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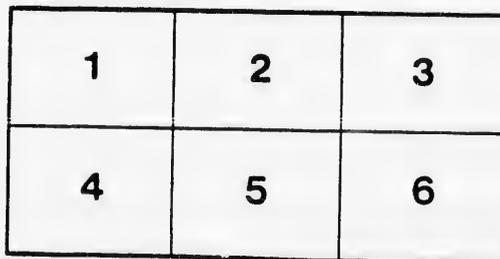
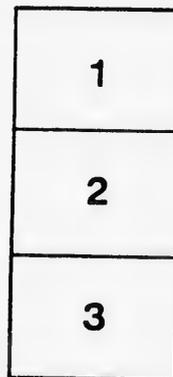
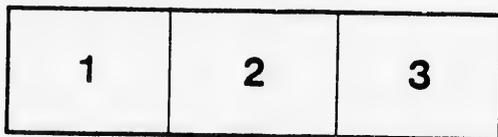
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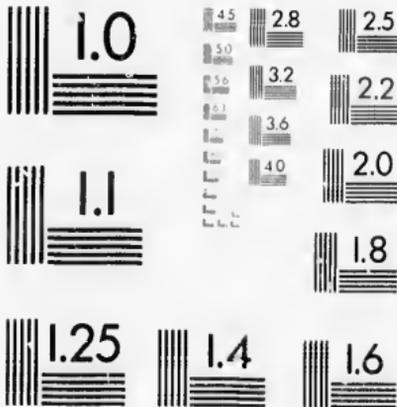
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SHORT NOTES ON THE MYOLOGY OF THE AMERICAN

— BLACK BEAR (*Ursus Americanus*). By FRANCIS J. SHEPHERD, M.D., C.M., *Professor of Anatomy, in McGill University, Montreal, Surgeon to the Montreal General Hospital.*

LAST May I was fortunate enough to obtain a fine specimen of the American Black Bear, which had been killed by its mate in a bear-pit kept by a notorious character in this city. The bear was a male, and between six and seven years old. He measured, from the tip of his nose to the end of his toes, 7 feet 6 inches, and was in good condition. The brain had been removed when he came into my possession, and, in consequence, the occipital portion of the skull was much mutilated. The following account does not profess to be a complete one of the myology, my attention having been chiefly directed to the muscles of the limbs. In my description of the muscles I have taken human anatomy, with which I am best acquainted, as the standard.¹

NECK.

Sterno-mastoid.—Arises from the upper part of sternum, passes forwards and outwards, and divides into two portions. The outer and most superficial crosses the neck and blends with the *trapezio-deltoid* (*cephalo-humeral*) a short distance above the tendinous intersection between the trapezius and deltoid portion. The inner and larger portion passes forwards and ends in a round tendon, which is inserted principally into the mastoid process, which in the bear is well marked, but has also an attachment to the root of the styloid process in front, and the occipital bone behind.

Sterno-hyoid and *sterno-thyroid* arise together from the first piece of the sternum, but soon separate. Their insertion is much as in man.

Thyro-hyoid is a triangularshaped muscle with the base

¹ I must here acknowledge my great indebtedness to Mr A. W. Clement, V.S., and Messrs Kinloch and M'Guaig, medical students, for the great assistance they rendered me during the dissection.

forwards. It arises from the lateral mass of thyroid cartilage, and is inserted into the great cornu of the hyoid bone.

Omo-hyoid is a narrow ribbon-like muscle which arises from the anterior border of the scapula, passes forwards and inwards, and is finally inserted into the body of the hyoid with the sterno-hyoid. The muscle consists of a single belly, having no intermediate tendon or intersection.

Digastric (stylo-maxillaris) is a large, thick, well-developed muscle, which arises from the root of the styloid process by a round tendon, and is inserted along the under surface of the body of the inferior maxillary bone from the angle to near the symphysis. There is also a small slip of muscle running in the same direction as the digastric, which arises from the mastoid process beneath the levator clavicular by a flat tendon, which soon develops into a small fleshy belly, and is inserted into the body of the hyoid. This probably corresponds to the *stylo-hyoid*.

Mylo-hyoid.—Much as in man, except that a few of its posterior fibres arise from the mastoid process.

Genio-hyoid.—A very long narrow muscle. Origin and insertion as in man.

