LECTURES ON HUMAN MYOLOGY.

*Delivered at the Royal College of Surgeons
of England.*

By G. M. HUMPHRY, M.D., F.R.S.,

Lecturer on Anatomy and Physiology in the College; Professor of Anatomy in the University of Cambridge; etc.

LECTURE III.—*June 21st, 1872.*

In my last lecture, Mr. President and gentlemen, I described the muscles of the upper parts of the limbs as consisting of prolongations of the ventro-lateral muscle, forming ventro-appendicular sheaths; and each sheath was shown to be disposed in two layers—a superficial and a deep; and these again are divided into parts or sectors.

In the remainder of the limbs, the muscular fibres cease to be disposed in a circular manner about the joints, and are, in accordance with the movements, massed upon the flexor, or palmar and plantar, and the extensor, or dorsal, aspects. Those upon the flexor aspect prevail, and are occasionally aided by derivatives from those upon the dorsal aspect, which incline to the palmar or plantar surface, and so acquire a flexor action. The movements effected by the two sets of muscles, though antagonistic, are similar; and there is, accordingly, a general similarity in the arrangement of the flexor and extensor muscles. Each set consists, for the most part, primarily, of intrinsic fibres—that is, of fibres passing from the segment of the limb next above the joint to the segment next below it; secondarily, of the fibres from a higher segment, which, in the upper region of the limb, are often members of the deep ventro-appendicular or girdle-sheath; and, thirdly, of extensions of the superficial ventro-appendicular sheath, which, as before said, often clothe the whole, or nearly the whole, surface of the limb. There are thus usually three strata more or less blended together; and the dorsal or extensor divisions, and the palmar and plantar, or flexor divisions, of the three strata are, in each instance respectively, most closely associated or blended. Still, as just intimated, members of the dorsal division of a stratum are not unfrequently blended with the palmar or the plantar division of its own or of another stratum; and we shall also find instances, though they are not so common, of the converse—that is, in which members of the palmar or plantar division pass upon and blend with the dorsal muscles, and associate themselves with them in their action. It will be borne in mind that in the primitive limb—that, for instance, of *Lepidosiren*—all the strata are blended in an uniform, or rather an undivided, muscular investment, extended over the whole limb.

With regard to the flexors of the fore-arm, the examination of various animals shows that the coraco-brachialis, the biceps, and the brachialis anticus, form one continuous series, composed of deep ventro-appendicular and intrinsic fibres, extending, from the coracoid, upon the humerus and the upper part of the radius and ulna. They are covered to greater or less extent by, and in some instances are blended with, the pectorals, or palmar sector of the superficial ventro-appendicular sheet; and, in their turn, they extend upon, and to some extent are blended with, the flexors of the wrist and fingers. In Man, they are segmented into the three muscles—the coraco-brachialis, the biceps, and the brachialis anticus—acting respectively upon the humerus, the radius, and the ulna. Still, even in Man, the one, or coracoid head of the biceps, continues to be united with the coraco-brachialis; and the other, or glenoid head, arises in great measure from the base of the coracoid, where that bone contributes to the glenoid cavity. Hence the biceps remains essentially a coraco-brachial muscle; and it partly expands into the fascia of the fore-arm. Moreover, the brachialis anticus, the representative of the intrinsic stratum, though usually separated in great measure from the others in Man, yet retains some connection, either directly or through the internal intermuscular septum, with the coraco-brachialis; and it sometimes retains also a connection with the biceps, by means of slips detached from the ulnar side of the humerus, which constitute what are called the “humeral origins” of the biceps. The fact of the biceps becoming, by virtue of its insertion into the tubercle of the radius, a powerful supinator, renders it a good example of somewhat opposite or antagonistic movements being performed by the same muscle, and of that nice balancing of antagonistic actions by virtue of which the steady movements of the limbs are executed. For, supination is ordinarily associated with extension;

yet the biceps is the most powerful flexor of the fore-arm, and also the most powerful supinator. During the flexion of the fore-arm, the supinating tendency of the biceps, as well as that of the supinator radii longus, are counteracted by the pronator teres; and the force of all these muscles is combined in the one effort of flexion; whereas, under other circumstances, the two muscles are free to assist in supination. By this alteration of adjustment, and this combination of muscles in the one or the other movement, an economy of muscular substance is effected, with the attendant gain to lightness and activity.

