plants associated with his name, is another of the portraits in this collection. Lithographs of Sir Joseph and his father Sir William Hooker are also here.

A mezzotint engraving of Humboldt, seated in his ornamental shirtsleeves under a banana palm, with what might be mistaken to be an iceberg in the offing, is another composition which leads one to question the value of the picture as portraiture, though there can be no question of its value as a print. A beautiful engraved portrait of Linnaeus, dated 1779, is one of the treasures of the collection.

It is not necessary to list these pictures, but one word may be said as to how they have been accumulated. In the catalogues of second-hand book dealers one finds lists of portraits, some of which are undesirable because of inferior workmanship or for other reasons. In these lists one occasionally finds fine things, and some of our best pictures have been secured from second-hand book dealers. On the other hand, the interest of friends or of institutions has resulted in our getting other portraits not obtainable by purchase. Thus, we have an artist proof wood-engraving of Asa Gray, by Kruel, the gift of the Gray Herbarium. We have a very fine photograph of W. T. Sedgwick and an engraved portrait of Harvey which Sedgwick himself bought at Oxford, both of which were given to us by his widow.

Attention is called to this collection now because of our conviction that the presentation of face and features of the men who make science gives to it a human quality which those who are beginning to devote themselves to it ought not to miss; and in the second place, to invite additional contributions to a collection the value of which is already established. I should be very glad to receive correspondence relative to portraits of other eminent naturalists and to welcome gifts should any follow.

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SCIENTIFIC PUBLICATIONS FOR EUROPEAN LIBRARIES

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JAMES THAYER GEROULD,
For the Committee

GRANTS FROM THE RUMFORD COMMITTEE

As chairman of the Rumford Committee of the American Academy of Arts and Sciences I wish to direct attention to the decision of the committee by which the term "light" is considered to include the spectral region of the x-rays.

Under this interpretation the field in which grants may be made from the funds at the disposal of the committee is extended to include researches in x-rays.

THEODORE LYMAN
JEFFERSON PHYSICAL LABORATORY,
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SCIENTIFIC BOOKS

Botany: Principles and Problems. By EDMUND W. SINNOTT. Pp. xix + 385. Figs. 240. McGraw-Hill Book Company, Inc., New York, 1923.

TEXT-BOOKS in science fall naturally into two classes as to authorship—those whose authors are primarily interested in the science, and those whose authors are also interested in the teaching of the subject and in its use as an educational discipline. Sinnott's new text falls into the latter class. Authoritative and clearly presented from the standpoint of modern botany, it is very obviously a product of successful classroom and laboratory experience with college classes.

The book "endeavors to set forth somewhat briefly and concisely the more important facts concerning the morphology, physiology and classification of plants, and to provide a body of problem material which may be of assistance in stimulating thought and in promoting class discussion." Teachers, especially young teachers and those of more experience but burdened with a heavy schedule of classes, will welcome the "Questions for thought and discussion" and the "Reference problems" given at the end of each chapter. Students will also benefit thereby. Some one has well said that education in any given subject does not consist so much in information as in learning how to think in that subject. The organization of Professor Sinnott's text is well calculated to accomplish both results.

Of seventeen chapters, the first two are introductory in nature, the third deals with the soil and its importance to plants, and the next three with the root

and its functions, the leaf and its functions and the stem and its functions, respectively. In the chapter on the leaf, and in several diagrams, photosynthesis is presented in a way that might give the impression that it is the function of leaves and of no other part of a plant. Thus, on page 20, under "Metabolic processes," photosynthesis is not mentioned in the list of physiological activities that "are not confined to any one organ," although, as the author of course well knows, taking spermatophytes as a whole, photosynthesis may be the function of roots, stem, leaf, perianth or any other green organ. For this reason some botanists think it preferable to treat of photosynthesis (and other activities) as a process which may go on in any organ, or even in plants without "organs" (*e.g., Pleurococcus*)—a function, in fact, not of an organ but of a tissue, chlorenchyma.

Chapters VII (metabolism) and VIII (growth) are followed by an ecological chapter, "The plant and its environment." Here the more usual definition is given of the various tropisms as movements. Phototropism, for example, is defined as "any movement which is a specific reaction to the stimulus of light"; geotropism as "any reaction to the stimulus of gravity." To the reviewer it is preferable to regard the tropisms, not as movements or reactions, but as properties of the plant or organ by which it can detect any unilateral stimulus. It may or it may not respond, by a motion, depending on whether one kind of stimulus (*e.g.,* light) is overpowered, so to speak, by another kind of stimulus (*e.g.,* gravity), or whether response is mechanically hindered. The bending of a stem in the direction of the brightest illumination is a *reaction,* not a tropism. The author, however, is in good company in defining these terms as he does, and this comment is not for the purpose of pointing out an inaccuracy or error but is only propaganda for another and preferable (?) definition of terms.

Chapter X, on reproduction, is followed by one chapter on heredity and variation and one on evolution. Heredity is defined (p. 206) as the "tendency for offspring to display the particular characteristics which distinguish their parents." Here, again, the author is in fairly good company, but some students of heredity regard this definition as more or less misleading, if not, indeed, incorrect. The author's figure 128, in the same chapter, shows types of four successive generations of ferns as illustrated by leaf character. The "tendency" here is evidently toward unlikeness, instead of likeness, and yet all that the generation represented by each leaf had to start with was *inherited* from the parent from which it so widely differs. Is it not preferable to define heredity as all that an individual receives from its parents (*i.e.,* all it has to start with—the organization of the fertilized egg)? The *expression* may or may not resemble the parent; there may even be no *tendency* at all to resemble the parent, but quite the contrary.

Chapter XIII, on the plant kingdom, is followed by the last four chapters on the thallophyta, the bryophyta, the pteridophyta and the spermatophyta, respectively. The term Pteridophytes is used in its older signification as including horsetails and club mosses as well as true ferns, but this, probably, will not disturb the majority of botanists.

The illustrations illustrate (which is not the case in some texts), the typography and general make-up of the book are attractive, and the book should appeal to beginning students. Teachers are sure to welcome it as a valuable addition to botanical texts and a real contribution to botanical pedagogy.

C. STUART GAGER

BROOKLYN BOTANIC GARDEN

LABORATORY APPARATUS AND METHODS

A NEW PHOTOELECTRIC CELL

IN continuation of a previous investigation described at the meeting of the American Physical Society in Chicago in November, 1922, an abstract of which appeared in the *Physical Review,* 21, p. 210, 1923, the influence of very thin films of alkali metals has been studied. It has been found possible to control the flow of photoelectrons and of thermions by actuating invisibly thin films of alkali metals by light.

Remarkable photoelectric phenomena have been observed with a two-electrode photoelectric cell consisting of a glass tube supplied with a bulb at each end. Each bulb has inside a hemispherical deposit of metallic potassium and a platinum electrode connected with the sensitive layer. Care was taken that the connecting tube itself separating the bulbs had no visible deposit on its wall. When the bulb with its electrode connected to the negative side of a battery is illuminated, it shows the usual photoelectric effect; if, however, the transparent connecting tube is also illuminated, the deflection of the galvanometer inserted in the circuit increases considerably. The illumination of the positively charged anode has no perceptible influence in either of the mentioned cases. If the positively charged potassium layer had the property of reflecting the electrons as observed by Langmuir (SCIENCE, November 16, 1923) for caesium on nickel electrodes, a decrease of the photoelectric current should be expected when the anode is illuminated. No such action of the positively charged potassium layer was observed.

The relation between the photoelectric current passing the transparent connecting tube and the potential applied was observed for the case, when only the cathode was illuminated and also when both the