study has been extended to Mexico and Patagonia, with moreover most careful elaboration of the likewise finely silicified but rare types of the Carpathians.

The preliminary approach to the Yale cycad study was perforce macroscopic, as arranged by Marsh with Lester F. Ward. That meant an arbitrary naming of species. But that was no less the severely practical line of approach. As Ward well said, the cycadeoid series was to the plant life of the Mesozoic what the dinosaurs were in that animal world.

The closer study of the cycads, with the initial help and advice of Marsh and Ward, was nextly carried forward by Wieland, attention being given to both structure and further collection in the field. By 1906, the first quarto on the American Fossil Cycads was brought out. Then, that fine paleobotanist of all time, D. H. Scott, said, "The brilliant elucidation of the American Fossil Cycads by Dr. Wieland at Yale has for the first time brought the origin of the modern types of flowering plants within the range of scientific discussion." A new chapter had been added to the paleontologic texts.

Moreover, the work has gone on in the laboratory and the field, but with many difficult and varied tasks yet ahead. Change within Yale has resulted in removal and restorage of the tons of material, following the dismantling of the old Peabody Museum, four times. The great collections are safe, but far from clearly in view for either purposes of study or exhibition. The related studies of Mesozoic floras indicated as severely needed have about lapsed.

In for the present closing these brief notations, two pleasant interludes must be recorded. By accident in 1927 following a detour in the Black Hills it was learned that a large once flowering type had been found in the "Mesaverde" series of the San Juan basin of New Mexico. This was the sixth such type from the known world. Aggressive examination of the new field of occurrence followed in the summers of 1928 and 1929. This surpassed expectation. Two tons of the new types were secured and have been freely cut and preliminarily described under the new generic name *Monanthesia* or once flowering. Several distinct species are present, and the descriptive memoir with free illustration is now well forward. An addition to Yale collections and to the great subject of cycadeoid study of a fascinating interest is here seen. There followed the November, 1935, collection of one ton of *in situ* specimens on the front mesa of the Fossil Cycad National Monument. Work afield is never safely to be neglected, is ever fully as important as laboratory study.

The 1935 Fossil Cycad National Monument collection is now stored at Yale for safe keeping, against the day of return for exhibit in the museum yet to be erected on the frontal mesa of the Monument.

The plans for bringing to the fore the immense educational value of the F C N M have been freely discussed in print, and are slowly reaching clear understanding. In few words, the Monument is a contribution from the Carnegie Institution and Yale dedicated to the cause of science through the centuries to come. The Bureau of National Parks and Monuments has in course come into a great responsibility. For the Monument marks the finest cycadeoid locality yet found on the globe and must be held sacred, intact and free from theft or trespass as an educational point of both international interest and surpassing value. The closest analogue yet remains hidden in the Galician Carpathians.

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SCIENTIFIC BOOKS

GENETICS

Genetics. By EDGAR ALTENBURG. xii + 452 pp. Illustrated. New York: Henry Holt and Company. 1945. $3.20.

THE publication of a new text-book in genetics is a rather rare event. Several good texts are available, and the market in terms of number of students is limited if compared with that of books on general biology, college physics or similar introductory topics. The purpose of a college course in genetics is less well defined than that of many other courses. Some of the advances in genetics have so far outrun possible practical applications that they are of less immediate preprofessional use than, for instance, the facts of chordate anatomy to the student planning to enter a medical school, or physical chemistry to the future chemist. Nor is a course in genetics a generally recognized prerequisite for advanced work in fields other than genetics itself. Primarily then, a course in genetics is offered because this science has become a basic branch of biology, one about which the student should be informed.

Altenburg's book serves this purpose admirably. The author states in his preface that in preparing the manuscript he constantly asked himself, "Could I understand this if I were the student?" The text bears witness to this self-questioning of an experienced teacher. While a great many aspects of genetics are covered within 452 pages, the treatment is never too condensed, and singles out skilfully for detailed discussion many points of special importance or of potential difficulty. Consequently, the

book serves not only as an elementary introduction but leads successfully to a lucid treatment of many advanced and complex groups of investigations such as "Locating the breakage points in a translocation," construction of cytogenetic maps or the cases of complex heterozygotes (Oenothera).

