

**Not like man, bimanous and biped, nor yet quadrumanous, but  
cheiropodous / by George Britton Halford.**

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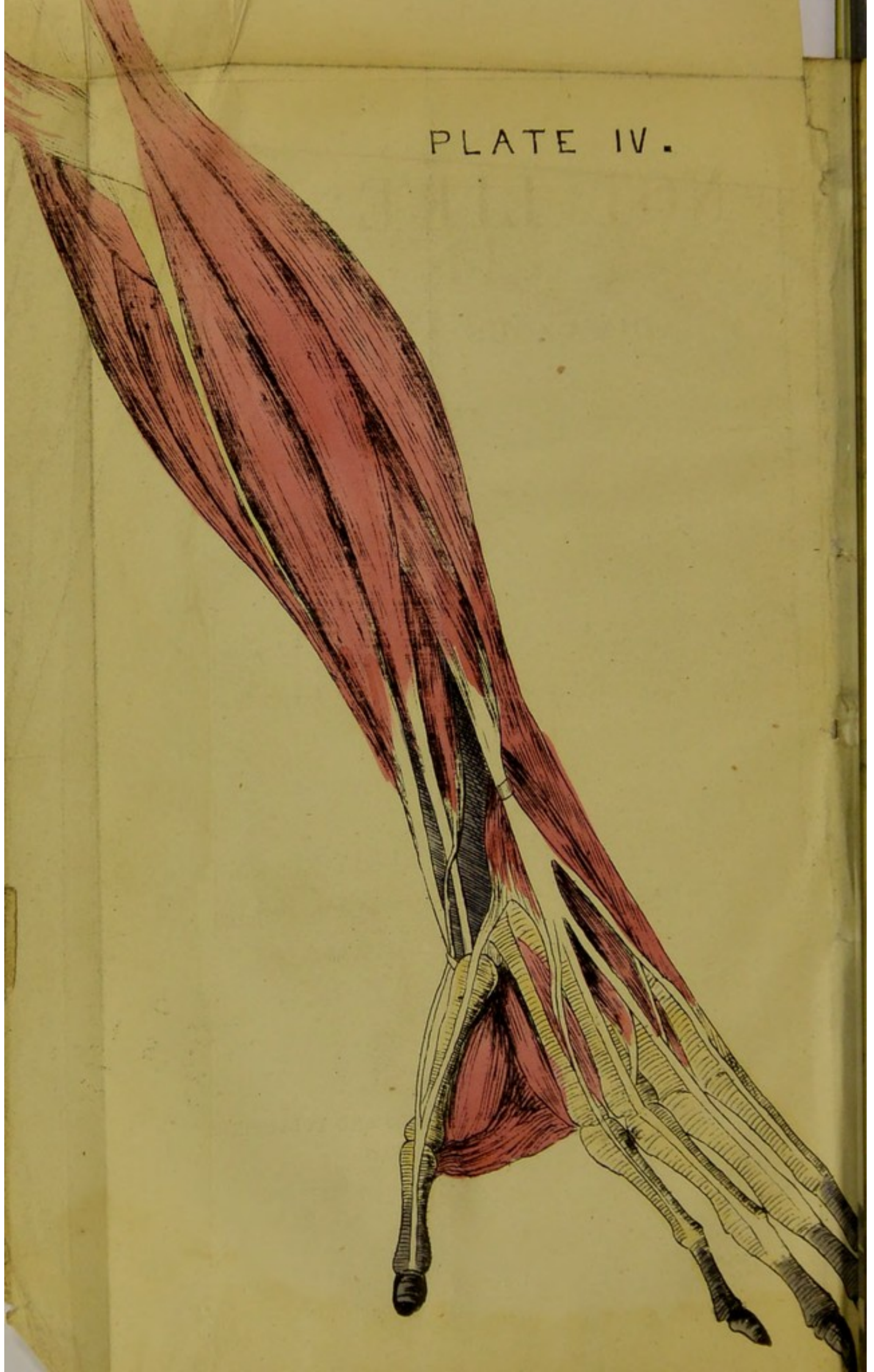








PLATE IV.



# NOT LIKE MAN

BIMANOUS AND BIPED,

NOR YET

QUADRUMANOUS,

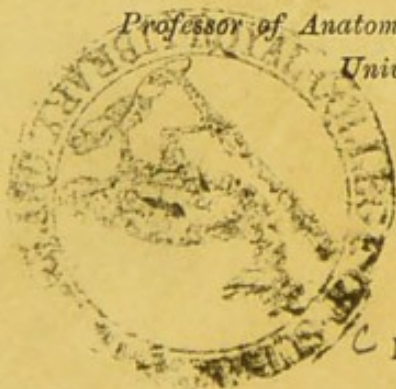
BUT

## CHEIROPODOUS.

BY

GEORGE BRITTON HALFORD, M.D.

*Professor of Anatomy, Physiology, and Pathology in the  
University of Melbourne.*

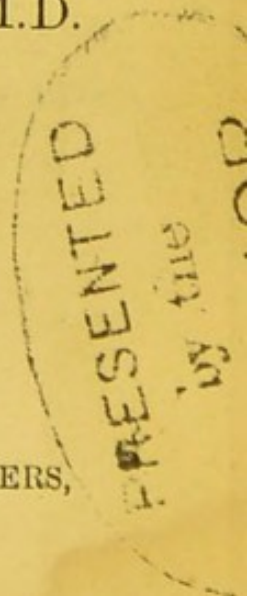


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1863.





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## PREFACE.

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The following observations are the result of an enquiry into the value of the statements lately put forth by Professor Huxley\* respecting the Brain, Hand, and Foot of Monkey and of Man. Appended to the observations are some most beautiful drawings, from my own dissections, by two gentlemen attending my class, Mr. Neild and Mr. Morton. I have to thank them for the pains they have taken to be accurate.

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\* *Evidence as to Man's Place in Nature*, by Thomas Henry Huxley, F.R.S., 1863.



