IV. "Variations in Human Myology observed during the Winter Session of 1866–67 at King's College, London." By John Wood, F.R.C.S., Demonstrator of Anatomy (with a Table and Seven Drawings). Communicated by Dr. Sharpey. Received May 9, 1867.

A largely increased number of abnormalities has been the result of a systematic observation of *thirty-six* subjects during the past winter session. This has been owing partly to the comprehension of one or two irregularities which are commonly referred to in systematic works on anatomy,—such as the coronoid origin of the *flexor pollicis longus* and the insertion of the *extensor ossis metacarpi pollicis*, partly to the more productive results of a vigilant superintendence, an increased efficiency in the dissections. For much of this the author's thanks are due to the able help of his assistants, Messrs. Perrin and Amsden, and the intelligent zeal of many of the anatomical class. Mainly, no doubt, the increase is owing to an absolutely larger number of abnormalities. The value of the observations to the author is, of course, much increased by his having personally and thoroughly examined every specimen before noting it down, and, if possessing sufficient interest or novelty, sketching it from the subject. The exact numerical results thus arrived at have, in almost all important particulars, confirmed, but in some modified, the conclusions as to frequency and coincidence given in the author's former papers. What the author has termed the *lines of variation*, i. e. the particular muscles which are by far most commonly affected, are nearly identical with those of last year, as will be found by comparing the columns of the appended Table with those of the former. Only a few different will be found in the columns occupied by the sundry specimens.

Out of the total number of 295 abnormalities of muscles in 34 subjects showing abnormalities (as compared with 132 in 32 subjects of last year), we have in the *head and neck* 11 muscles affected with varieties, as compared with 10 of last year. In the *arm* we have 30 lines of muscular variation as compared with 26; while in the *leg* we have 20 as compared with 14 in last year's subjects.

The increase will be seen to be disproportionately greater in the leg. In this part also is the absolute number of the specimens increased; for while those in the head and neck proper (acting only on the parts or bones of the head, neck, and spine) are 15 as compared with 10, and those of the arm 157 as compared with 83, those of the leg are increased to 106 as compared with 39. This raises the proportion of abnormalities in the leg to two-thirds of those in the arms, as compared with rather less than one-half found last year. This seems to have some significance in being coincident with an increase in the number of female subjects to 12, as compared with 4 in last year's list. The author has

remarked in former papers upon the apparent greater frequency of one variety in the foot, viz. "the abductor ossis metatarsi quinti" in the female subject. This increase is clearly maintained in the results of the present investigation, and apparently extends to some other muscles also.

To economize time, space, and the difficulties of tabulation, the explanations necessary to understand the adjoined Table are taken, as before, in the order of the columns therein given.

The first three are appropriated to the muscular varieties of the *Head and Neck*, numbering 31 instances, viz. 24 in the 22 males, and 7 in the 12 females, affecting 15 different muscles. Of these, the cleido-occipital, trapezius, occipito-scapular, and levator anguli scapulæ, amounting to 16 instances, are to be considered as belonging quite as much to the upper extremity. This leaves 15 specimens affecting 11 muscles of the head and neck exclusively.

1. *Cleido-occipital.*—By this name is signified a muscle usually about three-quarters of an inch wide, which, arising from the border of the clavicle outside the cleido-mastoid portion of the sterno-cleido-mastoideus, is placed parallel to the posterior border of the latter, and separated from it by a more or less wide areolar interval. It is distinguished from the cleido-mastoid proper by its insertion into the superior curved line of the occipital bone on the same plane as the fibres of the sterno-mastoid. It joins close up to the trapezius, with which its upper fibres are sometimes united. The true *cleido-mastoid*, on the other hand, is inserted deeper than the fibres of the *sterno-mastoid* into the mastoid portion of the temporal bone. It has been recognized as an occasional accessory portion of the sterno-cleido-mastoideus, by Meckel, Kelch, Sœmmerring, and Henle. In animals it forms an important part of the muscle called the *Cephalo-humeral*. There were in the 34 subjects examined no less than 12 specimens, all on both sides. In subject 21 it was very large, broad, and double, with a superficial slip of communication with the cleido-mastoid. Last session the proportion of specimens was strikingly similar, viz. one-third of the whole number of subjects.

2. *Omohyoid.*—One of the five specimens of abnormality in this muscle was found in the hinder belly arising from the whole length of the middle third of the clavicle covering the subclavian artery (No. 17). In the four others the anterior belly was implicated. In No. 6 it received a muscular slip from the sterno-hyoid. In No. 19 it contributed a large slip to the same muscle, the latter being double also at its origin, and giving off a muscular bundle to its fellow on the opposite side across the median line. In No. 20 the anterior belly was double, the posterior portion being attached by fascia to the stylo-hyoid muscle, which did not reach the hyoid bone. In No. 27 the anterior belly was triple, the middle portion becoming the normal insertion, the front one being inserted into the cervical fascia, and the hinder one implanted into the upper horn of the thyroid cartilage.

3. In one of the subjects (No. 3) the whole of the fibres of origin of the *Splenius colli* were placed superficial to, instead of deeper than, those of the serratus posticus superior, which thus intervened between those of the lower parts of splenius capitis and colli, the origins of these latter being in other respects normal.

In No. 28 was found a muscle which presents what is possibly a further development of this displacement. The muscle was flat and riband-like, three-quarters of an inch wide, attached above to the transverse process of the *atlas* behind the levator anguli scapulæ, and between it and the splenius colli. Passing down and inwards for about 6 inches, it ended at the spinous process of the first dorsal vertebra in a short flat tendon with diverging fibres, which passing beneath the rhomboideus minor, became blended with the deep surface of the upper fibres of origin of the rhomboideus major half an inch from their attachment. Some of the fibres were lost on the tendon of the serratus posticus superior also.

A muscle closely similar to this has been described by Mr. Macalister, of the Royal College of Surgeons of Dublin, in a paper published in the 'Proceedings of the Royal Irish Academy' (April 1866, vol. ix. pl. v.) under the name of the *rhombo-axoid* (by misprint for *atloid*). In his case the muscle was connected, however, with the rhomboideus minor on its deep surface. In both instances the splenius colli was coexistent.

A still more striking muscular anomaly, and possibly a further development of the same tendency, was seen in subject 20 (fig. 1). A distinct riband-shaped muscle, three-quarters of an inch wide, a quarter of an inch thick, and 10 inches long (*a*), was attached to the *occipital bone*, on a level with the splenius capitis (*b*), directly under the line of junction of the trapezius (*c*) with the cleido-occipital muscle (*d*), which was also present. Passing down and outwards, superficial to and obliquely across the splenii and covered by the trapezius, it was inserted by short tendinous fibres posterior and superficial to the insertions of the rhomboideus minor (*e*) and major (*f*) muscles into the border of the *scapula* opposite to the spine and upper part of the infraspinous fossa. Its fibres of insertion were more or less blended with those of the rhomboids.

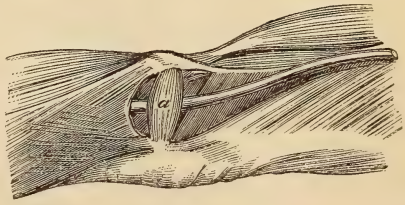
The author has named this muscle the *Occipito-scapular*. It may be considered as a slip of connection from the origin of the trapezius (*c*) with the insertion of the levator anguli scapulæ (*g*), in the same manner as the *levator claviculæ* may be considered as a muscle connecting the origin of the latter muscle with the insertion of the former, thus falling among a numerous class of abnormal human muscles as arranged by the author in his first paper upon the subject. Its action would evidently be to approximate the scapula to the occiput, assisting the levator anguli; and to raise the head backwards, assisting the complexus, splenius, and trapezius. The author has not met with any

mention of such a muscle in the authorities he has consulted. He has found the exact similitude of this muscle in the tame *Rabbit*. In this

Fig. 1.

animal it is of like shape and proportionate size, and has an origin, insertion, and relations almost exactly the same. It is attached to the occiput close to the mastoido-occipital suture, opposite the interval between the cleido-mastoid and trapezius, and is connected below with the *insertions* of the rhomboids into the scapula.

Fig. 2.



This curious concurrence is rendered the more re-

markable by the additional presence in the fore leg of the same animal of a somewhat fan-shaped muscle, connecting the *epitrochlea* and the *olecranon*. As far as the author is aware, this is also unrecorded hitherto. It is entirely distinct from the inner head of the triceps, from which it is separated by the ulnar nerve. Across the nerve this small muscle is placed superficially. The same muscle was found by the author in a human male subject (No. 7 of the Table of last year's series) as a distinct muscular slip, arising from the back part of the epitrochlea, bridging over the ulnar nerve, and separated by it from the triceps above, and by a distinct areolar interval from the fascial arch which gives origin to the flexor carpi ulnaris muscle below. A sketch of this muscle is given in fig. 2 (*a*). It may be called the "*Anconeus epitrochlearis*."

In two subjects were found abnormalities of the *Trapezius* (Nos. 4 & 13). The first was one of deficiency, the fibres of origin of the right muscle reaching only as low as the tenth dorsal spine, and those of the left only to the eighth. In the other the insertion of the muscle opposite to the scapular spine gave off a strong aponeurotic slip down and outwards to the lower angle of the scapula.

In a very muscular subject with many irregularities (No. 11) was a curious arrangement connected with the fibres of the *Platysma* just below the chin. A superficial band of muscular fibres, an inch and a half wide, arose on both sides from the mastoid process and parotid fascia, and passed down and forwards, slightly narrowing and thickening, to unite with its fellow just below the point of the chin. It crossed the insertion of the masseter, the angle of the lower jaw, and the facial artery, superficial to the "risorius Santorini," which was normal. Kelch has described this variety (as seen in two subjects) by the name of the *Musculus menti accessorius* (Beiträge, xx. S. 30).

