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MDCCCLXVII. [1865-67]

31. Extensor carpi radialis, 0·28

Inserted by a bifurcate tendon into the near ends of the metacarpals of index and middle fingers.

32. Supinator radii brevis, 0·02

33. Extensor digitorum communis, 0·05

34. Auricularis, 0·04

Inserted into the little, ring, and middle fingers.

35. Extensor carpi ulnaris, 0·07

Inserted into the near end of the metacarpal of the little finger.

36. Extensor ossis metacarpi pollicis, 0·05

37. Indicator, 0·01

Inserted by a double tendon into the index and middle fingers.

The Rev. SAMUEL HAUGHTON, M. D., Fellow of Trinity College, Dublin, read the following paper :—

NOTES ON ANIMAL MECHANICS.

XVI.—ON THE MUSCULAR ANATOMY OF THE RHINOCEROS.

A YOUNG male Rhinoceros, three years old, having died in the Zoological Gardens of Dublin in April, 1865, the body was purchased, for £17, for the Museum of Trinity College, and I availed myself of the opportunity of making a careful examination of his muscles. I was ably assisted in the dissection by Mr. Macalister, Demonstrator in Anatomy of the Royal College of Surgeons, and by a staff of medical students, who relieved each other from time to time. The stench from the decomposing blood was almost intolerable, and several of my assistants were disabled by typhoid diarrhœa; this I escaped myself, as I had done on a former occasion when dissecting a Nylghau, which had died of putrid fever, and whose blood after death seemed to communicate diarrhœa by its smell to almost every person in contact with the body. Notwithstanding these difficulties, I was able to complete the entire muscular dissection in person, the results of which cannot fail to prove of interest to anatomists.

Having made a careful *post-mortem* examination of all the viscera, except the brain, I felt it my duty to lay the following Report before the Council of the Zoological Society :—

“SCHOOL OF PHYSIC, TRINITY COLLEGE,
“Dublin, April 14, 1865.

“REPORT ON DEATH OF THE RHINOCEROS.

“The Rhinoceros died at 4 A. M. on Thursday, the 6th inst., and his body was opened in the new Dissecting Room of Trinity College on the 8th inst., at 1 P. M.

"I was assisted in making the *post-mortem* examination by Professor Ferguson and Mr. Connor; there were also present Dr. Alexander Carte, Dr. M'Dowel, Dr. Bennett, Dr. Macalister, and several other anatomists.

"The rectum was protruded through a space of eighteen inches, and in it were two *post-mortem* ruptures; in the ilium, two feet from the cæcum, there was extensive softening, as also at the junction of the duodenum and jejunum; the stomach was filled to distention with a mixture of hay and whole Indian corn, both fermenting, and pervaded with an aldehydic smell, which overcame even the intolerable odour of the gases with which the abdomen was distended almost to the bursting point; the hay was somewhat masticated, but the corn had been bolted whole; numerous tapeworms were found in the upper part of the intestines.

"The decomposition set in with most unusual rapidity, particularly in the anterior extremity, and it was with the greatest difficulty that a few precious fragments of the viscera of this rare animal could be preserved; many of the muscles also dissolved in the course of twenty hours into a mass of putrid jelly. This phenomenon was most marked in the left side of the thorax and left anterior limb.

" CAUSE OF DEATH.

"I believe that death was caused by the improper administration of Indian corn, which fermented in the stomach and intestines, and developed gas to such an extent as to cause prolapsus of the rectum, and that the pressure caused by this gas ultimately destroyed the action of the diaphragm, and so caused death by asphyxia; and I am further of opinion that it is the duty of the Council to institute the most searching inquiry into the manner in which Indian corn was given to this animal, as such food does not appear in the scale of dietary formally prescribed by the Council's order to be used.

(Signed)

" SAMUEL HAUGHTON, *Hon. Sec. R. Z. S.*

"P. S.—The tapeworms were in all probability the cause of the convulsions experienced by the Rhinoceros shortly after his arrival in the Dublin Gardens.

"S. H."

A.—*Muscles of the Hind Limb.*

	Oz. Av.
1. <i>Sartorius</i> ,	12·5
Origin; from the inner margin of the narrowest part of the ilium, near the insertion of the <i>psoas parvus</i> .	
Insertion; by flat tendinous fascia into the inner side of the leg below the knee.	
2. <i>Psoas magnus</i> ,	47·5
Origin; from the lumbar vertebræ, with one slip from the true pelvis, from the inner margin of the ilium.	