The biceps plays round a groove in the inner tubercle of the humerus, whereby it steadies the bone, and prevents that rotation upon its axis which the pull of the muscle upon the radius, and so upon the outer condyle of the humerus, has a tendency to cause.

In the triceps extensor muscle of the fore-arm, the intrinsic or substratum, arising from the humerus, and standing in the relation of antagonistic homologue to the brachialis anticus, is large, and is extensively blended with the scapular or deep ventro-appendicular stratum. The latter is the antagonistic correspondent to the biceps; but it is less intimately blended with the dorsal scapular muscles—with the other elements, that is, of the dorsal division of the deep ventro-appendicular or girdle sheath, the infraspinatus and teres minor—than the biceps is with the coraco-brachialis. The triceps is inserted into the ulna, rather than into the radius, for the purpose of leaving the latter bone free to rotate in pronation and supination. In lower animals, it is blended with, or in variable ways related to, the latissimus dorsi,—the overlying sector, that is, of the superficial ventro-appendicular sheath—just as the flexor muscles are related to, and in some instances blended with, the pectoral or palmar sector of that sheath; and more or less of this connection is often traceable in Man.

The quadriceps extensor of the leg corresponds very closely with the triceps extensor of the fore-arm. The chief differences from it which it presents are as follows. First, the rectus, the girdle element—a deep ventro-appendicular element—is attached to the anterior edge of the ilium; this being the edge towards which the dorsal surface of the limb is turned. Both it, however, and the long head of the triceps, incline to the dorsal surfaces of their respective girdles; those being the surfaces towards which, in the primitive state of the limb, the extensor aspects of both limbs are directed. That the chief attachment of the one to the anterior, and of the other to the posterior, edge of its girdle, depends upon the direction of the corresponding surface of the limb, is shown by the fact that in Bats, where the rotation of the hind limb is the reverse of what it usually is, the rectus is attached behind the acetabulum. Secondly, a patella is commonly developed in the quadriceps. This is also the case in Bats and some other animals in the triceps. Thirdly, the quadriceps is inserted chiefly into the tibia or preaxial bone of the limb, evidently because the upper end of this bone is constructed of large size, for the purpose of transmitting the weight through one solid stem from the knee to the ankle. Fourthly, the quadriceps is more distinctly covered by the expansion of the superficial ventro-appendicular sheath, being to a considerable extent invested by the fascial continuation of the gluteus maximus. In the Bird, the gluteus and the rectus are inseparable. Fifthly, it is not traversed or supplied by the great extensor nerve of the limb. This nerve—the peroneal—turns round the post-axial side of the lower limb at a lower point than that at which its homologue—the radial—takes the similar course in the upper limb. Sixthly, there is no piece segmented from the quadriceps corresponding with the anconeus.

I have, I think, clearly shown in another place that the biceps flexor cruris is really a derivative from the ventro-appendicular, or gluteo-rectus, part of the extensor mass, which, inclining to the plantar side, has acquired a flexor action, and which, in its upper part, has become in great measure attached to the tuber ischii. This attachment is in consequence of the tuber ischii having grown down into the track of the biceps and intercepted the greater number of its fibres on their way to the ilium and sacrum, where, if my view be correct, the muscle would properly derive its origin: indeed, it may still be said to do so, in part, through the fibres of the sacro-sciatic ligament, with which its own are, to some extent, continuous; and in many Mammals it is continued quite over the ischium to the sacral or caudal vertebrae, beneath the gluteus. In the Racoon, it in addition receives a slip from the gluteus. As it descends, it is joined by the femoro-fibular muscle, usually called the short portion of the biceps. This is the intrinsic flexor of the leg. In many animals it is absent; but in some it is a separate muscle, passing to the fibula. It is accordingly the only antagonistic representative of the vasti and the crureus, and the only serial representative of the brachialis anticus; and it arises from the narrow space between the ridges of the linea aspera of the femur, which represents the flexor surface of the bone, just as the brachialis anticus arises from the flexor surface of the humerus. I am not aware,

however, that it ever presents connections with the adductors and the tibial flexors of the leg similar to those which the brachialis anticus has, or often has, with the coraco-brachialis and the biceps brachii.