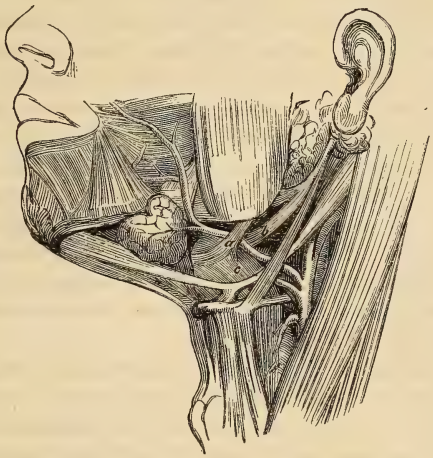
In one subject (No. 5) the anterior belly of the *Digastric* was double, the inner abnormal one being attached to the median raphe, but not decussating with its fellow.

In a female (No. 17) was found the curious muscular slip given in fig. 3 (*a*), on the left side only. It is called by the author the *Mylo-glossus* muscle. It arose tendinous from the inner border of the angle of the lower jaw, behind and below the internal pterygoid, spreading out down, inwards, and forwards, to be inserted into the fibres of the tongue, between the stylo- and hyo-glossus muscles (*b* & *e*), joining especially the latter. The facial artery passed deeper than the muscle, and the border of the submaxillary gland overlapped it. Henle saw a cylindrical muscle arising from the same place and joining the posterior belly of the digastric (Muskellehre, S. 112). This is the nearest approach to the above muscle the author has found mentioned.

The *Stylo-pharyngeus* was in one subject (No. 19) found doubled on the right side. In another (No. 26) the *Scalenus medius* arose by a thick band of fibres covering the intertransversalis from the transverse

process of the atlas. In third (No. 27) the *Scalenus anticus* received a large slip across the subclavian artery from the medius. In No. 30 the *Levator anguli scapulæ* sent a large slip of its fibres to join the insertion of the scalenus medius.

Fig. 3.



These interchanges have been frequently observed in these muscles. In No. 32 was a well-marked specimen of the muscle named by the author in his previous papers the *Supra-costal.* It was attached below to the third rib in front of the serratus magnus, and above to the first rib and cervical fascia. In No. 33 it was a very distinct duplication of the *Rectus capitis posticus major*, like that described by Albinus and Sandifort, and by Douglas both in Man and the Dog.

Twenty-one columns of the accompanying Table are occupied by the muscles of the *upper extremity* only. Twenty-six muscles are concerned. The instances number 158, viz. 117 in the 22 males, and 41 in the 12 females.

4. *Pectoralis major.*—The number and kind of abnormalities of this muscle, as well as of the pectoralis minor, coincide almost exactly with those of last year in nearly an equal number of subjects. In one (No. 5) was a detached slip arising separately from the abdominal aponeurosis opposite the seventh costal cartilage, and crossing the axilla to be inserted into the tendon of, and fascia covering, the *coraco-brachialis* about an inch below the coracoid process. In another (No. 6) a similar slip arose from the fifth rib connected with the lower fibres of the pectoralis major, and was inserted with the pectoralis minor into the coracoid process joining on to the coraco-brachialis. In No. 20 a separate slip arose from the abdominal aponeurosis at some distance from the rest of the muscle, and was inserted into the deep surface of its tendon at the upper

border, connected with the "frenum suspensorium." Such slips of the pectoralis major were noticed long ago by Sir Charles Bell (Anatomy, p. 302, 1829). In No 32 a band of fibres, about an inch broad, detached themselves from the lower border of the pectoralis major, and, curving gradually away from the rest down the arm, were inserted into a long roundish tendon about three-eighths of an inch wide, which crossed the brachial vessels and nerves obliquely down and inwards, and joined the internal brachial ligament about 2 inches above the inner condyle. Altogether this was a fair specimen of the *Chondro-epitrochlear* muscle described and figured by the author in former papers as presenting a close resemblance to the muscle so called in the Monkeys. It has been described also by Sœmmerring, Caldani, Theile, Gruber, Cruveilhier, Henle, Hallett, Macwhinnie, and Macalister. In another subject (No. 33) the clavicular fibres of the pectoralis major were uninterruptedly continuous with those of the deltoid, the cephalic vein passing through a foramen low down. Otto seems to have met with this peculiarity, which he describes as absence of the clavicular fibres of the deltoid (Path. Anatom. 1830, S. 249).

5. *Pectoralis minor.*—Four subjects were found (Nos. 6, 8, 10, & 13) to present an insertion of this muscle into the greater tuberosity of the humerus by a flat tendon usually uniting with that of the supra-spinatus, but in one case separately inserted, and grooving the upper surface of the coracoid process, where it was provided with a bursa. This arrangement was described in the author's last paper as resembling the arrangement in the Mammalia. It has been noticed by Meckel, Harrison (Dissector, i. p. 79), by Benson (Cycl. Anat. & Phys. i. p. 359), and by Macalister (Journ. Anat. & Phys. No. ii. May 1867, p. 317). In another (No. 9) the upper fibres of the left pectoralis minor were inserted into a strong costo-coracoid membrane. Those on the right side had become developed into a separate slip of muscle nearly an inch wide, which was inserted into the lower border of the clavicle itself. This slip was connected below with the second rib, constituting an approach towards the formation of a *Sterno-clavicular* muscle, as described in the author's last paper.

6. *Latissimus dorsi.*—Five subjects were affected with varieties in the insertion of this muscle. In two females (Nos. 17 & 24) the abnormality assumed the more common form of "*Achselbogen*," viz. a short slip across the vessels and nerves to the insertion of the pectoralis major. In a male subject (No. 8) the slip on the right side was connected in a peculiar way with the *pectoralis minor*, but, on the left, in the common form with the *pectoralis major*. The former consisted of a flat, vertically placed, muscular slip 1 inch broad, attached below to the upper edge of the tendon of the latissimus dorsi, and above to the lower border of the pectoralis minor about an inch from the coracoid process, covering partly the axillary vessels and nerves. In Nos. 20 & 28 the tendon of the

latissimus gave attachment to a strong, thick muscular slip, which, passing separately down the upper fourth of the arm, finally joined to long head of the triceps, presenting the most marked approximation (especially in the last subject) to the *Dorso-epitrochlear* muscle in the Orang and other Simiadæ which the author has hitherto found in the human subject. Both the subjects were males, presenting respectively 16 and 11 muscular variations.

Fig. 4.

7. *Biceps.*—Five variations were presented by the *origins* of this muscle. Two, one male and one female (Nos. 7 & 24), showed on the left side the more common third head, arising from the humerus between the coraco-brachialis and brachialis anticus. This was also present in the right arm of another male (No. 27). On the right arm of No. 7, and the left of No. 27, the third head arose as a detached slip from the coracoid process, and, in one, from the capsular ligament also, forming a fusiform belly which joined the tendon of insertion separately at the part which gives off the semilunar fascia. In two others, both males (Nos. 8 & 13), the varieties were found connected with the *insertions* of the muscle. In the first it was found in the left arm only, and presented a most complicated arrangement (fig. 4). The origin of the muscle was normal. Just below the junction of the two heads, about the middle of the upper arm, the muscle divided into three fusiform bellies. The outer, which is largest (*a*), presents the normal insertions into the radius and semilunar fascia (cut at *b*). The middle one (*c*), the smallest, ends in a small rounded tendon, which, passing obliquely down and inwards between the semilunar fascia and the radial insertion, becomes lost on the *supinator* fascia and the *bursa* of the radial tuberosity (*d*). The inner division (*e*), constituting the larger of the abnormal bellies, ends in a strong tendon which, at the elbow, divides into three slips, the

outer joining the coronoid insertion of the *brachialis anticus* at its inner border (*g*); the middle once is implanted upon the deep or coronoid origin of the *pronator radii teres* (*f*), and the inner, connected under the superficial muscles with the coronoid origin of the *flexor digitorum sublimis*. We have thus in this complicated arrangement four insertions in addition to the usual two. These are, moreover, connected with four other muscles, viz. the brachialis anticus, the pronator radii teres, the flexor sublimis digitorum, and the supinator brevis.

In another subject also (No. 13), the biceps sent a slip to join the coronoid origin of the *pronator radii teres*. It was detached from the middle of the inner border of the muscle, as a band of muscular fibres provided with a separate tendon. In the right arm this joined with the *semilunar fascia*, and on the left with the *pronator*.

8. *Coraco-brachialis.*—In four instances this muscle presented a complete interval between its lower fibres implanted into the internal intermuscular septum and brachial ligament, and its upper fibres, inserted into the humerus. In one (No. 27) its highest fibres were inserted into a fibrous band, constituting an upward prolongation of the internal brachial ligament across the tendon of the latissimus dorsi and teres major, as described by Henle. In all, the musculo-cutaneous nerve passed between the two portions. In No. 30 the muscle was inserted into the intermuscular septum at quite the lower third of the arm.

9. *Brachialis anticus.*—In two subjects a slip of the outer fibres of this muscle was continued into those of the *supinator longus*. In one right arm (No. 26) it sent off over the brachial vessels and median nerve a slip of fascia to join the *semilunar*. In one (No. 31) it was deeply divided down the middle, the outer part sending some fibres into the *supinator longus*, and others into the *bicipital semilunar fascia*. The first-mentioned peculiarity has been before described by the author, and the last has been noticed by Hildebrandt, Sœmmerring, Theile, and Meckel, and was compared by the last-named anatomist to the arrangement in Birds.

10. *Flexor sublimis digitorum v. perforatus.*—Out of nine instances of irregularities in this muscle two were specimens of deficiency. In one (No. 5) the radial origin was entirely absent, in another (No. 18) the tendon to the little finger was wanting. This has been noticed by Meckel, Theile, and Henle. In No. 9, a muscular slip from the middle of the *pronator radii teres* joined the radial fibres of the sublimis. This has been noticed by Otto. In four subjects (Nos. 6, 8, 21, & 31) the origin of the flexor sublimis was variously differentiated. In the right arm of No. 6, a separate muscle arising from the inner border of the coronoid process gave off the *perforatus* tendon of the *index*.

