contributions, while containing interesting material, are too short and limited in content to have much pedagogical advantage over research publications in the journals even though they are somewhat less technical.

The broadest contribution is a good theoretical introduction in which J. S. Bell outlines various concepts and tools of theoretical particle physics, though apparently this was intended as background for the more current topics. In spite of the sweeping scope of the book's title, it is only in this introduction that electromagnetic interactions are discussed at all. A short review of the field of weak interactions is given by S. Berman. The contributions by L. Van Hove, G. Puppi, H. Harari, N. Cabibbo, and T. Regge suffer from the disadvantages mentioned above. The last part of the book consists of five seminars, each discussing, in detail, a particle experiment with no apparent relation to each other, or to the lectures in the rest of the book.

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Phospholipids of Vertebrates

Phospholipids: Chemistry, Metabolism, and Function. G. B. Ansell and J. N. Hawthorne. Elsevier, New York, 1964. xiv + 439 pp. Illus. $20.

This book is, as the authors point out, the first devoted entirely to phospholipids since Wittcoff's monograph published in 1951. As such, it will be welcomed by all whose interests touch this group of compounds. The authors have chosen to restrict their coverage to the phospholipids of vertebrates, a decision which has simplified their task, but one which seriously limits the usefulness of the volume and thereby will greatly disappoint many readers.

The text is divided into roughly 25 percent on chemistry and preparation of phospholipids, 15 percent on phospholipid biosynthesis and metabolism, and the remainder on the role of phospholipids in various tissues, pathological conditions, and physiological processes. Appendices deal with the stereochemistry, nomenclature, fatty acid composition, and distribution in tissues of phospholipids. The section on chemistry includes only minimal information on structure and hydrolysis of phospholipids, with no attempt to present details of the chemical reactions or physical chemistry of phospholipids. Analytical methods are covered concisely and briefly. For example, the section on thin layer chromatography occupies half a page. A chapter on preparation of phospholipids is written from a highly personal point of view, and somewhat in the style of *Biochemical Preparations*. A method which is used in the authors' laboratory for preparing a specific phospholipid is given in detail, and references to other methods are listed. The DEAE chromatographic procedure of Rouser, probably the most important innovation since the introduction of silicic acid chromatography, is not mentioned.

Phospholipid biosynthesis is adequately covered but not with the clarity found in some recent reviews. The most interesting chapters are those dealing with the more physiological aspects of phospholipids. The authors point out that a well-defined role for phospholipids in these various processes has not been discovered, but they have summarized a large volume of literature and presented it in a form that is fairly easy to digest. I found most interesting and well written the chapter (84 pages with 380 references) dealing with phospholipids and the nervous system.

The main fault with this volume lies not with the authors, but with the publisher. The text occupies 11 by 17 centimeters with approximately 38 lines per page. For 439 pages of this, $20 is an outrageous price.

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Research in Geophysics. vol. 2, *Solid Earth and Interface Phenomena.* Hugh Odishaw, Ed. M.I.T. Press, Cambridge, Mass., 1964. xxiv + 595 pp. Illus. $12.50.

This volume and its companion, which deals with the sun, upper atmosphere, and space, represent two further blocks in the avalanche of books of this general type that threatens to engulf us. The book contains review articles, each by a separate author or group of authors, covering some aspect of the broad field of endeavor described in the title. Numerous volumes covering similar, although not identical, subjects or subdivisions of the broad field have either been published or are projected. In addition to these "one-shot" ventures, there are the relatively well-established review series—such as *Physics and Chemistry of the Earth* and *Advances in Geophysics*—that appear on a more or less periodic basis. Volumes with this format inevitably give very irregular coverage to a field as large as geophysics, and it is all but impossible to rank such a volume vis-à-vis its competitors. It is safe to say (i) that one could spend one's entire time writing articles for such works, and (ii) that each work differs appreciably from the others in its field. The latter fact insures the publishers a wide circulation to libraries. It also, paradoxically perhaps, leads to unnecessary duplication and causes one to wonder whether that frightful day when the total volume of review literature equals or exceeds that of original literature may be closer than is generally suspected.

The volume under review, and its companion, contain the proceedings of a conference held at Berkeley, California, during the 13th General Assembly of the International Union of Geodesy and Geophysics in August 1963. That was also the year of the 100th anniversary of the National Academy of Science, and the coincidence of these events provided a happy excuse for the conference. The basic theme of the conference, as explained in the preface to the book, was to attempt to answer the following questions. "Where did we stand, in a given area, about ten years ago? What were the results of investigations during the International Geophysical Year . . . ? What have we learned in the half-decade or so following the IGY? Hence, where do we stand today? And finally, what problems confront us now?" The papers in this volume in general attempt to answer these questions. Many of them contain brief summaries of the theoretical basis on which the measurements described in the papers are to be interpreted. Thus, they can be read with understanding by the nonspecialist. In addition, most articles include rather complete bibliographies of recent literature. As implied by the above quotation, the emphasis is on research during and after the IGY.

The first chapter in the book is "Long-period waves and free oscillations of the earth" by Frank Press.

