

and in most species at the sides; and so, in order that its characteristic proportions might be preserved throughout the various stages of growth in the head which it covered, it had to be formed from several distinct centres of ossification, and to extend in area around the edges of the plates originated from these. The workman finds no difficulty in adding to the size of a piece of straight wall, whether by heightening or lengthening it; but he cannot add to the size of a dome or arch, without first taking it down, and then erecting it anew on a larger scale. In the domes and arches of the animal kingdom, the problem is solved by building them up of distinct pieces, few or many, according to the demands of the figure which they compose, and rendering these pieces capable of increase along their edges. It is on this principle that the Cystidea, the Echinidæ, the Chelonian carapace and plastron, and the skulls of the osseous Vertebrata, are constructed. It is also the principle on which the cranial bucklers of the ancient Ganoids were formed.* And from the general resemblance in figure of these bucklers to the upper surface of the osseous skull, the separate parts necessary for the building up of the one were anticipated, by many ages, in the building up of the other; just as we find external arches of stone

* In all probability it is likewise the principle of the placoid skull. The numerous osseous points by which the latter is encrusted, each capable of increase at the edges, seem the minute bricks of an ample dome. It is possible, however, that new points may be formed in the interstices between the first formed ones, as what anatomists term the *triquetra* or *Wormiana* form between the serrated edges of the lambdoidal suture in the human skull; and that the osseous surface of the cerebral dome may thus extend, as the dome itself increases in size, not through the growth of the previously existing pieces, — the minute bricks of my illustration, — but through the addition of new ones. Equally, in either case, however, that essential difference between the pla