Hyo-glossus.—Divided into two portions, one from the body (basi-hyal), and the other from the cornu (thyro-hyal). The middle portion from the lesser cornu (chondrio-glossus) is absent. The two portions are inserted as usual into the side of the tongue.

Stylo-glossus.—Large size, from the base of the stylo-hyal to the side of the tongue, blending with the fibres of the hyo-glossus derived from the thyro-hyal.

Scalenus.—A large mass of muscle arising by a fleshy origin from the transverse processes of the 2nd, 3rd, 4th, and 5th cervical vertebræ, and also by tendinous slips from the 3rd, 4th, and 5th transverse processes; as it passes backwards beneath the subclavian artery it divides into three slips, which are inserted as follows:—(1) the *innermost* is a broad slip which is inserted into the first rib near its cartilage and under the pectoralis minor; (2) the *middle* slip, which is long and narrow, goes back over the side of the thorax, becomes aponeurotic opposite to the 5th rib, and is inserted into the 7th and 8th ribs

beneath the external oblique and rectus abdominis muscles; (3) the *outermost* slip is rather broader than the middle, and also passes back, and has a muscular insertion into the 3rd, 4th, and 5th ribs. Between the two last-mentioned slips the lateral branches of the thoracic nerves appear.

Longus Colli is of large size, and arises as low down as the body of the 6th dorsal vertebra.

A muscle is seen arising from the lateral mass of the atlas, and going to be inserted into the outer tubercles of the transverse processes of the 3rd, 4th, 5th, and 6th vertebrae. This muscle is of considerable size, and sends a small slip back to be attached to the inner tubercles of the transverse processes of the 6th and 7th cervical vertebrae.

FORE LIMB.

Brachio-lateral subcutaneous muscle.—On removing the skin from the body this muscle comes into view. It is of considerable size, and arises from the fascia of the flank and back, covering the external abdominal oblique and latissimus dorsi muscles. It also has origin from the fascia covering the rectus abdominis, where it passes over the lower costal cartilages. The lower edge is connected with a long narrow strip of subcutaneous muscle, which is derived from the sheath of the penis. From this extensive origin the fibres are collected into a thick, strong band of muscle, which proceeds forwards and receives a thick slip of muscle from the axillary band derived from the latissimus dorsi; the conjoined muscle then crosses the axillary vessels and nerves, and is inserted into an aponeurosis on the outer surface of the great pectoral muscle near its insertion into the humerus. Its lower border also blends with the dorso-epitrochlear portion of the latissimus dorsi.

Pectoralis major.—This muscle is single at its origin, but soon divides into two portions. It arises from nine costal cartilages and the whole length of the sternum, forming a broad triangular mass of muscle which goes outwards and divides into two portions. The broader and deeper portion is inserted into the inner edge of the bicipital groove of the humerus, the narrower and superficial portion into the outer edge of the bicipital groove.

Pectoralis minor.—Triangular in shape. Arises from first piece of the sternum and first costal cartilage, passes across the shoulder, and ends in a tendon which is inserted into the upper end of the outer edge of the bicipital groove of the humerus, in a line with the more superficial portion of the great pectoral. It is quite distinct from the great pectoral.

Trapezio-deltoid (cephalo-humeral).—This muscle is made up of a trapezius and a deltoid portion, separated near the shoulder by a well-marked tendinous intersection. It is a strong thick muscle, which arises from the back of the skull and part of the middle of the neck, and at its origin is continuous with the anterior portion of the trapezius; it passes down over the shoulder outside the biceps, and is inserted into the outer side of the middle of the humerus. A short distance anterior to the tendinous intersection it receives a slip from the sterno-mastoid as above mentioned. The levator claviculae muscle joins it at its tendinous intersection.

Levator claviculae,¹ is a ribbon shaped-muscle, which arises from the mastoid process and back part of the skull, and at its origin it is closely connected with the sterno-mastoid muscle. It passes back beneath the cephalo-humeral, and ends by being inserted into the deeper portion of the tendinous intersection between the trapezius and deltoid portion of the cephalo-humeral muscle.

