there are no commanding eminences; the widest panoramas from the hill tops extend but a few miles, and the general evenness of the skyline is usually broken only by remnants of the old forest, not yet cut or burnt. It is significant that the name 'mountain' has been applied by local surveyors to hillocks only 100 or 200 feet in local relief. The minor features are explained by the scouring action of the ice sheet on this preglacial peneplain. The areas of massive crystalline rocks have a surface mammillated with rocky knobs and pitted with hollows; the first are largely bare, the second are filled to their brim with ponds or quaking bogs. Ledges and scarps are found at the border of the stronger rocks, while the weaker rocks, eroded to a somewhat lower level, are covered with drift plains which are mostly followed by the main streams. The drainage is very immature, varying irregularly from standing water in lakes and sluggish meandering streams in swamps to flowing reaches in graded drift channels and rushing rapids on rocky ledges. The lakes have generally been reduced to a lower level than that of their original shore line; they are often surrounded by muskegs or reduced to 'hay marshes.' Swamps cover a large part of the surface, not only filling many basins and valley floors, but ascending gentle slopes to the spring line on the hillsides; their thick spongy carpet of moss retains sufficient moisture for the growth of cedars and other swamp-loving trees and shrubs.

This district is of interest as a sample of the geographic conditions that prevail over a vast area of the Laurentian highland in northeastern Canada; an ancient mountainous region, reduced to moderate relief before the Cambrian strata were laid upon it, and since then remaining remarkably quiescent while so many changes were going on in other parts of the world.

WATERPOWER IN NORTH CAROLINA.

Bulletin No. 8 of the North Carolina Geological Survey (Raleigh, 1899) is devoted to an account of the water powers of that State, contributed by several writers. The volume opens with a chapter on the general physiographic features of North Carolina, in which the essential peculiarities of coastal plain, piedmont plateau and mountain belt are well presented by J. A. Holmes. The fourth chapter, by the same author, discusses the geologic distribution of waterpower and refers the rapids and falls of the rivers to their controlling causes. In the mountains, falls are determined by irregular variations in the resistance of the crystalline rocks; here short ungraded rapids frequently alternate with longer graded reaches. The narrows and falls of the Yadkin in the piedmont plateau occur where the river crosses a belt of resistant schist between belts of weaker argillaceous slates. The Roanoke descends 85 feet in nine miles as it passes from the piedmont crystallines to the weak strata of the coastal plain. The Tar has an abrupt fall of 15 feet at Rocky Mount, some 20 miles east of the border of the piedmont area, where the river has cut down through the coastal plain strata upon a reef of schists and resistant granite. The greater number of pages is devoted to details of individual rivers. The volume is well illustrated by half-tone plates.

W. M. Davis.

BOTANICAL NOTES.

RECENT BOOKS FOR SECONDARY SCHOOLS.

Professor Barnes has prepared a little book under the title of 'Outlines of Plant Life,' for use in such secondary schools as cannot give as much time to the subject as is required by his earlier 'Plant Life.' He has omitted much of the minute anatomy 'upon the assumption that no laboratory work with the compound microscope is possible,' an unfortunate assumption in our opinion. However, the author does not reduce his work to this low plane, but freely introduces suggestions for microscopical studies quite at variance with his prefatory statement. The sequence of structural study is from the simple to the complex plants, considerably more than a hundred pages being given to this part of the subject. This is followed by about the same number of pages devoted to physiological studies, and sixty pages of ecological matter. It should be very helpful to teachers.

The same publishers (Holt & Co.) bring out a smaller edition of Professor Atkinson's 'Ele-

mentary Botany.' The author assumes that the compound microscope is available, and proceeds to plan the work accordingly. The sequence here is in our opinion not as philosophical as that in Dr. Barnes's book, beginning with physiology (114 pp.), with structural studies next (164 pp.), followed by ecology (59 pp.). However, the teacher will find much which is helpful in the book, which has the merit of having much original matter in it.

Here perhaps may be noticed Professor W. W. Bailey's booklet 'Botanizing,' intended to be a guide to field collecting and herbarium work. For this it is apparently well fitted. It describes the equipment necessary for the work in the field as well as in the herbarium, and tells just how the work should be done for different groups of plants. It is not a modern book, for the department of botany with which it deals is not modern. When another edition appears it may be well to make it a field manual in a sense broad enough to include ecological work.

A STUDY OF NON-INDIGENOUS PLANTS.

PROFESSOR AND MRS. KELLERMAN, of Ohio, have been studying the non-indigenous flora of that State, publishing their results in the *Journal of the Cincinnati Society of Natural History* for March, 1900. They find that there are known 2060 flowering plants in the present flora of the State, of which 430, or a little more than 21 per cent., are non-indigenous. Of these foreigners 326 came from Europe, 30 from Asia, 2 from Africa, 46 from Southern and Western United States, 21 from tropical or South America, while 5 are of unknown nativity. It will be seen that more than 83 per cent. of these plants came from the Old World. Fifty-five natural families are represented by one or more species, the largest being Compositae (88), Gramineae (46), Druciferae (27), Labiatae (24), Caryophyllaceae (23), Leguminosae (19), Rosaceae (15), Polyponaceae (14), Scrophulariaceae (14), Umbelliferae (12), Boraginaceae (11), Chenopodiaceae (11). While many of these introduced plants are useful, many also are weeds, no less than 49 falling within this category, and of these all but eight come from the Old World. In order to show that by no means all of the weeds are exotic, the authors give a list of 40 troublesome weeds which are natives of Ohio.

