with the external anatomy of *Braula,* especially with the structure of the mouth-parts; but there is an historical account of the insect and a consideration of its relations to the bee.

An interesting little book has been written by L. C. Miall as an introduction*to the study of economic entomology. The work is divided into four portions; I., Preliminary lessons; II., Lessons on common insects, chiefly such as are either injurious or useful to man; III., Descriptive account of the larger orders of insects, with short notices of remarkable forms; IV., The destruction or mitigation of insect pests. The book is devised especially for English students, but the introductory structural and biological features would be of much help to Americans. Indeed on these points it is plainly superior to most of our works on economic entomology, and indicates the lines along which our text-book could be improved. The economic accounts of the various species treated are frequently of interest to us, and the chapter on insecticides is largely drawn from American sources. The outline figures are good; and the book will undoubtedly do much to broaden the knowledge of economic entomology in England.

Nathan Banks.

BOTANICAL NOTES.

TWO TEXT-BOOKS OF BOTANY.

Among recent books designed for the use of students is Professor Heald's 'Laboratory Manual of Elementary Biology' (Clute & Co.), Part I. of which interests us here, as it alone is devoted to plants. This book is interesting as coming from a teacher who has had to solve the problem of the best method of presenting the subject to beginning classes. The method adopted is described by the author as a mean between the 'verification method' and the 'question method,' neither of which he fully approves. Directions are given for making particular observations, and some questions are asked, but at the same time much information is given in the text. Apparently the author has succeeded in quite successfully steering the middle course which he approves. In taking up the subject he begins at once with the lower plants, and makes this excellent contribution to the pedagogics of botany in his preface: "No excuse need be offered for beginning with the simple forms and ending with the complex. Experience has shown that the logical order can be carried out with even more satisfactory results than the illogical order of complex first and simple forms later." The book is remarkable in containing no illustrations whatever, and may thus be regarded as a protest against the excess of illustrations found in so many recent books. Professor MacDougal's little book, 'Elementary Plant Physiology' (Longmans, Green & Co.), reminds us of his earlier work, 'Experimental Plant Physiology,' which in fact it is intended to replace. The sequence of topics is quite different, however, in the new book, and many new illustrations have been added. After a useful introductory chapter devoted to material, measurements, etc., the author takes up 'Growth,' following this with 'Reproduction and Germination.' Then follow chapters on 'Exchange and Movements of Gases and Liquids,' 'Nutrition,' 'Respiration, Digestion and Fermentation' and 'Stimulation and Correlation.' The physical aspects of physiology are thus first taken up, and then the chemical aspects, followed by what may be called the vital aspects. Here again we detect a suggestion as to the proper sequence of topics in the study of plants and their activities. The book will no doubt become popular.

FURTHER STUDIES OF CELLULOSE.

Several years ago a notable work appeared from the hands of C. F. Cross and E. J. Bevan under the simple title of 'Cellulose' (Longmans), which at once took place as a standard reference book in botanical laboratories. Recently the same authors have prepared another book, 'Researches on Cellulose,' brought out by the same publishers, which is intended to supplement the former work. It gives a brief account of the researches published since the issue of the earlier book,

* 'Injurious and Useful Insects,' London, 1902, 8vo, pp. 256, figs. 103.

in addition to some investigations of the authors themselves. The book follows the general plan of its predecessor, but no attempt is made to give it the form of a connected record. The earlier book must be in the hands of the reader in order that the results here given may be understood. The original papers are summarized under their proper headings, and references are made to the places of publication. The attempt has been made 'to reproduce the authors' main conclusions, and in most cases without comment or criticism.'

It is quite impossible to review a book of this kind; it must be read by the person interested. To show the value of the book to plant physiologists we may quote from the introductory chapter (pp. 8, 9): "These researches of Fenton's appear to us to have the most obvious and direct bearings upon the genetic relationships of the plant furfuroids, and not only *per se*. To give them their full significance we must recall the later researches of Brown and Morris, which establish that cane sugar is a primary or direct product of assimilation, and that starch, which had been assumed to be a species of universal *matière première,* is probably rather a general reserve for the elaborating work of the plant."

STUDIES OF THE STRUCTURE OF MOSSES.

WE have had occasion heretofore to call the attention of botanists, especially of non-professionals, to the help that may be obtained from certain special periodicals which are too often overlooked by the very persons who might receive benefit. It is all very well for the general student of science to read general journals, but he misses much if he does not read these special journals also. Thus there are many amateur botanists who are interested in the structure and classification of the mosses who would be greatly helped by reading the papers in the current numbers of the *Bryologist*. Dr. Grout, the editor, began some months ago a series of papers on the *peristome* of the moss fruit, and from those which have appeared we may judge as to the high value they will have for the beginner in bryology. Every one who has attempted to work the mosses has found out that this is one of the difficult structures to understand, and for the solitary student who has no handy and obliging professor to whom to appeal such help as is given in Dr. Grout's papers must prove invaluable.

THE IGNORING OF BEGINNERS AND AMATEURS.

WHEN we take up special journals like that referred to above, we are reminded that the beginner has a hard time of it now-a-days. Most journals ignore him—that is, journals of high standing and scientific reputation. One is sometimes tempted to wish that the large botanical journals might not forget that there are a great many people who are still beginners in botany, and that there always will be many beginners. The writer remembers when the American journals of botany were edited by beginners, for beginners, and he wonders whether they were not even more useful than now, for they offered to other beginners a means for 'getting up in the world,' which they scarcely do to-day. Then they were botanical ladders let down in the midst of students who wanted to learn, but now these ladders have been pulled away above the reach of the beginner. This is not always the fault of the editors. Not long ago an editor, in commenting upon the suggestion that this journal should contain more for beginners and amateurs, said that he had been criticised repeatedly by prominent scientific men for admitting even a very little of such elementary matter. Evidently some men who attain eminence forget the helps which enabled them to succeed, a state of mind which is certainly not to be commended. Let such repeat to themselves the text: 'For none of us liveth to himself.' No man should be impatient of the elementary work which is so necessary in order that beginners in science may attain to something.

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SCIENTIFIC NOTES AND NEWS.

M. BOUVIER has been elected a member of the Paris Academy of Sciences in the section of anatomy and zoology. Others who received