It is a summary of methods of analysis and results that is unusually up to date because it draws heavily on material which was unpublished at the time the chapter was written and which has only recently appeared in print. In their paper "Seismicity and earthquake mechanism," John H. Hodgson and A. E. Stevens place most emphasis on the latter topic. The results of a fresh analysis of fault-plane data are presented; this has the advantage of treating all the data in a uniform manner. "Seismology and logics," by V. I. Keilis-Borok, is an examination of the logical structure of seismology. A strong appeal for uniformity and thoroughness in the interpretation of seismograms is made. Estimates of uncertainties in velocity-depth and amplitude-distance functions are shown. "Seismic studies of the earth's crust in Eurasia," by I. P. Kosminskaya and Y. V. Riznichenko, and "Explosion seismology in the western hemisphere," by L. C. Pakiser and J. S. Steinhart, summarize studies of crustal structure. It is interesting to note that the Russians conclude that "detailed observations have brought to light a velocity stratification in the earth's crust" whereas the Americans find that "it is certain only that the velocity-depth function can at any place be adequately represented by a continuous velocity variation." These differing conclusions presumably result from basically different philosophies of interpretation.

In "Longitude and latitude," W. Markowitz, N. Stoyko, and E. P. Fedorov discuss mainly IGY measurements of motions of the pole of rotation, continental drift, and variations in the length of the day. In "Earth tides" Paul Melchior describes advances in instrumentation for observing the bodily tides and improved numerical predictions of the Love numbers. G. P. Woolard, in a chapter entitled "Gravity," describes the international gravity net, compares pendulum and gravimeter data for a large number of stations, and discusses recent absolute determinations of gravity.

"Geophysics of the South Pacific," by R. W. Raitt, is a discussion of bottom topography, seismic crustal studies, heat flow, and the structure of the continental margin of the west coast of South America. This part of the oceans was virtually unstudied prior to 1951. In "Sea-level fluctuations and long waves," William L. Donn, June G. Patullo, and David M. Shaw discuss measurements of sea level in the Pacific, made principally during the IGY, and the detailed observations of sea level and water density made off Bermuda in the years 1954 to 1962. A briefer discussion of waves with periods up to several thousand seconds is included. John A. Knauss discusses subsurface ocean currents, with particular attention to the Cromwell current or Pacific equatorial countercurrent. He emphasizes the unexpected occurrence of high velocities at great depths in all the oceans. "Oceanic polar front survey in the North Atlantic," by G. Dietrich, covers the bottom topography of the North Atlantic and the southern limit of cold polar water. The influence of topography, especially the mid-Atlantic ridge, on the polar front is discussed. In "Antarctic oceanography" V. G. Kort discusses ice distribution, wave heights and periods, water and heat exchange, formation of bottom waters, and dynamics of water masses in the Southern Ocean. Russian work is emphasized.

The structure of Antarctica and its ice cover is discussed by Charles R. Bentley. Measurements of elevation, gravity, ice thickness, ice-cap structure, slope of the ice surface versus its thickness, crustal thickness, and snow accumulation are considered. A lengthy discussion of the reliability of the various measurements is included. "Glacial meteorology," by Herfried C. Hoinkes, is a discussion of the mass and heat budgets of glaciers, including methods of measurement, difficulties, and recent results. "Ice and its changes," by P. A. Shumskiy, A. N. Krenke, and I. A. Zotlikov, covers topics ranging from the terrestrial abundance of ice through theory of glacier flow and distribution of ice to changes in the volumes of glaciers. "Changes" in the title refers to the amount and distribution of ice rather than to its bulk physical properties. "Antarctic weather and climate," by M. J. Rubin, covers the chemical constituents of air and snow, climate controls, heat and water budget, circulation patterns, and climate. Bert Bolin, in "Gross-atmospheric circulation as deduced from radioactive tracers," covers both stable and radioactive tracers, emphasizing the latter. Natural and bomb-produced radioactivity are discussed. Circulation in the troposphere and lower stratosphere is examined, but little is said about the upper stratosphere and mesosphere. The latter topic is discussed by S. Teweles in the next chapter, "Stratospheric-mesospheric circulation." Teweles covers composition, annual cycle of circulation, winter breakdown of circulation, and the 26-month cycle in this part of the atmosphere. In "The heat balance of the earth," M. I. Budyko and K. Y. Kondratiev discuss the inflow and outflow of heat at different parts of the earth and different times of year.

The last two chapters of the book contain material presented at the general plenary session which launched the conference. V. V. Beloussov discusses "The Upper Mantle Project," and Roger Revelle considers "International Cooperation in Oceanography."

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Organic Chemistry

Les Mécanisme Réactionels en Chimie Organique. Blanca Tchoubar. Dunod, Paris, ed. 2, 1964. xvi + 231 pp. Illus. F.18.

According to the preface, the purpose of this book is to present the basic principles of molecular structure needed for an understanding of chemical reactivity, to indicate our present understanding of reaction mechanisms and the theoretical and experimental methods available for their study, and finally to show that a profound (approfondie) knowledge of chemical processes is needed to determine the laws relating structure to chemical properties. The book is divided into two parts. The first deals with the basic properties of orbital theory and molecular structure, with polarity and the inductive effect, with resonance and the mesomeric effect, and with acids and bases. In the second part a classification of reaction mechanisms and a survey of chemical kinetics precede chapters on aliphatic substitution, elimination reactions, addition reactions, prototropic reactions, carbonyl reactions, and aromatic substitution.

Reading this book fills me with a faint sense of nostalgia, for nearly the whole of it could have been written 30 years ago. The presentation is at a very elementary level, and little reference is made to modern developments in the field. Thus, the treatment of aliphatic substitution could well have been written in the 1930's, with the exception of a brief reference to nonclassical car-