

gouty or rheumatic diathesis, as conditions under which waste products are imperfectly removed from the tissues, will be allowed a certain weight in establishing the probabilities. In the upper arm the extensors (triceps) are most frequently affected, in the lower arm, the flexors and extensors with about equal frequency. Occasionally the coraco-brachialis or the anconeus may be affected alone, giving rise to rather obscure pains in the shoulder and elbow respectively. Such cases are readily overlooked in a careless diagnosis. Incidentally their deep location renders treatment more difficult. The tenderness over the affected muscle, the painful and imperfect function, and the occasional fibrillary spasm are the positive factors upon which we base a diagnosis, while the absence of fever, swelling or redness, the absence of tenderness about the joints, along the course of the nerves, or along the tendon sheaths will weigh against rheumatism, neuritis, and thecitis respectively. The absence of fibrous crepitation will also serve to aid in excluding this last affection. From painful affection of the bone or the periosteum it may be extremely difficult to differentiate a deep-seated myalgia: the absence of pain on jarring the limb, and its ready yielding, if recent, to the faradic current will serve to aid in identifying a myalgia.

The prognosis is good if treatment be instituted early; if treatment be too long postponed, and atrophy ensue, due partly to disuse and partly to local poisoning of the muscular substance by the "materies peccans" of the disease, the affection may prove very obstinate and intractable, but will in almost all cases eventually yield where the persevering co-operation of the patient can be secured. It is my firm belief, however, that simple myalgia, if severe and untreated, can occasion permanent disability.

The treatment of myalgia consists in efforts to throw again into solution those precipitates in the muscles whose presence impedes their function and causes the pain. This we seek to accomplish along certain rational lines, all tending to this common end.

Probably the first therapeutic efforts of sufferers from myalgia were directed toward keeping the affected part warm. The rationale of this lies in inducing a dilatation of the blood-vessels, which brings a larger supply of the solvent serum into contact with the offending precipitates, thus promoting their solution. With the increased advent of blood follows in turn an increase of heat, which in connection with the heat added from without induces an actual rise of the temperature of the part, which is likely to promote considerably the solubility of any precipitates. Recently this method of treatment has had its efficacy greatly enhanced by the devising of methods of exposing the affected limb to dry air at very high temperatures. Local hot-air baths may now be procured from instrument dealers by means of which an extremity may be exposed, without damaging the skin, to dry air at a temperature of 300° to 500° F.

Other ways of increasing the afflux of fresh serum to aid in the solution of precipitates are, first, counter-irritation, applied to the overlying skin by the use of iodine or other rubefacients, cantharidal blisters, or "firing" with the actual cautery; secondly, moderate, active use of the muscles, when practicable without causing too much pain; every athlete is familiar with the disappearance of "muscular stiffness" (the mildest grade of this disease) under fresh exercise; thirdly, massage of the affected parts is extremely useful, particularly in the more obstinate and chronic forms of myalgia. It acts partly by mechanically dislodging crystals or amorphous masses of precipitated matters, forcing them into the lymphatic circulation, and partly by greatly stimulating the local circulation.

Antirheumatic remedies, and the antirheumatic régime are also of use in controlling the pain of myalgia, chiefly by the solvent affect of alkalies and of the salicylates on the morbid deposits, and of these measures there is none that compares in importance with the ingestion of very large quantities of water.

While massage is our best weapon against chronic forms of the malady, especially in the presence of secondary atrophy, there is no agent whatsoever that will give the

immediate and lasting relief that is to be obtained from the application of the faradic current, and no more grateful patients are encountered than those who have been relieved from the misery of a myalgia by the brief application of a mild current.

