

granular lines, as if they were becoming obliterated,—that it can hardly be doubted that all three are similarly constituted, and that in the innermost one the fibres are totally obscured by the uniform deposit of lime. The same would naturally be said of the fourth, (*d*), were it not that in a transverse section (fig. 4) of this layer an irregular, coarse, granular deposit (*d*) may very easily be seen. From this we should infer that the third layer (fig. 3, *c*) is, very probably, the basis of a transition state between the fibrous and amorphous modes of calcareous deposit. In respect to the mode of deposit of lime among the true cartilage cells, (fig. 4,) we would say, that, interior to the calcareous deposit (*d*) already present, the cells (*a*, *b*) have partial, granular linings, which extend over greater or less portions of the cells, and are seen either in profile (*a*) or with the outer or inner surface next to the eye (*b*). The fact that the granules are arranged along the wall of the cell would seem to indicate that there is a preparation going on for forming the meshes of calcareous matter. This is confirmed, in some instances, where the granular lining is in direct communication with the lime granules already deposited, at the edge of ossification (*c*). Since, however, nitric acid does not dissolve this lining, and moreover since a similar lining is disclosed when the lime is dissolved away from the cells in the already ossified portion, (*d*), it is evident that it serves merely as a framework or basis, in which the lime is deposited. The large, single, homogeneous mesoblast may be seen not only in the unossified cells, (*a*, *b*, *c*) but also (*e*) in those which are ossified (*d*). To show that the hardening of the vertebræ is due to lime, the nitric acid which was used to dissolve the coarse granules in this section was allowed to evaporate slowly, and the result (fig. 4a, *a*, *b*) proved to be the characteristic crystals of nitrate of lime.

The Ribs. The intimate structure of the ribs was not investigated until at the time the Turtle was hatched. By making a very oblique section (Pl. 22, fig. 1) of one side of a rib, from the surface to its centre, portions of the surface of all the layers of which it is composed were displayed very clearly. A transverse section (fig. 2) displays the thickness of the cells at right angles to the axis of the rib. The central cartilage cells (fig. 1, *a*, fig. 2, *a*) have a quite thick and dark wall, and contain each a sharply defined but faint, large, clear, homogeneous mesoblast, and a heap of coarse and fine granules. A little distance from these, the cell is flatter, (fig. 2, *a*¹) and the wall, (*a*¹) as well as the mesoblast, is fainter, and the heaps of granules more spread throughout the cell. Still further outward the cell is yet more flattened, (fig. 2, *a*²) and the wall is very faint (fig. 1, *a*²). Finally, at the surface (fig. 1, *a*³, fig. 2, *a*³) of the cartilaginous mass, the cell wall is invisible, but the granules still retain a faint, cumulated arrangement. This layer is quite distinct from the mass of cells