

CURRENT LITERATURE.

A text-book for advanced students.¹

In the second half of Vines' "Student's Text-Book of Botany," recently issued, two-thirds of the space is given to the discussion of phanerogams, which concludes part III of the four grand divisions of the book. The presentation of the phanerogams is not characterized by any novelties in the way of changes in classification, but rather by a conservative retention of the older views. In the present state of our knowledge of relationships perhaps this is the only safe course, but one cannot help wishing that the dicotyledons had not appeared under the old three-fold division. This, however, has been suggestively modified, for the old group *Apetalæ* has been broken up; those in which the flower has become simple by suppression being intercalated among the *Polypetalæ*; and those which are regarded as primitively simple forming the group *Monochlamydeæ*. For example, *Euphorbiaceæ* appear among *Polypetalæ*, while *Chenopodiaceæ* are retained among the *Monochlamydeæ*. Theoretically the distinction is a good one, but the difficulty of determining what groups are primitive and what groups are reduced is a large practical objection.

Aside from the fact that our most recent knowledge of morphology is incorporated, and so the whole presentation enriched, the notable feature is the maintenance throughout of a consistent morphological terminology. Sporophyte and gametophyte are discussed separately, and their structures are so designated as to keep homologies clearly in view. By no means the least important part of the work is the excellent summary given in each great group of the histology and embryology of the sporophyte. Probably the most perplexing morphological problem that remains among angiosperms is that concerning the nature of the structures of the embryo-sac, and one always turns with interest to this subject in a new book. Dr. Vines has adopted the view that the prothallium of angiosperms is developed in two stages, separated from each other by the act of fertilization; that is, that the "endosperm" is simply a later development of the prothallium. It is true that there are other prothallia which continue to develop after the oospheres have been fertilized, but there remains yet to be ex-

¹VINES, S. H.—A student's text-book of botany (second half). 8vo. pp. 431-821, figs. 280-483. London: Swan Sonnenschein & Co. New York: Macmillan & Co. \$2.00. (See for notice of first half, this journal, 19: 202. 1894.)

plained the significance of the formation of the endosperm nucleus, and the relation of its segmentation to the act of fertilization. The strong development of the antipodal region in certain groups, is a fact coming into such prominence that the old statements concerning it should certainly be modified.

The presentation of phanerogams is certainly a botanical treasure house, full of the latest and best that is known concerning the subject. From the teacher's standpoint the only criticism to be offered is lack of organization. It is difficult for the reader, who is not already a botanist, to grasp the really salient things and separate them from the rest. If the book were a picture one might say that the perspective was bad. With the living teacher such an objection disappears, and in any event is far overbalanced by the fullness and freshness of facts and terminology.

When we turn to part iv, on physiology, we find Dr. Vines at his best, and cannot help regretting that he did not restrict the treatment of phanerogams (which covers nearly 230 pages) to a discussion of the "orders" at least or even to his "cohorts," and thus leave himself room for a fuller discussion of physiological questions. We must however make the best of the 118 pages which he devotes to these topics. No fault can be found with the way in which he has utilized these all too few pages. The matter is logical, clear, well-balanced. The most notable departure from his "Lectures on the Physiology of Plants" is to be found in the parts on the special physiology of the nutritive functions and reproduction. Here Vines distinctly recognizes the manufacture of carbohydrates as a distinct process, to which however he gives no name, designating it merely as "the first step in the process of assimilation." He abandons also the idea that carbohydrates arise in the course of assimilation by a katabolic process, saying "the product of this carbon-assimilation is . . . a non-nitrogenous organic substance having the composition of a carbohydrate."

It need hardly be said that in each of the four chapters, on general physiology, and on special physiology of the nutritive functions, movement and reproduction, the matter has been brought down to date. On the whole the work must be looked upon as one of the best reference books in our language, and, with judicious selection by a good teacher, one of the best texts for advanced readers.

Horticultural botany.

