or ossification of a tendon, rather than a true carpal ossicle. There may be an analogous sesamoid ossicle on the other side of the wrist (on the side of the scaphoid) even in Apes, and this obtains its maximum in the Mole, where it strengthens and broadens the manus for digging. The true carpal bones may be more numerous or less numerous than in Man. Thus there may be an ossicle— called intermedium or centrale—placed in the mid line between the two rows of carpals, and this may be double, as in *Crypto- branchus* and some Siberian Urodeles. The unciforme may also be represented by two bones, as amongst Chelonians ; the pisiforme is often absent, and also the trapezium. The bones of the distal row are the less constant in number and development, and they may coalesce with the metacarpals, as in the Chameleon. Their development is related to that of the digits with which they articulate. All the true proximal carpal ossicles may unite into one bone, as in *Pteropus,* and the whole carpus may be reduced to two distinct bones, as amongst Birds.

The *mctacarpus,* when fully developed, consists of five rather long metacarpal bones, as in Man. There may, however, be but two, and these united into what is called a “ canon bone ” (as in Sheep, Deer, &c.); or there may be but a single one, as in the Horse,— answering to Man’s third metacarpal. They vary in relative size and proportion in different animals, but are most remarkable for their length and slenderness in the Bats, while they are much elongated in the Horse and most Ruminants.

As to the *digits,* there may be but a single one, as in the Horse, or two, as in Ruminants and the Marsupial known as *Chœropus.* There may be three, as in the Rhinoceros, the Proteus, and in *Seps ;* or there may be four. The digits are never certainly more than five (except by monstrosity), although in the Ichthyosaurus extra mar­ginal bones along the manus give at least the appearance of more.

When a digit is wanting it is generally the pollex (thumb), as in Spider Monkeys, but it may be the fifth, as in Pterodactyles, or both fourth and fifth may be wanting, as in Birds. The pollex may be more or less opposable to the others, as in Lemurs, most Monkeys, and in Man, or two digits may be opposed to the other three, as in the Chameleon.

The second digit may be greatly reduced, as in the Potto, or the third may be disptoportionally slender, as in the Aye-Aye, or thick, as in the Great Armadillo. The digits may be enormously elongated, as in the Bats, or short, as in the Mole and the Land Tortoises. They may be very imperfectly developed, as in Birds. They may be so united by dense tissue as to be quite incapable of separate motion, as in the Cetaceans. The bones of the fingers are called phalanges, and there are always three of them to each digit except the pollex, which has but two in all Mammals with the exception of certain Cetaceans, which have more. There may be as many as fourteen phalanges in one digit in *Globiocephalus.* The proximal row of these bones may become anchylosed to the metacarpals, as in the Three-toed Sloth. In Reptiles the numbers of the phalanges often increase from two in the pollex to five in the fourth digit, as in the Monitor. The abortive manus of Birds has at its best but three digits, with two phalanges to the pollex, three to the index, and one or two to the third digit. The phalanges are very numerous in the Ichthyosaurus and Plesiosaurus.

B. *Pelvic. —*The bone of the thigh is called the *femur,* and is a long bone which varies less in its form and proportion in different animals than does the humerus. It is, however, relatively very short in the Seals, and still shorter in the Ichthyosaurus.

In front of the knee-joint there is generally present a large sesamoid bone known as the knee-pan or patella. This, however, may even in Mammals be very small, as in Bats and Seals, or wanting altogether, as in the Wombat.

The leg below the knee is supported by two long bones, the *tibia* and the *fibula,* placed side by side, whereof the former is the more internally situated, the larger generally, and the more constant. The two bones may anchylose together at each end, as in the Armadillos, or they may do so only below or only above ; the two bones may be completely fused together, as in the Frog. The tibia may be the only long bone, through the small development of the fibula, as in Ruminants and the Horse. The fibula may be quite styliform, as in Birds, or it may be developed inferiorly but be atrophied at its upper end, as in Bats. It may be represented only by a small ossification outside the lower end of the tibia, as in the Ox, and with this there may exist a styliform rudiment of its upper part, as in the Elk.

The joint by which the foot moves on the leg is situated between the lower end of the leg bones and the tarsus in Mammals and Am­phibians. In Birds and Reptiles, however, this joint is placed in the tarsus, the proximal part of which is firmly connected with the leg, while its distal part is firmly connected with the metatarsus.

The *tarsus* of Man consists of seven irregularly shaped, more or less short bones. Of these the astragalus joins the tibia and has the os calcis beneath it and the naviculare in front of it, while the metatarsals are supported (from the great toe outwards) by the internal, middle, and external cuneiform bones and by the cuboides, which is connected with the fourth and fifth metatarsals.