One special point it is important to notice in the treatment of myalgia of the upper arm—namely, this, that the muscles which move the upper arm have their origin on the trunk; and that their function is twofold, first, that of imparting voluntary movements to the upper extremity, and secondly, that of supporting the weight of the arm. This second function is not appreciated during health, but in the presence of a severe deltoid myalgia, the six to ten pounds weight of the arm dragging upon the lame muscle is a very considerable factor in increasing the pain and a serious obstacle to recovery. In all acute myalgias, therefore, affecting the muscles which pass from the trunk to the arm it is necessary to support the weight of the member by a firm bandage at the elbow. The most effective device for this purpose is a Moore's dressing for fracture of the clavicle, as described under the head of fractures.

Occasionally one sees cases of what are called "chronic sprains" or "sprains," caused by the overuse of certain muscles, in which the pain is principally at the origin or insertion of the muscles. Tenderness and stiffness are prominent symptoms. Examples of this are seen in the so-called "BASE-BALL PITCHER'S ARM," "TENNIS ELBOW," etc. Such persistent overuse of a muscle may give rise to a local periostitis at one of the points of attachment of the muscle, possibly resulting in necrosis.

ACUTE MYOSITIS is occasionally encountered in the muscles of the arm as a result of pyogenic infection. The pyogenic type of this disease, however, is rare, and when present is but a secondary accompaniment to neighboring extensive septic processes. It may lead to necrosis of the muscles *en masse*, or to fractional sloughing, and solution of the muscle fibres in the purulent effusion.

The most common forms of myositis are those whose origin is SYPHILITIC, indeed it is more than probable that part of the rheumatic pains which precede or accompany the eruption of constitutional syphilis depend upon a light and acute irritative myositis.

A commoner form of syphilitic myositis is the CHRONIC INTERSTITIAL VARIETY depending upon a small-celled infiltration rising from the perimysium, and extending into and between the muscle bundles. These are destroyed by pressure atrophy, and become transformed into connective tissue with gradual loss of the muscle. It is a diffuse process within the muscle, and is at first generally attended with pain.

GUMMATOUS MYOSITIS may develop as a slowly growing, and perfectly painless infiltrate in the muscles. Accompanying the gummatous process there are usually found more or less extensive inflammatory changes. More commonly, however, the growth of the gumma is more rapid, and pain, increased by touch and motion, is a marked symptom. The muscle in all the more rapidly growing gummata is in a state of constant contraction, the growth at first moves with the movements in the muscle. As it increases in size it becomes softer in consistency, and the muscle assumes a condition of permanent contracture.

Gummatous myositis often advances beyond the muscle, and comes to involve the fascia and subcutaneous tissues. It becomes more prominent, softer and less movable, and finally breaks through the skin, leaving a sinuous ulcer from which necrotic masses, chiefly fascial, are extruded. After healing, which requires weeks or months, a cicatricial tissue remains which binds together the muscle, fascia, and skin (Hartley).

PROGRESSIVE MUSCULAR ATROPHY is a disease which manifests itself most distinctly among the muscles of the arm. It is, however, essentially a nervous disease and not a disease of the muscles: its consideration here, in connection with the muscles, is for greater convenience only. The nerves supplying the atrophied muscles may be affected anywhere along their course, but the principal site

of the lesion is in the anterior gray columns of the spinal cord. However general the disease may subsequently become, it is at first localized, and the upper extremity is by far the most frequently involved. Affection of the right hand is said to be considerably more frequent than that of the left, and of the muscles, either the interossei or those of the ball of the thumb first succumb. The disease, in fact, at first simulates an ulnar neuritis, but careful study will indicate the involvement of certain muscles which are supplied by other nerves. From the thenar muscles and the interossei, the disease commonly creeps up the forearm and thence to the arm, or it may skip the forearm and pass into the arm, although the triceps extensor muscle is usually spared. It may come to a standstill in either of these two places, but may involve the muscles of the shoulder, especially the deltoid. Beginning most frequently on the right side, both upper extremities become involved sooner or later. In other instances in which the extremities are involved the atrophy begins in the deltoid (here again the right first). Succeeding the deltoid, the scapular and trapezius muscles may be involved in any order, while a grotesqueness of effect is often produced by reason of certain adjacent muscles retaining their natural size or even being hypertrophied. This is particularly the case with the anterior part of the trapezius, which is almost never involved. While the shoulders remain exclusively affected, the arm and forearm may retain their usefulness and strength, but the power of lifting the arm from the side, and especially of raising it above the head, is lost, and if the patient wishes to lay hold of anything he must swing his arm forward with a jerk till the object is brought within reach of his fingers.