A separate coronoid or middle head is described in many text-books as a normal arrangement for the *flexor sublimis digitorum*.

In almost every subject, however, the author has found that the fibres

composing the superficial or condyloid head are continued uninterruptedly along the internal lateral ligament to the inner margin of the coronoid process, which they occupy along nearly its whole length, and are frequently connected there with the coronoid tendon of the pronator radii teres. This part usually gives rise to the *indicial* tendon of the muscle. In the subject above mentioned it constituted a separate muscle. In addition to this, the most common coronoid attachment, however, there sometimes exists a strong flat tendon arising from the *outer* and *lower* border of the coronoid process and joining, not the condyloid, but the *radial* origin of the muscle.

In the sketches of the muscular anatomy of the limbs of an adult female Orang-utan dissected by the author, he finds that in this animal this flat coronoid tendon gives attachment not only to some of the fibres of the radial origin of the *sublimis*, but also to the *flexor carpi radialis*, which arises both from it and from the oblique line and outer border of the radius by a common aponeurosis with the sublimis. This arrangement has been observed by Mr. Macalister in the human arm (*op. cit.* p. 12). In the Orang, the four tendons of the flexor sublimis are attached to separate muscles, the areolar intervals between which are very readily separable. That to the index lies deepest, and arises from the upper coronoid origin and lateral ligament. Those to the second and third fingers both arise from the oblique line and border of the radius, the latter being superficial and attached also to the condyle of the humerus, while the former is connected chiefly with the lower coronoid tendon, but having a separate slip also from the internal lateral ligament; while the muscle to the little finger arises superficially from the condyle of the humerus.

In one of the above-mentioned varieties of the flexor sublimis (No. 8) was a separate fusiform muscle to the little finger, arising from a tendinous intersection springing from the condyle of the humerus. In another (No. 21) the tendons of the left index and little fingers both were connected with a digastric muscle with a tendinous intersection in the middle, arising from the condyle, internal lateral ligament and upper coronoid origin. This has been observed by Macalister in a female subject, with many other irregularities. Such a digastric portion has been recorded also by Meckel (Muskellehre, S. 536). The same author describes a similar intersection in the Loris (Anat. Comp. 6. p. 340). In No. 31 all the tendons were provided with separate muscles, the first arising with a digastric formation from the condyle, internal lateral ligament and coronoid process; the second from the radius and lower coronoid tendon; the third from the condyle and internal lateral ligament; and the fourth from the condyle only. In No. 10 was a tendinous slip from the superficial surface of the sublimis to the annular ligament, the palmaris longus being normal.

11. *Flexor digitorum profundus v. perforans.*—In four subjects (Nos.

3, 9, 26, & 34) some of the indicial fibres of this muscle arose from the inner part of the front surface of the radius. In one (No. 9) these were inserted into the side of the long tendon of a fusiform muscle, which (arising with the coronoid origin of the flexor sublimis in connection with a similar one passing to the flexor longus pollicis) passed under the annular ligament and divided into two, one to join the tendon of the flexor longus pollicis, and the other (larger) that of the index perforans. This arrangement, somewhat dissimilar to those formerly described by authors, is yet formed on the same plan or type of the connection between the flexors of the thumb and index and the flexor sublimis. It forms a coalescence of the "Accessorius ad flexorem pollicis longum," with the "Accessorius ad flexorem digitorum profundum" of Gantzer.

In No. 26 one half of the muscular fibres of the *flexor longus pollicis* were implanted upon the tendon of the *index perforans*. In the left arm of No. 6 was found a detached muscular slip from the outer part of the *profundus*, ending in a tendon which joined that of the *sublimis perforatus* of the index in the palm. It was in the right arm of the same subject that the detached *perforatus* muscle of the index before described was found. In three (Nos. 10, 28, & 33) were found detached musculo-tendinous slips of the *profundus* in the fore arm of a like type. In No. 10 it was single, and gave part origin to the fourth *lumbricalis*. In No. 28 it was lost on the synovial sheath of the tendons in the palm, and in No. 33 it was connected both with this and with the first *lumbricalis*. This has been noticed by Sœmmerring, Theile, and Henle. In six subjects were found a *coronoid* origin of the *flexor profundus*, arising in common with the fibres of the *flexor sublimis* as a fusiform tapering muscle ending in a rounded tendon. In four (Nos. 7, 9, 13, & 20) this tendon joined the perforating tendon of the index finger; in one (No. 25) that of the middle finger: and in another (No. 31) those of the ring- and little fingers. This muscle is mentioned by Meckel, Sœmmerring, Theile, Henle, and by Cowper and Macwhinnie. It was named by Gantzer the "Musculus accessorius ad flexorem profundum digitorum." In No. 9, as before described, it received muscular fibres also from the radius.

12. *Flexor pollicis longus.*—In twelve subjects this muscle also derived a separate fusiform musculo-tendinous origin from the *coronoid* process of the *ulna*. This has been noticed by Albinus, Otto, Sœmmerring, and Meckel, and was called by Gantzer the "Accessorius ad flexorem pollicis longum." It is usually alluded to by text-book writers as an occasional origin, described by some from the outer, and by others from the inner side of the coronoid process. The proportion of its occurrence in thirty-six subjects is one-third. In only three was the origin at all separate from the coronoid fibres of the sublimis. It usually assumes the form of a tapering muscle, detaching itself from the indicial fibres of the *sublimis*, often in connection with the similar contribution

to the *flexor profundus*, and ending in a tendon more or less long, which joins that of the *flexor pollicis longus*. In three instances the junction took place below the middle of the arm. In a former paper the author described a remarkable development and amalgamation of these accessory origins of the *flexor longus pollicis* and *profundus digitorum* in a Negro, resulting in a complete set of tendons to each of the fingers placed intermediate to those of the *sublimis* and *profundus*.

In the Dog, the coronoid origins constitute the chief bulk of the united flexors. In the Cat, Hedgehog, Guinea-pig, Rabbit, and many other animals they form a great part of them.

In No. 7 was a muscular, and in Nos. 8, 20, & 33 a tendinous connection of the *tendons* of the *Flexor longus pollicis* and *Index perforans*, constituting a more decided tendency to the complete union of these muscles found in the lower animals than even in the instances above-mentioned of the radial origin of the flexor profundus. This connection exists more or less completely in all the Apes and Monkeys, reaching its most peculiar development by the entire substitution of the *flexor longus pollicis* by a separated and entire *flexor indicis* in the Orang-utan. It is evidently the homologous representative of the tendon of connection between the *flexor longus hallucis* and *flexor longus digitorum* in the foot.

13. *Lumbricales.*—In two subjects (Nos. 3 & 5) the *fourth* lumbricalis on the right side was inserted into the extensor aponeurosis on the ulnar side of the ring-finger (which was thus provided with two, acting in different directions), instead of the little finger, which was destitute. In Nos. 11 & 34, in the right hand, and in No. 32 in both hands, the *third* lumbricalis was bifurcated, one being inserted into the ulnar side of the middle digit (which was thus provided with one on each side), while the other was inserted into the usual place. In the left hand of No. 33 both the *third* and *fourth* lumbricalis were bifurcated, the middle and ring-fingers both having a lumbricalis on each side. These abnormalities have been described by Meckel, Theile, and Froment. According to the last-named author, the lumbricales are irregular in nearly half the number of subjects, the third being the most frequently bifurcated, and next, the fourth. In half, the author has found the irregularities on both sides; when single, he has found the right and left to be in about equal proportions irregular.

14. *Flexor carpi radialis brevis v. profundus.*—In only two subjects has the author found this year the muscle described by him in previous papers under this name. Both were imperfect specimens, arising in a penniform way from the *radius* outside the flexor longus pollicis, and inserted by a rounded tendon, which in one subject (No. 32) was as large as that of the flexor pollicis itself, into that deep portion of the *annular ligament* which is attached to the trapezoid and base of the middle metacarpal bone, secluding the sheath of the flexor carpi radialis tendon. In one (No. 20) the *palmaris longus* was normal. In the other it was

represented by a small slip from the superficial surface of the *flexor carpi radialis*. Mr. Macalister of Dublin has communicated to the author the description of a complete specimen of this muscle inserted into the base of the *middle metacarpal* bone. It existed in the *right* arm only, and had its origin from the radius internal, instead of external, to the flexor pollicis longus. He has also met with an instance of an incomplete muscle of this kind inserted into the deep portion of the annular ligament, also on the right arm. A *palmaris longus* was present in one of these cases, but not in the other.

It is somewhat remakable that in these two cases, as in all the eight cases observed by the author, this muscle has been found in the *right arm only*. It offers the best homologue in the arm to the *tibialis posticus* in the leg.

15. *Palmaris longus.*—In three subjects (Nos. 5, 24, & 32) the normal palmaris was absent in both arms. It was also wanting in the right arm of No. 28, and in the left of No. 27. In three (5, 27, & 32) there was a feeble slip of tendon from the superficial muscular fibres of the *flexor carpi radialis* to the superficial surface of the middle portion of the palmar fascia, which seemed to supply its place. This relation between the two muscles is interesting in connection with the occurrence of a flexor carpi radialis brevis in one of these subjects (32). In the left arm of one subject (No. 28) both the tendon and muscular portions of the palmaris were doubled, the supernumerary one being smaller and placed internal and posterior to the other, and arising with the condyloid portion of the sublimis. Its tendon was spread out and lost on the fascia at the wrist, a little above the annular ligament. In the right arm of another (No. 34) the tendon of an otherwise normal palmaris was doubled, both portions being inserted into the annular ligament and palmar fascia. In a third (No. 8, the subject of fig. 4) the belly of this muscle was inverted (*h*) and placed just above the wrist.