Insertion ; by a common tendon with, and inside the *M. iliacus*, into the lesser trochanter.

3. *Iliacus*, 34·5
Origin and insertion ; as usual.

4. *Pectinæus*, 28·0
Origin ; from the inferior margin of the anterior crest of the pubis.
Insertion ; into the femur at lower point of trisection, by a strong round tendon.

5. *Adductor brevis*, 7·0
Origin ; from the symphysis pubis (middle two inches).
Insertion ; by a flat tendon, inside the insertion of the *adductor magnus*.

6. *Adductor magnus*, 32·5
Origin ; from the arch of the pubis, backwards, nearly as far as the tuberosity of the ischium.
Insertion ; into the back of the outer condyle, and halfway up the femur.

7. *Obturator externus*, 19·0
Origin ; as usual.
Insertion ; into the upper half of the line leading from the great trochanter to the posterior trochanter.

8. *Adductor longus*, 12·0
Origin ; from the arch and symphysis of the pubis, lying under the *M. gracilis*.
Insertion ; into the lower half of the *linea aspera* and inner condyle of the femur.

9. *Quadratus femoris*, wanting.

10. *Obturator internus*, 3·0
Origin ; from the ilium above the ischiadic notch, and without any fibres from the rim of the foramen ; it is a long slip of muscle (Qu. *Gemellus superior* ?)

11. *Gemellus inferior*, 2·5

12. *Glutæus maximus* (Fig. 36), 208·0
Origin ; from the posterior half of the ilio-ischiadic line, and from the sacro-ischiadic ligament.

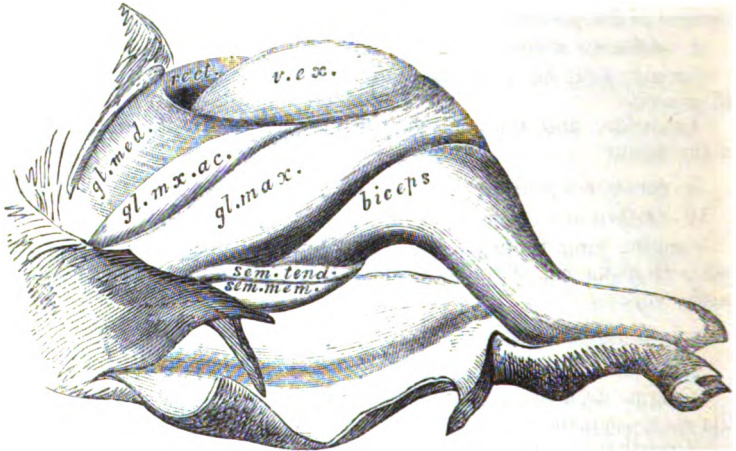
Insertion ; by means of a tendon, $4\frac{1}{2}$ inches in length, into the top of the fibula and fascia of the leg ; it gives off two tendinous slips to the greater and posterior trochanters in passing.

13. *Glutæo maximo accessorius* (Fig. 36), 13·0
Origin ; from the vertebral edge of the ilio-ischium, in front of the origin of the *Glutæus maximus*.

Insertion ; by a long tendon into the posterior trochanter.

- | | |
|---|----------------|
| | Oz. Av. |
| 14. <i>Glutæus medius</i> (Fig. 36), | 98·5 |
| Origin; from the whole outer surface of the ilium, being overlapped on its posterior border by <i>gl. max.</i> , and its accessory, No. 13. | |
| Insertion as usual. | |
| 15. <i>Glutæus minimus</i> , | 13·0 |
| Origin; from a small surface of the narrowest portion of the ilium, near the ischiadic notch. | |
| Insertion; into the anterior ridge of the great trochanter. | |
| 16. <i>Tensor vaginæ femoris</i> , | 67·5 |
| Origin; from the crest of the ilium. | |
| Insertion; into the fascia of the knee, principally on the outer side, but partly on the inner side; its insertion on the outer side is separated from the <i>glutæus maximus</i> by a strong fascia. | |
| 17. <i>Biceps femoris</i> (Fig. 36), | 48·0 |
| Origin; from the tuberosity of the ischium. | |
| Insertion; into the whole length of the outer side of the leg, as far down as the heel, by fascial attachment; and is intimately blended in its muscular portion with the <i>semitendinosus</i> . | |

Fig. 36.