The muscles of the trunk become at times involved: the pectorales, the latissimi, the serrati, and the intercostales, and even the diaphragm and the abdominal and lumbar muscles.

The muscular atrophy is generally accompanied by a corresponding wasting and retraction of the skin, so that this continues to be applied to the muscles in the usual manner. In some instances, however, this is not the case, and in these a baggy condition of the skin is added which gives its subject an appearance which has more than once rendered him valuable to the showman as the "elastic skinned man," etc. It sometimes happens, on the other hand, that the atrophy is obscured by an accumulation, between the muscles and skin, of adipose tissue, and an appearance of hypertrophy rather than of atrophy may be produced in consequence.

A second muscular symptom, more or less distinct, is fibrillar contraction. This consists in wave like contractions running along small bundles of muscular fasciculi. These contractions occur spontaneously, or are excited by some slight stimulus, as a breath of air or a dash of water, or by tapping the patient with the fingers or passing a galvanic current through the parts, and this too in any stage of the disease, except that they do not occur in muscles wholly destroyed. Sometimes they can be felt by the patient; at other times he is wholly ignorant of them. They are not invariably present, and often they have been seen in muscle atrophy from other causes; they possess, however, a certain amount of diagnostic value, especially when spontaneous. Coincident with the wasting of muscles is their loss of function. Sensibility is in many cases unchanged, the tactile sense being as delicate as ever, and pain, except accompanying the cramps and chronic contractions of groups of affected muscles, which sometimes occur, is absent. At times, however, the atrophy is preceded by painful paroxysms, which may or may not accompany the chronic contraction referred to. The pain is sometimes in the course of nerve trunks, but is as often diffuse, as if the muscles themselves were its seat. At other times it is variably described as a soreness, an aching or a rheumatic pain. Morbid sensations, as those of cold, numbness, and formation may be experienced. Reflex excitability may be increased, while the knee jerk is said to be absent. Unusual sensitiveness to cold is sometimes noted, and so

also is the loss of muscular power under its influence, which is again restored by artificial warmth (Tyson).

The lipomatosis, which has already been alluded to as affording, in some cases of muscular atrophy, somewhat the appearance of the pseudo-muscular hypertrophy, may to the casual observer obscure the diagnosis of this disease. Pseudo-hypertrophic paralysis, however, almost invariably first asserts itself in the lower extremity.

SYRINGOMYELIA is another of the central nervous diseases which finds its most marked expression in the secondary changes it induces in the sensory, trophic, and motor functions of the arms. The symptoms are almost always bilateral, but a few cases have been observed in which but one side of the body was affected. The most common type is that in which the most salient features are loss of perception of pain and temperature, with retention of the tactile and muscular senses, combined with atrophy of the arms similar to that observed in progressive muscular atrophy. The atrophy usually appears in the small muscles of the hand and gradually extends upward, involving consecutively the arm, forearm, and shoulder muscles, or it may first appear in the shoulder and upper muscles and later descend to the hand. The difference depends upon whether the lower cervical gray matter is first affected with extension upward of the process, or whether the upper cervical enlargement, in which are located the centres for the shoulder muscles, is first affected.

Corresponding with the atrophy there is naturally a weakness of the muscles which may go on to complete paralysis. Trophic disturbances are common. Changes in the joints and bones, very similar to those observed in tabes, occur in about ten per cent. of the cases. The joint changes consist principally of enlargement of capsular ligaments, loosening of the joints, thickening of the capsule, changes of form in the ends of the bones, and development of bony spicula in the capsular walls. The further changes resemble those in tabetic joints.

