on he gathers into stable communities. Nations spring up. Always winding downward, the path leads to new proof of man's ability to evolve socially and to change his environment. The spiral widens as it slants down and down, so that there is an ever-expanding space for the ships, the machines, the art, the houses that man created in his progress through the ages. At the bottom of the pyramid you find yourself on the sidewalk in the twentieth century, in the midst of a modern city, with its electric lights, its buses, its subways, its airplanes.

That museum was almost built in Geneva. I am told that political bickerings prevented its realization. Had it been built it would not only have satisfied Dr. Goldstein's cogent requirements but played its part in revealing what the nations of to-day owe to one another and to the past.

WALDEMAR KAEMPFFERT

THE NEW YORK TIMES

SPHALERITE AND GALENA IN SEDIMENTARY ROCKS IN OHIO

RECENTLY, while making a study of the sedimentary formations of Mississippian age, in a quarry located in the city of Wooster, Ohio, the presence of sphalerite and galena was discovered in a horizon within the Cuyahoga formation. These minerals occur as crystals in the shale or as fillings or replacements of fossil forms such as crinoid stems or brachiopods. They are also present in fossiliferous concretions associated with iron pyrite and calcite. The sphalerite is much more abundant than the galena and appears to occur where fossils are numerous. The concretions are calcareous because of the abundance of the crinoid and brachiopod shells.

Near Marshallville, Ohio, in the railroad cut near that place, the Pottsville formation of lower Pennsylvanian age is exposed. In the shale beds occur numerous concretions, some of which, when broken, show sphalerite associated with iron pyrite, calcite and barite. These concretions are likewise fossiliferous.

There are other places in Ohio where sphalerite and galena occur in sedimentary rocks. These occurrences may have some value to students interested in the theories of the origin of sphalerite and galena ores, such as those of the upper Mississippi valley.

KARL VER STEEG

COLLEGE OF WOOSTER

A NEW SOURCE FOR AGATE ARTIFACTS IN CENTRAL NEW MEXICO

IT is commonly assumed that agate artifacts found in central New Mexico are derived exclusively from the river gravels of the area in which agate pebbles are fairly abundant. Continued geologic study of the region indicates that some of them were derived from rock in place. Cerro Colorado, a small but prominent hill approximately 14 miles west of Albuquerque in the valley of the Rio Puerco, is the remnant of a volcano of Tertiary time. It was clearly such a source of agate. Its rough, rhyolitic slopes are cut by narrow, irregular veins of gray to white chalcedony or agate. This material is not entirely homogeneous in texture, and the largest available masses are only 3 or 4 inches in diameter, yet it is suitable for making artifacts. That this material has been so used, presumably by the Indians, is shown by the presence in the locality of spalls and worked pieces. The veins of chalcedony are too narrow and irregular for systematic quarrying. However, they weather less readily than the bedrock and project above its surface as tiny ridges. Fragments of the chalcedonic veins eventually weather out and drift down the slope, where they are available for use. It also seems probable that the projecting veins were broken off by the agate users of the past.

FRANKLIN T. MCCANN

DAYTON, OHIO

SCIENTIFIC BOOKS

HORTICULTURAL PLANTS

Propagation of Horticultural Plants. By GUY W. ADRIANCE and FRED R. BRISON. ix + 314 pp. 182 figs. New York: McGraw-Hill Book Company. 1939. $2.50.

A KNOWLEDGE of the fundamentals of propagation of plants is recognized as something essential to good horticultural practice, and in recent years this subject has been involved in many research projects. The results of such investigations have contributed to both science and practice.

This book has been prepared primarily as a text for horticultural courses in college. There are seventeen chapters arranged as follows: Introduction; Seeds; Flowers and Fruits; Germination of Seeds; Forcing Equipment; Asexual Propagation; Bulbs and Related Structures; Layerage; Cuttage; Graftage; Grafting Waxes, Materials, and Tools; Methods of Grafting; Methods of Budding; Propagation of Certain Plants; The Relation of Propagation Practices to Diseases; Transplanting; Growing and Handling of Nursery Stock.

A glance at the chapter titles shows that the authors chose to handle various phases of the subject at random rather than to organize it under the main divisions, sexual and asexual propagation.