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|---|------|
| 18. <i>Semimembranosus</i> (Fig. 36), | 66·0 |
| Origin; from the tuberosity of the ischium, with posterior fibres from the great ischiadic ligament. | |
| Insertion; into the back and inner side of the inner condyle, with a prolongation to the tibia by fascial attachment. | |

19. *Semitendinosus* (Fig. 36), 64·0
 Origin; from the tuberosity of the ischium.
 Insertion; by a tendon, one inch broad, into the point of bisection of the tibia.
20. *Gracilis*, 45·0
 Origin; from the arch of the pubis and two inches of posterior portion of its symphysis.
 Insertion; into the head of the tibia, by a tendon, three inches in length.
21. *Rectus femoris* (Fig. 36), 54·0
22. *Vastus externus* (Fig. 36), 54·5
 A strong ligament joins the greater and posterior trochanters, under which the outer head of the *vastus externus* passes.
23. *Vastus internus*, 41·5
24. *Cruræus*, 21·5
25. *Popliteæus*, 5·5
 Origin; by a strong tendon from the outer condyle of the femur; this tendon forms one of the ligaments of the knee joint, and winds round the back of the head of the fibula.
 Insertion; into the upper half of the back of the tibia.
26. *Gastrocnemido-solæus*, 29·0
 Insertion; into the os calcia.
27. *Plantaris* (*flexor perforatus*), 3·5
 Origin; from the back of the outer condyle, covered by *gastrocnemius*.
 Insertion; into the *plantar fascia* covering the os calcia, from which it passes on to the common junction of flexor tendons in the sole of the foot, and ultimately expends its force on the three *perforate* tendons of the toes.
 N. B.—This seems to be the *plantaris* and *flexor digitorum brevis* (*perforatus*) combined.
28. *Flexor digitorum* (*perforans*), 21·0
 Origin; from the whole back of the fibula, and from the lower half of the tibia.
 N. B.—This seems to be the *flexor digitorum longus* and *flexor hallucis longus* combined.
29. *Tibialis anticus*, 10·0
 Origin; from the upper anterior half of the tibia.
 Insertion; into the inner edge of the inner tarsal (*cuneiform*).

	Oz. Av.
30. <i>Extensor digitorum longus</i> ,	19.5
Origin; from the outer condyle of the femur, by a strong tendon.	
Insertion; double:—	
	Oz. Av.
<i>a.</i> Into the inner tarsal (cuneiform),	5.5
<i>b.</i> By two tendons inserted into the inner sides of the first phalanges of outer and inner toes,	14.0
	19.5
31. <i>Peronæus longus</i> ,	1.75
Origin; from the outer condyle of the femur.	
Insertion; by a pulley passing under the outer ankle, winding obliquely outside it, and crossing the sole of the foot, to be inserted two-thirds of the way across into the under surface of the middle cuneiform bone.	
32. <i>Peronæus brevis</i> ,	3.5
Origin; from the whole outer side of the fibula.	
Insertion; into the near end of the first phalanx of the outer toe.	
33. <i>Extensor brevis digiti medii</i> ,	9.5
Origin; by a strong tendon from the calcaneum, just below the ankle joint, and by fascia from the whole breadth of the instep.	
Insertion; into the near end of the first phalanx of the middle toe.	
34. <i>Interossei digiti externi</i> ,	5.0
35. <i>Interossei digiti medii</i> ,	2.0
36. <i>Interossei digiti interni</i> ,	4.0

B.—Muscles of the Fore Limb.

	Oz. Av.
1. <i>Trapezius clavicularis</i> (vel <i>cervicohumeralis</i>),	35.0
Origin; from the transverse process of the axis.	
Insertion; into the head of the humerus, in a transverse line, 2½ inches long, from the great tuberosity.	
2. <i>Trapezius scapularis</i> ,	32.0
Origin; from the spines of the dorsal vertebræ.	
Insertion; into the end of the spine of the scapula.	
3. <i>Omo-atlanticus</i> (vel <i>brachio-atlanticus</i>),	24.0
Origin; from the transverse process of the atlas.	
Insertion; into the front of the lower part of the humerus: is a long round muscle.	

