

secondly, the angle θ that the ray was designed to have with the commonly perpendicular plane, when the above formula will prove itself, by giving us the correct bend δ in the ray that the instrument was designed to produce. Whereupon any error on deflection in the entering ray either does or does not make a new angle θ' with the commonly perpendicular plane, giving us, therefore, by the above formula the new value of δ .

ALAN S. HAWKESWORTH

UNIVERSITY OF PITTSBURGH

THE INSUFFICIENCY OF DATA ON ENVIRONMENT
GIVEN IN PAPERS DESCRIBING DEEP-SEA AND
OTHER MARINE ORGANISMS

TO THE EDITOR OF SCIENCE: In examining a number of recently published papers on corals, foraminifera and other marine animals, especially for the purpose of ascertaining the temperature conditions under which the organisms live, I have been particularly impressed by the fact that very rarely are any definite data given on the temperature of the waters from which they were taken. As it is a generally known biological fact that temperature is one of the most influential factors in determining geographic distribution, it is highly important that precise information on this subject should be available. In fact, the data on the physical conditions under which an organism was collected should always be presented as fully as possible. Depth, temperature, nature of the bottom, and relations to marine currents, are important factors. As so many zoologists are engaged on the description of marine faunas, and as it is more or less habitual to give very meager data on the conditions under which the organisms described live, this appeal for more detailed information is made to the body of investigators through the columns of SCIENCE.

T. WAYLAND VAUGHAN

SCIENTIFIC BOOKS

The Age of Mammals in Europe, Asia and North America. By HENRY FAIRFIELD OSBORN. Illustrated. New York, The Macmillan Co. 1910.

Students of paleontology have awaited impatiently the past few years a promised work on extinct mammals by Professor Osborn. In his "Age of Mammals," as it has recently appeared, expectations have been more than realized. For more than a century, beginning with the classic researches of Cuvier, our knowledge of extinct vertebrates has been increasingly widened, and of no group so greatly as of the mammals. In North and South America, throughout Europe, in India, and more recently in Africa, discoveries have followed discoveries so rapidly that all but the expert have nearly given up in despair the attempt to follow and understand. And it is superfluous to say that in no part of the world has the progress of our knowledge been so rapid as in North America. Those famous pioneers in American paleontology, Leidy, Cope and Marsh, followed soon by Scott and Osborn, and later by Wortman, Hatcher, Matthew, Merriam, Sinclair, Gidley, Peterson, Douglass, Loomis, as well as others whose names may be omitted here without invidiousness, have contributed abundantly and meritoriously to our knowledge of the history of mammalian life in North America.

But, for some years it has been growing more and more evident that it was time that an inventory should be made of what we know. And this has now been done ably by Professor Osborn in this voluminous work of more than six hundred pages. That there is no place in the world where such a work could be written as the American Museum of New York City, with its extensive collections, and various experts in paleontology, especially Dr. Matthew, for aid and advice, vertebrate paleontologists know full well. That there is no one who could treat the subject more broadly and comprehensively than Professor Osborn will, also, be as readily admitted. Indeed there are few who are competent to criticize expertly the work as a whole, as the reviewer is painfully conscious, since he knows that he is not one of them. Vertebrate paleontology has advanced with such enormous strides within the scientific career of the present writer even, that it is no longer possible for