It will be remembered that the semitendinosus arises, in conjunction with the biceps, from the ischium, and that the two are connected, for some distance from the ischium, by a tendon from which both arise. Moreover, the semitendinosus is in some lower animals continued, like the biceps, over the ischium to the caudal vertebrae; yet, below, it is attached to the inner side of the tibia and is associated with the adductors and the gracilis. In the Cryptobranch, it forms one mass with them, and at about the middle of the thigh is joined by the muscle from the tail, which I have named "caudo-crural"; and there is a tendinous intersection at the point of junction. It seems to me, therefore, not improbable that this intersection in the Cryptobranch represents the well known inscription or tendinous intersection in the semitendinosus of Man. I conceive that the portion of the muscle below the inscription is the part segmented from the pubischio-femoral, or gracilis and adductor, mass—that is, from the plantar division of the superficial and deep ventro-appendicular sheaths; and that the portion above the inscription is segmented from the caudal part of the biceps and gluteus mass—that is, from the dorsal division of the superficial and deep ventro-appendicular sheaths. I may observe that this view is corroborated by the dissection of Saurians. In them there is a thick transverse septal band between the caudal and the femoral parts of the muscle.

The purpose served by the retention of the inscription in the semitendinosus is probably the same as that served by the inscriptions in the rectus abdominis—viz., to break the length of the muscular fibres. The range of action of the semitendinosus is considerably greater than that of the semimembranosus or of the biceps, in consequence of its lower insertion in the leg; hence its muscular fibres are longer. In a woman of average height I found that they measured ten inches; whereas none of the fibres of the semimembranosus exceeded three inches, and none of the fibres of the biceps exceeded six inches. It is, moreover, a muscle which has to bear severe and sudden strains; and therefore the remarks made with reference to the use of the intersections in the rectus abdominis apply to this inscription in the semitendinosus. In reference to this point, it is not without interest to observe that the length of the muscular fibres in each of the three flexors of the leg bears a proportion to the distance of the insertion of each from the centre of motion, and, therefore, to the range or amount of contraction required of its muscular fibres. Thus the semitendinosus is inserted lowest in the leg; and its fibres are the longest. The semimembranosus is inserted nearest the joint, and its fibres are the shortest; and the biceps is, in both respects, intermediate between the other two.

The two hamstring muscles—the biceps and the semitendinosus—pass to opposite sides of the leg for the purpose of giving the rotatory movement (the pronation and supination) of the leg upon the thigh, which is admitted in the flexed or semiflexed position; and it is worthy of note that in the Bat, where these movements are not permitted by the shape of the articular surfaces, the biceps is absent and the semitendinosus is united, below, with the gracilis, and is inserted into the middle of the back of the tibia.

The biceps cruris, if the view above given be correct, has no distinct representative in the upper limb; neither has it, as just said, any representative in the hind limb of the Bat, which is turned upon the girdle in the same manner as the fore limb—viz., with the extensor or dorsal surface directed backwards. The semitendinosus is probably in part represented in the upper limb by the coracoid portion of the biceps brachii. Its exceptional insertion in the Bat, above referred to, resembles the ordinary insertion of the biceps brachii. The semimembranosus is a tolerably accurate representative of the larger or glenoid part of the biceps brachii. Moreover, the semimembranosus is, in some animals, inseparably connected with the adductors; and it often retains connections with them as close as, or closer than, those of the biceps brachii with the coraco-brachialis.

The muscles of the middle and distal segments of the limbs may be most conveniently considered together, forasmuch as they are blended both in function and structure.