# Observations

ON THE

## RELATION OF TWO MAGNOLIA MONETZ

The first of the two species of Magnolia which I have examined is the Magnolia speciosa, which is the most common of the two. It is a large tree, with a trunk which is often covered with a thick layer of moss. The leaves are large, ovate, and have a smooth surface. The flowers are large and have a strong fragrance. The second species is the Magnolia speciosa, which is a smaller tree with a more slender trunk. The leaves are smaller and have a more serrated margin. The flowers are also smaller and have a less strong fragrance.

### PLANT

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OBSERVATIONS  
ON THE  
DISSECTION OF TWO MACAQUE MONKEYS.

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BRAIN.

As in *Man* the lateral ventricle of each hemisphere of the Brain, contrary to what is stated in the *Edinburgh Review*, even so lately as April 1863, possesses a posterior cornu, in which the hippocampus minor is clearly seen. The posterior lobe of the cerebrum also overlaps the cerebellum. On these points Professor Huxley is strictly correct. See plate I.

HAND.

The Hand of *Macaque* agrees bone for bone, and with one singular exception muscle for muscle with the hand of *Man*, the exception being that a muscle of the fore-arm corresponding in origin, shape, and position to the extensor primi internodii pollicis in man, is not inserted as in him into the first phalanx of the thumb, but into the base of the metacarpal bone of the thumb, side by side with that of the extensor ossis metacarpi pollicis. The thumb of *Macaque*, with this difference, is otherwise similar to the thumb of *Man*. It is a curious fact that the same relation exists between the *hind thumb* of *Monkey* and the thumb of *Man*!



## FOOT.

The Foot of *Macacus*, and of every Monkey and Man-like ape which I have seen, and the skeletons and drawings which I have examined, present us with what must be called a Fingered Foot. In all, including the *Gorilla*, the central digit is the longest, and the thumb can be opposed to the fingers, in these respects equalling their own hand and the hand of *Man*. Further the separate bones of the digits, called phalanges, are those of fingers and not of toes; instead of being stunted, as in the foot of *Man*, they are elongated as in the hand of *Man*. The first departure from the foot of *Man* occurs in the internal cuneiform bone, which is turned away from the other tarsal bones, and presents a peculiar articular surface, resembling that of the os trapezium of the carpus. In the tarsus we have distinct evidence of the bones of a foot, one only presenting any change from the similar bones in *Man* and that *one which, without the intervention of any other bone, supports a digit* (for the so-called metacarpal bone of the thumb is not only in *development* but in *function* a phalanx), and this obtains from *Macacus* to *Gorilla*. These are Professor Huxley's words: "At first sight, the termination of the hind limb in the *Gorilla* looks very hand-like, and as it is still more so in many of the lower Apes, it is not wonderful that the appellation *Quadrumana*, or four-handed creatures, adopted from the older anatomists by Blumenbach, and unfortunately rendered current by Cuvier, should have gained such wide acceptance as a name for the Simian group. But the most cursory anatomical investigation at once proves that the resemblance of the so-called 'hind hand' is only skin deep, and that in all essential respects the hind limb of a *Gorilla* is as truly terminated by a foot as that of a *Man*." And again, after comparing the Human with the Simian foot, he



says, "Throughout all these modifications it must be recollected that the foot loses none of its essential characters. Every Monkey and Lemur exhibits the characteristic arrangement of tarsal bones, possesses a short flexor and short extensor muscle, and a peroneus longus. Varied as the proportions and appearance of the organ may be, the terminal division of the hind limb remains in plan and principle of construction a foot, and never in these respects can be confounded with a hand." "A cursory anatomical investigation" is of little value, and, as we shall see, leaves much unexplored, which the author of "The Relations of Man to the Lower Animals" should have laid bare ere, by comparing the foot of *Man* and *Monkey*, he assigned to either his place in nature.

I will now describe the muscles of the leg and foot of *Macacus*.

#### MUSCLES OF THE FRONT OF THE LEG.—PLATE IV.

*Tibialis Anticus*.—This muscle arises from the upper two-thirds of the outer surface of the tibia, from part of the interosseous membrane, from the intermuscular septum between it and the following muscle, and from the fascia of the leg. The tendon passes over the lower end of the tibia to be inserted into the internal and planter aspect of the internal cuneiform bone. Its action is to turn the sole of the foot inward.

*Extensor Ossis Metatarsi Pollicis*.—Nearly as large as the former muscle, arises by a tendon from the outer side of the head of the tibia, from the intermuscular septa, and from the fascia of the leg. Its tendon passes down close to that of the former muscle, and is inserted into the inner side of the base of the metatarsal bone of the thumb. The name expresses its action.

*Extensor Proprius, vel Secundi Internodii, Pollicis*.—



As in *Man*, this muscle lies hidden between the preceding and the extensor longus digitorum, its tendon appearing between those two muscles, just above the ankle-joint. It arises from the upper two-thirds of the inner surface of the fibula and from the interosseous membrane, and is inserted into the base of the last phalanx of the thumb. In the fore-limb of *Macaque*, as we have seen, no muscle is inserted into the second bone of the thumb.

*Extensor Longus Digitorum*.—Arises from the head of the tibia and from the upper two-thirds of the fibula, from the intermuscular septa and from the fascia of the leg. It ends in four tendons which are inserted into the second and third phalanges of the four outer fingers.

#### MUSCLES OF THE OUTER BORDER OF THE LEG.

*Peroneus Longus*.—Arises from the upper half of the outer surface of the fibula and from the intermuscular septa between it and the extensor longus digitorum on the one side and the flexor longus pollicis on the other; the tendon passes to the outer side of the foot, where a sesamoid is present in it; from this point it turns inward to the sole of the foot, where it runs in a groove of the cuboid bone, covered by the calcaneo-cuboid ligament, and is finally inserted into the outer side of the base of the first bone of the thumb. *Actions*.—It is a powerful flexor of the metatarsal bone of the thumb, being, in this respect, the direct antagonist of the extensor ossis metatarsi pollicis; its second action is to direct the sole of the foot outward. *Moreover, by making the thumb its fixed point from which to act, it would tend to keep the animal's body in equilibrium when swaying to and fro in its passage from branch to branch. Such a muscle, so inserted, would be of little use for walking, and as it exists, according to Huxley, in the Gorilla, whose hind thumb is opposable, it affords the*



strongest argument that the creature can only walk on the outer side of its foot, and that not for long, except the hind thumb has something to grasp, as in passing over branches, exposed roots of trees, uneven ground, &c.

