the volume before us, 'The text-book is intended chiefly for the use of students who lay most stress on the study of the experimental part of physics, and who have not yet reached the stage at which the reading of advanced treatises on special subjects is desirable.' With this end in view special attention is given the description of the fundamental experiments and special emphasis is laid upon the various assumptions, and the conditions under which the different theories hold.

It is of interest to note the order of arrangement of the matter in a text-book written by men so well known as teachers as well as investigators. There are in all twenty chapters, and their contents may be outlined as follows: Discussion of temperature; expansion with rise of temperature; quantity of heat, conductivity; conservation of energy; the kinetic theory of matter; change of state; radiation and absorption; thermodynamics, radiation.

A better order for the presentation of the subject of heat could hardly be imagined; and as one reads the chapters it is only at rare intervals that one feels called upon to offer any criticisms or to make any comments which are not most favorable. It may not be amiss to mention as being worthy of special praise the treatment of such subjects as the kinetic theory of matter, radiation, the porous plug experiment, the discussion of various phenomena in meteorology, the spheroidal state, and the theory of the radiometer. The most valuable feature of the book is undoubtedly the exact statement of the various theories and their limitations. Thus, in speaking of the radiometer, the authors say: "The theory is altogether beyond our scope, but the following account of what occurs may give some idea of the action. It is to be remembered that it is an account and not an explanation." Various sentences like this may be found throughout the book, and any student must be impressed with the great care taken to give a true account of both experiments and theory. There is one criticism, rather general in its nature, which may be passed upon the whole book, and that is that too much attention is given experiments and observations of former days at the expense of more modern work. It does not seem altogether advisable to discuss so fully experiments which were incomplete or mathematical laws which have been shown to represent the truth imperfectly. This is specially marked in the chapter on radiation. Again, in the description of certain forms of instruments, care is not taken to explain certain essential features in their accurate use, as, for instance, the Bunsen ice calorimeter. It would have been well, further, in discussing the difficulties of calorimetry to say a few words concerning the instrument perfected by Waterman. In the chapters dealing with the specific heat of water and the mechanical equivalent of heat good, bad and indifferent experiments are all described together, and a student is not told which are the best. If so many experiments and observations are to be described, it certainly would be best for a student to be told which are designed with the greatest care and which are the most trustworthy.

These slight criticisms are not meant in any way to reflect upon the excellent character of the book. As a text-book it stands by itself and should be put in the hands of every student of physics early in his course.

J. S. Ames.

Minnesota Plant Diseases. By E. M. Freeman, Ph.D., Assistant Professor of Botany, University of Minnesota. Report of the Survey, Botanical Series, V. St. Paul, Minnesota, July 31, 1905. Pp. xxii + 432. 8vo.

From time to time, it has been the pleasant task of the writer to notice the publication of the Botanical Survey of Minnesota, and to comment upon the thoroughly satisfactory style of publication adopted by the director, Professor Conway Macmillan, of the University of Minnesota. The volume now before us fully maintains the high standard set by the previous publications in this series. In its paper, type, illustrations and binding, this volume leaves nothing to be desired. As one turns over the pages, he is struck by the uniformly high quality of the illustrations, whether they are cuts from line drawings, or half-tones from photographs. They are all

judiciously selected, well printed, and give one the impression of illustrating the text rather than of adorning the book. This is not the case with all recent books, in some of which one suspects that pretty pictures have been used to add to the attractiveness of the pages, with only remote reference to the text.

We are told in the preface that the chief object of this book is 'to disseminate knowledge of the destructive parasites of the useful plants of Minnesota, to assist all concerned in the cultivation of plants, to a more intelligent and thorough understanding of the habits of these parasites, and to point out established methods of combating such diseases.' In carrying out this plan, the author gives about one half of the book to a general discussion of the nutrition, reproduction, life methods, and parasitism of the fungi, their rôle in plant diseases, their kinds systematically considered, the prevention of diseases, fungicides, spraying, etc. This is followed by a special discussion of diseases of timber and shade trees, timber rots, diseases of field and forage crops, garden crops, orchards and vineyards, green house and ornamental plants and wild plants. In connection with each disease, there are brief but clear suggestions as to preventive or remedial treatment. The volume must at once be in great demand in Minnesota, and, without doubt, the small edition of 2,500 copies will soon be exhausted. It is so valuable a book that it is certain to be in demand wherever there are students of plant diseases, and to meet this demand it should be placed on sale.

CHARLES E. BESSEY.
THE UNIVERSITY OF NEBRASKA.

Sea-shore Life. The Invertebrates of the New York Coast. By ALFRED G. MAYER. New York Aquarium Series, No. I. Published by the New York Zoological Society. 1905.

Dr. Mayer has succeeded in the difficult task of presenting in a readable and popular form a good deal of information regarding the habits and distribution of the lower marine animals of the coast of New York and of Long Island. A simple description of the appearance and structure of most of the forms is given that will suffice for identification. Especially noteworthy are the large number of new illustrations; most of them photographs of the living animals. While these photographs are not all of equal merit, the majority of them are excellent and valuable.

The book of some 200 pages is not intended as a guide to the New York Aquarium, but it is anticipated that many visitors whose interest has been aroused by the fine exhibit at the aquarium will be glad to learn more about the marine fauna of our coast; and a book of this kind will meet such a need. At present, it is true that the animals in the aquarium are largely fishes and a few other vertebrates, but with the completion of the new salt water system that is now being introduced it will be possible to keep alive many of the more delicate invertebrate forms. When this change occurs the first volume of the New York Nature Series will form a useful compendium to the visitor who desires to study the animals in the aquarium as well as to see them.

Two features of Dr. Mayer's book seem to us to be especially noteworthy. In the introductory statement the theory of evolution is presented in a modest and undogmatic spirit, that will recommend itself to most readers. In the second place many references to more special works are scattered through the text, so that the tyro will be able to follow up any special subject that may excite his interest.

The book is clearly printed and presents a very attractive appearance. It ought to prove useful as well as attractive.

T. H. MORGAN.

SOCIETIES AND ACADEMIES.

THE AMERICAN MATHEMATICAL SOCIETY.

THE one hundred and twenty-fifth regular meeting of the American Mathematical Society was held at Columbia University, on Saturday, October 28. The simultaneous meeting of the American Physical Society afforded an agreeable opportunity for the renewal of cordial relations among the members of the two organizations. The attendance at the morning and afternoon sessions of the Mathematical So-