Two chief points of difference are noticeable in the two limbs (upper and lower) which require special muscular adaptation. The first is the pronation and supination of the radius upon the ulna in the upper limb; and the second is the projection of the heel-bone in the lower limb, and the employment of it as a lever to flex the ankle and throw the weight of the body over the ball of the foot. Both these specialised conditions are more marked in Man than in any other animal. In him, therefore, the muscles deviate most, and especially in the

lower limb, from the simple form of those lower animals in which the movements and the construction of the two limbs are more nearly alike. Hence we must educe the plan of their morphology in the more complex and specialised condition of the human limbs from the simpler disposition in the animals referred to. In those animals, as I have shown from the dissections of the Cryptobranch, the muscular fibres are, on both surfaces of both limbs, directed obliquely from the post-axial towards the preaxial side, as well as downwards, forming a pronator-flexor mass on the palmar or the plantar side, and a supinator-extensor mass on the dorsal side, of each. The more superficially placed fibres have the least obliquity, and become separated as a superficial flexor or an extensor stratum, with little of pronator or supinator function, except in the case of the pronator teres; while the deep fibres have more obliquity and more of a pronator or a supinator function. The chief features of this arrangement are tolerably distinct in ourselves; and it will be interesting to trace the modifications which it undergoes in the two limbs to meet the requirements of each. The superficial stratum in each instance—that is, on the flexor and extensor aspects of both limbs—is divided into three sectors. Of these, one passes along each side of the limb—that is, along the radial or the tibial side, and along the ulnar or the fibular side, to the corpus or tarsus; and the third, or intermediate, sector passes to the digits.

Let us now follow the modifications of these on the flexor and extensor aspect of both limbs, beginning with the radial sector of the superficial stratum on the palmar aspect of the upper limb, and remembering that in the simplest form the whole of the pronator-flexor muscles are one simple unsegmented mass, radiating from the ulnar condyle downwards and to the radial side, and attached to, and deriving fibres from, the radius and the ulna, the carpus, metacarpus, and digits.

The radial sector reminds us of this in the fact, that the upper part retains its connection with the radius, forming the pronator radii teres; and further, in the fact that the part segmented as this muscle also retains a derivative from the ulna, constituting the ulnar origin. This ulnar origin of the pronator teres is a remarkable feature. It is found in the Chimpanzee; but we rarely meet with it again in the descending series till we reach the Reptiles, in some of which it is of considerable size, and constitutes an intermediate pronator between the pronator teres and the pronator quadratus. Its presence is advantageous in ourselves, as assisting in pronating the radius in the flexed position of the elbow, in which state the condyloid portion of the pronator teres is so relaxed or shortened as to render it incapable of effectually executing that movement. The ulnar artery passes behind the ulnar origin, or the "pronator intermedius", as it might be called, for the purpose of supplying vessels to the deep region of the fore-arm, back and front: whereas the median nerve, not having to supply that region, takes a somewhat more direct course by penetrating the muscle, or rather by passing between the superior and the intermediate pronators; following, in this respect, the same course which it takes in the Reptiles just referred to.

The remainder of the radial sector forms the flexor carpi radialis. The tendon of this muscle passes deep in the palm to the metacarpus, though the belly of the muscle lies superficially in the fore-arm. It thus offers one of the many examples of that blending of parts of different strata to form one muscle which I have mentioned in speaking of the digastricus.

The ulnar sector of the superficial stratum forms the flexor carpi ulnaris. It retains connection with the ulna; and the connection serves in Mammals as an additional origin. In some of the lower animals the connection serves rather as an insertion, in the same manner as does the connection of the pronator teres portion of the radial sector with the radius in Mammals.

The intermediate sector forms the palmaris longus and the flexor digitorum sublimis. It retains in Man a connection with the radius, in the form of the radial origin of the flexor of the fingers, which is not commonly found in lower animals. I may observe that this muscle is usually in two portions—a superficial and a deep—both arising from the ulnar condyle of the humerus. The superficial, which includes the radial origin, is muscular to about the middle of the fore-arm, where it divides and terminates in the tendons to the middle and the ring fingers. The deeper portion has a broad tendinous interruption, an inch and a half below its origin; it then again becomes muscular, and the lower muscular belly divides and terminates in the tendons to the fore and the little finger. The two portions are connected by muscular slips, which pass from the lower belly of the deep portion to the divisions of the superficial portion, or *vice versa*. The purpose served by this arrangement would seem to be simply that of convenience in packing; the tendons being thereby arranged in front of one another at the

wrist, and the muscular fibres being, by virtue of the tendinous interruption in the deeper portion, disposed at different heights in the forearm, so as to avoid inconvenient massing of them at one part; at the same time the equality of length in the several fibres is preserved. The intermediate position of this deeper portion is also a reminder of the union, or rather imperfect segmentation, of the superficial and deep flexors of the digits in many of the lower animals. A similar division into two parts, and for the same purpose, is found in the biceps brachii of Saurians, which is muscular where it arises from the coracoid, tendinous where it passes beneath the pectoralis, and again muscular lower down.

