

more or less independent regions, each with its own biological character. The distribution of the Cladocera in each of these is given, with a discussion of the reasons why certain species occur in all the regions, whereas others are found in only one or two. By means of sixty-two diagrams, in the form of curves, the sexual period of each species (and variety) of Cladocera captured is shown, and the stations at which these species have been found are marked on thirty-eight maps of the lake, on which also the various shore conditions (*e.g.* the nature of the aquatic plants) are indicated. This investigation has evidently been carried out in a very thorough manner, and affords a good example of the intensive method.

J. H. A.

AGRICULTURAL EDUCATION IN THE UNITED STATES.¹

THE object of the interesting volume referred to below is sufficiently indicated by the title and subtitle. The public schools are those of elementary and secondary grade. In his introductory note, Mr. Judd ascribes the present great activity shown by the United States in agricultural education to (a) the large number of persons engaged in agriculture; (b) the value of its products; (c) the necessity, in connection with rural depopulation, for making farm activities attractive; and (d) the desirability of laying greater emphasis on outdoor experiences in the education of children.

The volume first gives an account of the U.S. Department of Agriculture, organised in 1862. During the last twenty years a sum approximating to twenty-one million pounds sterling of public money has been spent on agricultural research and education in the States, mostly through the Department, which since 1889 has worked with the Association of American Agricultural Colleges and Experiment Stations, at first for the organisation of collegiate instruction, and more recently with a view to place agricultural school teaching on a sound basis. The U.S. Bureau of Education has played the part of a correlating influence, exercised through its publications, legislation, and the land-grant colleges.

Much has also been done by the State Departments of Education. Prof. Davis considers the State agricultural colleges as the most important agent in agricultural education, and they are now assisting the elementary and secondary schools by various extension methods, by organising departments of agricultural education, and by conducting summer schools for teachers. After dealing successively with State normal schools, national education and other associations, educational periodicals, and periodical literature, the author gives an account of State organisations for agriculture, and farmers' institutes. In 1908 there were 4643 regular and a number of special institutes, attended by more than two and a half million persons.

"The function of the farmers' institute is to educate the people on their own ground. It is a phase of extension work that carries education directly to the localities in which the people live. It deals less with individual men on their farms than with small communities or groups of men; it therefore has the opportunity to exert great influence in developing the social life of rural neighbourhoods" (p. 90).

Next follow accounts of agricultural societies, boys'

¹ "Agricultural Education in the Public Schools." A Study of its Development, with Particular Reference to the Agencies Concerned. By Prof. R. M. Davis. Introduction by C. H. Judd, Director of the School of Education, University of Chicago. Pp. vi+163. (University of Chicago Press, Chicago, Ill.; Cambridge University Press, London and Edinburgh, 1912.) Price 4s. net.

agricultural clubs, and elementary and secondary schools. Of schools the author speaks as follows (p. 126):—

"Agricultural colleges are now well established, and their problems are largely matters of detail and of research. The problems of agricultural education are now being shifted to the secondary schools offering agricultural instruction. There is a great diversity, not only in respect to types of schools, but also as to methods, time devoted to the subject, equipment, qualification of teachers, and in other respects. But of the widespread interest there can be no doubt. The results on the whole promise much for the development of rural education and redirection of rural schools."

The work concludes with a short chapter on textbooks, and a valuable bibliography with annotations. Nor is a good index forgotten.

Prof. Davis may be congratulated on a most valuable and thoughtful expert contribution to the literature of his subject. The problems he discusses are at present engaging very serious attention in this country on the part of the Boards of Agriculture and Education, and of those concerned with all grades of agricultural and rural instruction, to whom the book is heartily recommended, though all the methods advocated are not necessarily suited to Britain, *e.g.* the teaching of agriculture as such at the school stage. There is also room for difference of opinion as to the lines on which farm institutes are best organised.

J. R. AINSWORTH-DAVIS.

HURRICANES OF THE WEST INDIES AND OTHER TROPICAL CYCLONES.

THE Journal of the Washington Academy of Sciences of May 19 contains an abstract of a useful paper, by Dr. O. L. Fassig, on the above subject, intended to appear as a special Bulletin of the U.S. Weather Bureau. An analysis of 135 storms recorded by the Bureau from 1876 to 1910 in the West Indies shows that their paths closely coincide with the two branches of the great equatorial current of the North Atlantic. The path of greatest storm frequency begins near the Windward Islands, and runs nearly due west to Jamaica, gradually turns north-west, recurves in the eastern part of the Gulf of Mexico, and passes out north-easterly over the North Atlantic. A secondary track extends from the northern group of the Windward Islands across the Bahamas, recurves east of Florida, and passes out also north-easterly into the Atlantic.

The path pursued by an individual storm depends to a great extent upon the point of its origin. Those that originate far to the east, as they generally do in August and September, are most likely to move west-north-west for a considerable distance before recurving, while those which originate in the western waters of the Caribbean Sea, as those do in the early season and in October, move north-west or north along the recurve of the normal track. Some of the more important facts given in the tables show that the storms may occur in any month from May to November, but that the great majority take place from August to October; that the area in which they originate is between latitude 12° and 28° N. and longitude 55° to 95° W.; that their mean annual frequency is 4; and that the mean daily velocity in the first branch and in the recurve is 260 miles, and in the second branch 390 miles. Conditions favouring the formation of the cyclonic systems are produced by changes in the positions and intensities of the so-called permanent areas of high and low atmospheric pressure.