Painless fracture of the bones may occur from very slight causes, as in the case of a man who fractured the radius while kneading dough. Various atrophic changes in the skin are frequent, such as herpes, eczema, and even deep ulceration and gangrene; in rare cases amputation of the hand may be necessary; or there may be simply vaso-motor changes causing lividity and coldness of the skin or the opposite, or œdematous swelling of the hand. There may be sweating or dryness of the skin. The nails may become dry, cracked, and brittle and may drop off.

An obtrusive symptom which is sometimes observed is the painless felon, similar to that which occurs in Morvan's disease. These felons occasion deep ulceration and necrosis of the distal phalanges of the fingers so that they may drop off. Notwithstanding this extensive ulceration the felons are painless, owing to the analgesia present (Prince).

For a more accurate differential diagnosis of these different secondary muscular dystrophies, and for a more exact discussion of their pathology and treatment, the reader is referred to articles in this work on diseases of the nervous system.

Spastic rigidity of the arms is often one of the earliest signs of CHRONIC HYDROCEPHALUS, even before the skull begins to enlarge, and convulsions may be present from time to time. In congenital spastic rigidity, due to sclerosis or defective development of the cortex cerebri, the spastic condition is usually confined to the legs.

IN PARAMYOCLONUS MULTIPLEX, as the name of the disease implies, the contractions of the muscles appear in paroxysms and the muscles involved are usually the biceps, deltoid, and triceps in the arms, and the quadriceps femoris and calf muscles of the lower limbs. Myoclonus multiplex is a disease of adult life, and may be differentiated from chorea, which is usually seen in childhood. Sometimes the muscles in myoclonus are exceedingly irritable.

Sometimes, as the result of infantile cerebral paralysis, or from reasons developing later in life, the muscles of

the hand are affected by a slow, constant movement, so that the fingers assume curious constrained and unusual postures, being moved into extreme or forced extension, flexion, pronation, or supination. This condition is called **ATHETOSIS**, and is separable from chorea in that the movements are slower, and are limited to the fingers and wrists, the arm escaping.

Absolute loss of power in one hand and arm, without the necessary development of subsequent deformity, results from cerebral or peripheral lesions as a rule, being rarely spinal in origin, and is called **BRACHIAL MONO- PLEGIA**. Although the onset of a monoplegia due to cortical, sub-cortical, or capsular causes is sudden, the reactions of degeneration do not come on for a long period of time in such cases, because the muscles in the paralyzed area are still connected with the trophic centres in the cord, and this affords us a valuable point in differential diagnosis. In all cases of brachial monoplegia due to peripheral lesions we find that atrophy of the muscles comes on very rapidly from cutting off of the muscles from their trophic centres in the spinal cord.

(b) *The Tendons*.—The want of protection of the tendons in the forearm is the reason of their frequent accidental division from incised wounds near the wrist. In the event of such division the proximal end will retract an inch or more into the tissues of the forearm, and naturally the function of the accompanying muscle will be totally suspended. Where several of these tendons have been divided at once, there may be considerable difficulty in identifying the corresponding proximal and distal ends. In any clean wound, however, union by suture should be attempted; nor would the mistaken apposition of the proximal end of one tendon to the distal end of another prove as serious a disaster as the failure to unite the severed tendon ends. In fact an intentional transplantation of the proximal end of one tendon to the distal end of another has recently been practised with brilliant success in some cases of infantile paralysis, with a view to imparting vicarious function to the paralyzed members. In uniting multiple sections of the tendons in transverse incised wounds of the wrist and forearm, it is important that the union should be at least between tendons traversing the same compartment of the annular ligament.

