good purpose in illustrating their descriptions of the larynx by photographs taken from the reflected images in the laryngoscopic mirror. Thus, the chink of the glottis is shown in the act of forming sound. Photographs are also given of the interior of the mouth, showing the positions of the soft palate during the singing of certain notes. These and other illustrations greatly add to the interest of the elaborate descriptions of the processes of phonation.

The book commences with a plea for the study of vocal physiology. The importance of a knowledge of the *principles* of vocal physiology to singers and speakers, no one will dispute; but it may be doubted whether any practical benefit can be derived by voice-users from the anatomical detail of the structure of the vocalizing-apparatus, which is here so copiously exhibited. This part of the treatise might have been much condensed with advantage, so far as its practical applications to speaking and singing are concerned. This portion of the book may, perhaps, have its utility to voice-*trainers*, who ought fully to understand the mechanism which they undertake to direct; but voice-users could not 'govern the ventages' in speech or song with any better effect from knowing the shape and name of the individual cartilages which they set in motion.

In the chapter on defects and impediments of speech, both stammering and stuttering — very indefinitely distinguished — are traced to one common source: "A fault in respiration is at the root of all the mischief." No system is presented or advocated for the relief of stammerers, for the specified reason that "there is none that is honestly applicable to all cases." Something more definite might have been expected under this head. For facts relating to the vocal registers, and to the anatomy of the larynx and the chest, this book will be useful as a work of reference in the libraries of scientific teachers of speech or song; but it will not add much to their knowledge of practical vocal physiology.

M'ALPINE'S BOTANICAL ATLAS.

The botanical atlas: a guide to the practical study of plants, containing representatives of the leading forms of plant-life, with explanatory letterpress. By D. M'Alpine, F.C.S. 2 v. New York, *Century Company.* 1883. 52 pl. 4°.

It is difficult to see why this work should be entitled '*The* botanical atlas' (except to distinguish it from the other atlases compiled by the author), since many of its best plates are from an entirely different treatise, which may as fairly lay claim to being called '*The* atlas;' namely, that of Dodel. Judging by its size, it is apparently designed to be used in class demonstrations; but its sumptuous binding somewhat unfits it for the laboratory table, while, on the other hand, the figures are not large enough to be used in place of lecture diagrams. The work is in two volumes, one of which is devoted to phanerogams, the other to cryptogams.

The drawings in the volume on flowering-plants are, for the most part, very good, some of them possessing remarkable clearness of outline; and the coloring is above the average in delicacy of effect. The impression made by this volume as a whole is, that it has received an amount of care which could have been more usefully expended in a slightly different direction. With the exception of the words 'magnified' and 'highly magnified,' there is nothing to serve as a guide to the relative size of the figures of corresponding parts. Every practical teacher of botany would have suggested to the compiler the desirability of furnishing what is never out of place in an atlas of any kind, to wit, a scale of parts. This is always serviceable in the treatment of microscopic or of any minute figures: in fact, without it they are often misleading to the beginner. It may be said, that it is impracticable to state in every case the approximate amount of enlargement or reduction; but certainly in most cases it is not impossible to give a hint as to the relative sizes of the figures.

Drawings of the size given in this atlas are chiefly useful for individual and not class study. With a greater enlargement, the plates would have proved useful in classes of ordinary size. A few attempts have been made to provide plates of suitable size for class use; but the subjects have not always been so well chosen, nor so successfully treated, as those in this volume. The well-known series made by Professor Henslow is so crowded that the effect of the exquisite drawing is obscured. In the lack of good wall-plates, we have a want which ought to be supplied. If the plates in the present volume were larger, so that they could be employed for demonstration before classes of moderate size, they would go far to meet this need. Their size now restricts their employment to the individual student, and this necessarily lessens their utility; but this is a matter for publishers to consider.

