

from English sources, and to have devoted more attention to popular expositions than to the original literature of the subject. The volume is consequently not free from the faults that are almost inseparable from a compilation of this kind, and the arrangement of the matter is in places somewhat confusing. But the author has made a sober and honest attempt to give a simple explanation of a very complex subject, and has attained a fair measure of success. The figures are clearly and simply drawn, and the full-page plates, which include reproductions of the spectra of radium, calcium and helium, and of Sir William Huggins's two series of spectra, are valuable features of the book.

Second Stage Botany. By J. M. Lowson. Pp. viii + 452. (London: W. B. Clive, 1904.) Price 3s. 6d.

THE syllabus of the second stage examination in botany of the Board of Education has been judiciously framed on broad lines, and those students generally shape best who possess a reasonable knowledge of the structure and activities of plants and apply that knowledge in their answers. In the preparation of students for this examination the primary object should be to emphasise leading principles, and further to stimulate reflection by making the student observe many facts for himself. Instead of this one finds in the book under notice the usual attempt to supply directly all the information required to answer the manifold questions which are possible, and important facts are lost in the mass of detail. In the latter part of chapter ii., which deals with tissues, the most essential fact is the importance of the vascular tissues as continuous conductive strands, but this is relegated to one of the final sections, which is reached after wading through descriptions of meristems, stereid bundles, sclerotic cells, &c. The chapter on the leaf bristles with terms, including the "incubus" of phyllotaxis, but any suggestions as to the reasons for the variety of form are considered unnecessary. Another defect in the book is the inclusion of antiquated terms and ideas, of which the most noticeable, because it is accompanied by a diagram (Fig. 105), is the existence of centrospheres in Phanérogams. The description of "double-fertilisation" is peculiar; on p. 199 it is stated that the generative cells pass down into the pollen tube, and one cell fuses with the oosphere; "the fate of the other generative cell is described on p. 304." One is tempted to find a correlation between this method of incorporating the result of recent research and the statement which appears in the introduction, that a large portion of this work has already appeared in the author's "Text-book of Botany."

Les Frontières de la Maladie. Maladies latentes et Maladies atténuées. By Dr. J. Héricourt. Pp. xi + 285. (Paris: Ernest Flammarion, 1904.) Price 3.50 francs.

ALTHOUGH in well marked cases health and sickness are distinct and opposite conditions, in a large number of instances the boundary between the two is indefinite, the one passing insensibly into the other, and it is with this borderland that the author of the work under review deals. Commencing with dyspepsia, he shows how this may pass on into more grave conditions, and by natural stages finally comes to consider the mild types of such infective diseases as scarlatina, enteric fever, and diphtheria, which in their mildest forms cause little disturbance, and may pass unnoticed and undiagnosed.

Among others, an interesting chapter is devoted to a consideration of how epidemics of disease spontaneously die out. As treating of a little studied branch of medicine, the book is suggestive and to be recommended.

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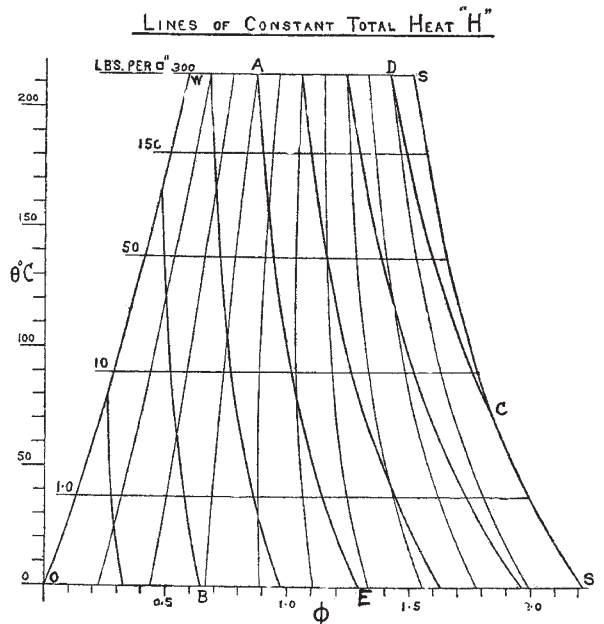
LETTERS TO THE EDITOR.

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$\theta\phi$ Lines of Total Heat.

I THINK that $\theta\phi$ diagram curves showing constant total heat, although often drawn by students, have never yet been published, and I venture to ask you to publish a set made more carefully than usual by one of my students, Mr. A. W. Steed. Total heat is intrinsic energy + pv , so that for steam it is what Regnault called his total heat. In the figure I have indicated the pressure, but of course the ordinate is proportional to temperature and the abscissa is entropy. Along OW the stuff is all water. Along SS the stuff is all saturated steam. The thin lines, like AB, show the stuff maintaining the same fractional dryness; for example, along AB the stuff is 0.3 of steam, 0.7 of water. Along the thicker lines, like AE, the stuff has constant total heat.

Many people have the notion that when steam is throttled it is very greatly dried. Of course the drying is greater if



the place of throttling is well protected from loss of heat by a non-conducting covering, and in this case total heat remains constant. Now if the line DC is looked at, it will be seen that steam which is 90 per cent. dry at 300 lb. pressure, if throttled to 150 lb. pressure is about 93 per cent. dry, and if throttled to 50 lb. pressure is about 95½ per cent. dry. Thus the drying effect is not very great.

The effect is evidently more marked with very wet steam. Thus, looking at AE, steam 30 per cent. dry at 300 lb. pressure becomes 42 per cent. dry if throttled to 50 lb.

The lines show at once how much steam at any pressure will result on the Halpin system of storage from each pound of stored hot water. Thus imagine a total heat line from the point W in the figure. A pound of water stored at 300 lb. pressure and reduced to 150 lb. pressure will generate about 0.07 lb. of steam.

I need not mention the other important applications of this diagram. To the right of SS, in the superheated part, lines of constant total heat are horizontal, being lines of constant temperature.

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