	Oz. Av.
4. <i>Rhomboides</i> ,	8·5
	Oz. Av.
a. <i>Externus, vel levator anguli inferioris scapulæ</i> ,	7·0
b. <i>Internus</i> ,	1·5

 8·5

5. *Serratus magnus*, 79·0
Includes the *levator anguli scapulæ superioris*.

6. *Teres major*, 21·0

7. *Latissimus dorsi*, 61·0

Has tendon in common with *teres major*.

8. *Tricipiti accessorius*, 22·0

This muscle takes its origin from the ribs, and forms a costal head of the *triceps*, into the back of which it passes, behind the olecranon process.

9. *Subscapularis*, 28·0

10. *Pectoralis minor*? 98·0

Origin; from the sternum and first six ribs.

Insertion; into the pectoral ridge, from the greater to the lesser tuberosity of the humerus.

11. *Pectoralis major*? 49·5

Origin; from the keel along the anterior half of the sternum, and from the ribs.

Insertion; into the oblique line down the whole inner side of the ulna.

12. *Pectoralis avium*? (*subclavius*?) 24·0

Origin; from the first rib and side of the top of sternum.

Insertion; into the outer summit of the greater tuberosity, and by fascia passing over the *supraspinatus*, into the scapulæ—*levator humeri*.

13. *Coraco-brachialis*, 2·5

Origin; from the coracoid process inside the *biceps*.

Insertion; into the inner and anterior side of the middle of the humerus, by a flat insertion, three inches in length.

14. *Deltoides scapularis*, 25·5

Origin; from nearly the whole length of the spine of the scapula.

Insertion; into the outer side of the great tuberosity.

N. B.—The *deltoides clavicularis* is merged in the *cervico humeralis*, or *trapezius clavicularis* No. (2), which forms a part of the great *deltotrapius*.

	Oz. Av.
15. <i>Supraspinatus</i> ,	83.0
16. <i>Infraspinatus</i> ,	55.0
17. <i>Biceps humeri</i> ,	21.5

This muscle takes origin as usual; but it is remarkable that the tendon passing over the head of the humerus is much stronger than the muscle itself requires. I do not know the reason of this singular circumstance.

Inserted, as usual, into the tubercle of the radius.

18. <i>Brachialis extornus</i> ,	34.5
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Origin; arises from the outside, backside, and part of the inside of the head of the humerus, winding outwards round the shaft of the bone, to be inserted in the radius by a flat prolonged tendon, below and to the inside of the tubercle of the radius.

19. <i>Triceps humeri</i> ,	224.0
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20. <i>Flexor carpi radialis?</i>	8.75
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Origin; from the inner side of the inner condyle of the humerus.

Insertion; by a long tendon passing in a groove at the inner side of the wrist, then plunging deep into the palm, to be finally inserted, below the short flexors, into the bases of the metacarpals of the inner and middle fingers.

21. <i>Palmaris longus</i> ,	6.25
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Origin; from the inner and back side of the olecranon.

Insertion; into the common junction of the palmar tendons at the bend of the wrist.

22. <i>Flexor carpi ulnaris</i> ,	4.5
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Origin; from the back of the inner condyle and olecranon.

Insertion; into the carpal bone (*pisiforme*), articulating with the ulna.

N. B.—A ligament connects this bone with the sesamoid bone, into which the *extensor carpi ulnaris* is inserted, so as to cause both muscles to *flex* and *abduct* the outer side of the hand.

23. <i>Flexor digitorum communis</i> ,	19.5
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The superficial and deep flexors unite in a common tendon at the wrist, from which proceed three perforating and three perforate flexors. At the same point of junction of tendons there are also found—

1. A tendinous ligament from the inner condyle, without any muscular fibres attached;
2. The tendon of a small muscle (24), which seems to be the *flexor pollicis longus*.

24. <i>Flexor pollicis longus?</i>	1.0
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Origin; from the radius and ulna, and interosseous septum.