An occasional result of a severe sprain is the **DISLOCATION OF THE TENDONS** about the affected joint. The long head of the biceps is oftenest so affected, being displaced from its groove in the humerus. The flexor carpi ulnaris is sometimes injured in this way, and the tendon of the extensor communis digitorum, which runs to the index finger, is not infrequently torn from its bed at the back of the wrist, owing to the fact that the portion above the annular ligament stands at quite an angle to the portion below. Its displacement is always to the radial side. In cases of dislocation of the tendons, the muscles can still contract, but the tendon can be felt to move in its abnormal position, while the extremity suffers a partial loss of function from the mechanical disadvantage under which the muscle works.

These accidents may be treated by replacing the tendon and keeping it in position by a splint. This not availing, the tendon may be cut down upon and the torn sheath sutured or a new sheath formed by dissecting up a band of periosteum.

Among the traumatic affections of the tendons we occasionally meet with instances of complete rupture. This occurs either in the course of the tendon proper, or, more frequently, at the attachment of the tendon to the bone, but rupture at the musculo-tendinous junction is almost unknown. When the tendon is inserted into a special epiphysis, as the triceps into the olecranon process, the biceps into the tubercle of the radius, and the supinator longus into the styloid process of the radius, so-called rupture of the corresponding tendons is usually accompanied with tearing off of the epiphysis and more or less stripping up of the adjacent periosteum, constituting what is known as a fracture "par arrachement." Although the tendon is the part which usually gives way under strain on a muscle, the muscular fibres

themselves may, in rare cases, be more or less extensively torn across, especially after long and exhaustive diseases, such as typhoid and scarlet fever. Contusion of a muscle in a state of tense contraction may, however, bring about a subcutaneous division of its fibres sufficient to cause a pronounced diastasis of the divided portions. The tendons of the arm most frequently the subject of rupture are the long head of the biceps, and the pronator radii teres; the radial attachment of the biceps, the triceps, the deltoid, and the pectoralis major have been reported as torn from their insertions. It is not likely that rupture of a healthy tendon can occur except when the muscle is suddenly and unexpectedly exposed to severe additional strain when already in a state of contraction. The accident is generally accompanied by sudden and violent pain, by complete loss of power in the muscle, and by considerable impairment of function in the limb. When seen soon after the occurrence of the accident a more or less marked depression can be felt over the site of the rupture; this depression may later become filled with extravasated blood or effused lymph and may in fact become converted into an elevation. Where the fleshy body of a muscle is torn across, unless the muscle be one lying very deep, the depression will be likely to be quite deep and quite persistent. Such an evidence of an hiatus in the continuity of a tendon or muscle is almost pathognomonic of the lesion.

The treatment will vary, according to the importance of the affected muscle and the amount of disability incurred, from simple rest with pains to keep the limb in a position to relax to the utmost the affected muscle, to more or less elaborate operative procedures for the restoration of the continuity of the lacerated tissues by suture. It should be remembered that contractures may subsequently develop in consequence of muscular or tendinous ruptures.

The tendons themselves are rarely the subject of disease which does not also involve their synovial sheaths as well. They may become necrotic in suppurative processes which have invaded their sheaths, and in this case their separation will take place at the point where their intrinsic blood-vessels have been destroyed. The tendons are sometimes the seat of deposits of urates, and not infrequently undergo calcareous infiltration in advanced life. Ossification of their distal ends is also sometimes observed, and in some cases there is an anomalous development of sesamoid bones at the point where the tendons may form an angle in passing over bony prominences. Rheumatic deposits are sometimes found near the proximal end of the tendons.