I may here observe that the tendinous interruptions, or septa, or inscriptions, in muscles are, in some instances, the result of persistence of the transverse septa of the lateral muscle, as in the case of the rectus abdominis, the biventer cervicis, and some other of the dorsal muscles—the sterno-hyoid, the omohyoid, and the digastricus—the persistence of the interruption in the last two being associated with the angular form of the muscles. Secondly, they may be caused or retained by one muscle impinging upon and joining another at an angle. This is the case with the latissimus dorsi in the Raccoon, where it is joined by the teres major nearly at a right angle, and with the semitendinosus in the Cryptobranch, where it is joined by the caudo-crural muscle. Thirdly, they may be found where one muscle is crossed or pressed upon by another muscle, as in the biceps brachii of Saurians, and in the deeper portion of the flexor digitorum sublimis of Man. Fourthly, the interruption is sometimes at the part where a muscle turns over a bone or a joint, as over a pulley. This is seen in the mode in which the rectus femoris internus of the Bird is continued over the knee into the flexor digitorum, and in the mode in which the muscular crural part of the flexor digitorum sublimis (*i.e.*, the plantaris) in the hind limb of some animals, becoming tendinous, is continued behind the ankle and then expands into the muscular pedal part of the same, commonly called the flexor brevis digitorum. To this I shall again presently refer.

The superficial element of the intermediate palmar sector—the palmaris longus—is a somewhat diminutive, variable, and inconstant muscle; the elements of the sector being chiefly, and sometimes altogether, absorbed by the flexor of the digits. It is of much interest, however, morphologically, for it is the representative of the extension of the external or superficial ventro-appendicular sheath upon the distal segment of the limb which we meet with in some of the lower animals. Its inferior or palmar part, at any rate, corresponds with the caudo-pedal part of that sheet in the hind limb of the Cryptobranch, and, like it, expands upon the flexor aspect of the distal segment and upon the digits.

The deep stratum of the pronato-flexor mass in the upper limb is, with the exception of the small deepest portion—the pronator quadratus—entirely devoted to the digits, and is converted into the flexor profundus digitorum and the flexor longus pollicis. The complete isolation of the radial part of it as flexor longus pollicis, which is, I believe, peculiar to Man, and is not always accomplished in him, must be associated with the free and independent movements of the pollex with which he is endowed.

The pronator quadratus is sharply marked off from the remainder of the stratum by the transverse, or even obliquely ascending, direction of its fibres. Its relations, however, to the rest of the stratum are well shewn in the Cryptobranch, as represented in the *Journal of Anatomy* (vol. vi, page 38, fig. 18), where it is distinctly seen to form part of the stratum, and where, moreover, the continuity of the deep and the superficial muscles is shewn by the blending of the upper fibres of the pronator quadratus with the lower fibres of the pronator teres. I have already intimated that the connecting fibres between the two muscles are, in Saurians, separate from both sufficiently to constitute a pronator intermedius, and that a representative of them is afforded in ourselves by the ulnar origin of the pronator teres.

It is rather remarkable that the superficial strata—pronato-flexor and supinato-extensor—in each limb and in most of the higher animals, sedulously, as it were, avoid the first digit (pollex or hallux). They leave that digit to be supplied exclusively by the deep strata.* We may connect this omission with three points. First, that digit never has more than two phalanges; and the flexor sublimis (the same may be said of the extensor sublimis) has commonly especial relation to the middle one of the three phalanges in the other digits. Hence we can scarcely be surprised at its absence in digit 1, especially since we find that in some animals, as Sloths and Anteaters, in which the usual number of phalanges is hardly attained in the other

