COMPARATIVE TABLE FOR SEPTEMBER.

Year	Temperature				Rain.		Wind.
	Mean	Max	Min	Range	Days	Inches	Mean velocity.
1840	44 44	64.5	33.9	44 6	13	1.860	Miles.
1841	41.47	58.3	20 3	38 0	6	1.3 0	
1842	44.84	68 5	30 0	38 5	8	5 175	
1843	41.57	65.7	24.5	41.2	12	3.790	
1844	43.24	69.6	17.8	51.8	7	1.245	
1845	46.16	62.7	20 0	42.7	11	1.760	
1846	41.63	69.7	20.7	49.0	14	4 130	
1847	44.08	65.0	20 3	44 7	13	4 390	
1848	46.69	66 2	25 4	35 8	11	1.550	4 40
1849	45 28	59 2	25 5	33.7	13	5.965	4.76
1850	45 44	66 6	24 8	41.8	10	2 085	5.30
1851	47.83	66 1	25 0	41 1	10	1.080	4.39
1852	48 09	70.7	29.8	40 9	12	5 280	4.47
ean	44.90	65.60	23.77	41.83	10.8	2 101	4.78.

MONTHLY METEOROLOGICAL REGISTER, AT

Latitude, 43 deg. 30.4 min. N. Longitude, 79 deg. 21.5 min. W.

Magt.	Day.	Barom. at tem. of 32 deg. 6, A.M.	2, P.M.	10.P M.	MEAN.	Temperature of the air. 6 A.M.	2, P.M	10,P.M	MEAN	Tension of Vapour. 6.A M.	2, P.M.	10,P.M	MEAN.
						°	°	°					
cd	1	—0.187	0.23-	.03 71	0 281	2.9	6 4	6 0	3.74	0.155	0.283	0.277	0.257
a	2	— .596	— .622	— .418	.540	6 0	3.0	1 8	3.10	249	.271	.220	.249
c	3	— .198	— .016	— .077	— .041	0 2	2 0	0 4	0 80	193	.178	.187	.183
c	4	.115	.089	.105	.104	1.2	2.1	— 1 0	1 00	.195	.240	.195	.211
c	5	.064	.054	.062	.048	1.5	0.1	— 0 2	0 46	.182	.177	.161	.172
bd	6	— .113	— .38-	— .6.6	— .398	1 5	2 2	5 4	2 24	.177	.234	.264	.229
cd	7	— .544	— .121	....	....	4.1	0.7	....	....	.165	.177	....	....
a	8	— .051	— .015	.566	.037	0 8	— 0.5	— 0 4	0.40	.192	.192	.190	.191
b	9	.032	— .012	.054	.028	0.2	2 4	— 5.9	— 2.64	.197	.163	.100	185
ac	10	.004	.211	.219	.190	6.7	— 0.8	3 8	— 3.11	.141	.181	.155	.164
c	11	.255	.137	.207	031	2.5	— 0 4	— 7 3	— 1.59	.176	.163	.244	.193
c	12	— .418	— .345	— .114	.302	7 2	— 0.7	— 1 0	— 0 85	.242	162	.151	.178
cd	13	— .202	— .092	— .163	.148	1.0	— 4 7	— 3 7	— 3 88	.174	.139	.154	.154
c	14	— .308	— .213	....	....	4 8	— 8 8	....	....	.148	.158	....	....
b	15	— .167	— .130	— .130	— .149	2 4	— 5 7	— 4 5	— 3.87	.164	.136	.157	154
c	16	— .157	— .17.-	— .1.8	— .159	2.7	— 3 7	— 5.5	— 4.22	.1 7	.142	.157	.153
c	17	— .118	— .097	— .07	— .102	6 0	— 1 5	— 5 1	— 4.34	.138	.134	.136	.136
b	18	— .079	— .047	— .09	— .093	7 4	— 0 3	— 0 4	— 1.00	1 9	.142	.149	151
a	19	— .104	— .127	— .181	— .134	0 1	— 0 7	— 5.2	— 1 6	.176	175	154	163
a	20	.211	.312	.427	.337	0.2	— 1 6	— 1.3	— 0 25	.189	.123	.139	.145
a	21	.393	.437	....	....	0 1	— 4 6	....	....	.169	.169	....	....
b	22	.340	.0.8	.07	.034	2 2	— 5.3	— 0.-	— 0.87	.164	.165	.173	.168
b	23	.004	.155	.308	.166	1.7	— 5.7	— 9 6	— 6 11	.141	.143	.100	.128
b	24	— .330	.248	.075	219	2.2	— 10 5	— 1 6	— 8.03	.087	131	.154	.123
bc	25	154	— .266	— .3.0	— .274	12 6	— 0.3	— 5.8	— 3 03	.146	.197	.211	.193
c	26	— .552	— .605	— .557	— .601	8.5	— 5 5	— 6 1	— 6 81	.222	.255	.215	.230
bc	27	— .515	— .160	— .03.	— .291	4.5	— 1.5	— 1 0	— 2 03	.185	.154	.133	.151
b	28	— 148	.194	....	....	2.7	— 1.9	....	....	.115	.152	....	....
a	29	.201	.219	.38-	.280	3 2	— 2 0	— 1 6	— 0 62	.161	.177	.131	.153
bd	30	.389	.199	.294	.118	2.4	— 7 1	— 5.1	— 3.60	.123	.198	.168	.170
Means	Normal...	29,627	29.636	29.621	29.626	33.68	40 02	35 47	36.20	0 172	0.180	0.175	0 176
	Observed	29.57-	29.534	29.593	29.573	33 26	39 95	31 95	35 39				

