

The Tarsus.

The tarsal bones, as shown by Gervais and Alix¹ in their observations on the anatomy of the embryonic Penguin, present the same peculiarities as in birds in general—one becoming coalescent with the lower end of the tibia, the other with the upper extremity of the metatarsus.

The Metatarsus.

The metatarsus (Pl. VII. fig. 11) of the adult Penguin differs from that of other birds, inasmuch as it shows clearly its original composition through the union of four distinct metatarsal bones.

The first or innermost metatarsal is very small, and almost rudimental. It is not ankylosed with the others, but articulates by its base with the lower end of the shaft of the second metatarsal bone by means of a moveable joint.

The second, third, and fourth metatarsal bones are ankylosed together to form a single osseous mass, with which, moreover, the lower tarsal element as in other birds is inseparably united. The original composition of the mass by the union of three distinct metatarsal bones is clearly indicated on the anterior surface of the bone by the presence of two well-defined longitudinal grooves. These grooves are deeper at the upper than at the lower end of the bone, and the lower portion of the external is prolonged slightly beyond that of the internal groove. The upper end of each groove, at least in *Eudyptes chrysocome* from Tristan d'Acunha, is perforated by a foramen which appears on the posterior surface of the bone. Through these intermetatarsal foramina, minute blood-vessels pass from the front to the back of the limb. On the posterior surface of the metatarsus, the position of the intermetatarsal grooves is indicated only by these foramina. With regard to the dimensions of the three outer metatarsal bones, the second and fourth are nearly of equal length, the second slightly longer than the fourth, while the third is longer than either. The second metatarsal bone is more slender than either the third or fourth, both of which are of nearly equal thickness. The shaft of the third metatarsal bone is, moreover, provided with a small tubercle situated opposite the junction of the upper and middle thirds of its length for the insertion of the tendon of the tibialis anticus muscle. The lower extremities of the three larger metatarsal bones are quite distinct, being separated by notches which, even more distinctly than the intermetatarsal grooves themselves, indicate the original separation of the component elements of the compound metatarsus. The shafts of the third and fourth metatarsal bones are nearly parallel with one another from end to end, but the second metatarsal bone diverges considerably at the lower end from the third. In consequence of this arrangement, the metatarsus of *Eudyptes* is somewhat broader at its lower than at its upper end—a point in which the members of that genus differ somewhat from those of the others which I have examined. The lower extremities of the metatarsal