digits, the flexor sublimis is proportionately abortive; and in them the whole available flexor strength is concentrated in the muscular fibres of the flexor profundus, which passes to the long, clawed, terminal phalanges. Secondly, the flexor sublimis descends vertically, and is directed more particularly upon the middle digits. It supplies the marginal digit (No. v), on the ulnar edge of the limb, rather sparingly, and sometimes imperfectly, passing perhaps only to its radial side, or, more rarely, only to its ulnar side; and it commonly omits altogether the marginal radial digit (No. 1). Thirdly, I have mentioned that the deep strata of the pronato-flexor and supinato-extensor masses have a more oblique direction towards the pollex and hallux than the superficial strata; and they are therefore more naturally and easily extended upon those digits.

In the lower limb, the disposition of the components of the pronato-flexor or plantar mass differs considerably from that of the corresponding or palmar mass in the fore limb. The great feature of difference consists in the amount of muscular force which is combined in effecting the flexion of the foot upon the leg, and which is obtained by applying to this purpose many of the elements answering to those which, in the fore limb, are employed in pronating the radius or in flexing of the digits.

Thus, in the first place, the whole of the superficial stratum is employed in flexing the foot, and is, for this purpose, brought to bear upon the os calcis in the form of gastrocnemius, soleus, and plantaris. The various elements which, in the fore limb, arise from the ulnar condyle, and are divided into flexor carpi ulnaris, flexor carpi radialis, palmaris longus, and pronator teres, find their only representatives in the outer or fibular head of the gastrocnemius, while the fibular origin of the soleus represents the ulnar origin of the flexor carpi ulnaris. The plantar fascia is clearly the representative of the palmar fascia; but its continuity with the muscles above is interrupted by the projection of the heel-bone. The plantaris and the flexor brevis digitorum are the representatives of the flexor sublimis digitorum manus, their continuity being, like that of the fascia, interrupted by the heel-bone. There does not appear to be any purpose served by the persistent individuality of the plantaris, and its continuation as a distinct tendon to the inner side of the os calcis, in Man. The muscular fibres gathered in it would, so far as one can see, do their work as well if they were blended with the calf-muscle. In some of the lower animals it is so blended; in many it is continued on into the flexor brevis, forming with it a flexor sublimis digitorum pedis, which is thus a biventer muscle; in some, it is more or less blended with the plantar fascia on the one side, or with the flexor profundus digitorum on the other.

Secondly, an additional element appears in the form of the tibial head of the gastrocnemius, for which there is no representative in the upper limb. This is wanting in the Urodelans; but, as I have shewn,* it is traceable in Reptiles and Birds as a derivative from, or an extension of, the plantar division of the ventro-appendicular sheath, being in those animals, or several of them, continuous with the adductors or the semimembranosus, or both. The tibial origin of the soleus, so rarely present except in Man, is an extension of this upon the tibia; and the situation of its attachment to the tibia, along the edge and between the popliteus and the rest of the deep stratum of muscles, corresponds precisely with that of the radial origin of the flexor digitorum sublimis manus.†

Thirdly, not only is the superficial stratum thus entirely employed in the work of flexing the ankle, but a part of the deep stratum, which in the upper limb passes to the digits, is in the lower limb devoted to the same task with the superficial stratum. Thus, the tibialis posticus is made up of fibres lying close upon the tibia, the homologues of which in the upper limb are converted into the radial portion of the flexor profundus digitorum manus—of the part of it, that is, which forms the flexor longus pollicis. This at least is the case with the muscular portion of the tibialis posticus; though the tendinous portion corresponds with the tendinous portion of its functional representative—the flexor carpi radialis. The flexor hallucis corresponds with the remainder of the flexor profundus digitorum manus; and the flexor digitorum pedis longus is segmented from the surface of this deep stratum, from the surface, that is, of the tibialis posticus and the flexor hallucis; and it, together with the flexor hallucis, make up the flexor profundus digitorum pedis, the flexor sublimis being represented, as already said, by the flexor brevis and the plantaris. This disposition

* *Journal of Anatomy*, vi, 360; *Observations on Myology*, p. 72.