Of all who deal with plants probably the horticulturist and florist come to the most intimate knowledge of certain phases of vegetable life. The success of their daily toil and the year's profits depend

upon their recognition of the material needs of the plants under their care, the prevention of disease and injury, and the selection and improvement of varieties and races. Yet the knowledge of the simplest physiological processes and most elementary details of structure of the living objects they daily care for is astonishingly vague and unreliable. This lack of apprehension of the plant nature extends from the boy who washes flower pots to the proprietor of the establishment, with only here and there an exception, and yet no class of cultivators are quicker to comprehend and apply knowledge in their own line. A book giving the physiological meaning of practical operations, if clearly and pleasingly written, must therefore supply a real demand. Such a work, it seems to us, is Dr. Sorauer's *Physiology of Plants* in its English form.¹

The field which the author essays to cover is largely unbroken, and so we are inclined to deal leniently with the shortcomings of the work, and more especially as it contains a great amount of most useful information in a form that is likely to prove attractive to the class of persons for whom intended. It can not be overlooked, however, that the title is misleading, as the work is in no proper sense a physiology of plants. It might be termed applied or economic botany based in part upon physiology, and in part upon ecology, whereas most works on applied botany are based upon structural and systematic botany.

The point of view is constantly that of the cultivator, and as such the treatment of the subject is logical and satisfactory. This accounts for the fact that many topics of great physiological interest, like certain portions of metabolism and nearly all of irritability, are not mentioned.

The work opens with an explanation of the true conception of a living plant organism, then passes in succession to consider the functions of root, stem, leaf, flower, and fruit, including, so far as required to understand their activities, some account of the elementary structure. Constant references to practical operations and advice upon the right performance of the same, with the physiological or ecological reasons therefor, give the work a genuine practical value, and rob it of the formality of pure science. Ample attention is given to strictly horticultural matters, *e. g.*, over twenty pages are devoted to pruning and thirty to propagating by cuttings and grafting.

Some fundamental topics are quite inadequately or even misleadingly treated, as the production of organic matter in green leaves, and

¹ SORAUER, PAUL: A popular treatise on the physiology of plants for the use of gardeners, or for students of horticulture and of agriculture. Trans. by F. E. Weiss. 8vo. pp. 256, figs. 33. London: Longmans, Green & Co., 1895.

the use of stomata. Much stress is laid upon the need of aerating the roots, but the author fails to explain why it is necessary if gases, as he says, can not pass through imperforate surfaces of plants.

Such defects, however, may be overlooked in view of the fact that the work is to teach a rational horticulture, and not to teach vegetable physiology. This is certainly the spirit of the book, in spite of the unfortunate title; and as such the work is admirable, and to be highly commended.

Minor Notices.

THE NATURALIST'S DIRECTORY¹ for 1895 comes to us with decided improvements. In addition to the alphabetical list, the names are arranged geographically (by states) and also by subjects. In the latter part of the work the editor has been obliged to omit names from some departments when ten or a dozen "specialties" had been given. But we judge that the real specialists will be found correctly listed. These two additional lists will greatly increase the usefulness of the book and we hope will bring a proper reward to the enterprising publisher and compiler.

THE ATTENTION of those who are following Mr. Charles Robertson's papers on "Flowers and insects" in this journal is directed to a paper by him in the Trans. St. Louis Academy of Science 6: 435-480. 1894, covering plants included in the families Rosaceæ and Compositæ.

TO BOTANISTS who have occasion to use statistical methods we cordially commend a pamphlet entitled "Statistical Methods," by G. W. Moorehouse. It is a reprint from *Mind and Body* and is published by the Freidenker Publishing Co., Milwaukee, Wis., at 25 cents.

THE BULLETIN of the Botanical Society of Geneva¹ covering the years 1892-4, contains eight papers, dealing chiefly with the local flora. Briquet's "Le Mont Vuache: étude floristique" and Paiche's "Observations sur quelques espèces critiques du genre Hieracium" are of most general interest.

THE LAST semi-annual report of Schimmel & Co. (Fritzsche Bros.) of Leipzig and New York contains notes on many essential oils, of equal interest to botanists and chemists.

¹ CASSINO, S. E.—The naturalist's directory, containing the names, addresses, special departments of study, etc., of professional and amateur naturalists, chemists, physicists, astronomers, etc., of the U. S. and Canada. 12mo. pp. viii + 382. Boston: S. E. Cassino. 1895.

¹ Bulletin des travaux de la société botanique de Genève (section de la société suisse de botanique) (no. 7, années 1892-1894. 8vo. pp. 241. 1 map. 2 figs. Genève: H. Georg. 1894.



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