

of the physical laboratory, and therein he has our sympathy, combined with some amusement when we think of the lay mind pondering over such a sentence as: "By [dynamic heating and cooling] is meant that, if air is compressed, work is done and its temperature is raised, and if expanded it does work and is cooled"; or the still more cryptic utterance about fog: "When the water appears to be steaming—actually evaporating into air already saturated and thus inducing condensation."

The pose as regards knowledge of the physical processes of such phenomena as the distribution of temperature over the surface and in the upper air, or the trade winds and monsoons, is reminiscent of the heedless assurance of the old physical geographer rather than of the caution of the modern physicist, but the ambition to place the whole of meteorology upon a sound physical basis is a very worthy one and worthily attempted. The book should have a hearty welcome. We look forward to its expansion and development with confidence. It is well executed, and the illustrations are remarkably apt. Among some beautiful photographs of cloud-forms Fig. 54 (alto-cumulus) seems to be printed upside down, but that is the only misprint we have noticed.

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#### OUR BOOKSHELF.

*Agricultural Laboratory Exercises and Home Projects adapted to Secondary Schools.* By Henry J. Waters and Prof. Joseph D. Elliff. Pp. vi+218. (Boston and London: Ginn and Co., 1919.) Price 4s. 6d. net.

In this book the authors set out exercises suitable for students in secondary schools where agriculture is a prominent subject and occupies a considerable part of the curriculum. The exercises fall into two groups—those to be carried out in the laboratory, and those to be done at home on the farm, or, in the case of town dwellers, on the school ground.

The laboratory classes follow the conventional lines; indeed, in no branch of agricultural science perhaps has there been less advance during past years than in schemes of exercises suitable for students. Nevertheless, although there is little or no novelty, the book is likely to be quite serviceable to teachers. The old favourite exercises that have served for several generations of students are here, and all of them, as the authors say, have been "tried out," and can be relied upon to give decisive results if the directions are properly followed. In a few cases the experiment does not really prove the point intended. Thus, one exercise is intended "to demonstrate how the soil food enters a plant." The student is instructed to close the end of a thistle funnel with parchment, fill with sugar solution, and invert in a vessel of distilled water. The experiment illustrates several points, but it does not show how soluble solutions pass into the plant. Another experiment, "the air as a source of plant food,"

shows an even greater divergence between the intention and the accomplishment.

To English readers the novel part is that dealing with "project work." Pupils in all schools in the States receiving Federal aid under the Smith-Hughes Act are required to do some of their agricultural work at home or on the school farm; this is called a project. The project must represent a sustained effort of considerable magnitude; in the authors' description it must be "worth while"; detailed records of costs, time, methods, and income must be kept; the work must be done under proper supervision, and it must form the subject of a written report by the student. The projects described here include the growth of maize and of vegetables for profit, selection of seed corn, preparation of a seed bed, finding the "failure cow" in a herd, the discovery of the soil requirement, etc. The collection will be found of distinct value to the teacher.

*The Voice Beautiful in Speech and Song. A Consideration of the Capabilities of the Vocal Cords and their Work in the Art of Tone Production.* By Ernest G. White. (New and enlarged edition of "Science and Singing.") Pp. viii+130. (London: J. M. Dent and Sons, Ltd., 1918.) Price 5s. net.

THE opening sentences of chap. ii. of this book are as follows: "The whole burden of this book is to show and, if possible, convince the world in general that the vocal cords, situated on the top of the windpipe, in what we call our throat (diagram I.), are not the seat of sound—that is to say, in neither speech nor song do the vocal cords actually create the tone." We venture to say that no physiologist will support this statement. It is true that sound can be produced by other parts of the apparatus, and without necessarily the presence of the vocal cords, but that the vocal cords vibrate and are the chief agents in producing tones has been proved to the satisfaction of all who study the parts and can employ the laryngoscope. The author is right so far in attributing importance to the sinuses in some of the bones of the face and skull, but he exaggerates their function of acting as resonators to strengthen or modify tone. Over and over again he furnishes what he regards as evidence in support of his thesis, but the conclusion, almost invariably, is in the opposite direction.

Still, there is much to admire in this book. It is clever and even witty; it shows wide reading in physiology and in the related sciences, and the illustrations from original preparations are worthy of all praise; indeed, it may be said that the anatomical details are brought out so clearly as to be well worthy of study. As a teacher of vocalisation the author maintains that he has met with success, without laying stress on the alleged functions of the vocal cords; this we admit, but, if he has done so, this success must really depend on the mechanism as generally understood, and not on the production of tone by the sinuses in the head.

J. G. M.