

whilst five is the original number, there is a distinct tendency exhibited for the adductors to disappear from the centre of the foot towards the margins, and this disappearance takes place in a more marked degree in an outward direction towards the minimus than in an inward direction towards the hallux. Thus the adductor hallucis and the adductor minimi digiti are the most constant—the former or more internal of the two much more so than the latter or more external. The adductor indicis and adductor annularis rank next in point of constancy, but the adductor indicis, which is the more internal of the two, is more frequently present than the adductor annularis. The central adductor, viz., the adductor medii, was only found in three specimens. The sudden disappearance of this adductor is probably due to the tendency which these muscles have to arrange themselves so as to act with reference to the middle toe. The exact ratio of constancy of the different members of this group of intrinsic muscles can be seen by a reference to the table.

Intermediate and dorsal layers.—At the end of Ruge's paper upon the Deep Muscles in the Sole of the Foot¹ there is the following statement:—"During the printing of this work I notice that D. J. Cunningham divides the deep muscles of the mammalian foot into three divisions—(a) plantar (adductores), (b) intermediate (flexores breves), (c) dorsal (abductores). I hold it incorrect to extend this subdivision to all mammals, especially since, even according to Cunningham, a fusion of layers b and c is very common."

I fail to perceive wherein Dr. Ruge should consider this classification of the intrinsic muscles "incorrect," seeing that throughout his two papers he indirectly admits it. Thus he makes the great primary division into (1) contrahentes, and (2) interossei, and then he divides the latter¹ into (a) a palmar, and (b) a dorsal series. Is this not a clear subdivision into three layers, or in other words, a trilaminar arrangement? The muscles of the minimus and the muscles of the hallux he describes as two separate groups. Why he should consider the muscles of the marginal digits distinct from those of the other toes I cannot understand. I have found no grounds upon which we can base a difference, beyond the fact that from the more commanding position of these toes it frequently happens (more especially in the case of the minimus) that their muscles have undergone greater development, and it may be segmentation.

Dr. Young of Manchester in answer to Ruge's criticism remarks:—"It is difficult to understand why the fusion of two previously existing layers, however common, should in any way militate against the view that the separate condition was more typical than the coalesced; conversely, indeed, if the fact of their fusion be in all cases established, it certainly seems to favour Dr. Cunningham's views of the type arrangement." I cannot take advantage of this argument, forcible though it be, because I do not consider that we

¹ *Loc. cit.*, p. 657.

² In his Memoir upon the development of the foot (*loc. cit.*) he says, "In the group of interossei pedis which at present with general acceptance is divided into the four outer or dorsal, and the three plantar or inner, I include the flexor brevis minimi digiti, &c. &c."