*Peroneus Brevis*.—Arises from the lower half of the outer surface of the fibula, and is inserted into the base of the fifth metatarsal bone. It is a flexor of the foot upon the leg.

#### MUSCLE OF THE BACK OF THE FOOT.

*Extensor Brevis Digitorum*.—Arises from the annular ligament and from the upper and outer surfaces of the os calcis. It ends in four tendons which blend with the tendinous insertions of the extensor longus digitorum. Its action is to assist and modify that of the long extensor. The existence of this muscle does not prove the terminal division of the hind limb of the *Monkey* to be a foot; true it is not found in the hand, where the fingers are in the same line with the bones of the fore-arm, but were the Creator to place a hand at an angle to the bones of the leg, whence the extensor longus digitorum arises, a short muscle would be equally needed and consequently be found.

#### MUSCLES OF THE BACK OF THE LEG.

It is unnecessary to speak of the *Soleus* and *Gastrocnemius*, as their tendons do not pass into the sole of the foot.

*Flexor Longus Pollicis*.—This muscle, large in *Man*, is proportionately much larger in *Macacus*. It arises from the whole length of the posterior surface of the fibula to within one inch of the malleolus, from the middle third of the posterior surface of the tibia, and from the interosseous membrane below the origin of the *tibialis posticus*. The tendon, very large, passes into the sole of the foot and near



the scaphoid bone unites with that of the flexor longus digitorum, and is so disposed that its own proper tendon pierces that of the long flexor of the fingers ; it then runs its course, as in *Man*, between the two heads of the flexor brevis pollicis and is finally inserted into the last phalanx of the thumb. Next it gives off, in common with the last named muscle, a tendon to the last phalanx of the second finger, and two very powerful ones are similarly inserted into the third and fourth fingers ; a slight slip also goes with another from the flexor longus digitorum to the little finger. *Action*.—Its first action would be that of forcibly bending the fingers on the foot, after which it would extend the foot upon the leg. It is obvious that the great development of this muscle with the co-existence of the peroneus longus as a flexor of the thumb, renders the foot of *Monkey* a far more grasping organ than his hand. This I think is seen to its greatest extent in *Ateles*.

*Flexor Longus Digitorum*.—Arises from the posterior surface of the tibia below the popliteus muscle, from the interosseous membrane, and from intermuscular septa, and passing into the sole of the foot and blending with the tendon of the long flexor of the thumb is chiefly inserted into the last phalanges of the second and fifth fingers.

*Lumbricales*.—Four of these are connected with the tendons of the last and preceding muscles, and pass to be inserted into the tendinous expansion on the back of the first phalanx of the four outer fingers.

*Tibialis Posticus*.—Lying beneath the last two muscles, it arises from the upper third of the posterior surface of both tibia and fibula and from the corresponding portion of the interosseous membrane ; its tendon passes beneath and internally to that of the flexor longus digitorum, and is finally inserted into the scaphoid bone and bases of the third, fourth, and fifth metatarsal bones.



## MUSCLES OF THE SOLE OF THE FOOT.

*First Layer.*

*Abductor Pollicis*.—Thin and tendinous posteriorly, it arises from the os calcis and from the plantar fascia; from this point to the metatarsal bone of the thumb it takes origin from ligamentous tissue along the inner side of the foot; its tendon is inserted into the inner side of the base of the first phalanx of the thumb, where it is intimately connected with the insertion of the inner head of the flexor brevis pollicis.

*Flexor Brevis Indicis*.—This, the only representative in *Macacus* of the flexor brevis digitorum in *Man*, arises far back by a tendinous slip from the os calcis; the muscle then has an elongated fleshy belly, and its tendon, after splitting to allow of the passage of a long flexor tendon, is inserted into the sides of the second phalanx of the second finger.

*Abductor Minimi Digiti*.—Arises posteriorly by fleshy fibres from the os calcis and from this point to the base of the fifth metatarsal bone from ligamentous structure along the outer side of the foot; its very long tendon is inserted into the outer side of the base of the first phalanx of the little finger.

*Second Layer.*

*Flexor Accessorius*.—Arises from the annular ligament and from the outer part of the os calcis, and is inserted into the upper surface of the long flexor tendons.

*Contrahentes Digitorum*.—Four small muscles I have thus named are found arising by a common tendon from the sheath of the peroneus longus, and are inserted as follows:



The first into the base of the first phalanx of the thumb ; the second, third, and fourth, into the bases of the first phalanges of the second, fourth, and fifth fingers. The insertion of each is on that side of the phalanx nearest the centre of the foot. The *action* of these muscles is to draw the thumb and fingers to a point in an imaginary line running from before backwards through the centre of the foot. It is obvious that simple flexion of the middle finger will bring *it* to that point, consequently no such muscle as I am now describing is inserted into it. I need scarcely say these muscles do not exist in the foot of *Man*, nor in his hand, neither in the hand of *Macacus*.

*Third Layer.*

*Adductor Pollicis*.—Arises from the plantar aspect of second and third metatarsal bones, for the lower half of their extent. It is a triangular muscle, the tendon joining the insertion of that of the outer head of the flexor brevis pollicis. This muscle is more like the corresponding muscle of the hand than of the foot of *Man*.

*Flexor Brevis Pollicis*.—Arises by two heads, the inner from the internal cuneiform bone, the outer from the sheath of the peroneus longus, and from the bases of the second and third metatarsal bones. The two parts are separated by the tendon of the long flexor and are inserted the one into the inner, the other into the outer, side of the base of the first phalanx of the thumb.

*Flexor Brevis Minimi Digiti*.—Arises from the base of the fifth metatarsal bone, and is inserted into the outer side of the base of the first phalanx of the little finger.