Highest Barometer.....30.184, at 8 a. m. on 21st } Monthly range
Lowest Barometer.....28.943; at 2 p.m. on 26th } 1.241 inch.

High'st observed temp.... 58°4, at 2 p.m. on 1st } Monthly range
Lowest registered " 18 2, at a.m. on 24th. } 32°2

Mean. high'st obs'r'd tem. 29°66. } Mean. daily range:
Mean. registered minimum 20 65, } 9°51

Greatest daily range, 20°4, from a m. to 2 p.m. on 30th.

Warmest day, 15th, mean temperature 43°57 } Difference,
Coldest day, 24th, mean temperature 25 25 } 18°32

First snow of the season, from 6 to 9 a m., on the 11th.

The "Means" are derived from six observations daily, viz:—at 6 and 8, a.m.; and 2, 4, 10, and 12, p.m.

The column headed "Magnet" is an attempt to distinguish the character of each day as regards the frequency or extent of the fluctuations of the Magnetic declination, indicated by the self-registering instruments at Toronto The classification is to some extent arbitrary, and may require future modification, but has been found tolerably definite as far as applied. It is as follows:

(*a*) A marked absence of Magnetical disturbance.
(*b*) Unimportant movements,—not to be called disturbance.
(*c*) Marked disturbance,—whether shewn by frequency or amount of deviation from the normal curve,—but of no great importance.
(*d*) A greater degree of disturbance,—lasting more or less the whole day.
(*e*) Considerable disturbance of the first class.

The day is reckoned from noon to noon. If two letters are placed, the first applies to the earlier, the latter to the later part of the trace Although the declination is particularly referred to, it rarely happens that the same terms are not applicable to the changes of the horizontal force also.

Toronto, November, 1852.

M. M. Magnetical, Observatory Toronto, C. W.—NOVEMBER, 1852.

Elevation above Lake Ontario, 108 feet.

