

### § 3. *Formation and Development of Bone.*

But it is not enough to contemplate the purposes so admirably answered by these arrangements. Our curiosity cannot but be powerfully excited to learn what processes and refined series of means are employed by nature to raise and to perfect all these artificially contrived structures. It fortunately happens that in this instance we are permitted to penetrate a little farther than usual into the secrets of organic evolution: for the succession of changes can be better followed by the eye in the slow development of the harder parts, than in the quicker growth of more yielding and expansible textures. The peculiar material, also, of which bone is formed, is easily distinguished by its hardness, its whiteness, and its opacity, from the softer and more transparent animal substance with which it is intermixed. Hence we are allowed an opportunity of observing the earliest stages of its deposition, and of accurately following the subsequent changes it undergoes.

The parts of the embryo animal, which are destined to become bone, partake of the soft and gelatinous consistence, which, at that early period, characterizes all the textures of the body; and they can hardly, indeed, be distinguished from the semi-fluid portions which surround them. In process of time, when the vascular circulation of the blood has been established, and the newly formed arteries have extended their branches over every part of the nascent organization, those vessels which are appropriated to the task of forming the bones, arrive at the pulpy masses where their work is to commence. As sculptors, before working upon the marble, first execute a model of a coarser and more plastic material, so the first business of these arteries is to prepare a model of the future bone, constructed, not with the same material of which it is afterwards to consist, but with another of a simpler and softer nature, namely, cartilage. In every case, then, cartilage is first formed, and becomes visible by its greater opacity when compared with the adja-