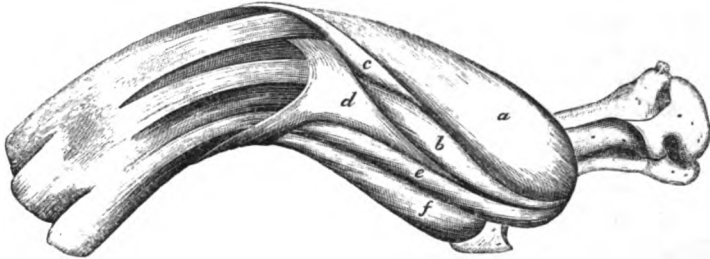
25. *Supinator radii longus*? 1·75

Origin; from the fascial covering of the outer condyle.
Insertion; into the tendon of (26) at the wrist.

N. B.—This muscle acts chiefly as a tensor fasciæ, but is, no doubt, the representative of the *sup. rad. longus*.

26. *Extensor carpi radialis* (Fig. 37, a), 37·5

Fig 37.



Left Fore Arm.

Origin; from the outer condyle.

Insertion; into the near end of the metacarpal of the middle finger.

N. B.—This muscle receives at the bend of the wrist the tendon of the *supinator longus*.

27. *Extensor digitorum longus* (Fig. 37, b), 13·5

Inserted into the near end of the first phalanx of the middle finger.

28. *Extensor minimi digiti* (Fig. 37, c), 6·0

Origin; from the outer condyle, and from the tendinous expansion of the interosseous septum from the outer condyle to the wrist.

Insertion; into the outer side of the first phalanx of the outer finger, with a tendinous slip to the metacarpal of the middle finger.

29. *Extensor carpi ulnaris*? 27·5

Origin; from the outer condyle.

Insertion; into the sesamoid bone outside the base of the metacarpal of the outer finger.

N. B.—I am almost certain that this muscle is the *extensor ulnaris*, although, owing to the arrangement described in (22), it acts as a *flexor*. The combined actions of the ulnar flexor and extensor would be to abduct the little finger—an action which would be of great use to the Rhinoceros when running on soft ground.

30. *Extensor ossis metacarpi pollicis* (Fig. 37, c), 4·5

Origin; from the anterior half of the radius and ulna, and from the interosseous septum.

Insertion; its tendon crosses the back of the wrist, binding down the tendons of the radial extensor, and is inserted into the outer side of the near end of the metacarpal of the inner finger.

The following muscles are found in the palm :—

31. <i>Short flexors of the outer finger,</i>	5.5
	Oz. Av.
a,	2.5
b,	3.0
	5.5

a. Origin; from the ligament already described (22) joining the pisiform and sesamoid of outer finger, from one carpal bone, and from the inner side of the shaft of the metacarpal of the outer finger.

Inserted into the base of the first phalanx of the outer finger.

b. Consists of two muscles, arising from the inner half of the metacarpal of the outer finger, and from the carpal bone of the middle finger, and inserted into the inner side of the first phalanx of the outer finger.

32. <i>Short flexors of the inner finger,</i>	5.0
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These are two in number, and similar to those of the outer finger.

33. <i>Short flexors of the middle finger,</i>	2.0
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These are two in number.

The Rev. SAMUEL HAUGHTON, M. D., Fellow of Trinity College, Dublin, read the following paper :—

NOTES ON ANIMAL MECHANICS.

XVII.—ON THE COMPARATIVE MYOLOGY OF CERTAIN BIRDS.

IN order to compare the muscles of different classes of birds, I dissected two Tiercel Peregrines, a Falcon Peregrine, a Cara Cara Hawk, a Demoiselle Crane, and a Canadian Goose.

The Cara Cara Hawk (*Polybarus*, or *Falco Brasiliensis*) presents a most striking resemblance to the Peregrine Hawk, and, judging from his muscular anatomy, must be regarded as a Hawk, and not a Vulture.

A.—Muscles of the Leg.

	TIERCEL	FALCON.	CARA.	CRANE.	GOOSE.
	Oz.	Oz.	Oz.	Oz.	Oz.
1. <i>Sartorius</i> , ^a	0.05	0.08	0.05	0.11	0.57
2. <i>Adductores</i> , ^b	0.04	0.05	0.09	0.18	0.40

^a The *Sartorius* takes its origin from the anterior curved edge of the ilium, and is inserted by a broad tendon into the side of the knee joint and tibia.