† In Pteropus (*Journal of Anatomy*, iii, 314), these tibial factors, as well as the greater part of those from the tibial condyle of the femur, together with others derived from the semitendinosus, are diverted to the flexor digitorum; but it is to the flexor profundus, not, as we might have anticipated from the usual disposition of the corresponding parts in the fore limb, to the flexor sublimis.

* The Manis (*Journal of Anatomy*, iv, 44) and Jerboa are exceptions to this. In each of them, the superficial flexor in the fore limb supplies all the digits.

is well illustrated in the Cryptobranch, where the deep pronato-flexor mass extends from the fibular side of the limb, downwards upon the tarsus and digits, inclining to the tibial side, and is inserted chiefly along the tibial side of the tarsus and the hallux. From its surface is segmented a long narrow flexor digitorum profundus; and the main part of the mass represents the tibialis posticus and the flexor longus hallucis. The chief difference in the disposition of the structures of this region in the Cryptobranch and in Man and the higher animals consists in the fact that in the latter the muscles—the tibialis posticus and the flexor hallucis, which constitute the deepest part of the flexor mass—are free from the several pedal attachments (attachments to the tarsus and metatarsus) which the flexor mass has in the Cryptobranch, and are connected only with the tarsal and metatarsal bones of the hallux and with the phalanges. They are thus able to act more efficiently on these parts, because they are devoted more exclusively to them.

I must not, however, forget one other interesting representative of these tarsal attachments in the Cryptobranch to which I have been referring, viz., the accessorius. The morphology of this muscle is, I think, thus to be explained; and we may regard it as a part of that common deep pronato-flexor mass which, in lower animals, covers and arises from all the tarsal bones of the fibular side of the foot. Its frequent connexion with both divisions of the deep flexor (flexor longus and flexor hallucis), as well as their connexion with one another, is a reminder of the fact that they are all segmented from one common mass. Of this fact we are still further reminded by the very variable ways in which, in different animals, the two divisions of the flexor muscle of the digits are distributed to the different toes. The purpose served by the accessorius resembles that served by the ulnar origin of the pronator teres, in that it prevents the flexor power over the digits from being quite lost when the long flexor muscles are relaxed in the state of forced flexion of the ankle. No homologous muscle and no such assistant exists in the upper limb; and we accordingly find that, when the wrist is bent, the power of flexing the fingers is partly, and that of the thumb is almost entirely, lost. In the fore limb of Saurians, however, an accessorius is found passing from the ulnar side of the carpus to the deeper surface of the flexor digitorum, and precisely corresponding with the accessorius in the hind limb of Man and Mammals.

The popliteus answers functionally and in general disposition to the pronator teres, pronating the foot, and passing diagonally from the post-axial condyle of the upper division of the limb to the pre-axial bone of the middle division; but it is, in the main, on a deeper level than the pronator teres, so that only the deeper fibres of the latter muscle can be regarded as answering homologically to it. Indeed, it and the other muscles which we have been just considering are a good illustration, among many others, of the free manner in which corresponding masses are variously moulded and segmented to suit the special requirements of the particular limb or the particular animal.

There is no special portion segmented from beneath the deep stratum, and passing across from the fibula to the tibia, which would correspond with the pronator radii quadratus. In Reptiles and Amphibians,* however, such a pronator tibiae is not uncommonly present; and it may have relations of continuity with the popliteus, similar to those which I have mentioned that the pronator radii quadratus in these animals sometimes has with the pronator teres.

[To be continued.]

OBSTETRIC MEMORANDA.

THE TREATMENT OF INERTIA OF THE UTERUS.

MR. LAWSON TAIT, in speaking of "the method of assisting the inert uterus by external pressure", says that "it would seem to be not of older date than 1856". The following quotation from Dr. Sermon's *Ladies' Companion or English Midwife* proves the plan to have been used in England as early as 1761. "Sometimes the midwife may gently press the upper parts of the belly, and by degrees stroke the child downward; the which pressing down with discretion will hasten and facilitate the delivery." (P. 95.) Raynald, in the sixteenth century, speaking of the "meanes to help and provoke the byrth, says: "The sides of the woman must be stroken downward with the hands, which helpeth greatly and furthereth." (Chap. v.) See also the same advice in Rueff, 1637, ch. ii; and Counsell, 1758, ch. iv; etc.