16. *Extensores carpi radiales.*—In no less than fifteen subjects these muscles presented the intervening muscle and tendon, named by the author the *extensor carpi radialis intermedius*. In six this muscle arose fleshy with the *longior*, and was inserted by a long tendon with, but distinct from, the *brevior* into the base of the third metacarpal bone. In four it arose with the belly of the *brevior*, and its tendon was distinctly inserted with that of the *longior* into the second metacarpal. In one subject it was arranged in the first way on the left arm, and in the second on the right; while in the remaining four it was double, *e. g.* there were two additional muscular bellies intervening between the longior and brevior, with long tendons crossing in exchange in opposite directions. In one, these tendons were united and more or less blended as they crossed each other. Such an arrangement has been recorded by Macalister (*op. cit.* p. 13). In another (No. 26) the left arm was provided with a single-bellied *intermedius* with two tendons, one going

to that of the longior, and the other to the insertion of the brevior. In another (No. 14) the *longior* was, in addition, provided with two tendons by division. In two subjects (Nos. 30 & 31) the tendon of the *extensor carpi radialis brevior* was inserted into the inner corner of the base of the *second* metacarpal bone as well as into the third. This was the case also in two of those which were provided with an extensor *intermedius* (Nos. 29 & 32). It is interesting as showing how an intermediate tendon and muscle may be formed by simple fission of the brevior.

17. *Extensor carpi ulnaris.*—In two subjects (Nos. 7 & 21) this muscle gave off a slip of its lower tendon to the extensor aponeurosis of the little finger. In one (No. 11) the *abductor minimi digiti* arose partly from the tendon, and was further provided with two other distinct origins—one from the pisiform bone, and the other from the upper border of the posterior annular ligament, evincing a tendency to the high origin described and figured in the author's former papers, and previously recorded by Günther, Milde, and Sœmmerring.

18. *Supinator longus.*—In three out of the four varieties found in this muscle, the tendon of insertion was double. In one (No 8, fig. 4, *i*) the lower insertion was the larger and normal one at the base of the radial styloid process, while the upper one was attached to the outer border of the radius three inches above, the radial nerve passing between them to the back of the hand. In No. 34 the same arrangement was present in both arms. In another (No. 21) the radial nerve passed higher than both tendons. In one subject (No. 28) the tendon was divided into three portions, the lowest and largest being inserted into the usual place, the upper one near the middle of the radius, and the intermediate one opposite the upper border of the pronator quadratus. The radial nerve passed between the two latter.

19. *Extensor communis digitorum.*—In two subjects (Nos. 8 & 28) the tendons of this muscle on the back of the hand were doubled; in the first for each digit, and in the last for the middle and ring-fingers only. In one (No. 29) the tendon of the index only was doubled, one being connected by a lateral slip with that of the middle finger, as the latter was to that of the ring-finger, and this,—with that of the little finger. It so resulted that all the tendons were thus joined together, except one of the two tendons of the index. The indicator was normal, but the extensor minimi digiti gave a tendon to the ring-finger. By means of these special tendons, the individual play of each finger was kept free. In one subject (No. 21) there was found, in the left hand, a single fleshy slip of the muscle first described by the author as the *Extensor brevis digitorum manûs*, arising from the dorsal surface of the os magnum and unciforme, and passing to the extensor aponeurosis on the radial side of the *middle* digit. In another (No. 23) there were found, in both hands, two slips passing from the same bones and from

the posterior carpal ligament, to the ulnar side of the *middle* and *ring-fingers*, joining the extensor aponeurosis by separate, slender, flat tendons.

20. *Extensor minimi digiti.*—In nearly half the number of subjects was the tendon of this muscle doubled (fig. 5, *c*). In one (No. 3) there were, further, two distinct muscular bellies. In two subjects (Nos. 29 & 34) the additional tendon was inserted with the common extensor tendon into the ring-finger, as in the Orang, Apes, Monkeys, Rabbit, Hedgehog, &c. In the Cat and Dog the third and second digits also are supplied by it.

21. *Extensor indicis* and *Extensor medii digiti.*—In two subjects (Nos. 8 & 27) the indicator was provided with a double tendon, showing the first tendency to the formation of a special extensor of the middle finger, such as that found as a distinct muscle in the remarkable arrangement seen in fig. 5 (*a*). Both these are constant muscles in the Apes and Monkeys.

22. *Extensor ossis metacarpi pollicis.*—An increase in the number of tendons of this muscle was seen in 16 subjects out of 36, *i. e.*, nearly half. In four the tendon was simply doubled, both being inserted into the base of the first metacarpal bone. In four others one of the two tendons was inserted into the trapezium. In one (No. 25) the tendon was triple, two being inserted into the metacarpal, and one into the trapezium. In seven instances the tendon sent off a slip which gave part origin to the fibres of the *abductor pollicis brevis*. These sometimes formed a separate muscle. In four of these there were two tendons only, one inserted into the base of the metacarpal bone, and the other going to the abductor. In two (Nos. 20 & 31) there were three tendons, one to the metacarpal bone, another to the trapezium, and the third to the abductor pollicis. Such an arrangement has been recorded by Macalister (*op. cit.* p. 13). In one (No. 11) there were no less than four tendons, three of which were inserted into the middle of the shaft and base of the metacarpal bone, and one went to the abductor. In the last subject the *extensor primi internodii pollicis* was entirely absent, increasing the similarity in the arrangement of these muscles to that found in the Chimpanzee and Orang. In two other subjects (Nos. 6 & 21) the muscular part of the extensor primi was entirely blended with that of the extensor ossis metacarpi, though the tendon was separate and its insertion distinct, into the base of the first phalanx of the thumb.

23. *Interossei manûs.*—Three specimens of the "*Palmar interosseus* of the *thumb*" of Henle were found. In two subjects (Nos. 4 & 20) the first interosseous space was occupied by two muscles, one, the "Abductor indicis" of Albinus and the older anatomists, and the other the "Interosseus prior indicis" of that author (the "Extensor tertii internodii indicis" of Douglas (Myograph. Comp. p. 181).

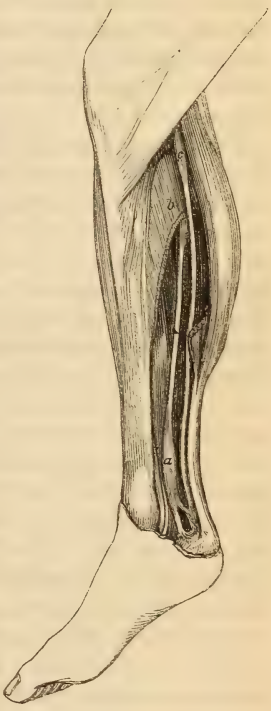
24. Among the miscellaneous specimens in the upper extremity were

found, in a female subject (No. 3), the muscle described by the author as the *Extensor pollicis et indicis* (fig. 5, *b*). Arising by a distinct penniform belly from the hinder surface of the ulna, interosseous ligament and intermuscular septa between the extensor secundi internodii pollicis

Fig. 5.

Fig. 6.

Fig. 7.



and the extensor indicis, it ended in a strong rounded tendon, which, passing under those of the extensor communis, parallel with and outside those of the indicator and extensor medii digiti, divided in the groove of the annular ligament into two tendons. The outer of these joined that of the *extensor secundi* on the middle of the first phalanx of the

thumb, to be inserted with it into the extreme phalanx, and the inner, smaller, was inserted separately into the *base* of the *first phalanx* of the *index,* outside of, and distinct from, the tendons of the common extensor and indicator proper. The author has found the same arrangement in the Vampire Bat, Dog, Cat, Hedgehog, and Rabbit. Meckel found it in the Bear, Coati, and Beaver.

In its insertion, this specimen differs from those formerly described by the author by joining the tendon of the *extensor secundi internodii pollicis.* In the others it joined or substituted that of the *extensor primi internodii* which was present and normal in the subject of the woodcut (fig. 5). This arm presents an extraordinary instance of multiplication of these special extensor muscles of the hand. In a specimen of the above muscle described by Macalister (p. 4), the indicial tendon joined that of the *indicator*, and was inserted into the *second* and *third phalanges* of the *index.*

In one subject (No. 11) the *Extensor primi internodii pollicis* was altogether wanting on both sides. A small tendinous looking ligament was attached to the styloid process of the radius and passed to the base of the first phalanx of the thumb, which seemed to represent the lower part of its tendon on both sides. It indicated an arrest of development in the muscular germ above, and was unattended by any evidence of diseased action, or any peculiarity in the muscular part of the extensor ossis metacarpi pollicis, usually so closely connected with this muscle. The occasional total absence of this muscle was noticed by Sœmmerring and Meckel. In one subject (No. 21) the *extensor primi internodii pollicis* was entirely blended at its muscular portion with the *extensor ossis metacarpi*, its tendon becoming free at the styloid process of the radius. This has been observed by Theile. In two subjects (Nos. 20 & 34) the tendon of the same muscle sent a large portion (in the last the chief portion) of its fibres to join that of the *extensor secundi* at the base of the ungual phalanx. Sœmmerring has observed this peculiarity. Macalister found once in about nine subjects an opposite arrangement to this, viz., the tendon of the *extensor secundi* giving a slip to the base of the first phalanx. This has been also seen by the author in cases of absence of the extensor primi internodii.

In one female subject (No. 17) was found a large slip of the spinal fibres of the *Infraspinatus* passing superficially to the rest of the muscle and to the teres minor, to be inserted into the lowest part of the hinder border of the greater tuberosity.

