

the base of the dentine-germ furnishes lateral prolongations, just as has been observed to be the case in man.

The dentine-organs conform closely with those of mammals; the odontoblast layer is very distinct, and the processes passing from these cells into the dentine-tubes are often visible.

The enamel-organs consist only of the outer and inner epithelia, without any stellate intermediate tissue; as, in some instances, enamel is certainly formed, the existence of the stellate tissue is obviously non-essential. When a tooth is moving to displace its predecessor, its sac travels with it, remaining intact until the actual attachment of the tooth to the bone by ankylosis.

II. "On the Structure and Development of the Teeth of Ophidia." By CHARLES T. TOMES, M.A. Communicated by JOHN TOMES, F.R.S. Received October 5, 1874.

(Abstract.)

Contrary to the opinion expressed by Professor Owen and endorsed by Giebel and all subsequent writers, the author finds that there is no cementum upon the teeth of snakes, the tissue which has been so named proving, both from a study of its physical characters and, yet more conclusively, from its development, to be enamel. The generalization that the teeth of all reptiles consist of dentine and cement, to which is occasionally added enamel, must hence be abandoned.

Without as yet pledging himself to the following opinion, the author believes that in the class of Reptiles the presence of cementum will be found associated with the implantation of the teeth in more or less complete sockets, as in the Crocodiles and Ichthyosaurs.

The tooth-germs of Ophidia consist of a conical dentine-germ, resembling in all save its shape that of other animals, of an enamel-organ, and of a feebly expressed capsule, derived mainly from the condensation of the surrounding connective tissue.

The enamel-organ consists only of a layer of enamel-cells, forming a very regular columnar epithelium, and of a few compressed cells external to this, hardly amounting to a distinct layer; the enamel-organ is coextensive with the dentine-germ. There is no stellate reticulum separating the outer and inner epithelia of the enamel-organ.

The successional teeth are very numerous, no less than seven being often seen in a single section; and their arrangement is peculiar, and quite characteristic of the Ophidia.

The tooth next in order of succession is to be found at the inner side of the base of the tooth in place, where it lies nearly horizontally; but the others stand more nearly vertically, parallel with the jaw and with the tooth in place, the youngest of the series being at the bottom.

I 2

The whole row of tooth-sacs is contained within a single general connective-tissue investment, which is entered at the top by the descending process of oral epithelium, whence the enamel-germs are derived.

As they attain considerable length, the forming teeth, which were at first vertical, become nearly horizontal, resuming, of course, their upright position once more when they come into place.

The clue to the whole peculiarity of this arrangement is to be found in the extreme dilatation which the mouth of the snake undergoes. The general capsular investment probably serves to preserve the tooth-sacs from displacement; while, if the forming teeth remained vertical after they had attained to any considerable length, their points would be protruded through the mucous membrane when this was put upon the stretch in the swallowing of prey.

Just as the author has shown in a previous communication to be the case in the Batrachia and Sauria, the hypothetical "papillary stage" is at no time present.

From the oral epithelium there extends downwards a process which, passing between and winding around the older tooth-sacs, after pursuing a tortuous course, reaches the furthest and lowest extremity of the area of tooth-development. Here its cæcal end gives origin to an enamel-organ, and, while it does so, buds forth again beyond it in the form of a cæcal extremity. Thus at the bottom of this area of tooth-development there is a perpetual formation of fresh enamel-organs, beneath which arise corresponding dentine-organs, or papillæ, if such they can be called when arising thus far away from the surface.

In essential principle, therefore, the formation of a tooth-germ is similar to that already described in mammals and other reptiles, the difference lying principally in the enormous relative length of, and the tortuous course pursued by, that inflection of the oral epithelium which serves to form the enamel-organs. The attachment of the tooth to the jaw is effected by the rapid development of a coarse bone, which is not derived from the ossification of the feebly expressed tooth-capsule, but from tissues altogether external to it. Nevertheless this coarse bone of attachment adheres more closely to the tooth than to the rest of the jaw, from which, in making sections, it often breaks away.

The base of the dentinal pulp assists in firmly binding the tooth to this new bone, being converted into a layer of irregular dentine.

This "bone of attachment" is almost wholly removed and renewed with the change of each tooth.