^b In the Peregrine and Cara there was only one *adductor*; in the Crane and Goose there were two, viz.—

	CRANE.	GOOSE.
	Oz.	Oz.
<i>Adductor magnus</i> ,	0.12	0.22
<i>Adductor longus</i> ,	0.06	0.17
	0.18	0.40

	TIERCEL.	FALCON.	CARA.	CRANE.	GOOSE.
	Oz.	Oz.	Oz.	Oz.	Oz.
3. <i>Obturator externus</i> ,	0·08	0·08	0·04	0·04	0·12
4. <i>Obtur. internus</i> , &c.	0·02	0·02	0·03	0·02	—
5. <i>Gubernator cauda</i> , ^c	0·02	0·02	0·02	—	0·20
6. <i>Glutæus maximus</i> , ^d	0·01	0·01	0·01	0·09	1·07
7. <i>Glutæus medius</i> , ^e	0·04	0·04	0·10	0·17	0·78
8. <i>Glutæus minimus</i> et <i>Gl. quartus</i> ,	0·04	0·08	0·08	0·04	0·78
9. <i>Tensor vaginae</i> <i>femoris</i> ,	0·07	0·08	0·07	—	0·52
10. <i>Biceps femoris</i> , ^b	0·08	0·08	0·10	0·16	0·72
11. <i>Semimembranosus</i> , ^l	0·02	0·02	0·05	0·09	0·17
12. <i>Semitendinosus</i> , ^l	0·03	0·03	0·05	0·07	0·07
13. <i>Gracilis</i> , ^k	0·04	0·03	0·06	—	0·11
14. <i>Rectus femoris</i> , ^l	—	—	—	—	—
15. <i>Vastus externus</i> et <i>Vastus inter-</i> <i>nus</i> ,	0·18	0·11	{ 0·13 0·03 }	0·80	0·85
			CRANE.	CARA.	
			Oz.	Oz.	
16. <i>Gastrocnemio-solæus</i> ,			0·81	0·18	
a. Outer head,			0·09	(Four heads).	
β. Middle head,			0·06		
γ. Inner head,			0·16		
			0 31		
17. <i>Plantaris</i> ,			0·01	—	
18. <i>Tibialis anticus</i> ,			—	0·14	

* This muscle is quite distinct from the *agltator cauda*, and lies in a plane below it. In the Falcon and Cara it takes origin from the transverse process of the large terminal caudal vertebra (*plough-share*), and is inserted into the second fifth from the top of the *linea aspera* by means of a flat tendon; in the Goose it is inserted into the middle of the lower part of the *glutæus medius*; and in the Duck into the outer head of the *fibula*.

^d The *glutæus maximus* in the Falcon and Cara takes its origin from the edge of the ilium, in a plane below that of the *ten. vag. fem.*, for one-fourth of an inch in front of the acetabulum, and has the usual insertion; in the Crane its origin is from the post-acetabular edge of the ilium, and it is inserted by a broad tendon into the middle of the *vastus externus* and fascia of the outer side of the thigh; and in the Goose it is inserted into the fascia of the inner side of the knee.

^e The *gl. medius* has the usual insertion in the Falcon, Cara, and Crane; but in the Goose and Duck it is inserted into the middle of the *linea aspera*.

^f Quite separate in the Crane; *gl. min.* = 0·01, *gl. quartus* = 0·08.

^g This small muscle, in conjunction with the *sartorius*, in most birds serves instead of a *rectus femoris*.

^h The *biceps femoris* in the Falcon, Cara, and Crane, passes through the usual tendinous pulley at the outer side of the lower end of the femur, and outer head of the *gastrocnemius*; in the Goose and Duck it is inserted into the tibia, at the inner side of the knee.

^l These muscles in the Falcon and Cara are inserted by flat tendons into the tibia; and in the Crane they are also inserted into the upper tendinous portion of the inner head of the *gastrocnemius*.

^k This muscle, in the Falcon and Cara, takes origin from three-fourths of the length of the pubis behind the acetabular prominence of that bone.

