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.

they are applied to the land. In many cases farmers who until now have made little use of fertilizers were ordered by the War Agricultural Committees to give their corn a dressing this spring, and there is no question that this provision of extra supplies of available plant food in the top soil has given the country bigger crops than could otherwise have been expected.

It is true that this has been an exceptional growing season, and that the growth of some crops was so lush that the straw did not stand battering by wind and rain and patches of corn are now lying flat. Even so, on balance the nation will gain extra crops. In a few of the worst cases the promise of extra grain has been lost and the farmer is faced with a heavy task in saving what he can. That is part of the gamble that is inherent in farming in an uncertain climate. Last harvest there was no such trouble, however generously chemical fertilizers had been applied. This year the trouble is not confined to fields where sulphate of ammonia was used. Some of the laid corn is to be found on land newly ploughed out of old grass rich in plant food. The lesson to be learned is surely that chemical fertilizers used prudently can greatly increase the yield of crops—especially if the farmer knows enough about his business to grow the stiffer strawed varieties of corn that will stand to harvest on well-fed land even in an exuberant season like this.

Everywhere farmers with long experience of arable farming will vouch for the value of chemical fertilizers when used properly as a supplement to the organic matter in the soil which provides the reservoir of the plant foods on which the crops draw year after year. In our settled type of farming livestock have long played a dominant part, and, despite the reduction in numbers of pigs and the grass flocks of sheep, they continue to do so to-day. The encouragement lately given to hurdled flocks should bring more sheep on to the lighter arable lands where they can be most valuable in maintaining fertility. Unless the balance of our farming is seriously upset—and there is little prospect of that—there is no risk of soil exhaustion and erosion, such as occurs in the New World, where wheat is grown by the square mile and then the land abandoned while fresh areas are tapped. In this green island we are now ploughing and cropping 4,000,000 more acres than we did two years ago, and dormant fertility lying under the grass sod is being stirred to produce the extra cereals, potatoes, and other crops that the nation needs in war-time. Other fields which have grown a succession of corn crops are being under-sown with clover and grass to grow a productive sward for long enough to allow the store of organic matter to be replenished. There is really no special virtue in dormant fertility.

Moreover, if agriculture is to regain its full place in the nation's life, the soil itself must be alive and fully productive. The tenets of good husbandry are so well understood in this country that the general public need have little fear that the land will suffer if farmers are allowed to use their discretion in developing production. On the contrary, the new life that is stirring in agricultural Britain is one of the few benefits arising from the present conflict that must be allowed to persist in the years after the war.—*The Times, London.*

SCIENTIFIC BOOKS

QUALITATIVE ANALYSIS

Elementary Qualitative Analysis. By J. H. REEDY. Third edition. x + 156 pp. New York: McGraw-Hill Book Company. 1941. $1.50.

THERE is a growing trend in colleges to teach qualitative analysis by semi-micro techniques. The obvious advantages are the substitution of centrifuging for filtration and a saving in time and material. This latest edition of Professor Reedy's text adds another to the list of books in which these techniques are used. In the present instance, however, the change is not complete since macro procedures are retained for a few of the analytical steps.

This text is presumably designed for a one-semester course for sophomore students in chemistry. In contrast to the more usual text in this field in which sections on theory, description and analysis are to be found, this book contains only the analysis material. Consequently its use will probably involve a companion text covering the other two parts of the subject.

There are two main parts to the book, a section on cation analysis and another on anion analysis. There is also a brief section on the systematic analysis of various solid substances. In addition to detailed and probably quite satisfactory directions for analysis, the two main sections contain well-organized sets of preliminary experiments and groups of study questions for each of the several groups of ions considered. The cation analysis material takes up the usual restricted list of ions and employs standard methods of separation. There are, however, new procedures for the Tin Sub-Group and for the Alkali Group. The anion analysis section considers an unusually large number of anions. The method of analysis is the now common combination of group eliminations and subsequent specific tests.