The tarsus may have its parts more or less permanently cartila­ginous, as in some Urodeles. The number of its bones, or cartilages, may be as many as nine, as in the Salamander, or be reduced to three, as in *Proteus,* or perhaps to two, as in *Ophiodes.* Two tarsal bones (the os calcis and naviculare) may take the form of long bones, as in *Galago* and especially in *Tarsius.* These two bones and the astragalus may be represented by a single bone, as in many Lizards, or may early unite with the tibia, as in almost all Birds. The astragalus may be represented by two bones, as in Urodeles. It may have an extra ossicle annexed to it, as in the male *Ornithorhynchus* and *Echidna.* Two extra ossicles may be attached to the tibial side of the foot, as in the true Porcupine *(Cercolabes).* The naviculare may anchylose with one of the distal tarsal bones, as in the Ox and Deer, where it unites with the cuboid. The distal bones are less constant than the others, and they may anchylose with the metatarsals, as in Birds, the Chameleon, and the Three-toed Sloth. The cuboid may be represented by two bones, as in certain Urodeles. The internal cuneiforme may be wanting, as in the Ox, or coalesce with the middle one, as in the Horse.

The *metatarsus* when fully developed consists of five rather long metatarsal bones, as in Man, and never of more. There may be but a single developed metatarsal, as in the Horse (the third) and *Chœropus* (the fourth), or two fused together, as in the Sheep, Deer, &c., or three fused together, as in the Jerboa, or four so fused, as in many Birds. There may be but two metatarsals well developed, as in the Hog, or three, as in the Rhinoceros, or four, as in the Dog. They are never enormously elongated like the metacarpals of Bats, but they may all be extremely short, as in Land Tortoises and the Ichthyosaurus.

The *digits* vary in number, as has just been indicated with respect to the metatarsal bones sustaining them.

When one digit is wanting it may be the fifth, as in Birds, or the hallux (first or great toe), as in the Hare. The third and fourth digits may be only functional ones, as in the Ostrich ; but the third may abort, leaving only the fourth, as in *Chœropus,* or the fourth, leaving only the third, as in the Horse. The fourth and fifth may be the only functional ones, as in the Kangaroo. The hallux may be opposable to the other digits, as in Monkeys, Lemurs, Opossums, and Phalangers ; or the first and fourth digits may be opposed to the second and third, as in Parrots ; or the first and second to the third, fourth, and fifth, as in the Chameleon.

The phalanges of the digits are in Man’s whole class always three to each digit except the hallux, which (like the pollex) has but two —save in the Orang, where it may have but one phalanx. They may be much more numerous than in Mammals, as in the pes of the Ichthyosaurus and Plesiosaurus. The numbers of the phalanges as we proceed from the first to the fifth digit may be 2, 3, 4, 5,∙ 4, as in Lizards generally, or 1, 2, 3, 3, 2, as in the Salamander, or 2, 2, 3, 4, 3, as in the Frog. In Birds (where the fifth digit is more developed) the numbers of the phalanges, proceeding from the hallux, are mostly 2, 3, 4, 5 ; but they may be 2, 3, 3, 3, as in the Swifts, or 2, 3, 4, 3, as in the Goatsuckers.

*Appendicular Skeleton of Fishes.*

*The Paired Limbs.—*Most Fishes possess two pairs of limbs, known as the pectoral and ventral fins, which respectively cor­respond to the pectoral and pelvic limbs of higher Vertebrates. These limbs are attached to corresponding limb-girdles, whereof the pelvic girdle is always inferior in development and never attains the large relative proportions and fixed position of the pelvic girdle of non-Piscine Vertebrates.

Very often, however, the ventral fins are entirely wanting, and the pectoral fins are sometimes wanting also. In the latter case there is usually present more or less of a pectoral limb-girdle, though it may be, as in *Murænophis,* little more than a filament. In all non-Piscine Vertebrates the right and left limbs are symmetrically and equally developed, but in the Flat Fishes (*Pleuronectidæ)* one pectoral fin may be larger than the other, or one may disappear, as in *Monochirus.*

The situation of the paired limbs is, in Elasmobranchs, Ganoids, and a good many Teleosteans, similar to that they hold in higher Vertebrates, but in some other Teleosteans (such as the Fishes on that account called “thoracic”) the ventral fins are placed far for­wards so as to come immediately behind the pectoral fins, while in yet other Teleosteans (known on that account as “jugular” Fishes) they are placed even in front of the pectoral fins.

The *pectoral girdle* may consist of a simple cartilaginous arch, as in Elasmobranchs, or it may be composed, as amongst Teleosteans, of two bones meeting ventrally, each being commonly regarded as a clavicle which is continued up dorsally to the skull by the inter­vention of a supraclavicle and a post-temporal. Besides these there is a cartilaginous element on each side which usually ossifies in two pieces, the upper one of which is reckoned as representing a scapula and the lower one a coracoid. These parts are annexed to the inner side of the clavicle, where also there is sometimes found a styliform bone, more dorsally placed, called the post-clavicle.

The *pelvic girdle* is represented in Elasmobranchs by a transverse