

*Adaptation of the intrinsic muscle-apparatus to the requirements of the pes.*—It is a question about which there can be no dispute that the number and arrangement of the intrinsic pedal muscles are in a great measure dependent upon the special functions required of the foot. It is disappointing, however, to find so little clear proof of this in the mammalian pes.

Let us take three well-marked examples of burrowing animals from different orders, viz., the *Echidna*, the *Bathyergus*, and the Badger, and compare the disposition of the intrinsic muscles of their feet. The result is found to be highly unsatisfactory. In the *Echidna* the only layer well represented is the plantar layer. Each digit is supplied with an adductor. Flexores breves on the other hand are only found in connection with the small hallux, the index and the minimus and abductores in connection with the hallux and index. In the *Bathyergus* the flexores breves are alone developed—one being furnished to each toe. Not a trace of adductores or of abductores exists. In the Badger all three layers are well represented; thus there are three adductors, five flexores breves, and five abductors.

If we next contrast the feet of four aquatic animals, viz., the Otter, the Beaver, the *Ornithorhynchus*, and the Walrus we obtain equally unsatisfactory results. In the Otter the intrinsic pedal muscles meet almost all the requirements of the typical trilaminar arrangement. Each digit is supplied with three muscles, with the exception of the annularis which wants an adductor. In the *Ornithorhynchus* the digits are also well furnished with intrinsic muscles, but these are arranged upon a different plan, and there is great difficulty experienced in separating the flexores breves from the dorsal interossei. The abductor hallucis, and the flexor brevis minimi digiti are absent; and further, the second and fourth dorsal interossei are developed into approximators. In the Beaver and Walrus, on the other hand, the plantar layer is only represented by a feeble adductor hallucis. With regard to the intermediate layer, the Walrus possesses a distinct flexor brevis for each toe, whereas in the Beaver the flexores breves are restricted to the index, medius, and annularis. The disparity in the dorsal layer is even more marked. In the Walrus there is a powerful abducting apparatus connected with the minimus, a very rudimentary abductor hallucis, and one questionable dorsal interosseus present, viz., the third. In the Beaver, the abducting apparatus of the minimus is feeble in the extreme; the abductor hallucis is well developed, and there are two well-marked dorsal interossei, viz., the first and the second.

In the dissection of these aquatic feet I was struck with the uniform feeble development of the abducting apparatus of the marginal digits. I fully expected that these muscles would be largely developed for the purpose of expanding the web. In the Walrus alone is the abductor minimi digiti well marked. In the Beaver it is very feeble, and in the *Ornithorhynchus* and Otter it is only represented by the metatarsal portion, viz., the abductor ossis metatarsi minimi digiti. Then with regard to the abductor hallucis: in the *Ornithorhynchus* it is absent, in the Walrus and Otter it is very feeble, and in the