Humidity of Air			Wind			Rain inches	Snow inches	Weather.
6 AM 2PM.	10	Mn	6, A.M.	2, P.M.	10, P.M.			
.92	.81	.92	.89	Calm	SSE	NE	0.145	.....	Frost at 6 a.m; day cloudy, rain'g slightly
90	86	89	59	NE	N	WNW	0 030	...	Slight rain till 5p.m; mostly clear fr. 7pm.
87	58	80	74	W b S	W b S	W	0.010	... ..	Frost at 6a.m; detac'd cl'ds gen'ly disp'd.
87	80	79	83	Calm	SSW	Calm	.....	.....	Densely clouded ; dull, dark day.
79	65	71	72	NNE	E	NE	inapp	.....	Gen'ly cloudy; a few clr spaces fr 2 to 4pm
79	91	91	89	ENE	E	NE b E	0 545	.....	Constant light rain from 7 a.m.
66	65	..	..	SW b W	WSW	WSW	inapp	....	Rain ceased 1 a.m.; day cloudy.
95	74	87	85	W b S	W b S	NNW	inapp.	.....	Slight rain 45m. p. 6 to 20m. p. 7 a. m.
95	81	92	90	Calm	W b S	W b S	inapp.	... ..	Spitting rain at 6 am; mostly clear fr 8 pm
90	72	82	82	W	NNW	N b E	inapp.	.....	Gen'ly fine; auroral light fr 15m. p. 8 p. m.
96	63	86	81	NE	ESE	SE b E	0.050	inapp.	Sl't snow 6to9 a.m. rain&sleet fr 55mp 1 pm
93	66	74	71	W b S	SW b W	W b N	.. ..	inapp.	Overcast all day; auroral light in N fr 7pm.
91	67	88	83	W	NW	NW	..	0 4	Sl't snow 6to8am&fr6pm, ft aur. at midn't
93	89		..	NW b N	NW b N	NW bW	.....	inapp	Do. occasionally; ft aur. fr 7 pm.
94	69	91	85	NW	NW bW	W b N	.....	.....	Overcast all day; mostly clear fr 8 to 11 pm.
91	67	90	89	WSW	WSW	SW bW	....	. ..	Cl'dy till 4pm aft. n'y clr; ft aur. at midn't
93	59	82	78	WSW	W b S	WNW	....	.....	Gen'y fine ; faint auroral light fr 10 pm.
92	59	75	77	N	NWbN	NNE	..	.....	Lt detached clouds disp ; clouded fr 4 pm.
93	73	90	86	N b E	S b E	N b W	. ..	. ..	A few light clouds disp'd; mostly fine.
87	50	75	73	N b W	NNW	NWbN	.....	.....	Lightly overcast; hazy, dull, but mild.
91	86	..	..	NNW	NE b E	ENE	.....	.....	Dlensely do.; hazy and very dull.
84	91	92	88	E b S	E	E b S	.....	0.8	Ditto do.; snowing from 15m. p. 1pm.
85	79	76	79	NNE	NNE	NE b N	..		Light detached clouds dispersed.
81	84	88	85	NE b N	NE b E	E b S	.	inapp	Mostly clear till 10 am; aft. dens. clouded.
86	88	92	91	E b S	E b S	NE b E	0.570	....	Densely overcast: constant rain or sleet.
92	96	95	94	E b S	ESE	WSW	0 32	. ...	Fog 6 am; raining slightly till 7 pm
92	68	72	75	WSW	W b S	WSW	.. ..	.....	Gen'ly ov'cast with h'vy det'd cl'ds; windy
78	60	..	..	SW b W	SW b W	SW	..	0.8	Clouded a.m, mostly clr. ; snow dur night
86	78	82	80	W b N	W b S	W b N		.....	Light det'd cl'ds, halo r. moon at midn't.
82	72	79	78	W	WSW	WSW	.....	.....	Gen'ly clear; Auroral light, and ft streamers fr 11 pm.; halo rd. moon midn't, and very brll. meteor in NE. at 45m. p 1 a.m.
.89	.74	.85	.83	Miles:	Miles:	Miles:	1.775	2.0	
				6.10	7 96	5 62			

Sum of the Atmospheric Current in Miles, resolved into the four Cardinal Directions:

North.	West.	South.	East.
1391.26	2327.69	827.59	1378.64

Mean velocity of the wind—6.39 miles per hour.
Max. velocity—19.5 miles per hour, from 2 to 3 p.m. on 27th.

Most windy day—12th: mean velocity—13.91 miles per hour.
Least windy day—4th: mean velocity—2.11 ditto.

Hour of greatest mean velocity—noon: mean velocity—8 59 do.
Hour of least " —9 p.m.: do. —5.34 do.
Mean diurnal variation—3.25 miles.

COMPARATIVE TABLE FOR SEPTEMBER.

Year	Temperature				Rain.		Wind.
	Mean.	Max.	Min	Range	Days.	Inches	Mean velocity.
1840	35.90	54.1	20.5	33 9	5	1.220	Miles.
1841	37.35	63.2	7.6	55.6	8	2.450	
1842	33.12	50.6	7.6	43 0	9	5.310	
1843	33.11	51.2	11.4	39.8	10	4.765	
1844	34.84	49 8	12.0	37.8	8	Imp't	
1845	36 67	58.8	7.6	51.2	7	1.105	
1846	40.85	55.5	18.2	37.3	12	5 805	
1847	38.72	58.2	7.8	50.4	14	3.155	4.77
1848	34.31	49 3	16.5	32.8	9	2.020	4.81
1849	42 33	56 7	28.4	28.3	10	2.815	4 78
1850	38 65	62.3	18.1	44.2	7	2.955	5.27
1851	34.72	50.1	16.5	33 6	5	3.885	4.70
1852	35 80	50.4	18.7	31.7	7	1.775	6.50
Mean	36.21	54.65	14.92	39.74	8.5	3.105	5.14.