

Fig. 18. Eight days' incubation, showing commencing segmentation in the fourth generation.

Fig. 19. Nine days' incubation, showing sporulation in the fourth generation.

Fig. 20 shows a young merozoite of the fifth generation after 10 days' incubation.

All of the above figures were obtained from one culture tube, without the removal of leucocytes and without the addition of fresh serum or corpuscles.

Fig. 21 shows a young benign tertian parasite at the time of inoculation of the culture tube.

Figs. 22, 23, and 24 represent 8 hours' growth in culture tube at 39° C.

Figs. 25-30 show parasites obtained from the culture tube after 20-29 hours' incubation.

Fig. 30 is a female gamete (undivided chromatin and scattered pigment) found in the culture tube; similar gametes were found in the blood at the time of inoculation of the cultures, so it is probable that this gamete was one of these, and that it had not developed in the culture.

Note the large size of the corpuscles in the benign tertian as compared with those in the malignant tertian, also the Schüffner's dots and the scattered pigment. The spores also are larger and fewer in number in the case of the benign tertian parasites.

CROONIAN LECTURE: *The Origin of Mammals.*

By DR. ROBERT BROOM.

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(Abstract.)

An endeavour is made to trace the evolution of mammals from Cotylosaurian ancestors through the carnivorous Therapsida. In Upper Carboniferous times the line probably passed through some primitive generalised Pelycosaurs; in Lower Permian through primitive, probably Therocephalian, Therapsids. In Middle and Upper Permian the line passed through the Gorgonopsia. In Triassic times the mammalian ancestors were small generalised Cynodonts. In Lower Jurassic the mammals are so Cynodont-like, and the Cynodonts so mammal-like, that in no single case are we absolutely certain which is which.

In the Therocephalia, the Gorgonopsia, and the Cynodontia, the skull is very mammal-like. The zygomatic arch is, as in mammals, formed by the jugal and the squamosal. The teeth are divided into incisors, canines and molars. In the later Gorgonopsians there is an imperfect secondary palate; in Cynodonts a complete secondary palate as in mammals. In Permian Therapsids there is a single occipital condyle; in the Triassic Cynodonts

there may be a single condyle slightly divided or two exoccipital condyles. There is, on passing from earlier to later types, a steady increase in the size of the dentary and decrease in the size of the other elements of the jaw. The quadrate also becomes much reduced in the higher types. In Gorgonopsians and probably all earlier types the arch of the atlas is a pair of bones; in Cynodonts, as in mammals, there is a single arch.

It is argued that the small Gorgonopsians fed almost exclusively on the comparatively slow-moving, small, herbivorous Anomodonts. In the Trias the small Anomodonts became very rare, and the carnivorous Therapsids had to feed on other small forms, apparently the more active lizard-like Cotylosaurs, such as *Procolophon*. The change of habit resulted in the Cynodontia.

In Upper Triassic times the larger Cynodonts preyed upon the large Anomodont, *Kannemeyeria*, and carried on their existence so long as these Anomodonts survived, but died out with them about the end of the Trias or in Rhætic times. The small Cynodonts, having neither small Anomodonts nor small Cotylosaurs to feed on, were forced to hunt the very active long-limbed Thecodonts. The greatly increased activity brought about that series of changes which formed the mammals—the flexible skin with hair, the four-chambered heart and warm blood, the loose jaw with teeth for mastication, an increased development of tactile sensation and a great increase of cerebrum. Not improbably the attacks of the newly-evolved Cynodont or mammalian type brought about a corresponding evolution in the Pseudosuchian Thecodonts which ultimately resulted in the formation of Dinosaurs and Birds.

*A Case of Abnormal Trichromatic Colour Vision due to a Shift
in the Spectrum of the Green-Sensation Curve.*

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