possible readiness to leave a problem open rather than to venture a solution that shall be at all one-sided. In fact, if there is any criticism to be passed it is that anxiety to be absolutely fair to the views of others sometimes prevents the author from stating his own with the positiveness that makes for definiteness. If one wants a statement of recent theories and the established facts in feeling or attention the volume is to be recommended as the best available. It gives not merely a clear, full and sympathetic statement of the theories themselves, but a measured and undogmatic criticism, and the resulting theory of the author.

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Camps and Cruises of an Ornithologist. By FRANK M. CHAPMAN. With 250 photographs from nature by the author. Pp. xvi + 432. New York, D. Appleton & Co. $3.00.

As its title indicates, this book is a series of narratives. But, though popular in style, it is not lacking in seriousness, for it contains many fresh or new observations on the habits of birds which will be of permanent value to ornithologists. It is based largely on the author's field work in gathering material for the now rather well-known "habitat groups" of birds exhibited by the American Museum of Natural History. Therefore, it may appropriately be called a by-product of museum work, and, as such, though published privately, it admirably illustrates the way in which a modern natural history museum may carry its broadening influence beyond its exhibition halls.

The eight sections into which the book is divided contain related chapters, each devoted to a certain species or a single expedition. Some of these have been published previously in periodicals and others will be recognized in certain quarters as having been the subjects of public lectures, but some are entirely new and all are pleasing in style and either replete with real information or most suggestive of possibilities in specialized bird study.

Travels about Home, the first section, includes a few little intimacies with blue jays, meadowlarks and nighthawks and indicates the opportunities for bird study that lie close at hand, even to the busy New Yorker. The next, Bird Life of Two Atlantic Coast Islands (Cobb's Island and Gardiner's Island), deals with some interesting species of water birds likewise found at home but a short distance from our largest cities. Florida Bird Life, following, is notable for its almost exhaustive study of the brown pelican and its revelations of the secrets of the great rookeries of herons and egrets, including the now rare experience of meeting the roseate spoonbill in the breeding season. Bahama Bird Life includes observations on terns, boobies and man o'war birds, but easily takes first rank for its superbly illustrated and fascinating story of experiences in the wonderland of flamingoes. The Story of Three Western Bird Groups briefly relates incidents of visits with the prairie chicken in Nebraska, the golden eagle in Wyoming and various small desert birds in Arizona. This is followed by Bird Studies in California, which is introduced somewhat modestly, perhaps in deference to the splendid work being done by Pacific coast ornithologists; but, in view of the limited time spent in the field, most creditable results are shown, especially in the chapters on the water birds of the San Joaquin Valley and of Lower Klamath Lake. Bird Life in Western Canada, like most of the book, is devoted to water birds, with the exception of a chapter on the white-tailed ptarmigan and other birds of the higher parts of the Selkirk Mountains. The concluding section consists of the single chapter, Impressions of English Bird Life.

The half-tone illustrations, 250 in number, are mostly of that excellent character regularly attained by our best bird photographers. The few that are not technical gems of photographic skill are quite justified by their ornithological interest, while some certainly deserve rank among the most interesting and successful bird photographs ever taken. Typographical errors and a few other slight evidences of haste while the book was in press are rather too frequent to be over-

looked. It is hoped that these will be corrected in later editions.

Wilfred H. Osgood

BOTANICAL NOTES

GANONG'S PLANT PHYSIOLOGY

Several years ago Professor Ganong wrote a very useful little book on plant physiology, which is now expanded into an octavo volume of 265 pages under the title of "A Laboratory Course in Plant Physiology," brought out by Holt in a very handy form for laboratory use ($1.75). The author tells us that the book has a threefold purpose, namely, (1) "to lead students through a good laboratory course in plant physiology"; (2) "to provide a handbook of information upon all phases of plant physiology having any educational interest"; (3) to serve "as a guide to self-education by ambitious teachers or students, who, unable to obtain regular instruction, yet wish to advance themselves in this attractive and important subject."

In pursuance of these objects the author devotes about fifty pages to helpful discussions on the place of plant physiology in botanical education, methods of teaching and study, greenhouse and laboratory plans, apparatus and material. This is followed by the book proper, in which the sequence of subjects is (1) the structure and properties of the protoplasm of plants; (2) the physiological processes of plants, the latter including (*a*) the processes of nutrition (photosynthesis, chemosynthesis, synthesis of proteids, conversion, respiration, absorption, transport, elimination); (*b*) the processes of increase (growth, reproduction); (*c*) the processes of adjustment (irritable response, adaptation). A closing chapter of a dozen or so pages is devoted to methods of manipulation, and to convenient tables and lists.

Looking over the pages of the book, the reader is impressed with the practicability of the suggestions made by the author. They impress one as being based upon much experience, and this is actually the case, for the book is a growth from Professor Ganong's long and successful experience with students in his own classes in plant physiology. The illustrations (68 in number) and full-page plates (4) are especially helpful, and yet not an illustration or plate has been given merely to make the book appear more attractive; every one is needed; every one helps to make some part of the subject more clearly understood. Altogether this is one of the most satisfactory botanical text-books in any department of the science that has come to our notice.

ECONOMIC BOTANY

The Report of the Chief of the Bureau of Plant Industry of the United States Department of Agriculture for 1908 is an encouraging paper, showing as it does the steady enlargement of the scientific study of plant problems. A full enumeration of all of the work carried forward is impossible here, but the following general outline may give some notion of its extent: Field and laboratory work in pathology and bacteriology; plant life-history investigations; investigations of drug and other special crops, and of poisonous plants; crop technology, cotton standardization and fiber investigations; grain standardization; seed laboratory; physical laboratory; investigations and experiments in the semi-arid west and southwest; demonstrations and experiments with field crops; Arlington experimental farm and truck-crop investigations; investigations in pomology; greenhouses, gardens and grounds; farm management investigations; farmers' cooperative demonstration work; work connected with the purchase and distribution of seeds; special testing gardens in the field. Under each of these heads are details of many experiments and studies of great botanical interest, and of still greater interest to farmers, gardeners and other growers of plants. Indeed, one can scarcely open a page of this pamphlet of 135 pages without finding an interesting and suggestive paragraph. The people of the country have reason to be proud of this bureau of our National Department of Agriculture.

Another paper which appeals to the economic botanist is one from the New York Agricultural Experiment Station, entitled