J. H. AVELING, M.D., 1, Upper Wimpole Street, W.

* See account of pronator tibiae in Cryptobranch, *Journal of Anatomy*, vi, 27.

PRESIDENT'S ADDRESS.

Delivered at the Annual Meeting of the South Midland Branch.

By ALLAN D. MACKAY, M.B., Stony Stratford.

GENTLEMEN,—My first duty is to thank you for the honour you have conferred upon me by placing me in your presidential chair, an honour which I trust will be safe in my keeping; for, though I am well aware that I may in many respects fall short of my predecessors in that chair, yet to none of them will I yield in my desire and endeavour to urge forward, as far as in my poor power lies, the welfare and prosperity of our Branch and its parent Association. From my earliest student days I took a deep interest in the doings of the British Medical Association, feeling assured that those ends (the advancement of medical science and the bringing into closer intercourse, one with another, the members of the medical profession), for which Sir C. Hastings and his worthy coadjutors founded it, would elevate the character of the noble profession to which we belong, and prove to the public that, though "doctors may differ," still, after all, they are "at unity amongst themselves." Step by step, then, since those days, have I watched with satisfaction the onward course of the Association, till I can to-day congratulate you on its having become one of the most powerful associations for good, noble, and unselfish ends in the kingdom. It would be idle on my part to tell you that it makes itself now felt as a political power—a political power used for the most unselfish ends; this you all know. It would be also idle on my part to tell you how frequently our JOURNAL is now quoted by the leading newspapers—this, too, you know; but I do think we owe a debt of gratitude to our Editor (my old fellow-student) for the very high-class periodical that the JOURNAL has now become; and I feel the more bound to make this observation, as, some few years ago, in a discussion on this subject, I was one of those who felt that our JOURNAL was not what it ought to be, and what Mr. Hart has shewn it could become. Gentlemen, our reported lectures will now cope with those of any other periodical, if they do not surpass them. What can be more simple, more plain, and yet more eloquent, than Sir James Paget's lectures on *Hernia*?—so plain, that by the study of them the merest tyro may feel himself safe in the operation; so eloquent, because so simple in their diction, that the most practised writer cannot surpass them. This, gentlemen, after all, is the test of true eloquence: to express our thoughts in the simplest and most common words—a fact which did not escape (few did) that jovial philosopher of old, Horace—

"In verbis, etiam, tenuis cautusque serendis,
Dixeris egregie, notum si callida verbum
Rediderit junctura novum."

The lectures, too, in course of publication, by Dr. Murchison, will be waited for anxiously, as written by a master hand, and a worthy successor of Sir Thomas Watson in a line in which he has hitherto been *facile princeps*. And for keeping us in the provinces *au courant* with the latest medical news, whether social or scientific, and inculcating amongst us medical morality, the JOURNAL is not equalled.

Since our last autumnal meeting, two great subjects, which I think all will admit are of the utmost interest to the medical profession, have been touched upon, and will sooner or later become the law of the land. I allude to the Public Health Bill and the Conjoint Examination Scheme. I am aware that, with many members of our Association, as well as others outside it, the former does not find acceptance; and whilst I admit that it is far from being a perfect Bill, yet I do think that it is a step in the right direction, and that we should, with some alterations, which no doubt it will receive before it becomes law, accept it as an instalment of future legislation on the subject; and that, as "coming events cast their shadow before," we may look for this shadow of good being hereafter more perfectly elaborated. How accidents appear to rule the destinies of nations! Scientific men and sanitarians have long laboured hard in the field for the public health; but that which they have long desired, legislation on sanitary measures, might have yet long been delayed, had not our Prince's illness been one "nigh unto death." That which had well nigh been counted a nation's loss, must now be counted a nation's gain. It has long been said of railway accidents that they will never be dealt with as they should be until a bishop or director be killed; and so, I take it, had it not been for the Prince of Wales' illness, our legislators would still be avoiding the sanitary question. Even now, notwithstanding that the cry has gone forth, "*Sanitas sanilatum*", they buckle to in much lukewarmness. The Conjoint Examination Scheme we must all hail with satisfaction, delighted that at last the opprobrium shall be taken away from our profession that there are nineteen (how