In a male subject (No. 14) was found, in the right arm, a fine specimen of the detached portion of the subscapularis, which has been described by Professor Haughton under the name of *Infraspinatus secundus*, and by Macalister under that of *Subscapulo-humeral* or *capsular.* It was quite detached from the subscapularis, arising from the border of the scapular as a flat muscular band, 1 inch wide, crossed the long

head of the triceps, and became inserted into the neck of the humerus at the same place as the capsular ligament, overlapped a little by the tendon of the latissimus dorsi. This muscle has been found by Haughton in the *Macacus nemestrinus* and other Quadrumana, and by Macalister in the Horse, Seal, and other Mammalia. In No. 24 was found a *Transversus manûs*, entirely separate from the bulk of the fibres of the abductor pollicis, and arising chiefly from the neck of the third metacarpal bone and transverse ligament.

The remaining ten columns in the Table are occupied by abnormalities of the *lower extremity*, affecting 23 muscles, and comprising 106 instances, viz. 74 in the 22 males, and 32 in the 12 females.

25. *Peroneus tertius.*—This muscle presented varieties in no less than 14 subjects. In no less than five it was *absent*; in three, on both sides, viz. two males (Nos. 24 & 28) and one female (No. 16). In two other females (Nos. 10 & 24) it was totally absent on one side only, in one in the right, and in the other in the left leg, the representative in the other leg being in each case so small as to be of little account. In one, indeed, it was a mere slender band of fibrous tissue attached to the lower fibres of the *extensor communis digitorum*. It may be said, then, that in one-fourth of the 12 female subjects it was wanting, and in two only out of the 22 males. In two males (Nos. 20 & 27) its tendon was doubled. In two other males (Nos. 30 & 32) its tendon was inserted into the base of the fourth as well as the fifth metatarsal bone. In four (Nos. 3, 8, 11, & 29) it sent forward a slip to join the extensor aponeurosis of the little toe, in the way of the *peroneus quinti* from the *brevis*. In all these four, except on the right leg of No. 8, the true *peroneus quinti* from the brevis was coexistent. Both these varieties have been well known to anatomists since Meckel. In one (No. 7) the slip was lost on the fascia covering the last dorsal interosseus, and did not reach the toe.

26. *Peroneus quinti.*—In 12 subjects (or one-third of the whole) was found a representative tendon of this animal muscle more or less complete, connected with the tendon of the *peroneus brevis*, and leaving it just below the malleolus. In three (Nos. 2, 16, & 26) the slip was attached to the front end of the fifth *metatarsal* bone, and more or less blended with the dorsal interosseous fascia—an arrangement which was noticed by Meckel in some subjects unprovided with a peroneus tertius. In all the nine other instances the tendon was more fully developed, and joined in forming the *extensor aponeurosis* of the *little toe*. In one subject only (No. 17) was it confined to one side. Three were found in the 12 female subjects, and nine in the 22 males, showing a larger proportion in the latter.

27. *Extensor primi internodii hallucis longus.*—In no less than 19 subjects, or more than one half, was found, in both legs, a long tendon attached to the inner part of the base of the first phalanx of the great

toe distinct from that of the *extensor brevis digitorum.* In three subjects (Nos. 9, 17, & 31) this tendon was provided with a well-developed and distinct penniform muscular belly, arising from the fibula and interosseous ligament, and separated by an areolar interval from that of the *extensor longus* or *proprius hallucis.* In a male subject (No. 9) this muscle lay at first outside the extensor proprius, and was provided with two tendons, the outer one joining the great-toe tendon of the *extensor brevis,* and the inner, crossing under that of the extensor proprius, was inserted into the usual place on the inner border of the base of the *first phalanx.* In a female (No. 17) the muscle lay to the inner side of the extensor proprius, its tendon subdividing in the same way, and going to the same destinations as the last specimen, but the *outer* one crossing in this case under the extensor proprius. In another female (No. 31) the right leg was provided with a distinct muscle of this kind, with a single tendon joining that of the extensor brevis. In the left leg it was represented only by a slip of tendon given from that of the *extensor proprius* at the ankle, and lying inside it along the foot to the first phalanx, where it was inserted in the usual way. In the 14 other subjects, the latter was the arrangement in both legs, the muscular fibres, together with the upper part of the tendon, being united more or less with those of the *extensor proprius.* Meckel remarks that the above abnormality is homologous to the *extensor primi internodii pollicis* in the hand. It is also mentioned by Sœmmerring, Theile, and Henle.

In a male subject (No. 23) this tendon to the base of the first phalanx of the hallux was given off from the outer side of that of the *tibialis anticus.* This anomaly had been previously found by the author in two subjects (also males), which were described and figured in his first paper on the subject. He is not aware that it has been observed by any other anatomist. It is not to be confounded with the common insertion of a slip of the tibialis tendon into the base of the first *metatarsal* bone. During the last Session a fine example of this formation was seen in a still-born male fœtus, which was not found to present any other muscular variety. In another adult male (No. 33) it was found in the right leg, with the addition of a second slip of tendon from the *extensor proprius*; while in the left leg, two slips came from that of the latter muscle, the outer joining the tendon of the *extensor brevis digitorum,* and the inner inserted separately into the base of the first phalanx of the hallux, as before seen in those (Nos. 9 & 17) with complete muscular bellies. The forward prolongation from the tendon of the *tibialis anticus* to the hallux presents a curious parallel on the inside to that of the *quinti* from the *peroneus brevis* on the outside of the foot. A blending of the tibialis anticus with the *long* extensor of the great toe is said by Meckel to be found in the Porcupine. Six out of the nineteen subjects possessing a separate tendon

to the base of the hallux were females (one half of the whole number of subjects of this sex). These comprised two out of the three complete specimens.

28. *Extensor longus digitorum pedis.*—In one subject (No. 6) the innermost tendon of this muscle detached a separate slip to be inserted into the *base* of the *first phalanx* of the *second* toe, producing an exact analogy to the arrangement in the great toe last described, and which also coexisted in the same subject. It is mentioned by Meckel as homologous to the *indicator* in man, and as also found in the Pig and Porcupine (Anat. Comp. vi. pp. 429 & 432). In another (No. 9) a connecting slip from the innermost tendon of the long common extensor joined at the base of the metatarsals with that of the *extensor proprius hallucis.* A similar arrangement is said by Meckel to be found in the Kangaroo and in the Ruminants. In one (No. 11) the tendons of the second, third, and fourth toes arose by a separate muscular belly from the outer tuberosity of the tibia and head fibula; that to the fifth toe coming from the fibres of the *peroneus tertius.* This is found, according to Meckel, in the Hyæna, Bear, and other Carnivora, and also in the Kangaroo and some Rodents. In one subject (No. 19) two small slips of tendon, from those of the two outermost toes, were inserted into the shafts of the fourth and fifth *metatarsals* respectively. This is similar to the arrangement found in the Sloths and Reptiles. In No. 23 there was a reduplication of the extensor tendon of the little toe. In No. 26 the outermost tendon of the *extensor longus* was connected with that of the *extensor brevis* by a long slip arising from the former above the annular ligament, and joining the latter on the dorsum of the foot. In two (Nos. 32 & 33) the tendons of the long extensor were each provided with a separate muscular belly. In the former there was also a double tendon to the second toe.

29. *Extensor brevis digitorum pedis.*—In one subject (No. 9) a tendinous slip from the *second* tendon of this muscle joined that of the *first* dorsal interosseus; and another from the *third* tendon, that of the *second* dorsal interosseus. In No. 11 this connection existed with the *first* dorsal interosseus only. This evidence of connection between these muscles is interesting in relation to the occasional formation of an *extensor brevis digitorum* in the hand, which the author has in former papers explained by posterior displacement and separation of the superficial fibres of the *dorsal interossei.* In two (Nos. 23 & 26) the tendons to the second toe were doubled.

30. *Flexor longus digitorum* and *Flexor accessorius.*—In one subject (a female) the first tendon of the former muscle was entirely wanting, its place being supplied to the second toe by one from the *flexor hallucis*, approaching the formation in some of the Apes. In No. 14 was found a fully developed specimen of the *flexor longus accessorius*, arising from the lower third of the hinder surface of the

fibula and the adjacent aponeurosis, as a distinct muscle ending in a stout tendon, which passed under the annular ligament outside the vessels, and was joined by the muscular fibres of the "massa carnea Sylvii," and by the tendons of the perforans in the middle of the sole. The fibres of its tendon passed exclusively to the three outer toes. In No. 15 the "massa carnea" was replaced by a thick tendon attached to the inner border of the tuber calcis. At its junction with the outer tendon of origin, a small flat muscular belly was developed upon it. In the right foot of No. 24, a tendon from the outer head of an otherwise normal accessorius was joined to the superficial or *perforated* tendon of the middle toe, forming decussating fibres with others from the opposite side of the latter in the usual way. Three out of the four abnormalities in these muscles were found in female subjects. The complete *flexor accessorius longus* was seen, however, in a male subject, as in the three instances described last year.

31. *Lumbricales pedis.*—All the abnormalities in these muscles resulted from deficiency. In two the *fourth* was absent, one on the right side and one on the left. In one the *second* was wanted on both sides. All were male subjects.

32. *Flexor brevis digitorum.*—All the varieties of this muscle were also from deficiency. In all the seven subjects affected, the tendon to the little toe was absent, and, in six out of seven, on both sides. In one (No. 3) its place was supplied by a small fusiform slip of muscle, arising from the outermost tendon of the *flexor longus perforans.* In another (No. 4) the supplementary muscle arose by two slender fusiform bellies, one from the long flexor tendon, and the other from the inner tubercle of the calcis, deeper than the fibres of the flexor brevis digitorum. This, which the author looks upon as a transitional form to the arrangement found in No. 3, and in the Apes and Monkeys, was precisely like that given in the author's paper of 1865. In the rest of the subjects no substitute to the missing tendon was found, though possibly a feeble development may have escaped observation in some of them. Meckel has remarked on the frequent deficiency of this tendon in the human foot, and also that it is not always supplemented by the flexor perforans, comparing it to the usual deficiency of the flexor brevis in the Monkeys, and its total disappearance in other Mammalia.