An unusual feature of the book is the presence of itemized summaries of from one to three pages at the end of each chapter. These should prove very useful to the student. Numerous problems furnish an opportunity for applying knowledge gained from the text and also include additional information.

The book is not only centered around the chromosomal aspects of genetics but is devoted to it nearly exclusively. This results in an insufficient discussion of physiologic and of population genetics. Little space is given to human inheritance or to extranuclear transmissions. The treatment of Mendel's principles and of most other topics follows in general the scheme: (1) statement of theorem; (2) experimental proof. This enables the student to recognize the essential point immediately, but the reverse sequence, namely, (1) experiment; (2) deduction of theory, would have its merit too. While the information supplied is identical in both sequences, the latter seems better suited to convey the exciting pleasure of the discovery and organically makes possible a historical treatment with its humanistic implications. Altenburg does not neglect historical references but provides them as afterthoughts. Besides, the selection and omission of names of investigators is not free from subjectivity.

It is difficult to avoid errors in a first edition of a book which seems not to have been read critically in manuscript by colleagues of the author. A list of such errors has been placed at the author's disposal for use in later editions. For in spite of the criticisms voiced, this is an excellent book. There seems no doubt that Altenburg's "Genetics" will occupy a prominent place in the teaching of this subject.

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PLANTS AND CULTURE HISTORY

Plant Geography and Culture History in the American Southwest. By GEORGE F. CARTER. 140 pp. New York: Viking Fund Publications in Anthropology. 1945. $1.50.

IN this volume Carter has assembled a variety of data, archeological, ethnological, historical, geographical and taxonomic on the economic plants of the Southwestern cultures, has combined these with the results of his own research, and has drawn some far-reaching conclusions from the combination.

On the basis of the distribution, past and present, of cultivated plants Carter divides the agriculture of the Southwest into two areas—the Gila-Sonora and the Anasazi.

The Gila-Sonora area includes approximately the southern halves of Arizona and New Mexico, is associated with the Piman and Yuman cultures, is characterized botanically by the summer squash, *Cucurbita Pepo,* a single race of maize, tepary and lima beans, and cotton. Carter traces its origins directly to Mexico and regards it as relatively recent.

The Anasazi area represents the plateau agriculture which is associated with the Basket Maker and Pueblo cultures. It is characterized botanically by the cushaw type of pumpkin, *C. moschata,* the kidney bean and several types of maize, some of which show strong resemblances to those of the eastern United States. Carter regards the earliest culture of this area, the Basket Maker, as a peripheral development springing from an earlier eastern agriculture which had originated independently of Mexico and was based upon the growing of locally domesticated cucurbits and the utilization of seeds of Chenopodium, Ambrosia and Helianthus.

Carter's conclusions with regard to the Southwest have important implications for other regions. The first is obvious—if the earliest cultures in the Southwest have had their origins in eastern precursors then it follows that the latter must be considerably earlier than has commonly been supposed, perhaps, by Carter's reasoning, as early as Upper Pleistocene. A second implication is that domesticated plants (and by inference other cultural materials) have reached the region now the United States by two routes, one west Mexican, the other east Mexican or Caribbean. The third implication is that domestication of plants and the invention of agriculture have occurred in America independently again and again, indeed wherever plants suitable for domestication were available. Carter postulates four centers of domestication for *Cucurbita Pepo* alone.

To a botanist who holds the deep conviction that botanical studies of prehistoric plant material need not end with mere description, a first, cursory reading of Carter's book brings only delight. But further study raises serious doubts. Is the evidence adequate to support the important conclusions drawn from it? The evidence from maize, at least, is far from satisfactory. It deals with plant differences at a varietal or racial level. Progress has been made in recent years in identifying and describing the races of maize, but the problem is so complex, and intermixture between races is so wide-spread, that the conclusions which Carter has drawn from his studies of maize involve an appreciable element of doubt as well as one