(c) *The Tendon Sheaths*.—Much more common than disease of the tendons themselves is disease of the synovial membrane which surrounds them. The exact pathology of the **SIMPLE IRRITATIVE FORM OF TENOSYNOVITIS** is not very perfectly understood. From its etiology and course the pathological condition is strongly analogous to that which has been discussed under the head of myalgia, and is probably due to an alteration of the synovial fluid and possibly of the endothelial cells lining the sac. It is observed to occur under conditions strictly analogous with those which induce an attack of myalgia, *i.e.*, exposure to cold and over-use of the parts. It is generally accompanied with lameness and tenderness over the course of the tendon, and characteristic of the condition is the crepitation which follows contraction of the muscle. Rest, heat, and counter-irritation are the best means for relieving the difficulty.

In addition to the simple irritative form, a septic, a rheumatic, a syphilitic, and a tuberculous form of tenosynovitis are recorded.

The **SEPTIC FORM** is almost invariably secondary to septic processes outside of the tendon sheaths, and in septic tenosynovitis of the forearm the locus of primary sepsis is most frequently the hands and fingers. The disease is accompanied with a purulent effusion into the tendon sheaths, giving rise to tender oblong swellings, ill-defined on account of the distention due to accompanying cellulitis, and lying parallel with the axis of the limb. The

surrounding tissues are usually sufficiently involved in the pyogenic process to give rise to heat, redness, and swelling of the surface. Suppurative tenosynovitis has been known to follow gonorrhoeal rheumatism of the joints.

The treatment of purulent thecitis consists in laying open the tendon sheaths freely, though not literally from end to end lest the tendon escape from its bed. Only in rare cases would it be justifiable to divide the annular ligament of the wrist or even to open its compartments. Great effort, however, should be made to irrigate the sac most freely with antiseptic solutions through the liberal incision above and below the bridge of tissue which it may be deemed wise to leave to serve as a bridle to hold the tendon in its bed, and particular pains should be taken to force the irrigating fluid to pass under this bridge of tissue.

In dressing wounds, whether operative or otherwise, of the tendons or of the tendon sheaths, it must be borne in mind that the vascular supply of these tissues is limited, and that in consequence when they have been exposed to the air it is necessary to provide carefully against their desiccation in order to avoid necrosis. In all aseptic conditions of the tendon sheaths this may be accomplished by covering the exposed tissues with impervious protective strips of gutta-percha, rubber, or prepared mackintosh. In septic processes the use of impervious dressings is contraindicated, and provision against desiccation must be made by means of wet dressings, frequently renewed.

Like all diseases of the fibrous system, tenosynovitis is very prone to occur in arthritic subjects, and the **RHEUMATIC FORM OF TENOSYNOVITIS** has a very disagreeable tendency to become chronic. In the acute stages alkalies and the salicylates will afford relief to the patient. In the later stages lithia and the iodide of potassium are the most serviceable drugs available; while the exposure of the limb to high temperatures in the hot-air bath, together with massage, and active and passive motion carried on in spite of the soreness, will do much to restore the supple action of the arm.

The **TUBERCULOUS FORM OF TENOSYNOVITIS** begins in a very insidious fashion. It may be primary in the tendon sheath, but is frequently secondary to a tuberculous process in the adjacent joints. It is, like most tuberculous processes, of very slow growth, covering a period sometimes of years, with times of improvement under rest, but with great proneness to recur as soon as the limb is again put to its customary use. It develops frequently after some traumatism such as a sprain or a contusion, and the differentiation from the simple irritative or from the rheumatic form is not at first easy. After a while there will almost always be developed along the course of the tendon the characteristic flat or oval swelling caused by effusion into the sheath and thickening of the walls of the sheath itself. This swelling may take on more or less of an hour-glass shape from confinement of the tendon beneath the annular ligament. The disease may remain confined to one portion of a single tendon sheath, but tends to extend both upward and downward; also to attack neighboring tendons and even to invade underlying joints.