*Levator scapulae major*² arises from the transverse process of the atlas by a fleshy origin, and, enlarging as it passes backwards into a thick bundle of muscular fibres, is inserted into the anterior border of the spine of the scapula near the acromion process; its insertion is continuous with the anterior portion of the trapezius, from which however it is quite distinct. At its origin it is covered by the cephalo-humeral and levator claviculae muscles.

Latissimus dorsi, consists of a large sheet of muscle which arises from a small part of the crest of the ilium, the spines of all the lumbar, and the two or three hinder dorsal vertebrae; it

¹This is the basio-humeralis of Krause, and is probably the homologue of the cleido-mastoid of human anatomy.

²This may be looked upon as a portion of the levator claviculae, having its insertion shifted to the scapula.

has also an attachment to the lower ribs. As it passes forwards its fibres converge into a tendon, which is inserted into the posterior edge of the bicipital groove of the humerus; before its insertion, it gives off the inner dorso-epitrochlear muscle, and a bundle of fibres which joins the brachio-lateral subcutaneous muscle to cross the axillary vessels as described above.

Dorso-epitrochlear is a thick triangular muscle, which arises from the axillary border of the scapula and the upper surface of the latissimus dorsi; below the latissimus dorsi it receives a portion of the brachio-lateral muscle, and also a slip from the under surface of the teres major. (This latter slip is superficial to the latissimus dorsi). From this multiple origin it passes down the inner side of the limb, and is inserted by aponeurotic fibres into the internal condyle of the humerus and side of the olecranon process of the ulna.

Trapezius is made up of two parts, anterior and posterior. The *anterior* arises as far forwards as the cephalo-humeral, with which it is intimately connected; it also arises from the ligamentum nuchæ and 7th cervical spine, and is inserted into the anterior border of the spine of the scapula. *Posterior* arises by an aponeurosis from the spines of all the dorsal vertebrae, and is inserted into a strong fascia over the infraspinatus and into the end of the scapular spine, near the vertebral border.

Rhomboides major and minor.—Disposed as in man.

Serratus magnus as in man, with the exception that its anterior portion cannot be accurately differentiated from the *levator anguli scapulae*.

Levator anguli scapulae is continuous, with the foregoing of which it is apparently merely the anterior portion. It arises from the transverse processes of the lower six cervical vertebrae, and is inserted as in man.

Splenius colli of small size. It consists of a single slip, which is inserted into the transverse process of the axis.

Splenius capitis of large size, as in man.

Rectus capitis anticus, major and minor.—Very large, powerful muscles.

The Deltoid is a powerful muscle, consisting of two portions; the first arises by fleshy fibres from the posterior edge of the

acromion; the second portion arises principally by aponeurosis from the posterior border of the spine of the scapula, about one-fifth of its origin however, near the acromion process, is muscular. These two portions unite near the humerus, and are inserted into the middle of its outer surface with the deltoid portion of the trapezio-deltoid (cephalo-humeral).

Supra- and infra- spinatus.—Disposed much as in man.

Teres minor not distinguishable from the lower part of the *infra-spinatus*.

Subscapularis.—A very powerful muscle.

Teres major.—A large muscle which takes its origin from the posterior angle of the scapula, the axillary margin being all taken up by the scapular head of the triceps. It sends a slip over the latissimus dorsi to join the dorso-epitrochlear. Inserted as in man.

Coraco-brachialis arise from a rudimentary coracoid process with the short head of the biceps, and crossing down the inner side of the humerus is split into two portions. The first (*coraco-brachialis brevis*) is a short muscular slip which is inserted into the inner side of the humerus immediately below the lesser tuberosity and beneath the *teres major*. The second or main portion of the muscle (*coraco-brachialis longus*) continues down the inner side of the limb, and is inserted into the lower part of the internal condyloid ridge of the humerus. This portion is pierced by the musculo-cutaneous nerve.

Biceps brachii is principally made up of the long head which arises from top of glenoid cavity, pierces the capsular ligament, and lies in a very deep bicipital groove. This long head is soon joined by a very small tendinous slip which comes from the coracoid with the *coraco-brachialis*, and represents the second head. The muscle soon expands into a large fleshy belly which ends in a strong tendon near the elbow, and is inserted into the bicipital tubercle of the radius. This tendon gives off a very strong bicipital fascia which covers the brachial artery.