The volume relating to cryptogams contains twenty-six plates, some of which include a large number of figures copied from standard

authorities, a small number of the figures being original. The object seems to be quite as much to attract the eye by brilliant coloring as to furnish the student with accurately drawn microscopic details. The quality of the plates varies considerably: for, while those of Volvox and Mucor are effective, the same cannot be said of those of some of the lower forms, — as Nostoc, Oscillaria, Gloeocapsa, etc., — where a mass of color takes the place of clearness of outline, and important details are not well brought out. This may, however, be the fault of the lithographer, rather than of the original drawings. Considering their biological importance, better and more numerous figures of Myxomycetes might have been given. The plates of Fucus and Cetraria are unnecessarily bad, considering that there are several works from which excellent figures could have been copied; and the same may be said of the plate of Florideae, where no good figure of the procarp or cystocarp is given, and that of mosses, where the peristome is badly drawn. The antherozoid of a fern is represented not only without the usual bladder-like appendage, but also without cilia.

The text consists of brief descriptions of the figures, with directions for studying the objects themselves in the laboratory; the whole forming a skeleton to be filled out by the instructor. It seems to us that the use of the term 'gonidium' in the sense of non-sexual spore is hardly warranted. The word has a technical meaning in lichens, and its use in other orders has been superseded by better terms; and it is certainly undesirable to speak of the gonidia of Penicillium, for instance.

The work is likely to have a large sale among amateurs who wish a hasty glance at the subject; but it would be better for students to purchase some of the text-books, like Sachs or Luerssen, where they will find the same figures, and a full text as well.

ECONOMIC ENTOMOLOGY.

Injurious insects of the orchard, vineyard, etc. Illustrated with over seven hundred and fifty woodcuts and twenty-five pages of classified illustrations. By MATTHEW COOKE. Sacramento, *Crocker*, 1883. 472 p., illustr. 8°.

DURING the last few years, there has been a great growth in the popular appreciation of the importance of economic entomology. As a result of this growth, the demand for popular works on this subject has increased. To supply this demand, numerous publications have appeared in rapid succession. Of especial interest among these publications are the manuals of Miss Ormerod, Mrs. Treat, Mr. Saunders, and Mr. Cooke.

The work of the last-named author resembles in many respects the works of the others. Like them, it is largely a compilation; its chief merit being that it gives, in an easily accessible form, descriptions and figures which were scattered through many works. There is, however, some original matter. This consists of notes respecting various Californian species, which were studied by the author while serving in the capacity of chief executive horticultural officer of that state. The insects are discussed under the head of the plants they infest. The descriptions are written in a clear and popular style; but in some cases they are too brief, and in others they bear the marks of hasty compilation. A peculiar and excellent feature of the work is the bringing-together into one part descriptions of all the remedies suggested. These are referred to throughout the work by numbers. In this way unnecessary repetition is avoided. In the introduction a history of the legislation to prevent the spread of injurious insects in California is given. The work is profusely illustrated; but the good figures are not new, the new ones are not good, and all are poorly, printed. Still the book will be found to be a very useful one, especially to the fruit-growers of California.

Twelfth report of the state entomologist on the noxious and beneficial insects of the state of Illinois. First annual report of S. A. Forbes, for the year 1882. Springfield, Ill., 1883. 10+154 p., illustr. 8°.

IN this work we have the results of the first half-year of Professor Forbes's administration as state entomologist. In studying the report we are deeply impressed, both by the amount that has been accomplished and by the thoroughness with which the work is being done. Several of the articles in the report have been published separately during the past year, and have been noticed already in these columns. Of the other articles, the notes of experiments in the destruction of the European cabbage-worm, the account of a new plant-louse infesting cucurbitaceous plants, and studies on the chinch-bug, are the most important. The observations on Micrococcus insectorum Burrill, a bacterium parasite of the chinch-bug, are especially interesting.

We are glad to see that Professor Forbes has adopted the plan of intrusting some of the more special investigations to his assistants, and publishing the results they have