33. *Abductor ossis metatarsi quinti.*—No less than 17 specimens of this muscle, arising separately from the outer tubercle of the calcaneum, and inserted into the tubercular base of the fifth metatarsal bone, were found in the 36 subjects (very nearly one half). In three subjects it was found on the right foot only, and in two, on the left only. In the other 12 it existed on both sides. Ten of the specimens were found in the 24 males, and seven in the 12 females, giving a preponderance of frequency in the latter sex. This preponderance in the female sex is still more striking, if the cases given in the author's

last paper are included in the estimate; 8 having been found in the 16 females (or one half), while only 16 were found in the 54 males (not one-third). If this be established by future observation, as well as the more frequent deficiency of the *peroneus tertius* in the same sex before alluded to, its bearing upon the relative structural inferiority of the sex will be curious, since both are animal peculiarities.

Mr. Macalister states that he has found the *abductor of the fifth metatarsal bone* existing as a distinct muscle in nine out of every twelve subjects. In No. 5 of the Table the muscle was peculiar in arising from the *inner* tubercle of the calcaneum by a large, distinct, and triangular fleshy belly, and in being inserted by a long tendon into the *neck* or anterior part of the shaft, instead of the tubercle of the fifth metatarsal bone.

34. Out of 18 sundry specimens of abnormalities in the lower extremity, two were peculiarities of the tendon of the *Flexor longus hallucis*. In one, a female (No. 3), the usual slip of union with the flexor longus digitorum was wanting. In another female (No. 6) the *flexor longus hallucis* first received a long slip from the *flexor communis*, and then gave two separate tendons to the second and third toes. That to the second constituted the only perforating tendon, the one from the common flexor being wanting, while that to the third toe joined at the base of the digit with a smaller one from the common flexor. In two male subjects (Nos. 5 & 21) the *Plantaris* muscle and tendon were both apparently blended with the outer head of the gastrocnemius. In No. 30 the *Superior gemellus* was wanting. In the right foot of No. 8, a male subject remarkable for the number of its abnormalities, a considerable portion of the outer fibres of the *Flexor brevis hallucis* were detached from the rest, and inserted into the inner tubercle on the base of the first phalanx of the *second* toe. In the left foot of the same subject a still larger slip from the fibres of the *Adductor hallucis* was detached to the same destination. This was also found as a less developed specimen in the left foot of No. 13, also a male. Two specimens of these abnormalities, also in male subjects (one of each kind), were described by the author in his paper of last year. They do not seem to have been before recorded by any anatomist, though apparently recurring in the proportion of about once in 18 or 20 subjects.

A male subject (No. 9) was remarkable for the presence of the muscle described by Otto as the *Peroneus quartus* (Neue seltene Beobacht. S. 40), arising from the lower fourth of the outer surface of the fibula below the peroneus brevis, and inserted by a distinct tendon into the outer side of the calcaneum, upon the tubercle between the peroneal grooves. Theile mentions that this muscle sometimes replaces the *peroneus brevis* itself. In the case just described, both the peroneus longus and brevis were coexistent. A variety of the same character, but inserted into the outer border of the cuboid, is recorded by Macalister (*op. cit.*) in a subject having no peroneus tertius. One of the peronei muscles is, according to

Meckel, inserted into the cuboid in the Kangaroo. In a male subject (No. 14), the right *Peroneus longus* had a double tendon, one inserted into the internal cuneiform, and the other into the base of the first metatarsal. In a female (No. 15) the tendon of this muscle gave origin in the sole to the *flexor* and *opponens minimi digiti*, as well as to the *third plantar interosseus*, as in the variety figured in the author's paper of 1865. In another female (No. 16) the *Peroneus brevis* was, in both legs, provided with a double tendon, both inserted into the usual place. The peroneus tertius in the same subject was totally absent. In the left leg of a male (No. 20) a slip of tendon was detached from the outer border of the *Tibialis anticus* muscle to be implanted into the inner border of the *anterior annular ligament* and *dorsal fascia*. In both legs of another male (No. 29) a more decided development in this direction had resulted in a distinct, flat, spreading muscle, 3 inches long, arising from the outer surface of the tibia below and distinct from the fibres of the tibialis, and ending in a round tendon which was inserted into the annular ligament and dorsal fascia below the malleolus. Such a muscle was described by the author in his paper of 1864 under the name of the *Tensor fasciæ dorsalis pedis*, occurring on both sides in a female subject.

In two subjects (Nos. 22 & 34) a considerable portion of the inner fibres of the *Pectineus* were found to pass across the front of the deep femoral artery to become inserted with the upper fibres of the *Adductor longus*, an irregularity which does not seem to have been hitherto noted. A similar extension of the origin of the adductor longus is seen in the Marmot among the Rodents, in the Ratel of the Carnivora, and in the Magot and Chimpanzee among the Quadrumana.

No. 24 was found to possess a remarkable development in both feet of an *Opponens* or *flexor ossis metacarpi minimi digiti*.

In the right leg of a muscular female subject (No. 25), the *Biceps flexor cruris* was provided with a third head. This consisted of an elongated, rounded, and fusiform muscle (fig. 6, *a*), 8 inches long and three-quarters of an inch wide, connected above by a rounded tendon, 2 inches long, with the strong fascia which covered the deep surface of *gluteus maximus* (*b b*, cut and turned aside in the figure). Below, it was united by a tendon, 1 inch long, with the ischial or long head (*c*), just above its junction with the femoral head (*d*) at the lower third of the thigh. An additional head to this muscle, though not at all common, yet has been recorded by various writers, viz. by Meckel, from the upper part of the "linea aspera;" by Gruber, from the internal condyloid ridge of the femur; by Henle, from the fascia lata near the upper end of the linea aspera; and by Sœmmerring and Gantzer, arising from the tuber ischii. Of these, the three former joined the femoral or short head, while in the instances given by the two last-named authors, the abnormal head joined the ischial or long head. All having a

closely or identically similar origin to those heads of the muscle with which they afterwards respectively united, may be considered as extensions and separations of a portion of the fibres of those heads of origin. Mr. Macalister mentions that in a male subject he found in both legs a continuation of the tendinous ischial origins of this muscle over the surface of the great sacro-sciatic ligament to the side of the sacrum, but it does not appear that this constituted any approach to a distinct head. But in the specimen under consideration, the abnormality is constituted by a distinct muscular bundle, with an upper and a lower tendon, the fibres of the former capable of being traced in those of the deep gluteal fascia for a considerable distance. In the Dog the author has found the almost exact counterpart of this third head of the *biceps flexor cruris*. It is a deeply placed slender band of muscular fibres, arising from the surface of the great sacro-sciatic ligament. It lies under the ischial origin, and becomes inserted into the fascia on the outside of the leg below the main bulk of the widely-spread biceps proper. It is there connected also with a fibrous sheath which invests the tendon of the *plantaris*. In this animal this muscular slip seems to represent the caudal and sacral origin of the biceps in the Rodents, and other Mammalia. The homology between the abnormal third heads in the human subject and the caudal origin in animals was pointed out by Theile.

In a muscular male subject was found an abnormality, in many points resembling that described by Gantzer as the "*Accessorius ad calcaneum*." It was, however, very different in its origin to those described by that author, although identical in its form and insertion (fig. 7, *a*). A long slender tendon, very much resembling that of the *plantaris* in its texture and appearance, was placed along the inner side of it, so as to present the appearance of a double plantaris. This tendon was attached above to the upper third of the hinder surface of the fibula, below the origin of the soleus (*b*), and crossed obliquely the posterior tibial vessels, muscles, and aponeurosis, towards the inner malleolus. At the lower third of the leg, a flat, ovoid, tapering, muscular belly, 3 inches long and 1 inch wide, was developed upon it, and became implanted by a short-spreading tendon upon the calcaneum, in front and to the inner side of the tendo-achillis, about three-quarters of an inch distant from it. From the lower part of its outer border the muscle sent off a tendinous slip, which joined the plantaris tendon in a mass of fibro-fatty tissue placed above the bursa of the tendo-achillis. Hyrtl has mentioned the occasional occurrence of a muscle somewhat resembling this, as arising from the popliteal (?) fascia, or *lower* part of the fibula, and inserted into the calcis. This Henle seems to consider as an abnormal plantaris. In the case just described, however, the size, shape, and position of the muscular belly, and the insertion of the lower tendon so much resemble the muscle described by Gantzer, and also that figured by the author in his paper of 1864, that he has no

hesitation in referring it to the same class, with a somewhat higher origin, obtained by differentiation of the more vertical fibres of the posterior tibial aponeurosis. It constitutes probably, however, a link with the *plantaris*, similar to that which the muscle of the arm, which he has called the *flexor carpi radialis brevis*, in some specimens forms with the *palmaris longus*. From this point of view, this abnormal muscle in the leg has a similar relation to the *tibialis posticus* that the incomplete muscle in the arm has to a *complete flexor of the middle metacarpal bone*, its homologue; and it occupies a like intermediate relation to the *soleus* as the one in the arm does to the *flexor sublimis*. We shall find herein the most probable solution of some of the difficulties of the homologies of these post-tibial muscles.

In addition to the foregoing subjects, the author has had the advantage of descriptions and sketches of muscular abnormalities affecting three subjects out of eight, from his friend and former assistant Mr. Bellamy, demonstrator in anatomy at Charing Cross Hospital. In one muscular male were found four abnormalities, viz. in the right arm, a double *palmaris longus*. The irregular one was placed internal to the other, with its muscular fibres commencing just above the middle of the arm, and continued down to the annular ligament, into which and the palmar fascia it was inserted. In the same arm was found a well-developed *extensor carpi radialis intermedius*, arising distinctly between the longior and brevior by a fusiform belly, and inserted by a long tendon into the *posterior annular ligament*, close to the sheath for the outer extensors of the thumb. This the author looks upon as a formation intermediate to complete development of an *extensor carpi radialis accessorius*. A little further extension forwards and outwards would have brought the insertion of this muscle into relation with the origin of the abductor pollicis brevis and the base of the first metacarpal.

