used in previous attempted introductions. In the spring of 1899, while traveling for the Section of Seed and Plant Introduction, I again sent winter caprifigs from Naples, and also, in considerable numbers, from the fig-producing regions of the mountains of Algeria. These also endured the journey well, and on arrival at Washington they were turned over to Dr. Howard, under whose direction they were liberated by Mr. Roeding in his extensive orchards at Fresno. This time the introduction was successful, and *Blastophaga* is now breeding in California, and, it is hoped, may pass the winter and become permanently established.

The principal fig growing regions of North Africa, Italy, Greece, and Asia Minor were also visited in order to learn the methods of culture there pursued, and the conditions necessary to the life of the insect. In the spring of 1898, when the fig orchards about Smyrna were severely frozen, the extraordinary price of from one to three dollars a pound was paid for caprifigs from islands of the Archipelago and from Western Greece, to be used in restocking the orchards with the *Blastophaga*. From one to two cents a pound is the ordinary price of caprifigs. Some lucky owners of large caprifig trees realized fabulous sums for their crop, much more than would ever be obtained from a tree producing edible figs.

Caprifigs are by no means all wild, as commonly supposed, but are extensively propagated and exist in several named and well-known varieties in Greece and Asia Minor. It is further worthy of note that the *profichi* which are produced by certain trees often have a value greatly superior, and there is reason to suppose that some sorts produce not only more *profichi*, but more insects to the fig, and furthermore do not harbor the mess-mate, *Philotrypesis ficaria*, which is considered injurious by growers. I was shown a fig tree in Algeria to secure the fruits of which natives often journeyed twenty or thirty miles. Another yielded *profichi* which sold in 1897, for seven dollars; and in Patras, Greece, I saw a third tree which had brought in as much. These facts give some idea of the views of the natives as to the importance of the process of caprification, which, indeed, all testimony agrees in proving to be *absolutely necessary* for securing a crop in all figs of prime commercial value in the dried condition.

Walter T. Swingle.
U. S. Dept. of Agriculture.

SCIENTIFIC BOOKS.

Praxis und Theorie der Zellen- und Befruchtungslehre. By Professor Valentin Häcker. Jena, G. Fischer. 1899. 260 pp. 137 Figs.

The last decade has witnessed the appearance in a large number of biological laboratories of a new course of study, now becoming generally known as cellular biology or cytology, which has created new demands in the way of text-books and laboratory methods. In its morphological aspect this study is nearly related to, and strictly speaking forms a part of, the older histology; though a practical ground of distinction lies in the fact that cytology is principally concerned with the anatomy of the cell considered as an individual, while histology includes also the comparative anatomy of the tissues. Cytology covers, however, a much wider field than that of cell-anatomy, for a very important part of the study relates to the processes of cell-reproduction and cell-physiology, including the phenomena of cell-division, the maturation and fertilization of the germ-cells, the physiological relations of nucleus, cytoplasm, and other cell-organs, and many cognate problems relating to growth and development. The subject thus becomes one of very wide scope, and indeed joins hands with every branch of biology that can be studied from the cell-standpoint. As practically taught, however, cytology is still largely occupied with cell-morphology and reproduction, and the historical development of the subject has been such as to concentrate the attention of cytologists to a considerable degree on the structure of the reproductive organs and on growth, division and

related phenomena, as displayed in the history of the germ-cells and in the early stages of embryological development. This tendency of cell-research, with which students of cytology are sometimes reproached, is not wholly due to the high theoretical interest of the germ-cells. It is in large measure a result of purely practical conditions, such as the large size of the cell-elements in germ-cells or embryonic cells, the ease with which they may be obtained in all stages of development, and the accurate control of results thus rendered possible. Similar reasons may be given for the large share of attention that has been devoted to special forms of tissue-cells, such as the epithelial cells and leucocytes of salamander-larvæ, or the embryonic cells of plant-tissues. Cytological teaching has inevitably followed in the main, the lines of research; and thus it has come to pass that in practice, courses in cellular biology cover a very different field from those in histology, requiring special material and employing special methods.

Botanical students have been fortunate in the existence of Strasburger's well-known *Botanisches Practicum* which, though primarily devoted to general botanical morphology, also contains valuable directions for the practical study of plant-cytology. Students of zoology have had no lack of general works, such as those of Flemming, Carnoy, Bergh, Hertwig, Henneguy and Wilson, not to mention a number of admirable works on histology; but with the exception of Carnoy's *Biologie Cellulaire*, published fifteen years ago and the first of its kind, none of these works contain practical laboratory directions. Carnoy's work is now too far out of date to be of much service to the modern student, and the same applies to Whitman's excellent *Methods in Microscopical Anatomy and Embryology* published in 1885. A. Bolles Lee's *Microtomist's Vade-mecum*, especially in the German edition, translated and revised by Paul Mayer, is indispensable to all students of microscopical anatomy, yet even this work does not supply the want which Häcker has now endeavored to meet.

The '*Praxis und Lehre*' will, we feel sure, be of the highest service both to students and to teachers of cytology. As the name indicates, it is not properly a laboratory manual, but happily combines practice with descriptions of fact and the discussion of theory. The plan followed is to describe a series of 'objects,' each accompanied by practical directions for the collection and preparation of material, a brief and clear account of the topic which it illustrates, and a review of the earlier history and more recent literature of the subject. The methods, like many of the descriptions, are in the main compiled from recent original works, and the author has wisely omitted all accounts of elementary operations such as the use of the microscope, methods of section-cutting and the like, which are adequately treated in Lee's and other manuals. The student is thus brought directly to the real subject-matter and is enabled to gain a connected idea of the facts, learning at the same time how to procure and prepare the material for first-hand knowledge. Some of this material, it is true, is not readily procurable, some is practically out of the reach of all who are not specialists. Professor Häcker has none the less rendered a good service, especially to teachers, by bringing together in readily available form the widely scattered accounts of material and method given by special investigators. The book is a model of clearness and brevity, and is well illustrated by figures drawn as far as possible from the latest sources. While we do not doubt that further experience will suggest many improvements on the practical side, the book may be heartily recommended as a most useful adjunct both to lecture-courses and to practical work in cytology, and one that cannot fail to give a stimulus to the study.

E. B. W.

The Teaching Botanist. By WILLIAM F. GANONG, PHD., Professor of Botany in Smith College. New York, The Macmillan Company. 1899. Pp. xii + 270. Price, $1.10.

The growth of interest in the teaching of botanical science has found expression in the publication during the past few years of a liberal number of books, concerned in one way or another with this teaching. Up to this time these works naturally fall into two categories—that of the text-book and of the laboratory manual—and although some attempt has been