*Fourth Layer.*—SEE PLATE II.

*Opponens vel Flexor Ossis Metatarsi Pollicis.*—Arises from the internal cuneiform bone and is inserted into the whole length of the metatarsal bone of the thumb. No such muscle exists in the *foot* of *Man*, but a similar one is found in the *hand* of *Man* and of *Monkey*. The same observation applies to the following muscle.

*Opponens, vel Flexor Ossis Metatarsi, Minimi Digiti.*—Arises from the cuboid bone, and is inserted into the whole length of the fifth metatarsal bone.

*Plantar Interossei.*—Three in number. The first arises from the concave surface of the second metatarsal bone, and is inserted into the outer side of the base of the first phalanx of the second finger. The second and third arise similarly from the fourth and fifth metatarsal bones, and are inserted into the inner side of the bases of the first phalanges of the fourth and fifth fingers. *Action.*—They adduct the fingers into which they are inserted to an imaginary line passing longitudinally through the centre of the foot, *i.e.* through the centre of the middle finger.

*Dorsal Interossei.*—Four in number. Each arises by two heads from the contiguous surfaces of the metatarsal bones between which it lies, but chiefly from the metatarsal bone articulating with the phalanx into which it is inserted. They all project into the sole of the foot. The first arises between the first and second metatarsal bones, and is inserted into the inner side of the base of the first phalanx of the index finger. The second arises between the second and third, and the third arises between the third and fourth metatarsal bones; the former is inserted into the inner, and the latter into the outer side of the base of the first phalanx of the middle finger. The fourth arises between the fourth and



fifth metatarsal bones, and is inserted into the outer side of the base of the first phalanx of the fourth finger. They abduct the fingers into which they are inserted from an imaginary line drawn through the centre of the middle finger.

It is in the arrangement of this fourth layer of muscles that we see the greatest departure from the corresponding series in the *Human Foot*. As the hand of both *Man* and *Monkey* is characterised by the presence of *fingers* and of *special muscles to move them*, so is the foot of *Monkey*; we have now lost *all trace of a foot* and have before us *the bones and muscles of a hand*; and to render the homology complete no *Tranversus Pedis*, a muscle of this layer in the foot of *Man*, exists in *Macaque*.

The following tables show the strict homology of the *fingers* of *Man* and of those of both hand and foot of *Monkey*. The *letters* prefixed to the numerals express the relative lengths of the digits, *a* being the longest, *b* the next, and *c* the shortest. SEE PLATES II. AND III.

No. 1.		MAN.	No. 2.	
HAND.			FOOT.	
MUSCLES OF.			MUSCLES OF.	
<i>e.</i> 1st digit	Opponens.		<i>b.</i> 1st digit	Transversus Pedis.
<i>c.</i> 2nd „	Abductor, adductor.		<i>a.</i> 2nd „	Two abductors.
<i>a.</i> 3rd „	Two abductors.		<i>c.</i> 3rd „	Abductor, adductor.
<i>b.</i> 4th „	Abductor, adductor.		<i>d.</i> 4th „	Abductor, adductor.
<i>d.</i> 5th „	Adductor, opponens.		<i>e.</i> 5th „	Adductor.

No. 3.		MONKEY.	No. 4.	
HAND.			FOOT.	
MUSCLES OF.			MUSCLES OF.	
<i>e.</i> 1st Digit	Opponens.		<i>e.</i> 1st Digit	Opponens.
<i>c.</i> 2nd „	Abductor, adductor.		<i>c.</i> 2nd „	Abductor, adductor.
<i>a.</i> 3rd „	Two abductors.		<i>a.</i> 3rd „	Two abductors.
<i>b.</i> 4th „	Abductor, adductor.		<i>b.</i> 4th „	Abductor, adductor.
<i>d.</i> 5th „	Adductor, opponens.		<i>d.</i> 5th „	Adductor, opponens.



Tables Nos. 1, 3, and 4 are *alike*, so that if the digits of the hand of *Man* be *fingers*, so must they be in both Hand and Foot of *Monkey*, for "*things which are equal to the same are equal to one another.*" No. 2, however, stands by itself as the Foot of *Man*.

Now, Professor Huxley has not shown that Table No. 4 does not apply to the foot of the *Gorilla*, *Chimpanzee*, &c. Indeed it does not appear that he has examined into this deep, yet truth-telling, layer of muscles. It would certainly be marvellous if the terminal division of the hind limb of these did not differ as much from the Foot of *Man* as does the terminal division of the hind limb of the *Macaque*.

To what conclusion does our dissection lead us? Unquestionably to this—that Professor Huxley has fallen into a grievous error, for these creatures are *not* "bimanous and biped," neither are they strictly speaking "quadrumanous;" they are in fact *Finger-footed* (cheiropodous),\* the terminal division of their hind limb presenting beyond the tarsal bones *no resemblance whatever to the Foot of Man*, but being adapted to different functions is totally different in the proportion of its parts and in the principles of its construction. Perfect, exquisitely beautiful in its anatomy, it is yet for walking an ungainly, useless member; for clambering, climbing, running from bough to bough, sleeping on the unsteady tops of trees, it is supremely fitted and ever to be relied on.

From the drawings in Professor Huxley's book and from the stuffed specimens in England, I have no doubt that the *Gorilla*, like every other *Ape* and *Monkey*, is cheiropodous, whilst *Man*, as was stated by Cuvier, is "the only animal truly bimanous and biped."

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\* From *χειρ*, a hand, and *πους, ποδος*, a foot. Name suggested to me by Professor Irving, after he had carefully examined my dissections. I do not think a more appropriate one could be found.



Surely the intricacies of the *Monkey's* foot were planned, as was also the comparative simplicity of *Man's*! They could never run the one into the other, or to use a fashionably scientific term be "developed" the one from the other.

Of a certainty the *Man-like Apes* are *finger-footed* equally with *Macacus*. How *incomprehensible*, if they be not, are the following extracts from the Professor's work! How *natural* if they be!

"The Gibbons all day long haunt the tops of the tall trees." Page 27.

