

divided into a superficial and a deep layer by a well-defined line. The superficial layer consisted of cement, in which the lacunæ and branching canaliculi were large and distinct. The deeper layer was more opaque, and required a very thin section to determine its structure. It consisted of a granulated matrix traversed by numerous canals, which were for the most part arranged perpendicularly to the surface of the fang, so as to extend from the dentine to the cement. To some extent they branched, and adjacent canals communicated with each other (Pl. III. fig. 18).

The pulp-cavity was lined in the greater part of its extent by a well-defined layer, having a maximum thickness of nearly 1-10th of an inch. This lining could be seen with the naked eye to extend into the crown of the tooth, reaching on one wall of the cavity to within 1-10th of an inch of its apex, on the other to about 2-10ths of an inch. It had a brown colour, and the surface next the pulp-cavity was marked by numerous shallow grooves and small foramina. Examined microscopically this lining had essentially the same structure as the deeper layer of the outer covering of the fang. The canals were, however, of greater calibre in the inner lining, and passed obliquely from the surface next the pulp-cavity to that next the thin layer of dentine (fig. 18). The minute foramina on the free surface of this lining were the openings of these canals. Although, to the naked eye, the dentine, which formed the apex of the pulp-cavity, did not appear to have any of this substance in contact with it, yet, when examined microscopically, the part next the cavity was observed to be discoloured brown, and with its proper dentine tubes often indistinct, whilst some tubes of a larger calibre were seen in it.

The cement, as capable of recognition by the presence of lacunæ and canaliculi, terminated about 2-10ths of an inch from the edge of the cleft-like opening of the pulp-cavity, and previous to its termination it became very thin. The structure which formed the wall of the cleft was directly continuous with the deeper layer of the outer investment of the fang, and with the substance lining the pulp-cavity. It had a similar microscopic appearance, but the part next the cavity had in addition to the obliquely-divided canals, many canals divided transversely. There can, I think, be no doubt, that in the living tooth these canals had contained blood-vessels. In size they approximated to the Haversian canals in bone.

The question now arises, What is the nature of this very vascular substance, which formed the lining of the pulp-cavity, and the deeper layer of the external investment of the fang? If one could have traced its development, one would have had no difficulty in answering this question, as the several tissues of a tooth arise from definite structures. Thus the enamel proceeds from the enamel organ, the cement from the alveolo-dental periosteum, and the dentine, with its modifications termed vaso-dentine and osteo-dentine, from the pulp. The absence, however, of both dentine tubes and lacunæ and canaliculi in its matrix, and the presence of vascular canals, leave doubts, from a structural point of view, whether this substance ought to be regarded as a modified cement or a modified vaso-