Paleoclimatology

Climates of the Past. An introduction to paleoclimatology. Martin Schwarzbach. Translated from the German second edition by Richard O. Muir. Van Nostrand, Princeton, N.J., 1963. xii + 328 pp. Illus. $10.75.

Since the 17th century, the presence of fossil palms and reef corals, coal beds, evaporites, and glacial tills in areas where these organisms and phenomena do not now occur has intrigued man and has suggested to him that in the past, climatic zones have not always been distributed as they now are. As a result an extensive literature on paleoclimatology has been built up and numerous theories proposed to account for the inferred changes. During the last quarter of a century Martin Schwarzbach has been one of the leaders in paleoclimatology, and the present volume (a translation of the greatly revised second German edition) reflects his broad command of the field, but at the same time it is tempered by his awareness that recent advances have shown that some classical interpretations are debatable.

The contents of the volume are organized in three parts: General Paleoclimatology, a review of kinds of evidence, criteria, and techniques; Historical Paleoclimatology, a review of climates through geologic time, emphasizing the interval since the Precambrian; and Genetic Paleoclimatology, a review of the hypotheses and causes that have been inferred to control climates. Schwarzbach concludes that the primary cause of past climatic variation must be related to variations in solar radiation, but he also feels that a minor amount of continental drift and polar wandering are necessary to explain the observed variations in distribution patterns.

The first section of the work seems particularly disjointed, often with no transition or relationship from one part to another. This same fault occurs to a lesser degree in the other sections, and one suspects that this clumsiness as well as some contradictions are due to translating and editing. Other than this awkwardness, the volume is an up-to-date, conservative presentation of modern ideas on past climates, their variation, and the causes of variation.

Like nearly all modern investigators in the field, Schwarzbach gives no consideration to the fact that the Pacific Basin covers a very large share of the earth's surface and that almost no geologic data of Pre-Pleistocene age is available from within it. As a consequence of this lack of geographic control, many hypotheses cannot be adequately tested.

A second fault, which is also shared with almost all who delve in this field, is the presentation of world-wide paleoclimatic maps on projections using modern geography and then warping climatic belts across them. It is time for the presentation of new and more easily understandable maps.

The bibliography covers 35 pages, and the volume is well worthwhile from this aspect alone.

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Plant Physiology

Meristems, Growth, and Development in Woody Plants. An analytical review of anatomical, physiological, and morphogenic aspects. J. A. Romberger. U.S. Department of Agriculture, Washington, D.C., 1963 (order from GPO, Washington, D.C.). vi + 214 pp. Illus. $1.75.

The author of this book, J. A. Romberger, is a plant physiologist whose interest lies in forest trees. But little is known about certain phases of forest tree behavior, and he illustrates some of his points by referring to experiments conducted with herbaceous plants.

The volume contains slightly more than 200 pages which are arranged in three parts and a brief résumé. Part 1 is concerned with the anatomy of meristems. Here Romberger discusses the organization of shoot apices, both gymnosperm and angiosperm, and, to a lesser extent, the organization of root apices. He displays a great deal of tolerance toward controversial theories —for example, in discussing different interpretations of the pattern of apical zonation in conifers. In this part of the book there are topics on the physiological morphology of shoot meristems, on the origin of leaves, cataphylls, and vascular tissues, on terminal, axillary, and adventitious buds, and on the physiological processes of all of these. Discussion of the physiological anatomy and development of cambium is of particular interest to foresters.

Part 2 (95 pages) is called Episodic Growth and Dormancy of Shoots, and part 3 (11 pages) is on the episodic growth and dormancy of roots. Together these two chapters comprise the major, physiological part of the book, but the author always emphasizes the fact that physiological processes in nature occur in the living cells; concomitant anatomical and cytological changes are always kept in mind. Dormancy, a very important and still not well-known process, is thoroughly reviewed, and the discussion of photoperiodism in trees is illustrated with case histories of seven broadleaf species and one European pine. (But where are our American conifers?) Some space is devoted to the circadian rhythm in trees and its relation to photoperiodism and thermoperiodism.

An especially welcome chapter (32 pages) is devoted to an up-to-date discussion of growth regulators: auxins, gibberellins, kinins, and others like leucoanthocyanins and inositols whose physiological role in plants is not well known. Growth inhibitors are also mentioned, and the interaction of different growth substances is discussed.

This stimulating book will be extremely valuable to those who are engaged in researches on the growth and development of forest trees.

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Paleobotany

The Lower Tertiary Floras of Southern England. vol. 3, *Flora of the Bournemouth Beds; The Boscombe and the Highcliff Sands.* Marjorie Elizabeth Jane Chandler. British Museum (Natural History), London, 1963. xi + 169 pp. Illus. £10 10s.

This monograph is the final volume of a trilogy devoted to the study of the Lower Tertiary (Paleocene and Eocene) floras of southern England. The three volumes together with numerous shorter papers are the culmination of nearly 40 years' work that Miss Chandler has dedicated to the study of British Tertiary paleobotany. The monographs consider, in turn, successively younger floras from the continental and marine sediments. Their publication over a period of several years (1961 to 1963) precluded their review as a unit; they are nevertheless parts of a single story,