pituitary after prolonged adrenal cortical hyperfunction are confused with ACTH-secreting basophilic adenomas. Dorfman reviews the inhibition of tumor growth by steroids and presents in tabular form summaries of the qualitative effects of various steroidal compounds on a variety of tumor systems in mice, rats, hamsters, chickens, and guinea pigs.

The remaining chapters include a review, by R. E. Haist, of the literature on the effect of steroids on both the endocrine and exocrine portions of the pancreas, and another, by I. L. Bonta, on the effect of corticoids and ACTH on the induction of gastric ulcers in laboratory animals. The latter emphasizes once more how difficult it is to equate experimentally induced animal lesions to human disease.

The first and last chapters of this volume are excellent. The first, by A. Kappas and R. H. Palmer, is on the thermogenic properties of steroids. The other, by W. H. Fishman, is concerned with the influence of steroids on $\beta$-glucuronidase of mouse kidney. Fishman has pioneered much of the work on this subject, and his article contains a delightful exposition of many of his own contributions.

This volume provides a good list of references as well as a reasonable approach to most of the topics chosen for discussion.

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## Frontiers in Physics Series

**Phase Transitions.** Robert Brout. Benjamin, New York, 1965. xiv + 202 pp. Illus. $9.

Phase transitions such as melting and boiling are familiar experiences, but their explanation from first principles of statistical mechanics still presents a major challenge to the theoretical physicist. The same is true of other, less familiar, phase transitions such as those that occur in magnetic materials, in fluid mixtures or alloys, in liquid helium-4 which becomes a superfluid, and in many metals which become superconductors at low temperatures. All these phase transitions have in common, by definition, some discontinuity or singularity in their thermodynamic functions. Beyond this, however, they all appear very different. Some of them —the liquid-vapor phase transition, for example—occur at such high temperatures that specific quantum effects are almost certainly unimportant and may thus be treated entirely within the framework of classical statistical mechanics. In others—for example, the normal-superfluid normal-superconductor transition—the low temperature state cannot even be described in classical terms. Surprisingly enough, the last of these is perhaps the best understood at present.

This book, which has grown out of a set of lectures given by the author at Los Alamos, "is an attempt to treat in parallel a set of phase transitions which superficially seem to be quite independent of each other, but which on further examination are seen to be manifestations of a common structure, the self-consistent field." The book contains the following chapters: "Introduction," "Ising model," "Condensation," "Freezing," "Ferromagnetism: Heisenberg model: Band theory of ferromagnetism," "Superconductivity," "Bose-Einstein condensation," "Theoretical refinement," and "Epilogue." Each chapter consists of an elementary part and a more advanced "graph theoretic" part which is starred. The elementary part contains a discussion, from the author's point of view, of the present state of theory in each field (as well as some experimental results). The starred parts contain much of the work of the author and co-workers up to the date of publication.

The idea of the self-consistent field goes back to van der Waals and Orenstein in the theory of fluids and to Weiss in ferromagnetism, and it has been most successful in giving a simple qualitative understanding of phase transitions. The extent to which this idea can be used as a starting point for obtaining a complete and quantitative understanding of phase transitions is still an open question however. The point of view expressed in this book (based to a considerable extent on the author's own work) is that the self-consistent field idea can indeed be pushed very far and that it serves to unite many fields. Even if one disagrees with some of Brout's ideas, which he states are "frankly biased," about how much credence can be given to certain types of approximations, the book will still be useful as an expert presentation of a particular point of view. It will thus be valuable to all scientists working in this very interesting (and currently fashionable) field, and it should serve the useful purpose of making the various "specialists" broaden their point of view and of giving them courage to look outside their own speciality.

Like many books based on lectures and written in the heat of research, *Phase Transitions* often causes one to wish that the author could be asked to pause (Sec. 2–3 goes on for 15 uninterrupted pages), and that he could be asked to explain some obscure passages (for example, the first paragraph on page 74). This should be corrected in the next edition.

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## Soil Microecology

**Ecology of Soil-Borne Plant Pathogens: Prelude to Biological Control.** Kenneth F. Baker and William C. Snyder, Eds. University of California Press, Berkeley, 1965. xiv + 571 pp. Illus. $12.

A book such as this one is refreshing to read, for it covers all aspects of the ecology of soil-borne plant pathogens. In this day and age of specialization and departmentalism, the scientist is deluged with books on narrower and narrower subjects, often confined to the current fads of the year. This is not such a book! Although this interesting and fascinating volume is devoted primarily to the ecology of plant pathogens, much of the subject matter deals with broader topics. It might well be entitled "Soil Microecology." Portions of the book will be of interest not only to the plant pathologists, but also to ecologists, microbiologists, mycologists, and plant scientists.

This volume brings together the papers presented at a meeting entitled "An International Symposium on Factors Determining the Behavior of Plant Pathogens in Soil," held on the Berkeley campus of the University of California, 7 to 13 April 1963. Five years were devoted to the organization of the symposium, and more than 300 persons, from 24 countries, participated. The discussions following each formal presentation are included. In the

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 $\pi$ 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