

lus of food as they do in a wild state. Hence the fact that a given animal is indifferent to, or even rejects, a certain species of insect when in captivity, by no means indicates that it would be indifferent to or reject the same species under natural conditions. Indeed, it has been definitely shown that many "disregarded" and "rejected" species are actually taken by wild animals of the same species as those experimented upon.

The whole doctrine of warning colors and mimicry is built upon the presumption that the species mimicked is disagreeable or dangerous, and hence under the law of natural selection the mimicking species has come to assume the same colors as the one mimicked; this presumption is in many cases unsupported by any evidence, and in many other cases is quite contrary to the known facts. Dr. McAtee's conclusion is that since acceptance or rejection of food in captivity bears no close relation to food preferences under natural conditions, the value of experiments upon captive animals to determine the efficiency of warning colors and other protective adaptations in their insect food is very questionable. It should be checked up with such definite knowledge of the natural food as is obtained by the examination of contents of stomachs or other portions of the alimentary canals. He clearly shows that many species which have been considered to be protected by noxious secretions or other adaptations are not really so protected, a conclusion supported not only by the definite evidence produced by Dr. McAtee, but also by the fact that if such species were not preyed upon by various enemies they would soon people the whole earth. Whether the reader finally agrees with Dr. McAtee or not, he will find in this timely paper much information and food for thought, and by having read it will be better prepared for intelligent consideration of the subject. By no means the least valuable feature of it is the series of bibliographies occurring at intervals under the proper sub-headings.—JUNIOUS HENDERSON.

CONTRIBUTIONS TO AVIAN PALAEOLOGY FROM THE PACIFIC COAST OF NORTH AMERICA. By LOYE HOLMES MILLER (Univ. Calif. Publ. Geol., vol. 7, no. 5, October 12, 1912, pp. 61-115).

The present paper is a detailed summary of our knowledge to date of the fossil birds of the Pacific coast. The accompanying bibliography shows that there have been published eleven separate papers relating to this field of ornithology. By far the most important of these are obviously those of Miller himself who has been fortunate in having full access to the rich material accumulated under the

direction of Dr. J. C. Merriam in the department of palaeontology of the University of California.

Of the eight localities on the Pacific slope, in which fossil birds have been found, six are in California. The most notable of these localities, the now famous Rancho la Brea, near Los Angeles, has produced no less than forty-nine species of birds, with promise of further discoveries as excavations there are continued in the future.

Miller's present contribution includes an account of each of the fossil faunas, with lists of the species known from each. Past distribution as thus shown in the regions concerned is compared with present day conditions. Various lines of evidence point towards a Pleistocene climate of higher temperature and greater humidity than now.

The Pleistocene avifauna contained several types of birds not now found north of South America. There appears to have been a retraction in the ranges of these types to the southward. There were many more species of eagles and vultures in California in Pleistocene times than now.

Among causes of the extinction of raptorial species Miller considers as of probable importance, the disappearance of forests and luxuriant meadow vegetation, and the great reduction in the population of herbivorous mammals. J. C. Merriam's studies indicate the disappearance of many species of carnivorous mammals at about the same time with the raptorial birds now extinct. Dr. Miller believes the coincidence significant of dependence of the scavenging birds upon the beasts of prey, in that the former fed largely upon the discarded kills of the latter.—J. GRINNELL.

AN INVESTIGATION CONCERNING THE FOOD OF CERTAIN BIRDS. By JOHN HAMMOND, B. A. (Journal of Agricultural Science [Cambridge], June, 1912, 4, pp. 380-409).

As a further contribution to a knowledge of the food of the birds of England has come a paper entitled "An investigation concerning the food of certain birds" by John Hammond. This paper gives some of the results of an investigation instituted by Professor Wood and Mr. Warburton of the School of Agriculture, Cambridge, "to determine whether or not certain birds were harmful to agriculture." The method adopted in the investigation was "the examination of stomach contents, together with a collection of field notes concerning each bird."

In beginning the investigation the following points were taken into consideration:

"(1) That the examination of the stomach contents ought to be continued throughout the