"The Orang, by day, usually climbs from one tree top to another, and only at night descends to the ground, and if then threatened with danger, he seeks refuge among the underwood." Page 34.

"The Chimpanzees avoid the abodes of men, and build their habitations in trees." Page 44.

"The Gorilla's habits are in general like those of Troglodytes Niger, building its nest loosely in trees." Page 50.

Melbourne, July, 1863.



## DESCRIPTION OF THE PLATES.

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### PLATE I.

*Fig. 1* represents a section of the cerebrum, the upper parts of both hemispheres being removed, in order to display the two lateral ventricles and their contents. Enumerated from before backwards they are in each corpus striatum, choroid plexus, optic thelamus, pes accessorius, hippocampus minor. The anterior cornua are observed to diverge, the posterior to converge.

*Fig 2* is an outline of a section of the basilar and posterior parts of the skull of *Macaque*. *A b*, the basicranial axis ; *a c*, the occipital plane ; *d*, the point of attachment of the tentorium. Below the line, from *d* to *c*, the cerebellum lies, above *d*, the posterior lobe of the cerebrum, so that the latter overlaps the former.

### PLATE II.

Shows the fingers and deep layer of muscles of the *Foot* of *Macaque*. These muscles, nine in number, are found on examination to be three Plantar interossei, as in *Fig. 1*, with *a*, the Opponens Pollicis, *b*, the Opponens Minimi Digiti, and Four Dorsal Interossei seen in *Fig. 3*.

*Fig. 4.* The Os Calcis and Astragalus of the same Foot.

### PLATE III.

*Fig. 1.* The Palmar Interossei of the *Hand* of *Macaque* with, *a* Opponens Pollicis, and *b* Opponens Minimi Digiti.

*Fig. 2.* The Four Dorsal Interossei.

It will be seen that *Figs. 1* and *2*, *Plate III.*, exactly correspond with *Figs. 1* and *3*, *Plate II.*, and both as regards the length of fingers and muscles to move them closely resemble the hand of Man.



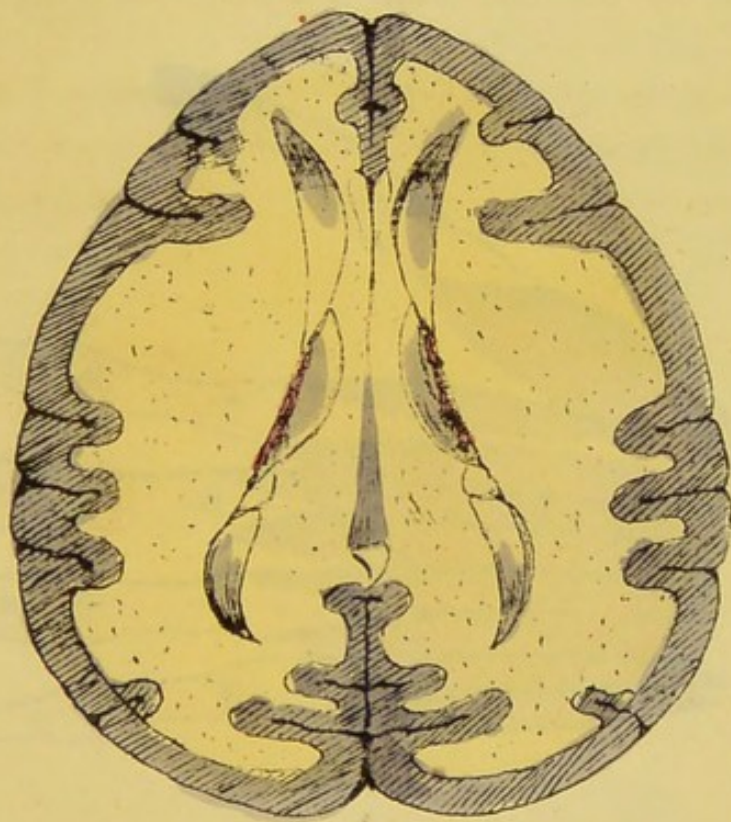
## PLATE IV.

The muscles of the front of the leg. Their relative positions are shown just above the ankle joint. The most internal is the Tibialis Anticus, external to this is the Extensor Ossis Metatarsi Pollicis ; still more external, and appearing only as the lower third of the leg, is the Extensor Proprius, vel Secundi Internodii, Pollicis ; lastly, the Extensor Communis Digitorum is seen giving off tendons to the four outer fingers. There is no Peroneus Tertius.

*The existence of the Extensor Ossis Metatarsi Pollicis is not alluded to by Professor Huxley ; it is not present in the leg of Man, and is essentially a muscle of a thumb, and not of a great toe.*

PLATE I.

*Fig. 1.*



*Fig. 2.*

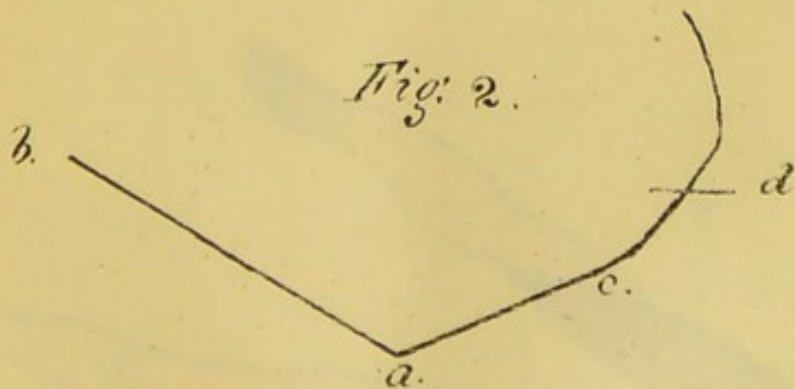




PLATE I.

