

solid parts of the ichthyic head, a certain set of pieces afford protection to the brain and cerebral nerves, and to some of the organs of the senses, such as those of seeing and hearing; while another certain set of pieces constitute the framework through which an important class of functions, manducatory and respiratory, are performed. The protective bones of merely passive function are fixed, whereas the bones of active function, such as the jaws, the osseous framework of the opercles, and the hyoid bones, are to the necessary extent free *i. e.* capable of independent motion. Of course, the detached character necessary to the free cerebral bones would be equally necessary in cerebral plates united dermally to the pieces of the cartilaginous framework, which performed in the ancient fish the functions of these free bones. And hence jaw plates, opercular plates, and hyoid plates, whose homological relation with recent jaws and opercular and hyoid bones cannot be mistaken. They were operative in performing identical mechanical functions, and had to exist, in consequence, in identical mechanical conditions. And an equally simple, though somewhat different principle, seems to have regulated the divisions of the fixed cranial bucklers of the Old Red Ganoids, and to have determined their homologies with the fixed cerebral bones of the osseous fishes.

These cranial bucklers, extending from nape to snout, protected the exposed upper surface of the cartilaginous skull, and conformed to it in shape, as a helmet conforms to the shape of the head, or a breast-plate to the shape of the chest. And as the cartilaginous heads resembled in general outline the osseous ones, the buckler which covered their upper surface resembled in general outline the upper surface of the osseous skull. It was in no case entirely a flat plate; but in every species rounded over the snout,