preface, the editors state that the emphasis of the first international symposium has been placed on background information from the various fields that bear on the biological control of soil microorganisms. We may very well be just at the beginning of a new era of soil microbiology-microecology, and this book may be its catalyst. More than 3200 references are cited, and, for this reason alone, the book should remain a standard reference to this important field of biology that affects the world food situation, influences the world population, and, in turn, has a direct bearing on world politics.

The book holds the reader's attention from the electron microphotograph of the surface of a root hair, which shows attached bacteria, and the first figure, which shows the growth of fungus mycelium in the cortex of a rootlet of plant material from the Carboniferous Period of the Paleozoic, to the end of the book, which discusses the planning for another symposium, on the same subject, to be held in 5 years.

Instead of a random arrangement of papers, the book is divided into parts that deal with soil microorganisms; soil environment; the plant root and the rhizosphere; pathogenesis and resistance; the mechanisms of antagonism; the soil inoculum; and interaction between soil, microorganisms, and the plant. Several of the authors have provided sections that outline work that needs to be done. Most of the numerous illustrations, tables, and graphs are original. In view of the number of authors who submitted papers, the illustrations are surprisingly excellent throughout. Because the book contains so much data on a diversity of topics, it needs an extensive index; this need is admirably fulfilled in a 34-page index of topics, names, and titles.

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Paleobotany: Tenth Pacific Science Conference

Ancient Pacific Floras: The Pollen Story. Lucy M. Cranwell, Ed. University of Hawaii Press, Honolulu, 1964. x + 115 pp. Illus. Paper, $3.50.

The 14 papers and abstracts presented in this slim volume derive from a symposium of the Tenth Pacific Science Congress, held in Honolulu in 1961. A stated aim of the work is that it should be understandable to the general reader. To that end, the editor's foreword explains the role of pollen and spores in the life cycles of plants, defines some terms, and traces the historical development of Pacific palynology. Additional introductory comments from the veteran paleobotanist R. W. Chaney stress the importance of pollen studies in evaluating and extending earlier phytogeographical and paleoecological inferences based primarily on leaf impressions. In view of the fact that some of the papers contain previously unpublished technical data, the goal of general readability seems fairly well achieved. This is done through the use of excellent illustrations, by avoiding involved nomenclatural discussions and keeping technical descriptions to a minimum, by the authors' emphasis on subjects of broad interest —ancient climates, plant geography, the age of the angiosperms—and by the lively writing of Lucy Cranwell's own papers (in which she deals with microfossils of remote Rapa Island and possible Antarctic origin of the southern beeches). The brevity of some of the offerings makes the work attractive as a "sampler," but one regrets that the Russian contributors, E. V. Koreneva and E. D. Zaklinskaya, submitted only abstracts; an expanded review of pertinent Soviet palynological investigations would have been a valuable inclusion.

The volume lacks topical unity. B. E. Balme reviews Australian pre-Tertiary microfloras, and C. J. Heusser compares postglacial climatic changes in South America with those of other continents. Other contributors (S. Tokunaga, J. Ueno, Jane Gray, J. Muller, and Isabel Cookson) discuss very diverse aspects of Tertiary research. In view of the increasing worldwide interest in pollen and spores, the editor's expressed hope for future Pacific Science symposia to treat more specific palynological themes will probably be realized. Let us also hope that in the future the publishers of such symposia will not take three years to bring the results to print.

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Three-Dimensional Drawings

The Architecture of Molecules. Linus Pauling and Roger Hayward. Freeman, San Francisco, Calif., 1964. Unpaged. Plates. $10.

This book is intended to provide the reader with a feeling for the three-dimensional structures of molecules. It consists of 57 colored drawings of atomic and molecular structures, each with a short caption. The drawings range from pictures of the regular polyhedra to illustrations of such complex molecules as the Prussian blue crystal, the polyoma virus (actually the DNA of the virus), and a portion of myoglobin. They are done with great skill, and some are truly things of wonder and beauty, representing three-dimensional structures about as closely as can be achieved in two dimensions. One wonders, though, whether an entire page is required for some drawings. For example, the plates depicting polyhedra could very well have been inserted into corners of later drawings. Conversely, one would like to see aromatic rings and a discussion of the π electrons. Also, a picture of purine-pyrimidine base pairing and nucleic acid structure would seem valuable, even though they are all too often mentioned nowadays. Again, one might wish that the central structural feature of a complex molecule such as the alpha helix (Fig. 50) was more clearly distinguished from the surrounding hydrogen bonds. This is very nicely achieved for the structure of silk (Fig. 48). The structure of the unit cube of diamond (Fig. 15) could be explained more clearly with an additional sketch in the figure.

The book is "planned especially for young people who are beginning to develop an interest in science." I agree that it indeed serves admirably to introduce young people to a most vital area. Ability to visualize the three-dimensional structures of molecules, including their angles, distances, and charges, is extremely important today in the sciences of chemistry and biology. Recent developments in molecular biology have underscored this to such an extent that it scarcely needs further statement. Conventional two-dimensional representations of molecules do not provide even approximately adequate pictures of what molecules really look like. This inadequacy is intensified by the persistence in textbooks of old-fashioned formulas such as linear structures