According to Park, there are two pathological forms of the disease: one is a fungous form distinguishable by the growth of exuberant granulation tissue of a gelatinous appearance surrounding the tendon on the inner side of its sheath. In the other form, known as hygroma, the inner surface of the tendon sheath is covered with small growths, which become detached, forming small, hard kernels known as rice bodies. These rice bodies are the result of fibrinoid degeneration, *i.e.*, the degenerated villous growths which are fibrous in character become loosened, forming free kernels. Until recently, this form of disease was supposed to have no connection with tuberculosis. It is now distinctly established that these bodies contain tubercle bacilli. The same condition may be found in tuberculous joint disease where they develop from a fibrinoid degeneration of tuberculous granulations

on the synovial fringes. If the disease is allowed to run its course, suppuration ensues, forming sinuses involving the skin which eventually breaks down. These with the resulting cicatrices greatly impair the use of the hand.

The treatment of tuberculous tenosynovitis is essentially the same as that of tuberculous joint trouble, and consists at first in the immobilization of the arm by suitable splints, with moderate pressure, together with the administration of appropriate tonics and careful attention to hygiene. The possible usefulness of dry air in the hot-air bath is not altogether settled, though it might seem a rational therapeutic measure. It is essential to differentiate positively the tuberculous form of the disease from the simple irritative and the rheumatic form. Massage, and movements, active and passive, so pre-eminently useful in the treatment of the two latter forms, is absolutely and positively contraindicated in tuberculous synovitis. Failure to secure improvement by the above means would justify us, as in cases of joint tuberculosis, in proceeding to operative measures. The simplest of these consists in aspirating the fluid contents of the tendon sheaths and in injecting into them a ten-per-cent. emulsion of iodoform. Should this fail to control the process, the tuberculous area should be cut down upon, the blood supply to the arm being first cut off with an Esmarch bandage, and any suspicious granulation tissue scraped away with a small curette. At any point where the tendon itself seems hopelessly affected, it should be freely resected and an effort should be made by splitting and grafting the tendon to compensate for the defect. Even should this be impossible, the function of the tendon may better be sacrificed than to expose the patient to danger of loss of the limb or even of life.

**SYPHILITIC TENOSYNOVITIS** may exhibit itself in an acute and chronic form, not easy to differentiate by symptoms alone from simple and rheumatic inflammation of the tendon sheaths. Both of these forms of syphilitic thecitis are seen in early syphilis, and I have myself observed one marked case ending in resolution after some months of treatment, in a case of hereditary syphilis accompanied with syphilitic pachymeningitis.

The **GUMMATOUS FORM** is almost invariably very late in development, occurring often fifteen or twenty years after infection. It is recognized as a round or spindle-shaped swelling involving the tendons. It grows slowly and painlessly, remaining as a gummatous swelling, becoming calcareous, or extending to the surrounding tissues, the fascia and the skin.

**SYNOVIAL CYSTS OF THE TENDON SHEATHS**, otherwise known as weeping sinews or ganglions, occur with greatest frequency about the wrist, whether just above or just below the annular ligament. There are cases met with, however, in the lower part of the forearm, both on the flexor and on the extensor tendons. Their exact pathology is a matter of dispute, but it is fairly well established that they rarely communicate with the synovial sac proper. They not infrequently contain rice bodies such as are found in the synovial sac in cases of tuberculous disease, but their almost invariably benign course would make it seem improbable that their origin should be tuberculous. These little cysts frequently disappear spontaneously, and often their disappearance can be hastened by moderate pressure long continued. More obstinate cases can be dealt with by free subcutaneous puncture with a sharp bistoury or tenotome and the expression of their contents by digital pressure into the surrounding cellular tissues. Some cases may demand free incision and extirpation of the cyst walls, an operation which must be conducted with careful antiseptic precautions, on account of the close association and occasional continuity of the cyst with the tendon sheath proper.

#### V. AFFECTIONS OF THE BLOOD-VESSELS.

(a) *The Arteries*.—The blood-vessels of the arm are subject to the same diseases as the blood-vessels elsewhere in the body. The **ANATOMICAL POSITION OF THE RADIAL ARTERY** is important from its frequent use for taking the