^l There is a *rectus femoris* in the Falcon and Cara, arising from the ilium, in front of the acetabular prominence of the pubis; it is a fine delicate muscle, weighing 0·01 oz. in the Cara, and its tendon passes obliquely across the front of the knee joint from within outwards, and, winding down into the calf, forms one head of the *first perforate flexor of the second toe*, the muscular portion of which is connected by muscular slips with the *first perforate flexors* of the third and fourth toes, and with the *second perforate flexor of the third toe*. The weight of the *first perforate flexor of the second or index toe* in the Cara, was 0·02.

This muscle is thus described by Cuvier:—

"Il y a dans le lieu qu'occupe le pectineux des quadrupèdes, un petit muscle grêle, qui se prolonge jusqu'au genou. Son tendon passe obliquement pardessus, et se glisse derrière la jambe pour s'unir au déchasseur perforé du second et du cinquième doigt."

Professor Owen† regards this muscle as the *gracilis*; while he considers as *rectus femoris* the muscle already described as *tensor vaginae femoris*.

^a "Leçons d'Anatomie comparée," tom. I., p. 359.

† "Cyclopædia of Anatomy," vol. I., p. 296.

B.—Muscles of the Wing.

	TIERCEL. Oz.	FALCON. Oz.	CARA. Oz.	CRANE. Oz.
1. <i>Serratus magnus</i> ,	0·04	0·06	0·05	—
2. <i>Rhomboideus</i> ,	0·02	0·03	0·07	—
3. <i>Teres major</i> , ^a	0·02	0·02	0·02	—
4. <i>Latisimus dorsi</i> ,	0·03	0·03	0·04	—
5. <i>Scapularis</i> ,	0·04	0·04	0·04	—
6. <i>Pectoralis minor</i> ,	0·05	0·05	0·04	0·06
7. <i>Pectoralis major</i> , ^b	0·73	0·76	1·03	2·00
8. <i>Pectoralis secundus avium</i> ,	0·08	0·11	0·10	0·37
9. <i>Wing flaps (extensor plicæ alaris)</i> ,	0·03	0·04	0·04	—
10. <i>Coracobrachialis</i> ,	0·03	0·03	0·02	—
11. <i>Deltoideus internus (clavicularis)</i> ,	0·03	0·02	0·02	—
12. <i>Deltoideus externus (scapularis)</i> , ^c	0·09	0·08	0·12	—
13. <i>Supra et infra spinatus</i> , ^d	0·09	0·07	0·10	—
14. <i>Biceps humeri</i> ,	0·05	0·04	0·06	—
15. <i>Triceps humeri</i> ,	0·11	0·14	0·15	—

The Rev. SAMUEL HAUGHTON, M. D., Fellow of Trinity College, Dublin, read the following paper:—

NOTES ON ANIMAL MECHANICS.

XVIII.—ON THE COMPARATIVE MYOLOGY OF CERTAIN RUMINANTS.

IN the following comparisons of the muscles of Ruminants I have made the Indian Goat the standard; the other animals examined being the Virginian Deer, the Nylghau, and Napu Deer of Java.

A.—Muscles of the Hind Limb.

	GOAT. Oz.	DEER. Oz.	NAPU. Oz.
1. <i>Sartorius</i> , ^a	0·11	1·25	0·13
2. <i>Tensor vag. femoris</i> ,	0·42	4·25	
3. <i>Psoas magnus</i> ,	0·97	7·50	0·37
4. <i>Iliacus</i> ,	0·26	2·50	0·05
[<i>Psoas parvus</i>],	0·15	1·75	0·04
5. <i>Pectineus</i> ,	—	2·25	0·03

^a The *teres major* arises from the spinous processes of the lower dorsal vertebrae, and crosses the lower extremity of the scapula, to be inserted by a flat tendon into its usual place in the humerus.

^b A slip from the upper edge of this muscle joins the wingfolder (*extensor plicæ alaris* Carus).

^c This muscle takes its origin from the acromion, and is inserted into the wrist, acting directly as a folder of the wing.

^d Arises from the tip of the acromion, and is inserted into the top of the humerus, inside the pectoral ridge.

^e Origin, from the portion of the scapula adjoining the acromion; insertion into the outer side of the pectoral ridge of the humerus; rotates the arm powerfully outwards.

^f Arises from the lower two-thirds of the outer side of the scapula.

^g The *sartorius* in the Goat has a double origin—

a. From the anterior edge of the pubis, close to the acetabulum.

b. From the anterior superior crest of the ilium, by fascia.