

The fins are quite a study. I have alluded to the connecting membrane. In existing fish this membrane is the principal agent in propelling the creature; it strikes against the water, as the membrane of the bat's wing strikes against the air; and the internal skeleton serves but to support and stiffen it for this purpose. But in the fin of the *Osteolepis*, as in those of many of its contemporaries, we find the condition reversed. The rays were so numerous, and lay so thickly, side by side, like feathers in the wing of a bird, that they presented to the water a surface of bone, and the continuous membrane only served to support and bind them together. In the fins of existing fish we find a sort of bat-wing construction; in those of the *Osteolepis* a sort of bird-wing construction. The rays, to give flexibility to the organ which they compose were all jointed, as in the soft-finned fish — as in the herring, salmon, and cod, for example; and we find in all the fins the anterior ray rising from the body in the form of an angular scale: it is a strong, bony scale in one of its joints, and a bony ray in the rest. The characteristic is a curious one.

It is again necessary, in pursuing our description, to refer for illustration to the purely cartilaginous fishes. In at least all the higher orders of these, furnished with movable jaws such as the sturgeon, the ray, and the shark, the mouth is placed far below the snout. The dog-fish and thorn-back are familiar instances. Further, the mouth in bony fishes is movable on both the upper and under side, like the beak of the parrot; in the higher cartilaginous fishes it is movable, as in quadrupeds, on the under side only. In all their orders too, except in that of the sturgeon, the gills open to the water by detached spiracles, or breathing-holes; but in the sturgeon, as in the osseous fishes, there is a continuous linear