genera will not only accord with, but appears actually to support a view of septation.

For the analogy with septate anthers, where septation must have occurred, and the similarity between the details of these and those in *Danæa*, and especially the partial septations in both, make it appear probable that in this genus progressive septation has taken place. It is thought probable that progressive septation has been a feature, at least where the sori are elongated, as in *Danæa*. But the question is left over for future discussion whether or not a similar septation, rather than coalescence, may be accountable also for the origin in the first instance of a circular sorus with a plurality of sporangia united together as in *Asterotheca*, or in *Pecopteris unita*.

"On the Development of Marsupial and other Tubular Enamels, with Notes upon the Development of Enamel in General." By Charles S. Tomes, M.A., F.R.S. Received July 12, 1897.

(Abstract.)

It was pointed out by my father, the late Sir John Tomes, that the enamel of marsupials was peculiar in that in the whole class, with the solitary exception of the Wombat, the enamel is freely penetrated by tubes which enter it from the dentine, and are continuous with the dentinal tubes at the junction of the two tissues. This character is met with sporadically in other mammals—for example, in the Jerboa among rodents, in the Shrew among insectivora, and notably in the Hyrax, in which animal the free penetration makes its enamel look quite like that of a marsupial.

Whilst there is a large literature upon the development of ordinary enamel, little or nothing has been written about that of tubular enamels.

The outermost portion of marsupial enamel is always devoid of tubes, and the extent to which the tube system exists varies greatly in different members of the group, so that the same enamel organ is obviously capable of forming either tubular enamel or enamel with solid prisms. Moreover, the sporadic reappearance of tubular enamels amongst mammals who have for the most part lost this character, and its occasional occurrence in a rudimentary condition as an abnormality in man, point to its not originating in any manner fundamentally different from that of ordinary enamel development; and it is claimed that the study of its development in marsupials affords the clue to the real nature of enamel development in all animals.

The nature of the question renders it impossible to convey in brief space the grounds upon which the conclusions have been arrived at, but they are—

That the special cells of the enamel organ (Ameloblasts) do not themselves calcify.

That they each furnish from their free ends outgrowths or processes which are continuous with their own plasm, and which may be traced through the entire thickness of young enamel.

That one ameloblast furnishes the whole length of an enamel prism.

That the fibrillar outgrowths, previously more or less correctly described by other observers in other enamels, but apparently not appreciated at their full importance, do calcify from without inwards in such a manner that an axial canal is left uncalcified. Hence the canals of marsupials are in the centres of the prisms, and not, as supposed by Von Ebner, in the interspaces of the prisms.

And that towards the completion of the full thickness of the enamel the central axis is no longer left soft, but the whole calcifies into a solid prism.

It is claimed that other enamels, for instance human enamel, calcify in the same way. It has long been known that short processes hang out from the ends of the ameloblasts, and these, having first been described by my father, are generally styled Tomes' processes; and also that the earliest formed layer of enamel is perforated, so that acids will peel up a perforated membrane from its surface during its development. Longer fibrils have also been detected by Andrews, Williams, and others; but so small a thickness is occupied by these structures, and the full solidification of the prism follows so close upon the heels of any change in the direction of calcification, that the true nature of these structures has not been detected.

But in marsupial enamel, owing to the tubular condition which is so very transient in human and other mammalian enamels being permanently retained, the problem is presented under conditions more favourable for elucidation.

Hence it is my belief that all enamels alike are formed by the centripetal calcification of fibres furnished by the ameloblasts, and that tubular enamels are nothing more than the perpetuation of a stage which is passed through, though only for a brief period, by every solid enamel prism. This view serves to explain the occurrence of the various forms of tubular enamel which are found in fish, in some of whom—*e.g.*, Sargus—the reverse order of things is met with—that is to say, the prisms first formed near to the dentine are solidly calcified, but as their growth goes on the later-formed portions become tubular, so that in the completed enamel there appears to be a system of tubes entering it from its free surface.

In certain cartilaginous fish there is a combination of both of these arrangements of tubes, from the dentine and from the surface, and sundry other apparently anomalous conditions are met with.

But if the views advocated in this paper be accepted, all difficulty in accounting for these arrangements, very difficult to explain from any teleological standpoint, disappear, for they become merely slight variations or arrests at different stages of a process common to all enamels during their formation.

"On a Green Leucocytosis in Oysters associated with the presence of Copper in the Leucocytes." By Rubert Boyce, M.B., Professor of Pathology in University College, Liverpool, and W. A. Herdman, D.Sc., F.R.S., Professor of Zoology in University College, Liverpool. Received July 9, 1897.

In the course of an investigation upon oysters under normal and abnormal conditions, upon which we have been engaged for the last two years, and upon which we propose to submit to the Society a detailed memoir during next session, we have come upon a phenomenon which we regard of such considerable importance that we desire to publish a brief record of our observations and experiments, as we believe they may prove of interest to other biologists who are engaged in work on the micro-chemistry of the cell. The phenomenon we have now to describe is the presence of large quantities of copper in certain green leucocytes found in a diseased condition of the American oyster. The oysters suffering from this leucocytosis are always more or less green, but must not be confounded with ordinary green gilled oysters, where the colour is due to a totally distinct cause.

History.

Green oysters have been known from an early period, and there are various historic cases on record* of people having been poisoned by eating green oysters, and of the oyster merchants being put upon trial because of the deleterious nature of their goods. Periodically green oysters have been suspected or convicted of being coloured with copper, and just as often it has been proved by competent authorities that copper has nothing whatever to do with the green colour. This difference of opinion in the past has undoubtedly been

* An interesting historical survey of the subject up to 1866, was given by the late Mr. Arthur O'Shaughnessy, in the 'Annals and Mag. Nat. Hist.,' ser. 3, vol. 18.