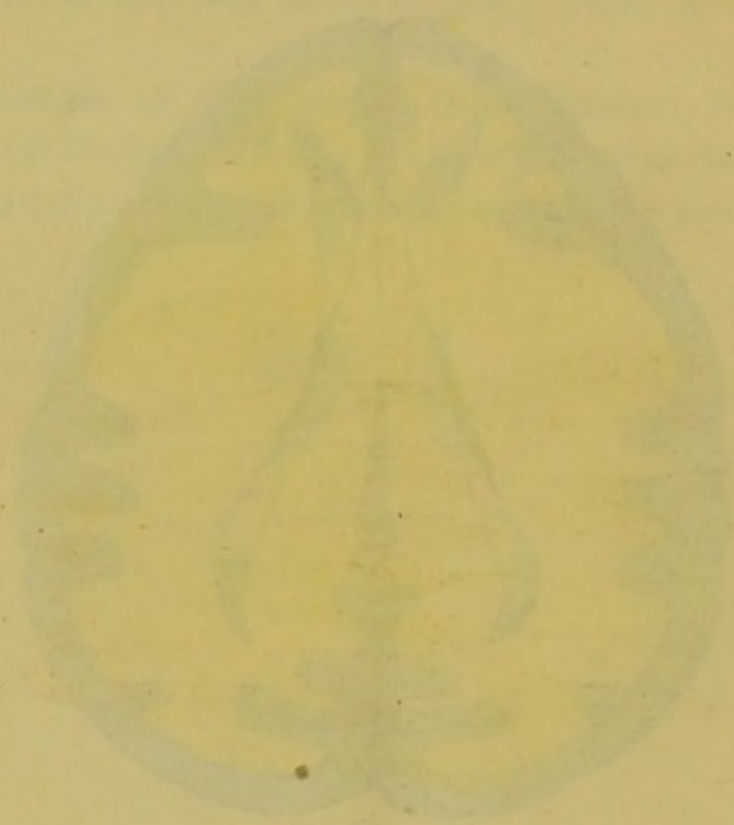


Fig. 3.

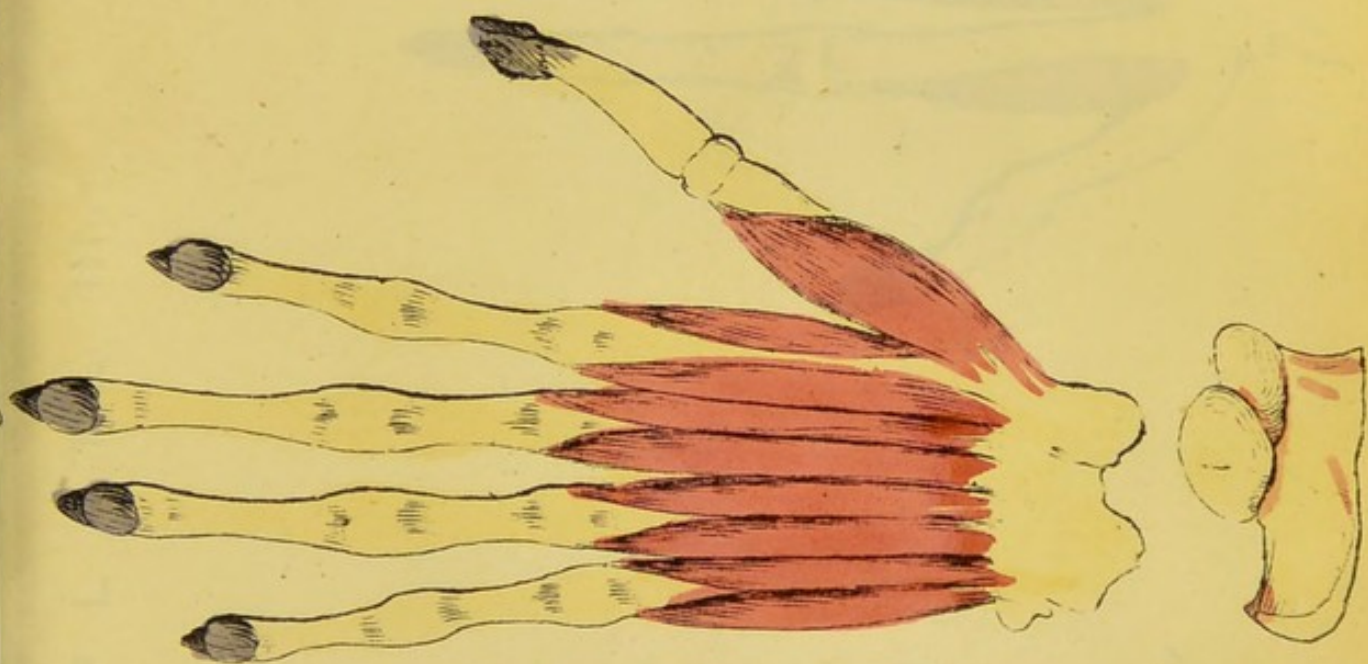
