and freshwater faunas of the Marquesas Islands, do not mention freshwater sponges from this island group. Mumford cites Gee, who believes that they may occur here and will turn up eventually as a result of further collecting.

From my own experience in collecting in the Hawaiian Islands during the summer of 1935, I am convinced that freshwater sponges may occur in many of these Pacific Islands. Although Perkins's[4] excellent work on the fauna of the Hawaiian Islands does not mention the presence of these animals, yet during the latter part of July, 1935, I found freshwater sponges in a pool at the bottom of a waterfall at Haepuaena on the Island of Maui. These sponges, vividly green in color and very apparent in the clear water of the pool, were found in large masses encrusting the undersides of rocks and submerged pieces of wood. A request for information concerning the distribution and occurrence of freshwater sponges in Hawaii was made to Dr. E. H. Bryan, Jr., curator of collections of the B. P. Bishop Museum in Honolulu, with the resulting information that Dr. Otto Degener of Honolulu had upon several occasions collected these animals in various parts of the Hawaiian Islands. A request to examine these specimens failed to elicit them, since they apparently had been lost. However, Dr. Degener very kindly sent me specimens which he had collected during the month of February, 1936, on the Island of Oahu. An examination of these two specimens reveal them to be *Heteromyenia baileyi*. Thus as a result of these collections the occurrence of freshwater sponges in the Hawaiian Islands is established for the first time, and the known distribution of these sponges in Polynesia is greatly extended both to the north and east.

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EARLIEST LAND VERTEBRATES OF THIS CONTINENT

ALTHOUGH discovery of amphibian remains in Greenland in deposits close to the Devonian-Carboniferous boundary[1] makes it certain that the origin of land vertebrates occurred in the Devonian Period, we know little of their history until a much later date. In American terminology the Carboniferous is customarily divided into two periods, the Mississippian (lower) and Pennsylvanian (upper). In the Coal Measures of the latter part of the Pennsylvanian, amphibians already well advanced and specialized are numerous and fairly adequately known. But for the entire stretch of time between the beginning of the Carboniferous and the Coal Measures, a period of perhaps 50 to 75 millions of years, land vertebrates, save for footprints, are almost unknown. In Scotland a dozen or so specimens have been found in late Mississippian deposits.[2] Not a single bone has been reported from Carboniferous rocks below the Coal Measures in any other area of the globe.

Last winter the presence of vertebrate remains in the Carboniferous shales of the Hinton District of West Virginia was reported to us by Mr. Harry Damron, graduate student at Harvard University; this locality has been investigated, under his guidance, by R. V. Witter and the writer. In addition to fishes the deposit contained numerous remains of amphibians. Unfortunately the bones are disarticulated and often fragmentary, so that their morphological value is limited. Stratigraphically, however, they are of great interest. Amphibians had been found in various instances in relatively late deposits in the Appalachian coal field area, and we had assumed that the present locality would also prove to be Pennsylvanian in age. To our surprise and delight it proved to be much earlier. The horizon is that of the Hinton shales of the Mauch Chunk Group. These amphibians are thus Mississippian in age. They are exceeded in antiquity only by the Greenland skulls mentioned above, and equalled only by the Scottish materials; they are by far the oldest skeletal remains of tetrapods in continental North America. Despite their incomplete nature these bones are thus important documents in the deciphering of the early history of land life.

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QUOTATIONS

SOIL FERTILITY

A SPIRITED correspondence has followed Lord Cranworth's warning that soil fertility may become exhausted by the pace of the war-time food production campaign, and has brought out several points which have vital significance for the nation as well as for farmers. Larger quantities than ever before of fertilizers, such as superphosphate and sulphate of ammonia, have been applied to the land in the past year, and as a result heavier crops have been grown. It has been the deliberate policy of the government to secure increased supplies of fertilizers and to see that

[4] R. C. L. Perkins, "Fauna Hawaiiensis," Introduction, 1913.

[1] Säve-Söderberg, G. Meddelelser om Grønland, Bd. 94, Nr. 7, 105 pp., 1932.

[2] These have been reviewed by D. M. S. Watson, Palaeont. Hungarica, *I*, 221–252, 1926.