Each chapter is followed by a set of questions and a few "suggested references." At the end of Chapter III the following questions are asked: 1. What is an inflorescence? 3. What is the distinction between a

fruit and a seed? Between simple, aggregate and multiple fruits? 5. Give examples of accessory fruits. What tissue comprises the edible part of each? Chapter VII has the following questions: 2. What are the distinguishing features of true bulbs? 3. In what way does a true bulb resemble a dormant bud in structure? 14. How do the sweet potato and the Irish potato differ in structure?

Those of us familiar with duplications in agricultural college courses can readily see from the nature of the questions cited that students will have had the same questions asked in general botany and elementary horticultural courses before they get to a special course on propagation. Though the criticism is offered, the reviewer knows no solution. Books on "Floriculture," "Pomology," "Vegetable Gardening," etc., usually carry a chapter or more on propagation of plants involved in the particular field. Whether or not such conflicts can be ironed out the reviewer is unable to say.

This book has a large store of compiled information, and the authors have made an effort to bring it up to date.

P. W. ZIMMERMAN

BOYCE THOMPSON INSTITUTE

INDIAN CORN

The Origin of Indian Corn and Its Relatives. By P. C. MANGELSDORF and R. G. REEVES. 315 pp. 93 figs. 40 tables. Texas Agric. Expt. Sta. Bull. 574. 1939.

LIVING in an obligate relationship with man and having covered its evolutionary tracks most successfully, the Indian corn plant presents an unusually interesting problem of origin and relationships. It is undoubtedly closely related to the two American grasses, *Tripsacum* and teosinte, but the exact relationship is obscure, and the picture of the wild ancestral form is wholly theoretical.

One theory makes teosinte the ancestor and assigns to the Indian the role of plant breeder, another has corn, *Tripsacum,* and teosinte develop from a common ancestor; and a third proposes a hybrid ancestry between teosinte and some other grass of hypothetical nature. Each of these has some shortcomings, but none of them can be entirely disproved.

By an ingenious technique, Mangelsdorf and Reeves have hybridized corn with *Tripsacum,* and the nature of the hybrid, supplemented by other data, suggests to them that teosinte originated, probably very recently, from a natural cross between these genera. The technical analysis, full details of which are given in an excellent manner, shows a close relationship between the characteristics of the various segregates and the presence of certain *Tripsacum* chromosomes, and teosinte is pictured as essentially corn to which certain genes of *Tripsacum* have been transferred.

This removal of teosinte from consideration in any ancestral relationship extends the possibilities as to the place in which corn originated, and attention is again turned to South America, where the highly developed agriculture of the Incas and the reports of early explorers are thought to afford promising evidence.

This addition to our collection of theories about these plants makes full use of important new data but does not necessarily preclude any of the older theories. It hardly fulfils the implication of the title of the book, for it adds nothing to our knowledge of the wild corn plant except to cast some doubt upon the claims of teosinte. To assume, as this theory does, that pod corn is the most promising lead back toward the wild ancestor leaves us exactly where we have been for a long time. Pod corn has primitive characters, but it is difficult to know whether they represent original or derived conditions, and, at best, it is not sufficiently different from the naked-fruited varieties to answer the requirements of the self-supporting wild plant.

PAUL WEATHERWAX

INDIANA UNIVERSITY

REPORTS

A STATEMENT TO THE BOARD OF TRUSTEES OF THE MUSEUM OF SCIENCE AND INDUSTRY, CHICAGO

FACED with a demand by the newly elected president of the Museum of Science and Industry for my resignation, a demand which he termed "irrevocable," I prepared the following statement dated August 22 for the Trustees for their meeting of August 26, 1940. Letters in regard to my appointment to the directorship are omitted and several minor alterations in the text have been made. Deletions are in general indicated by leaders, additions by enclosure in brackets.

Since 1 May 1937 I have served as director of the Museum of Science and Industry with singleness of purpose toward its welfare. I have held steadfastly to the aim that its exhibits should show primarily the dependence of our modern civilization on science and on its application in industry. Not only that this understanding be driven home, but that there should be clear presentation of the methods by which science approaches its problems, the attainments, the methods of application, the way of progress, what problems are pressing for solution. Moreover that there should be created an atmosphere of vivid alertness and inspiration.

This purpose was held in view as the interior construc-