Brachialis anticus has its origin external to the insertion of the deltoid, as high up as the capsular ligament of the shoulder. It is closely connected with the external head of the triceps; it covers the front of the humerus, and is inserted into the coronoid process of the ulna. There is a tendinous slip between it and

the supinator longus, and it gives a muscular fasciculus to the flexor carpi radialis.

Triceps.—This is a very large powerful muscle which arises by four heads :

a. Scapular head is of enormous size, and arises from the whole length of the posterior (axillary) border of the scapula, and from a ridge or second spine in the infra-spinous fossa, which separates it from the infra-spinatus :

b. Outer head has a tendinous origin from the humerus immediately below the outer tuberosity :

c. Internal head is of small size, and arises from the side of the shaft of the humerus internal to the upper insertion of the coraco-brachialis :

d. The Fourth head is attached to the posterior edge of the external condyloid ridge above the anconeus. The scapular head, which is by far the largest, first unites with the outer head, then these two are joined by the internal head, and finally, just above the elbow, the fourth head joins the other three, forming a common muscle, which is inserted into the olecranon process of the ulna.

Anconeus.—Small in size, arises below the fourth head of the triceps, and is inserted into the external surface of the olecranon as in man.

Pronator radii teres.—Disposed much as in man, has no origin from the ulna, and is inserted into the radius almost as low down as the styloid process. Is a long, narrow muscle.

Flexor carpi radialis.—As in man.

Flexor carpi ulnaris is divided into two portions; *one* arises from the inner edge of the olecranon and posterior ridge of the ulna, ends in a tendon about the middle of the fore-arm, and is inserted into the pisiform bone; *the other* arises in common with the sublimis digitorum from the internal condyle of the humerus, and is inserted into the pisiform bone and annular ligament.

Palmaris longus.—Absent.

Flexor sublimis digitorum has no radial origin as in man, but arises solely from the internal condyle and intermuscular septum. It is a well-developed muscle, which, after sending a fasciculus to the annular ligament, divides into three slips; (1) the most superficial and middle slip divides into three tendons

which go to 2nd, 3rd, and 4th digits; (2) the inner slip ends in a tendon which goes to the 5th digit, and also sends a fasciculus to the pisiform bone; (3) the deepest slip ends in a tendon which crosses the middle slip and is inserted into the terminal phalanx of the 1st digit. The tendons to the four inner digits are perforated by the tendons of the profundus digitorum.

Flexor profundus digitorum is a very large muscle, and arises by two heads, *one* superficial in common with the other muscles from the internal condyle; the *other*—the deeper head—arises from the anterior surface and posterior ridge of the ulna, from the interosseous membrane, and from the anterior surface of the radius below and internal to the oblique line. These two heads end in two flat tendons which, opposite the carpus, unite to form one thick broad tendon; the latter passes under the annular ligament and divides into five tendons going to be inserted into the terminal phalanges of the digits. The four inner tendons perforate the corresponding tendons of the sublimis digitorum. The radial edge of the common tendon is well rounded, and is directly continuous with the radial origin, having an appearance similar to the flexor longus pollicis of man. Arising from the superficial portion near its junction with the deep are two small muscular slips which, passing under the annular ligament, end in two slender tendons which blend with those of the profundus going to the 3rd and 4th digits.

Pronator quadratus.—Disposed as in man.

Lumbricales.—Four in number, attached to the four inner tendons of the deep flexor, and arranged as in man.

Abductor and Opponens pollicis of small size, but quite distinct muscles.

Flexor brevis pollicis of considerable size, arranged much the same as in man.

Abductor minimi digiti, Opponens minimi digiti, and Flexor brevis minimi digiti.—The two first of large size, the last very small. Disposed as in man.

Interossei, of small size.

Supinator longus.—A muscle of small size. Arranged as in man.

Supinator brevis.—Arises from the external condyle, external lateral ligament, and orbicular ligament, but has no origin from

the ulna. The shape is oblong, and its insertion covers three quarters of the upper part of the radius, posterior to and above the oblique line.

Extensor carpi radialis longior et brevior.—These muscles are not differentiated completely, but have a common origin from the external condyle of the humerus and posterior ridge of the humerus. The longer muscle is of small size, and, after passing down the outer side of the arm, ends near the carpus in two tendons, which, after going beneath the tendon of the m. ext. ossis metacarpi, and through the annular ligament, are inserted into the bases of the second and third metacarpal bones respectively.

