female parent, or simply false hybrids developed from adventive embryos. It is thus probable, or we may say certain that in such work many seedlings will have to be grown and fruited which are from adventive embryos and are not true hybrids. These of course cannot be expected to give rise to valuable new varieties, and growing them will greatly increase the trouble and expense.

W. F. GANONG,
Secretary.

SCIENTIFIC BOOKS.

Insects, their Structure and Life. By GEORGE H. CARPENTER, B.Sc. London, J. M. Dent & Co. 1899. Pp. 404, figs. 183.

There is need of a modern elementary text-book of entomology covering all the important phases of the study of insects. Comstock's Manual in its present form is chiefly devoted to the systematic and ecologic phases, while Packard's new text-book is given up exclusively to the morphological, physiological and developmental phases of insect biology. Mr. Carpenter's book is an attempt to supply the need. Its six chapters treat respectively of the Form of Insects (anatomy and, very slightly, of physiology), the Life-history of Insects (embryonic and post-embryonic development), the Classification of Insects, the Orders of Insects (these two chapters including the classification of insects as far as families, and brief mention of the habits with families as units), Insects and their Surroundings (ecology) and the Pedigree of Insects (phylogeny). These subjects include all the principle phases of the general biologic study of a group of animals, and in this respect the book is wisely planned to meet a real need. For the most part this presentation of the elementary facts of the 'structure and life of insects' will meet with the approval of teachers of entomology. The selection from the mass of material constituting the science of entomology of the little that can be included in an octavo volume of 400 pages, is a matter requiring a large knowledge of insects and a discriminating and clear pedagogic insight. The author (an active naturalist of Dublin) has a good knowledge of entomology, a discriminating perception of the relative importance of facts, and a clear and simple style.

In undertaking to write an elementary general text-book of entomology, the most difficult task is that of the satisfactory treatment of the systematic phase. The enormous number of insect species precludes the use in such a book of classificatory units smaller than families, and indeed renders the adoption of the family unit unsatisfactory. It is this part of the book, the chapter, Orders of Insects, devoted to the systematic consideration of insects, which is the least satisfactory part of it. To treat systematically the whole class of insects, using families as units, in a few more than one hundred octavo pages, and to impart to this treatment any real interest or life, or, one is forced to say, real value, is too nearly impossible to be expected from even the capable author of this book. He adopts a 15-order classification and races through these orders, leaping family barriers three or four to the page. To be sure, certain mechanical assistance, a resorting to small type, is offered to give each family a chance to have its habits told in two lines instead of one, but that hardly betters matters. There is simply no space for what is the absolute minimum of treatment necessary to make such a syllabus or synopsis worth anything more than a list.

It is with relief, therefore, that we leave this distressful attempt to do the impossible, to examine the following interesting and admirable chapter on 'Insects and their Surroundings,' where those general relations of insects to their surroundings, distribution, parasitism, protective resemblances and mimicry, social and communal life and other phases of insect ecology, are presented. Similarly good are the chapters on embryonic and post-embryonic development. Much of the matter of these chapters has never before been given in a small text-book of entomology, and that is the special value of this book. The illustrations are, while mostly good in themselves, often not very apposite to the context. Very few new figures have been made for the book. The excellent blocks (more familiar to American entomologists than they probably are to English students) of the Divi-

sion of Entomology of the U. S. Dept. of Agriculture have been drawn on heavily for the book's illustration. One hundred and one out of the one hundred and eighty-three figures are from this source.

A brief but good bibliography is appended and there is an index. The work of printers and binders has been tastefully done. Altogether the book is a useful one, and one that can be recommended to beginning students of insects.

VERNON L. KELLOGG.

STANFORD UNIVERSITY, CALIF.

The Strength of Materials. By J. A. EWING, Professor of Mechanism and Applied Mechanics in the University of Cambridge. Cambridge, The University Press. 1899. Octavo. Pp. 246.

It will be news to many Americans to learn that instruction in the subject of the strength of materials is now given at the University of Cambridge and that laboratory work in testing is done there. The mathematical theory of elasticity has long received attention at the universities of England and Scotland, as shown by the works of Todhunter and Pearson, of Love, and of Thompson and Tait; this theory and these volumes have, however, added little to the practical knowledge of the properties of materials and have not influenced engineering constructions. At last, after many years of waiting, there comes from Cambridge a book which recognizes the fact that observation and experiment are essentially necessary, and which sets forth the fundamental principles and facts in a manner likely to be of much value to the engineering students and civil engineers of Great Britain.

In its theoretical discussions the book covers about the same ground as that given in American engineering colleges, but there are few numerical exercises and no problems for solution by the student. That such problems are necessary is, however, recognized by the author in his preface which states that the volume is a lecture room treatment of the subject and should be supplemented by laboratory work and computations. The theory is not given isolated from experience, but methods of testing are explained in an interesting manner, and the principal conclusions of the authorities in all countries are noted. Processes of manufacture which influence strength and ductility also receive some attention. The theory of beams, columns and shafts is presented clearly and concisely, and the subject of stresses in trusses and arches is briefly treated. The author has succeeded admirably in putting much sound doctrine and practical information into a limited space. The notation and terminology leans toward that of the mathematical theory of elasticity, but here and there the author breaks away from that bondage and uses the notation of engineering literature. In short this happy wedlock of theory and practice is one upon which the University of Cambridge should be congratulated. No book has appeared in England in recent years which so fully corresponds to the American ideal of a text-book for sound and successful education.

M. M.

GENERAL.

PART V. of the 19th Annual Report, and accompanying Atlas, consists of a collection of papers and reports of the U. S. Geological Survey descriptive of the forests of the West, especially of certain of the forest reserves created by Executive Order of February 22, 1896, prominent among which are the Black Hills, Bighorn, Teton, Yellowstone Park, Priest River, Bitterroot and Washington Forest Reserves. Copies may be secured through United States Senators and Representatives, or by application to the Survey.

THE Liverpool School of Tropical Medicine has just issued a memoir, or small book, containing 'Instructions for the Prevention of Malarial Fever,' for the use of residents in malarious places.

BOOKS RECEIVED.

The Ore Deposits of the United States and Canada. JAMES FURMAN KEMP. New York and London, The Scientific Publishing Co. 1900. Pp. xiv + 481.

Annals of the Astronomical Observatory of Harvard College. EDWARD C. PICKERING, Director. *Visual Observations of the Moon and Planets.* WILLIAM H. PICKERING. Vol. XXXII. Part II. Pp. iv + 117–317. Plates viii–xiv. *Miscellaneous Researches.* Vol. XXXIII. Pp. 287. *Observations made at the Blue Hill Meteorological Observatory.* A. LAWRENCE ROTCH. Pp. 131–280. Cambridge, 1900.