On the left arm of the same subject was a development in the same direction in the lower part of the arm. A separate muscle was formed of those upper fibres of the *extensor ossis metacarpi pollicis*, which so frequently give off a slip of tendon to the origin of the abductor pollicis. The muscle arose from the radius and interosseous ligament, quite distinctly from the extensor ossis metacarpi, and was provided with a separate tendon, which, passing in the same sheath with that of the latter, subdivided into two tendons, one to be inserted into the base of the first metacarpal, and the other to join the outer fibres of origin of the abductor pollicis brevis.

If both the tendencies evinced in this interesting concurrence had been combined in the same arm, the result might have been the production of an entire *extensor carpi radialis accessorius*, like that described by the author in former papers. In the left leg of the same subject was found a large and well-marked specimen of the *accessorius ad cal-*

caneum of Gantzer, arising by a flat, bipenniform, muscular belly from the posterior tibial fascia below the tibial origin of the soleus, and inserted by a flat spreading tendon, which crossed obliquely the post-malleolar tendons into the os calcis in front of the tendo-achillis. From its outer border was given off a spreading aponeurosis, which was attached to the hinder border of the outer malleolus, almost like that seen in figure 7. In the left leg of a female subject was found the *perforatus* tendon of the *little toe*, arising from a separate triangular-shaped muscle, which was attached to both the tubercles of the calcaneum between the superficial muscles and the accessorius, like that described in the author's former papers.

In the left arm of another muscular male subject two abnormalities were found, viz. a third head of the *pronator radii teres*, arising with the fibres of the *brachialis anticus* at the junction of the middle and lower thirds of the humerus. The median nerve and ulnar vessels passed between the abnormal and condyloid heads, and the radial artery came off high in the upper arm. No supra-condyloid process was found on the bone (as described by Gruber in such a case), although carefully looked for. The other abnormality was a high muscular origin of the *abductor minimi digiti*, arising from the fascia covering the inner flexor muscles of the fore arm by a single penniform head, and joining partly with the normal abductor, and partly inserted by a separate tendon into the base of the first phalanx of the little finger.

The author is indebted also to Mr. J. Galton, of the Dreadnought Hospital, for some clever sketches of three abnormalities, one of a detached slip of the *pectoralis major*, arising from the anterior end of the fifth rib, and inserted behind the sternal fibres into the fascia covering the *coraco-brachialis*, an inch or so below the coracoid process; another, of an "*accessorius ad flexorem pollicis longum*" of Gantzer, the tendon of which, after being first connected by a broad aponeurosis with the muscular belly of the flexor longus pollicis, was then divided into two slips, one of which joined the tendon of the last-named muscle, and the other the indicial tendon of the flexor profundus digitorum (as in subject 9 previously described). The third was a small fusiform muscular slip, found on the deep surface of the *flexor brevis hallucis*, arising by a pointed tendon from internal cuneiform bone, and inserted by another round tendon into the abductor and inner head of the flexor brevis hallucis, close to the sesamoid bone. It seems to represent the "*inter-osseus palmaris volaris*" of the hand.

Out of 36 subjects dissected at King's College during the Session, 34 have been found to present muscular abnormalities worthy of note. Four of these had also noteworthy abnormalities of some of the arteries; viz. No. 3, having 10 muscular varieties in the head and arm, had also an irregularity of the third part of the subclavian, whence a common trunk was given off for the posterior and suprascapular arteries. The

internal mammary also gave off an accessory inferior thyroid. No. 7, having 10 muscular abnormalities, of which 7 were in the head and arm, presented that remarkable irregularity—the right subclavian given off from the descending aorta below the left—while the two carotids came off from a common trunk*. No. 20, having 16 muscular abnormalities, 12 being found in the arm, had also a high origin of the radial artery. No. 27, having 12 muscular abnormalities, of which 9 were in the arm, presented the left vertebral arising from the aortic arch, and the posterior- and supra-scapular coming by a common trunk from the second part of the subclavian.

From the 34 cases contained in the adjoined Table, which were all examined and noted with the utmost care and accuracy, a fair approximative idea may be deduced of the relative frequency of certain special instances in the two sexes; on both sides of the body, or on one side only.

The total number of muscular abnormalities noted in 36 subjects is 295 (reckoning both sides as one), of which 221, or about two-thirds, were found on both sides, and 74, or about one-third, on one side only; the proportion on the right side only being 39, and those on the left side only 35, or nearly equal on either side.

The individual abnormalities which exceed the above proportion *on both sides* are—the cleido-occipital; those of the pectoralis minor, coracobrachialis, brachialis anticus, extensor carpi ulnaris, and the interossei; and the extensor medii digiti in *the upper extremity*; and the extensor longus primi internodii hallucis, and those of the extensor brevis digitorum pedis in the *lower limb*, *all* of which were found represented on both sides; while the proportion of the abnormalities of the latissimus dorsi, the peroneus quinti, and the abductor ossis metatarsi quinti found on both sides was also greater than that above given.

Those instances of which the proportion *on one side only* was greater than the average, were found in the flexor sublimis and profundus digitorum and lumbricales, and the more rare abnormality, the flexor carpi radialis brevis vel profundus, *all* of which last were found in the right arm. Of the biceps flexor cubiti and the flexor longus accessorius digitorum pedis nearly as many were found on one side only as on both.

The total number of abnormalities found in the 24 males was 215, and in the 12 females 81, showing a greater proportionate frequency in the male sex of almost as many more. Of this number, 15 are confined to the *head, neck, and thorax*; 4 of which are in females, or rather less than the foregoing average.

No less than 174 are connected with, and acting chiefly upon, the bones of the *upper limb*, 130 of which are in males, and 44 in females. This also is proportionately less in the female than the general average.

* For an account of the formation of this abnormality, see a paper by the author in the Transactions of the Pathological Society of London, vol. x. p. 119.

Of the remaining 106 found in the *lower limb* 74 were in male, and 32 in female subjects, proportionately a considerably greater average on the side of the female. So far as these go, abnormalities of muscles appear to preponderate in the male, in the *head*, *neck*, *thorax*, and *arm*, and, in the female, in the *leg*.

In a much greater proportion than this on the male side were the special abnormalities of the cleido-occipital, pectoralis major, biceps, coraco-brachialis, brachialis anticus, flexor longus pollicis, lumbricales and interossei manûs, flexor carpi radialis profundus, palmaris longus, supinator longus, extensor communis and brevis digitorum manûs, and extensor carpi ulnaris in the *upper limb*; and the peroneus quinti, extensor longus and brevis digitorum, and lumbricales pedis in the *lower*. On the female side the most tangible preponderance is found in the frequency of *absence* of the peroneus tertius, and of the *presence* of the abductor ossis metatarsi quinti, the extensor carpi radialis intermedius, and of the extensor longus primi internodii hallucis.

The Table shows as decidedly as that of last year, the general absence of *correspondence* in *combination* of the muscular abnormalities.

Of the 14 subjects in which there are more than 10 variations, three only are females. One subject has 17 muscular abnormalities, of which 15 are connected with the arms, and 2 only with the legs. Two have 16 abnormalities; in one of them 11 are connected with the arms (including the cleido-occipital and the occipito-scapular given in fig. 1), 1 with the head, and 4 with the legs; the other has 5 in the legs and 1 in the head and neck. Two males have each 13 abnormalities; in one 10 are connected with the arms, and 3 with the legs; and in the other, 1 is found on the ribs, and 4 in the legs. Three subjects (one of them a female) have 12 abnormalities, of which 7 belong to the arms. One male has 11, of which 8 belong to the arms. Two females have each 11, of which 6 in one, and 5 in the other, belong to the arms; and 4 in one, and 5 in the other, to the legs. Three subjects have 10 abnormalities, of which 4, 6, and 7 respectively are found in the arms; one of these, a male, and another a female, have each 5 belonging to the legs. In 13 subjects no abnormalities are found in the head and neck. In 7 more, those which were found there acted equally on the bones of the upper limb. This leaves 14 in which the muscles of the head, neck, and thorax only were concerned. In 1 subject only, a female, were no abnormalities found in the arms, the only abnormal muscle discovered being the abductor ossis metatarsi quinti. In a male (No. 4) 2 only were found in the arms, and 4 in the legs. In 5 subjects one variation only is found in the legs, the others being found chiefly in the arms.

No levator claviculæ, extensor carpi radialis accessorius, or sternalis muscles have this year been found. With the exception of these and five others, all that were recorded last year have been found also this year, with the addition of abnormalities in 10 other muscles.

In the Table the figures which are placed at the end of the lines record the number of variations in each subject. Those at the bottom of each column express the number of variations in each muscle or muscles, the names of which are found at the head of the columns.

The ordinary Meetings of the Society were adjourned over Ascension Day and the Whitsuntide recess to Thursday, June 20.

[*To face p.* 546.]