Extensor communis digitorum, arises from the external condyle of the humerus, and divides into four tendons, which go to the 2nd, 3rd, 4th, and 5th digits.

Extensor minimi digiti arises from the external condyle in common with the preceding muscle, and ultimately divides into three tendons which are distributed to the 3rd, 4th, and 5th digits. This muscle is of considerable size and much larger than the *communis digitorum*.

Extensor carpi ulnaris is a large muscle, which arises from the external condyle of the humerus and posterior ridge of the ulna, in common with the flexor ulnaris and flexor profundus; it ends in a broad flat tendon, which is inserted into the base of the 5th metacarpal bone and sends a slip to the pisiform bone.

Extensor ossis metacarpi pollicis.—This is the largest muscle on the back of the fore-arm, and is bipenniform. It arises from the posterior surface of the radius as low down as the insertion of the supinator brevis, from the radial side of posterior surface of the ulna, reaching from the olecranon to the styloid process, and from the interosseous membrane. It has also an origin from the orbicular ligament, and is connected with the supinator longus. From this extensive origin the muscle passes downwards and outwards, and ends in a strong tendon, which, after passing through a special compartment in the posterior annular ligament is inserted into the base of the first metacarpal bone.

Extensor primi internodii pollicis.—Absent, or rather not differentiated from the extensor ossis metacarpi.

Extensor secundi internodii pollicis is a small muscle, which arises from the posterior surface of the ulna superficial to the m. ossis metacarpi, and ends in a long slender tendon, which is inserted into the last phalanx of the 1st digit.

MUSCLES OF THE TRUNK.¹

External abdominal oblique, arises from the lower ten ribs (5-14). Insertion as in man.

Internal abdominal oblique.—Origin from the 13th and 14th ribs, crest of the ilium, and the whole of Poupart's ligament; insertion as in man, except that its aponeuroses all pass over the rectus.

Transversalis, attached to the lower six ribs and whole length of Poupart's ligament and crest of the ilium. Its tendon splits to enclose the rectus.

Rectus abdominis is a well-developed muscle, which reaches from the os pubis to the first costal cartilage. It is attached to all the costal cartilages, and opposite the second becomes tendinous;² as the tendon passes over the first intercostal space it receives some fibres from the first external intercostal muscle.

Pyramidalis, a large well-developed muscle.

Psoas.—The psoas arises from the transverse processes and bodies of the three last dorsal and all the lumbar vertebrae except the last; when it reaches the sacrum it divides into two parts, superficial and deep; the superficial (p. parvus) goes to be inserted, by a strong tendon, into the ilio-pectineal line and spine of the pubis; the deeper portion (p. magnus), which is the larger, joins the *iliacus* muscle about the middle of the ilium, and is inserted with it into the lesser trochanter.

Iliacus, arises from the inner surface of the ilium and is of small size; it is separated from the *psoas* by the anterior crural nerve; after it is joined by the *psoas* it is inserted with it into the lesser trochanter of the femur.

Quadratus lumborum, a muscle of large size, disposed as in man.

¹ Having accidentally lost my notes on the dissection of the deeper muscles of the back and perineum, I omit a description of them altogether.

² Meckel describes the rectus of bears, as tendinous from opposite the 7th and 8th ribs, and again muscular as it passes over the first intercostal space and then becoming again tendinous. In the specimen I am describing the rectus was muscular up to the 2nd rib.

HIND LIMB.

Sartorius consists of a broad sheet of muscle arising from the iliac crest, and covers the greater portion of the anterior surface of the thigh. Its outer fibres end in a strong fascia covering the thigh, which has a special insertion into the patella; the inner fibres of the muscle pass downwards and inwards to be inserted into the tibia below the inner tuberosity.

Pectineus arises from the ilio-pectineal line, external and anterior to the insertion of the superficial psoas, and also from the capsular ligament of the hip. It is inserted into the femur below the lesser trochanter.

Rectus femoris.—Arises by a broad, thick tendon from the upper and outer part of the rim of the acetabulum; as it passes down the front of the thigh it is joined by the vasti muscles and inserted into the patella. It is a comparatively small muscle.