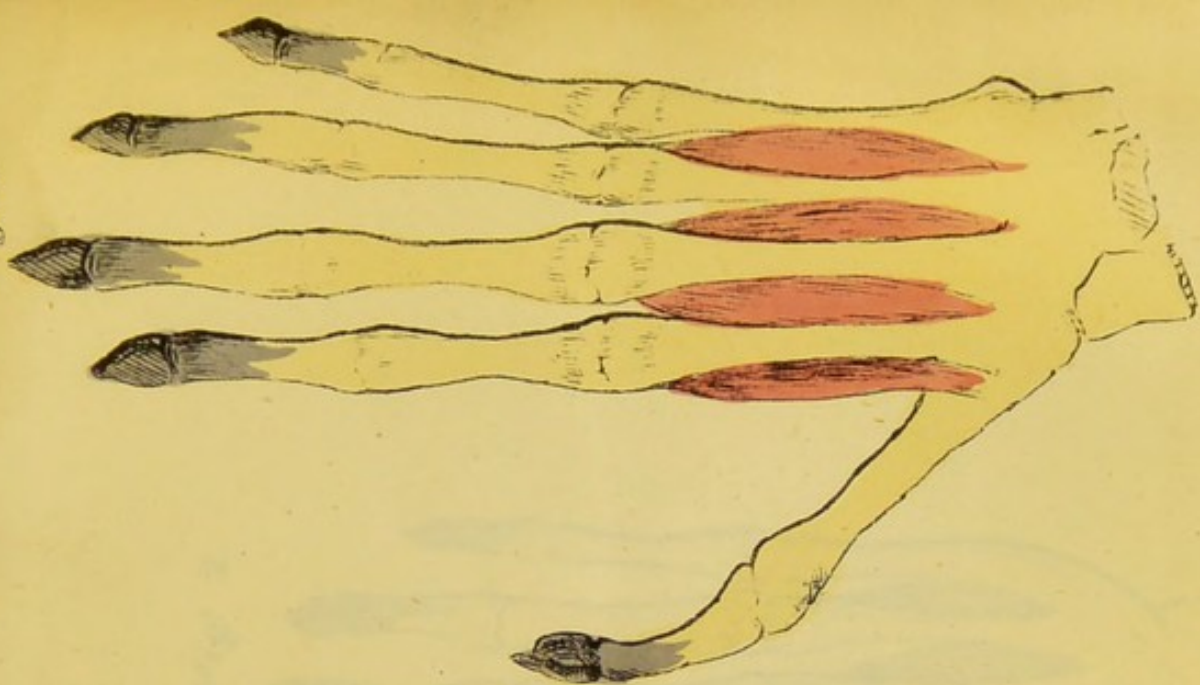
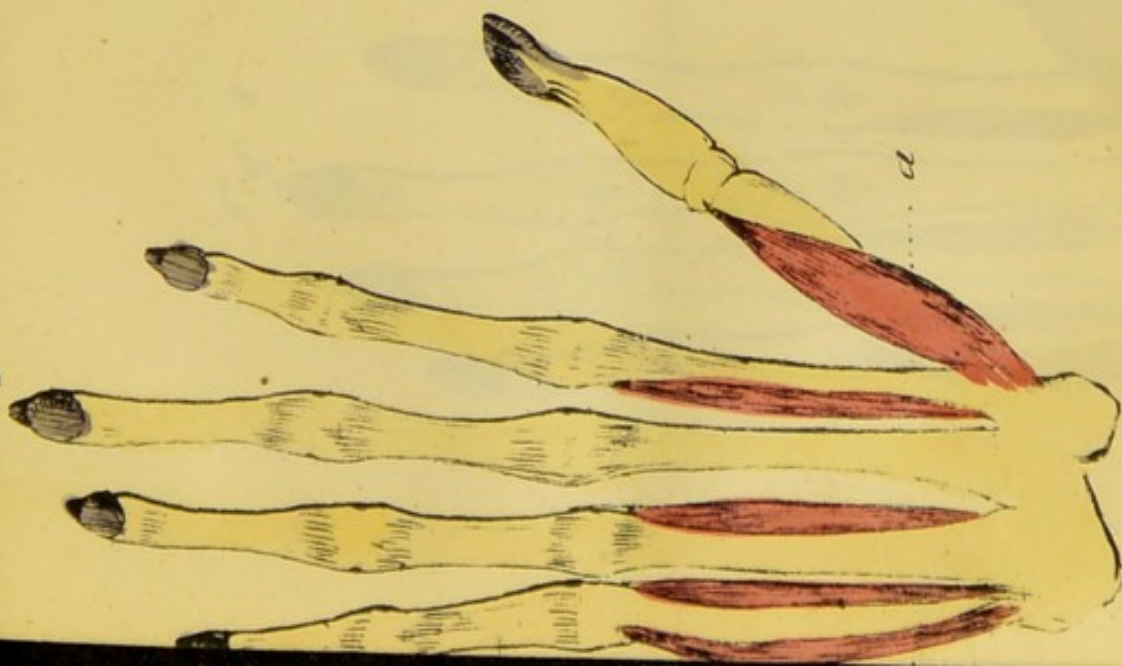


