two species. Perhaps the mottled, or more properly the streaked, appearance of the larvæ of *punctipennis* is a distinguishing feature. Dr. Howard, we believe, mentions nothing of the kind in regard to *maculipennis*.

The duration of the larval stage, under normal conditions with plenty of food, varied from twelve to fourteen days.

On June 5 three larvæ were placed in a jar containing very little food. What food there was lay among some sand at the bottom. Two of them were very young, while the third could not have been more than half grown. These larvæ remained there until June 29, when the two younger died. These two did not go to the bottom after food and probably starved. The third and more mature one did go to the bottom after food and remained alive until July 3, when it was transferred to water containing an abundance of food. In a few days it transformed to a pupa. In this case the larval stage was over a month and could doubtless have been prolonged.

Pupæ.—The pupæ of *Anopheles* are not strikingly different from those of *Culex pipiens* to the unaided eye. A close observer, however, can learn to distinguish the two with the eye by the difference in length of the respiratory siphons. Those of *Anopheles* are much shorter. Under the microscope they are also seen to be of quite a different shape from those of *Culex*. The thorax and body of *A. punctipennis* differ quite markedly in shape from those of *C. pipiens*, when seen from above. Like the larvæ, the pupæ tend to wriggle in a horizontal direction when disturbed. They are not as active as those of *C. pipiens*, which fact is brought out very forcibly when one attempts to make a camera lucida drawing of the living pupæ of both in their natural position in the water.

The pupal stage of both males and females lasted with great regularity just about two days. At least it could not have varied more than a few hours from this, as the adults were found in every case on the second morning subsequent to the morning on which the pupæ were found.

Egg-laying of Culex Pipiens.—On July 17, in the back yard of a hotel at Magnolia, Mississippi, the writer found a pig trough five feet long, containing water to the depth of about six inches. On the surface of this water by actual count there were 257 masses of eggs of *C. pipiens*. Since there were less than five square feet of surface, one can imagine the density of egg population. It was noticed that about a dozen of the egg masses were white, or yellowish white, in appearance. This led to a more careful examination, which resulted in the discovery of a female about to finish laying a batch of eggs. Time, 6 a. m. She was so busily engaged that we could watch her with a hand lens. She rested on the surface with the abdomen at a slight angle, because the caudal end was nearly touching the surface. The mosquito stood at one end of the mass, with her head away from it. As the eggs were deposited the mass was gradually pushed away from her. The end of the abdomen was slowly carried from side to side, so that the eggs might be placed across the end and the whole mass filled out and completed as she progressed. The process may be compared with the action of the hand as a bobbin is wound with thread. The eggs always came forth with the small end first. This end, since the abdomen was held closely to the mass, would strike the other eggs and appear to be slipped along the perpendicular sides of the others, and thus be brought to an upright position. However, the tip of the abdomen was curled slightly upward, so that the egg was directed upward and very likely would have been deposited in an upright position in any case. It would have been interesting to have seen the first egg deposited. There was an appreciable interval between the deposition of each egg, perhaps two seconds, although we did not time it.

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RECENT ZOO-PALEONTOLOGY.

A MARSUPIAL EVOLUTION.

In the April *Naturalist* * is an important paper by Mr. B. Arthur Bensley upon the origin of the Australian Marsupialia. The evolution of the Marsupials is compared with that of the Pla-

* 'A Theory of the Origin and Evolution of the Australian Marsupialia,' *The American Naturalist*, Vol. XXXV., No. 492, pp. 245–269, April, 1901.

centals after the later Cretaceous, and the conclusion is reached that since the Placentals have radiated from a Creodont prototype beginning in the later Cretaceous period, it is quite possible that the Marsupials have during the same time radiated from a *Didelphys* prototype; there is a striking general resemblance between the early Creodonts and the opossum which tends to support this theory. It is practically the working out of a hint by Huxley in 1880, and of a very suggestive paper by Dollo upon the arboreal ancestry of the Marsupials. The idea of *Didelphys* origin, however, is original with Mr. Bensley, and the detailed comparison of the evolution of the teeth of Marsupials with that of Placentals promises to give most important and interesting results. Mr. Bensley is enjoying the extensive collections of the British Museum.

GEOLOGY OF THE JOHN DAY BASIN.*

As a result of the explorations by the University of California, John C. Merriam contributes a valuable paper upon the geology of this important region in Oregon, as preliminary to the revision of the vertebrate fauna. Although this region was first reported in 1861 and explored by Condon, Marsh, Cope, Scott, Sternberg and Wortman, this is the first exact description of its geology, and is therefore most welcome and important. The author divides the beds into the Lower (250–300 feet), which is reported to contain *Oreodon;* Middle (500–1,000 feet), chiefly distinguished by *Diceratherium;* and Upper, which contained *Paracotylops*. The exact correlation of these beds with those of the Oligocene White River awaits the precise comparison and study of the faunæ. The mode of deposition has generally been considered entirely lacustrine, as the series are everywhere uniformly stratified and bedded, on the other hand, the author presents strong reasons for an æolian origin for the finer portions of these beds. In fact the problem is precisely similar to that which is now being discussed for the finer beds of the White River formation.

* 'A Contribution to the Geology of the John Day Basin,' *Bulletin*, Dept. of Geology, Univ. of California, Vol. II., No. 9, pp. 269–314, April, 1901.

DISCOVERIES OF PLESIOSAURUS AND OF PORTHEUS.

During the past season Mr. Charles H. Sternberg, well known for his years of explorations in the Kansas Chalk, made two discoveries of exceptional importance. The first is of a new type of Plesiosaur, the skeleton of which is preserved in an exceptional manner; this has been purchased by the University of Kansas and will be described by Professor Williston as part of his general studies upon Plesiosaurs. The second is a remarkable skeleton of *Portheus molossus*, of the suborder Acanthopteri, family Ichthyodectidæ—the characteristic predaceous fish of the Niobrara. The specimen is sixteen feet in length and is in an exceptional state of preservation. It has been purchased by the American Museum of Natural History, and will be mounted facing the great specimen of *Tylosaurus* from the Kansas Chalk which has already been described in this Journal.

H. F. O.

BOTANICAL NOTES.

SHORT NOTES ON RECENT BOOKS.

AMONG botanical books which are likely to attract attention is Dr. Wettstein's 'Handbuch der Systematischen Botanik' of which Part 1 (including pages 1 to 202) has been brought out by the Leipzig publisher Franz Deuticke. Resembling Warming's 'Haandbog i den Systematiske Botanik' and Schumann's 'Lehrbuch der Systematischen Botanik,' it promises to be much fuller and more helpful than either, and like them is to be a general survey of the structure and classification of the Vegetable Kingdom. The attempt is made to treat the subject from the phylogenetic standpoint, and whatever of success is attained in the work is largely due to this fact. In the part now issued forty-four pages are given to a general discussion of the principles involved, followed by the special discussion of representatives of the seven phyla recognized by the author, viz.: Myxophyta (including the single class *Myxomycetes*), Schizophyta (including the classes *Schizophyceae* and *Schizomycetes*), Zygophyta (including the classes *Peridineae*, *Bacillarieae* and *Conjugatae*), Euthallophyta (including the classes *Chlorophyceae* and *Fungi*, the latter in-