Vastus Externus and Internus.—Large powerful muscles which arise from the linea aspera and envelop the thigh, they are inserted with the rectus into the patella.

Gracilis, disposed as in man, a very broad thin sheet of muscle.

Adductor.—This large muscle consists of two portions—a greater and a less. The *greater* consists of a large sheet of muscle which arises from the rami of the pubis and ischium, and is inserted into the femur from a little below the lesser trochanter to a little above the internal condyle; the *lesser* is a narrow ribbon-shaped muscle, which arises from the tuberosity of the ischium in common with the semi-membranosus, and is inserted into the upper part of the internal condyle of the femur and adductor tubercle; a little before its insertion it joins the *greater portion*.

Tensor fasciæ is of large size, and disposed as in man.

Extensor communis digitorum arises by a round tendon from a deep pit in the front of the external condyle of the femur, a little external to the origin of the popliteus. This tendon then proceeds downwards beneath the capsule of the knee-joint, surrounded by a synovial sheath and grooves, the space between the head of the fibula and external tuberosity of the tibia; it soon develops into a large-bellied muscle, which has some

fascial attachments to the peronei muscles and tibialis anticus; it is fleshy down as far as the ankle-joint, where it becomes tendinous. The tendon passes through a sling of fascia, and divides into two slips over the tarsus. The outer subdivides into three tendons, which go to the 2nd, 3rd, and 4th toes, and the inner slip, which is of large size, goes to the 1st toe.

Tibialis anticus has its origin from the outer surface of the tibia and the interosseous membrane for its whole length, and ends in two tendons, the greater of which is inserted into the under surface of the base of the first metatarsal bone, the lesser into the upper surface of the base of the same bone.

Extensor brevis digitorum arises from the dorsal surface of the tarsus and annular ligament, and divides into four tendons which go to the four inner toes as in man. The one going to the 1st toe is the largest.

Interossei (Dorsal).—Very small, four in number, arranged as in man.

Gluteus maximus, a muscle of fair size, arises from the posterior part of the iliac crest, by a tendinous origin and by fleshy fibres from the side of the sacrum and the great sacro-sciatic ligament. From this extensive origin the muscle passes downwards and outwards over the great trochanter, and is principally inserted into a strong fascia which covers the upper and outer surface of the thigh. It is also inserted into the femur below and internal to the great trochanter.

Gluteus medius arises from the posterior surface of the ilium between crest and curved line, and is inserted as in man.

Gluteus minimus is divided into an upper and lower portion, both pyriform in shape, and separated by a well-marked cellular interspace; the *upper portion* arises from the lower border of the great sacro-sciatic notch, and is inserted into the anterior border of the great trochanter by a round tendon; the *lower portion* arises from the surface of the ilium below the origin of the gluteus medius, and is inserted also by a round tendon into the outer border of the great trochanter.

Pyriformis, small size, disposed as in man.

Obturator internus and Gemelli.—Well-developed muscles, and arranged as in man. The gemelli are especially large, and quite distinct muscles.

Quadratus femoris.—A muscle of good size, and arranged as in man.

Obturator externus arises from the whole outer surface of the obturator membrane and from the surrounding bone, and is inserted as in man.

Biceps femoris is the largest muscle on the posterior aspect of the thigh. It is triangular in shape, and arises from the tuberosity of the ischium, anterior to the semi-membranosus; it also arises from the strong fascia covering the gluteus maximus. From this origin a huge fleshy muscle is soon developed, which passes down the thigh in an outward direction, covering most of the deeper muscles, and is inserted into the fascia of the hind limb from the middle of the thigh to the os calcis; it is also inserted by a round tendon into the os calcis. This tendon cannot be separated easily from the fascia above mentioned, as it forms its inner edge. About the middle of the limb it is attached by means of the fascia into the side of the patella and outer tuberosity of the tibia.

Tenuissimus.—This is a delicate ribbon-shaped muscle, which arises beneath the biceps from the fascia covering the ischial tuberosity. It passes down the limb, beneath and internal to the biceps, and ends in the fascia a short distance above the ankle.

Semi-tendinosus arises from the ischial tuberosity, posterior and superficial to the biceps, passes down the inner side of the leg, and ends in a round tendon which is inserted immediately below and beneath the gracilis, into the inner side of the tibia near the tubercle.