Fig. 1.







P L A T E   I I I .

Fig. 1

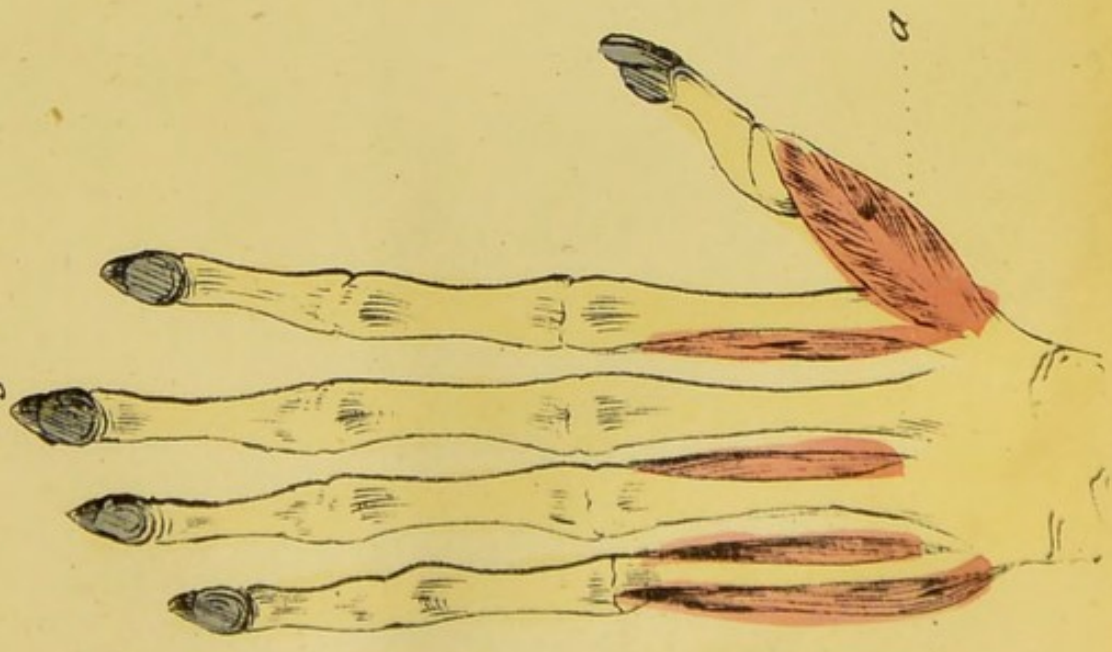
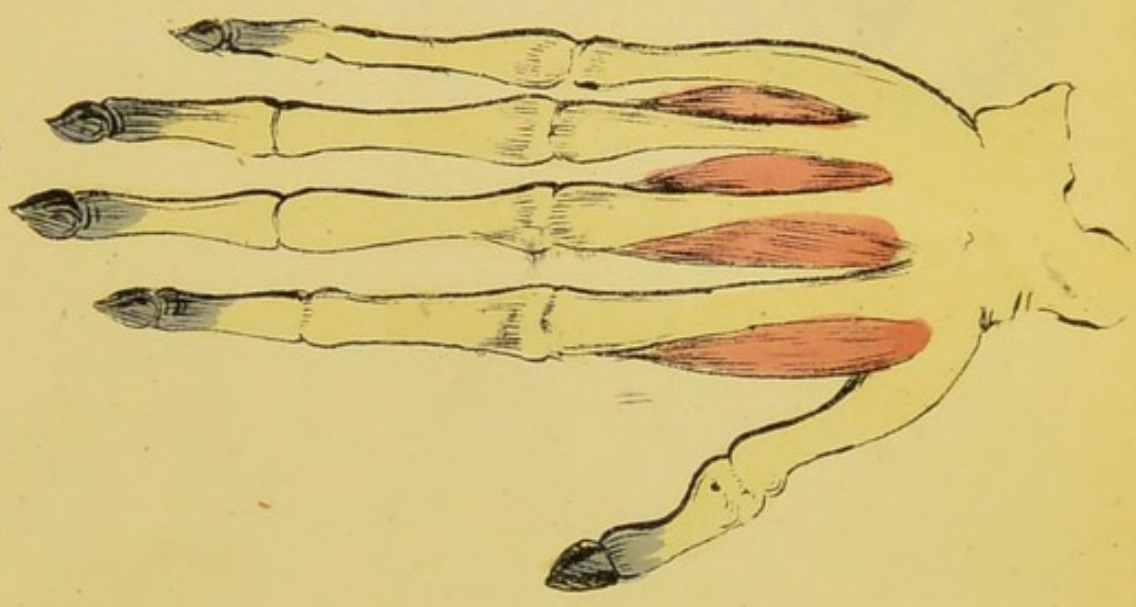


Fig. 2.







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FIG. 1.

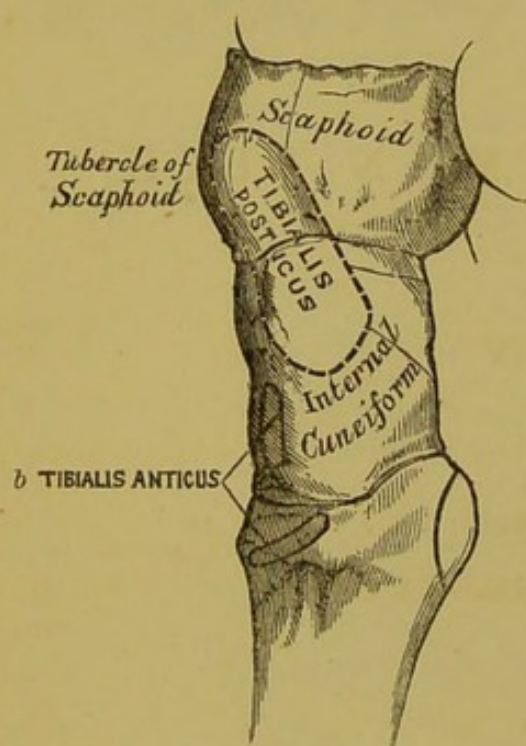


FIG. 2.

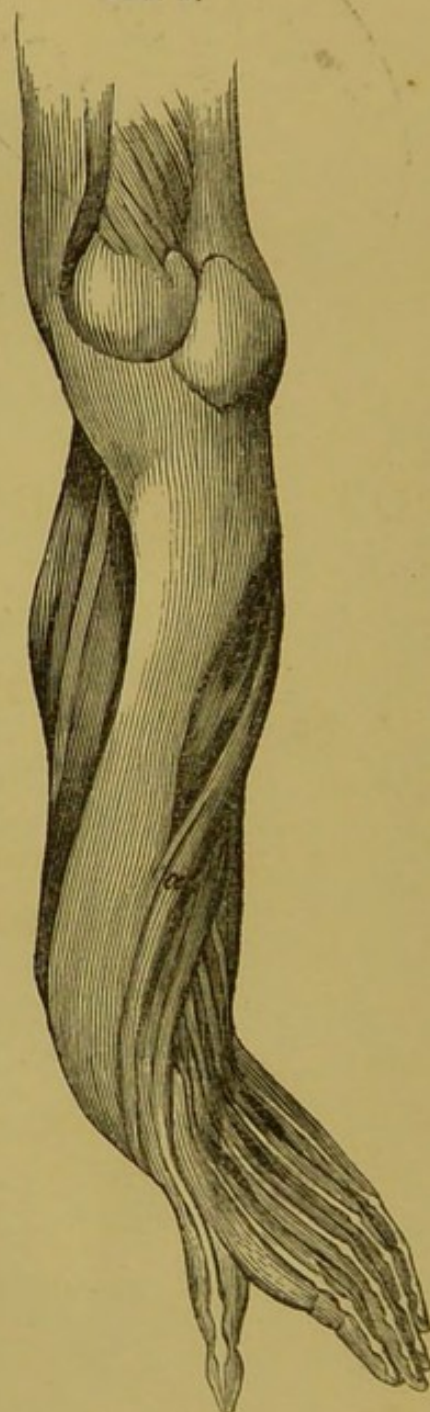


FIG. 1.—*b*. Double insertion of tibialis anticus in man.

FIG. 2.—*a*. The tibialis anticus as shewn in Tyson's drawing.