30. Flexor longus digit. and access.	31. Lumbr. pedis.	32. Flexor brevis digit.	33. Abduct. ossis metatarsi quinti.	34. Sundry specimens.	
			B.		1
					2
		B. 4th perforatus.	B.	B. flex. long. hallucis.	11
		B. 4th perforatus.	B.		6
		B. 4th tend. absent.	B.	B. plantaris absent.	9
B. 1st tend. absent.				B. flex. long. hallucis.	11
	R. 4th absent.				10
			B.	B. fl. brev. & ad. hall.	17
			B.	B. peroneus 4tus.	9
			B.		5
			B.		16
			R.		3
	B. 2nd absent.	B. 4th tend. absent.	B.	L. add. hall. to 2nd toe.	9
B. fl. access. fr. fibul.			B.	R. per. long. 2 tendons.	8
L. tend. fr. os calcis.		B. 4th tend. absent.	L.	R. per. long.	7
				B. per. brev. 2 tendons.	4
					8
			B.		3
			L.		7
	L. 4th absent			L. tib. ant.	16
				L. plantaris absent.	13
				B. pect. to add. long.	3
					5
R. access. to perforatus.			R.	B. oppon. min. dig.	12
			R.	R. biceps, 3 hds.	7
					12
					12
					11
		B. 4th tend. absent.		B. tib.-fasc.	10
		L. 4th tend. absent.		B. sup. gem. absent.	8
					9
					13
			B.	R. accessor. ad. calc.	10
				B. pect. to add. long.	8
4	3	7	17	18	295.

TABLE OF VARIETIES IN HUMAN MYOLOGY.

[*To face p. 546.*]

No.	Sex.	1. Cleido-occipital.	2. Omo-hyoid.	3. Sundry specimens.	4. Pect. major.	5. Pect. minor.	6. Latiss. dorsi.	7. Biceps.	8. Coraco-brach.	9. Brach. antic.	10. Flex. sublim.	11. Flex. profund.	12. Flex. long. pollic.	13. Lumbr. manûs.	14. Flex. carpi rad. brevis.	15. Palmaris longus.	16. Ext. radial. and interm.	17. Extens. carpi ulnar.	18. Supin. longus.	19. Extens. comm. and brevis digit.	20. Extens. minim. digiti.	21. Extens. indicis and media digiti.	22. Extens. ossis metacarpi pollicis.	23. Inter-ossei.	24. Sundry specimens.	25. Peron. tert.	26. Peron. quinti.	27. Extens. longus pr. inter. hallucis.	28. Extens. longus digit.	29. Extens. brevis digit.	30. Flexor longus digit. and access.	31. Lumbr. pedis.	32. Flexor brevis digit.	33. Abduct. ossis metatarsi quinti.	34. Sundry specimens.	
1.	F.												B. coronoid origin.																					B.			1
2.	F.											B. radial origin.		R. 4th to ring-finger.							B. double muscle.	B. ext. med. dig.			B. to metat.											2
3.	F.			B. splenius colli.																				B. voluris, 1st diff.		B. ext. ind. et pollicis.	B. to 5th toe	B.							B.		11
4.	M.			B. trapezius						B. to supin. longus.	B. no radial origin.			R. 4th to ring-finger.		B. absent fr. flex. rad.											B.	B. fr. ex. pr.					B. 4th perfo-ratus. B. 4th perfo-ratus. B. 4th tend. absent.	B.		6
5.	M.			B. digastric.	B. to corac.						R. sep. slip to index.	L. tendon to sublim.					B. ex. inter.																				9
6.	F.		B. fr. stern. hyoid.		B. to corac.	B. to humer						L. coronoid origin.	R. to flexor profund. B. to flexor profund.	B. double insert.		B. inverted	B. ex. inter.	B. to little finger.	B. double insert.	B. ext. com. doub. tend.	B. double tendon.	B. ext. indic doub. tend.	B. united to ex. pr. int.		B. volar.		B. to head of metat.	B		B. fe ex. pr.	B. to base of 2nd toe.		B. 1st tend absent.			B. flex. long. hallucis.	11
7.	M.	B.				B. to humer.	R. to P. min. L. to P. maj.	B. 3 heads		B. to supin. longus.	R. sep. slip to 5th dig.	L. coronoid origin.		B. double insert.			B. ex. inter.						B. double tendon.				R. to 5th toe							R. 4th absent.			10
8.	M.	B.				B. to clavic.		L. 6 insert.			L. fr. pron. rad. teres.	L. coronoid & radial orig.	B. to flexor profund. L. coronoid origin.				B. ex. inter.												B. distinct muscle.							R. tl. brev. & ad. hall.	17
9.	M.										R. slip to 4th lumb.						B. double ex. inter.																	B. peroneus 4tus.	9
10.	F.					B. to humer.																					R. absent									5
11.	M.			B. platysma				R. 4 heads			R. to ann. ligam.		B. coronoid origin.	B. 3rd inser. double.				B. to triple ab. min. dig.			B. double tendon.			B. ext. pr. pollicis.	B. to 5th toe	B.		B. fr. ex. pr	B. fr. per. ter.	B. to 1st dor. interossis.					16
12.	M.																L. ex. inter.						B. 4 tendons, 1 to ab. poll. B. double insertion.	B. volar.											R.		3
13.	M.	B.		L. trapezius		B. to humer.		B. to pron. rad. teres.				R. coronoid origin.											L. doub. tend. to abd. poll. B. double insertion.		R. subscap. humeral.			B. fe. ex. pr			B. 6. access. fr. fibul. L. tend. fr. ca calcis.	B. 2nd absent.	B. 4th tend. absent.	B.	L. add. halli. to 2nd toe.	9
14.	M.								B. double								L. ex. inter. doub. long.											B. fr. ex. pr.						B.	R. per. long. 2 tendons.	8
15.	F.																B. ex. inter.											B. fr. ex. pr.					B. 4th tend. absent.	L.		7
16.	F.																B. double ex. inter.									B. absent	B. to metat.							R. per. long.	4
17.	F.	B.	B. clavic. origin.	L. mylo-glossus.			B. to pect. major.				B. 4th tend. absent.						B. ex. inter.						B. double insertion.		B. infra-spinatus.			B. distinct muscle.							H. per. brev. 2 tendons.	8
18.	F.	B.																																			3
19.	M.		R. to stern. hyoid.	R. stylo-pharyng.					B. double																		R.	B. fr. ex. pr.	B. to 4th and 5th metat.						L.		7
20.	M.	B.	B. double ant. belly.	B. occipito-scapular.	B. separate slip.		B. to triceps.					L. coronoid origin.	L. cor. orig. to flex. prof. B. coronoid origin.		R. to annul. ligam.		R. ex. inter.	B. to little finger.	L. double insert.	L. ext. brevis to 3rd dig.	R. double tendon. B. double tendon. B. double tendon.		R. 3 insert. 1 to ab. poll. B. doub. tend. 1 to ab. poll.	B. double 1st dor.		L. tendon double.	B.	B. fr. ex. pr.				1. 4th absent		L. tib. ant.	16
21.	M.	B. double									L. digastric slip.						R. ex. inter.								B. ex. pr. poll. with os. met.			B. fr. ex. pr.						L. plantaris absent.	13
22.	M.																B. ex. inter.																	B. pect. to add. long.	3
23.	M.																			B. ext. brevis to 3rd & 4th.			B. doub. tend. 1 to ab. poll.					B. fe. tib. ant.	B. 2 tendons to 5th toe.	B. 2 tendons to 2nd toe.					5
24.	F.						B. to pect. major.	L. 3 heads					L. coronoid origin.			B. absent					L. double muscle.		B. double tendon.		L. transv. manus.	L. absent	B. fr. ex. pr.			R. access. to perforatus			R.	B. opponens. sig.	12
25.	F.											B. coronoid origin. L. radial origin.	B. coronoid origin.				B. double ex. inter.				B. double tendon. B. double tendon.					B. ext. pr. and sec. poll.	B. absent	B. fr. ex. pr.					R.	R. biceps, 3 hds.	7
26.	M.			B. scalenus medius.				L. 3 heads		B. brachio-fascialis.			B. coronoid origin.			L. fr. flex. carp. rad. L. double.						B. ext. indic doub. tend.	L. double tendon.			B. absent	B. to metat.		B. to extens. brevis.	B. 2 tendons to 2nd toe.						12
27.	M.	B.	B. triple ant. belly.	L. scalenus anticus.				B. 3 heads		B. double			B. coronoid origin.			R. absent.			B. triple insert.	B. ext. com. doub. tend.	B. tendon to ring-fing.		L. double insert.			B. tendon double.	B.	B. fr. ex. pr.								13
28.	M.	B.		R. atlo-rhomb.			B. to triceps.			B. double		R. sep. slip. to syn. sh.	B. coronoid origin.				B. double ex. inter.			B. ext. com. tend. joined.	B. double tendon.					B. absent		B. fr. ex. pr.								11
29.	M.	B.											B. coronoid origin.				B. brev. to 2nd met.				B. double tendon.					R. to 5th toe	B.					B. 4th tend. absent.		B. tib.-fasc.	10
30.	M.			R. lev. ang. scap.					B. very long.	B. to fasc. & sup. long.	B. separate muscles.	B. coronoid origin.	B. coronoid origin.				B. brev. to 2nd met.				B. double tendon.		B. 3 tendons, 1 to ab. poll.					B. fr. ex. pr.					L. 4th tend. absent.		B. sup. gem. absent.	8
31.	F.	B.																										B. distinct muscle.								9
32.	M.	B.		B supra-costal. B. rect. cap. post. maj.	R. to condyle	B. joined to deltoid.						B. slip. to 1st lumbr. R. radial origin.	B. to flexor profund.	R. 3rd double insertion. L. 3rd & 4th doub. inser. B. 3rd double insertion.	R. to annul. ligam.	B. absent. fr. flex. rad.	R. double tendon.	R. ex. inter.	B. double insert.		B. tendon to ring-fing.		B. 2 tendons, 1 to ab. poll.		B. ext. pr. and sec. poll.	B. to 4th and 5th metat. B. to 4th and 5th metat.	B.	B. fr. ex. pr. B. fr. tib. ant. and ex. pr.	B. much divided. B. much divided.					R. accessor. ad. calc.	13
33.	M.																																	B.	B. pect. to add. long.	10
34.	M.																																				8
		12	5	14	5	5	5	7	5	4	8	13	16	6	2	7	17	3	4	5	14	3	17	4	8	14	12	19	9	4	4	3	7	17	18	295.