Semi-membranosus is a large muscle, which arises by a broad origin from the inner and ventral surface of the tuberosity of the ischium. It soon divides into two portions, the lower and posterior part being inserted into a groove on the posterior surface of the inner tuberosity of the tibia, as in man. The upper and anterior part, which is the larger, passes down and out to join the great adductor, as described above. Its fibres can be traced to the upper part of the inner condyle of the femur.

Gastrocnemius (Left Side).—This muscle arises by three heads—*outer*, *middle*, and *inner*. The outer and middle heads arise together from the posterior surface of the outer condyle of the

femur; the inner head arises from the posterior part of the inner condyle by a round tendon. These three heads develop into three large fleshy bellies, which throughout their course remain quite distinct. The middle belly is the largest, and ends in the proper tendo Achillis, which is inserted into the os calcis; the *outer* and *inner* bellies overlap the middle, and are continuous in the middle line with one another by means of a strong aponeurosis which covers the tendon of the middle belly. The outer belly has also a special attachment to the os calcis.¹ The gastrocnemius is quite distinct from the soleus.

Soleus arises only from the upper and back part of the fibula by a round tendon, and also from the fascia in the outer side of the leg. It proceeds down as a well-developed muscle, and is inserted into the os calcis beneath the gastrocnemius.

Popliteus.—Disposed as in man.

Flexor longus digitorum consists of two portions. The larger (*flexor fibularis*) is a bipenniform muscle which arises from the whole posterior surface of the fibula, from the interosseous membrane, and from the posterior surface of the tibia in common with the *tibialis posticus*. It is muscular down to the ankle-joint and ends in a stout tendon, which, after grooving the astragalus and os calcis, as the flexor hallucis does in man, is joined by the smaller portion (*flexor tibialis*). The conjoined tendon then divides into five slips, which go to the five toes; the outer four perforate the tendons of the short or superficial flexor. The smaller portion (*flexor tibialis*) arises from the posterior surface of the tibia, passes down the back of the leg, and finally ends in a round tendon, which goes over and behind the tendon of the *tibialis posticus*, and then through a deep groove in the inner malleolus to the sole of the foot, where it joins the flexor fibularis. The flexor fibularis is by far the larger of the two portions, the tibial portion being merely an accessory slip.

Tibialis posticus has its origin from the tibia, external to the flexor tibialis and intimately connected and blended with the

¹ The above description is taken from the dissection of the left limb. In the right limb the outer belly was quite separate, except at its origin, from the other bellies, and had no insertion into the os calcis directly, but blended with the fascia into which the biceps was inserted. I looked upon it as a very large *plantaris*, as no other muscle corresponded to the *plantaris*.

flexor fibularis. After grooving the inner malleolus, its tendon is inserted to the scaphoid bone.

Flexor brevis digitorum arises from the inner tuberosity of the os calcis, and divides into four tendons, which are pierced by the deep flexor and go to the four outer toes.

Accessorius arises by a single fleshy head from the outer surface of the os calcis, and is inserted into the deep tendon before its division.

Flexor brevis pollicis and *Adductor pollicis*.—Disposed as in man, but of small size.

Flexor brevis minimi digiti, from the cuboid bone, divides into two heads, in each of which is a large sesamoid bone, is inserted into proximal phalanx of 5th toe.

Adductor minimi Digiti.—From the sheath of the long peroneal muscle, and inserted into the 5th toe with the inner head of flexor.

Lumbricales.—Arranged as in man.

Peroneus longus.—A long slender muscle arising from the upper and back part of the head of the fibula by a round tendon, passes down the leg and ends in a round tendon which passes in front of the external malleolus, grooving it deeply. It then goes over the os calcis and the tendons of the other peroneal muscles, and after grooving the cuboid crosses the sole of the foot to its inner side, to be inserted into the base of the first metatarsal.

Peroneus brevis arises from the outer surface of the fibula, and ends in a tendon, which passes behind the external malleolus and beneath the long peroneal tendon to be inserted into the fascia covering the 5th metatarsal bone and the proximal phalanx of the 5th toe.

Peroneus quinti digiti is a small muscle arising from the upper and outer half of the fibula. It ends in a slender tendon, which is inserted into the base of the 5th metatarsal bone.