NEW SPECIES OF INSECT PARASITES.

DR. ROLAND THAXTER, who is the authority on the group of insect parasites constituting the family Laboulbeniaceae has been able to add very materially to our knowledge of the group by a study of the material derived from an examination of the entomological collections in Paris, London, Oxford, Florence and Washington. He discovered 168 new species, belonging to 22 genera, some of the latter also being new. The genus Laboulbenia is enriched by the addition of 100 species. The new genera are *Monoicomyces*, with four species: *Polyascomyces*, with one species; *Limnaiomyces*, with two species; *Eucorethromyces*, with one species; *Misgomyces*, with two species, and *Euzodiomyces*, with one species. The descriptions of these new genera and species fill two numbers (9 and 21) of the *Proceedings* of the American Academy of Arts and Sciences, Vol. XXXV., issued respectively December, 1899, and April, 1900. Dr. Thaxter makes the welcome announcement that it is his intention to publish as soon as practicable a supplement to his 'Monograph of the Laboulbeniaceae' with figures of all the species.

PHYSIOLOGY OF TOBACCO.

AN interesting paper entitled 'Physiological Studies of Connecticut Leaf Tobacco,' by Dr. Oscar Loew, contains much of importance to the general plant physiologist, as well as to the practical grower of tobacco, as may be seen from the author's 'conclusions' which we quote in full. "Various problems relating to the manufacture of tobacco have been touched upon in this report, some of them within easy reach of solution, others of a very difficult nature. The prevention of fungous attacks in the barn or in the cases, the regulation of the temperature and humidity in the curing process, and the proper control of the sweat are points that can easily be settled. In many cases the replacement of the stalk-curing by the single-leaf curing process may prove a financial success. But there are other problems of a more delicate and difficult nature, as the prevention of the mosaic or calico disease

and the proper composition of the tobacco leaf while ripening. Upon this composition depends the development of a desirable aroma in the sweating process. Climate and weather are here such potent factors that human art can accomplish directly but little. Too cool and rainy weather may favor, for example, the production of fatty matter, which certainly exerts an unfavorable effect upon the aroma in smoking. There may be produced, however, still other products which are unfavorable to the aroma. Too dry weather may also interfere with the proper composition of the ripening tobacco leaves. By crossing and selection, however, varieties of tobacco may possibly be produced that even under favorable climatic conditions will not form much of the compounds which injure the aroma. In regard to the selection of the seed, it may be mentioned that even now some farmers go so far as to import their seed directly from Cuba each year."

Charles E. Bessey.

The University of Nebraska.

THE RECENT SOLAR ECLIPSE.

A joint meeting of the Royal Society and the Royal Astronomical Society was held on June 27th to hear preliminary reports from several expeditions that went out to observe the recent eclipse of the sun. Lord Lister, the president of the Royal Society, was in the chair, and with him was Professor G. H. Darwin, president of the Royal Astronomical Society. According to the report in the London *Times*, Mr. Christie, the astronomer royal, first presented an account of the observations made by himself and Mr. Dyson at Ovar, in Portugal. There totality lasted 84½ seconds, and though the sky was rather hazy he secured some good photographs. The plates employed were 15 inches square, and, owing to their size, were rather awkward to handle; hence he was only able to expose five during totality. The exposures ranged from one and one-half to fifteen seconds. The resulting pictures were exhibited. In several of them the prominences and inner structure of the corona were well shown, while in others considerable extensions of the corona were visible. Mr. Christie also showed some of the pictures taken by Mr. Dyson with a double camera; in one of these at least greater coronal extensions could be traced than were visible to the eye. As to the corona, it seemed very distinctly inferior in brightness, structure and rays to the one seen in the Indian eclipse, appearing, indeed, quite a different object.

Sir Norman Lockyer next described the observations made by the Solar Physics Observatory Expedition and the officers and men of H. M. S. Theseus at Santa Pola. This place, which lay very near the central line of the eclipse, was selected because it appeared likely to meet the requirements of a man-of-war, and without the assistance of a man-of-war the manipulation of long focus prismatic cameras in a strange country was impracticable. Two of these instruments were used, one of which was a new one with a Taylor triple lense of 6-in. aperture and 20-ft. focal length. Out of the great wealth of photographs at his command Sir Norman Lockyer only exhibited a few to give a general idea of his results. Four coronographs were employed. The corona appeared to him a repetition of the one seen in 1878 and different from that of 1871; in several respects he obtained confirmation of the differences between the coronas at periods of sunspot *maxima* and *minima*.

Professor Turner spoke of the observations he had made with Mr. H. F. Newall in the grounds of the observatory near Algiers. He himself had undertaken the photographic work, while the spectroscopic fell to his colleague, a joint program of polarization work being also carried out. Professor Turner spoke strongly in favor of the coelostat, which he had employed, as an instrument for eclipse work, and showed several of the photographs he had obtained. From observations on the brightness of the corona he concluded it was many times brighter than the moon—perhaps ten times as bright.

Professor Ralph Copeland described the observations he made on behalf of the joint committee at Santa Pola, endorsing Sir N. Lockyer's remarks as to the advantage of having the aid of a man-of-war. With his small prismatic camera, in which the optical parts were of quartz or Iceland spar, he was in India, working the instrument himself, only able to take