

BOOK REVIEWS

EARLY ASTRONOMY

Astronomy and Cosmology in the Achievement of Nicolaus Copernicus

By J. H. Ravetz. Pp. 91. (Warszawa: Zakład Narodowy Imienia Ossolinski, Wydawnictwo Polskiej Akademii Nauk, 1965.) Cena zł. 20.

The Globe of Martin Bylica of Olkusz, and Celestial Maps in the East and in the West

By Zofia Ameisenowa. Pp. 59 + 46 illustrations. Translated by Andrzej Potocki. (Warszawa: Zakład Narodowy Imienia Ossolinski, Wydawnictwo Polskiej Akademii Nauk, 1959.) Cena zł. 20.

It is well known that in respect of both the daily rotation and the annual revolution of the Earth around the Sun, Copernicus was anticipated by Aristarchos of Samos. Further, that the only novel movement of the Earth postulated by Copernicus was soon shown to be redundant. He retained the ex-centric and a considerable proportion of the epicycles of Ptolemy, but since he rejected the latter's equant point it is not surprising that the Prutenic Tables were already out of step with the phenomena when the young Tycho Brahe made an observation on Jupiter about a dozen years after their publication. Why then did the latter, in common with the leading astronomers of the age, though denouncing his hypothesis as "physically absurd", revere Copernicus as one of the greatest astronomers? Copernicus himself wrote that "mathematics is for mathematicians"; and it is as a mathematician that Dr. Ravetz examines an aspect of the *De Revolutionibus Orbium Coelestium* which he claims to be of more importance than the planetary theory generally regarded as the outstanding problem of pre-Newtonian astronomy. Emphasizing the persistent concern about the motion of the Eighth Sphere (that of the fixed stars), he claims that the genius of Copernicus lay principally in his recognition that this problem, bound up as it is with that of finding an invariant reference frame, is the fundamental problem of all quantitative astronomy; and further that the assumption of a constant angular velocity for this "orb" can be saved in relation to the precession of the equinoxes, and other irregularities real and imaginary, only if the motion of the Earth be allowed. Though one might question some of the less fundamental issues raised, the thesis is lucidly and persuasively developed; and in showing the greatness of Copernicus it shows also the greatness of Ptolemy, who for too long was regarded as having merely conflated the ideas of greater men. It is not, however, a book for beginners; final judgment must await detailed examination by those more competent than I. There are rather numerous typographical and orthographical slips, but one would like to feel sure that there would be no more in a British publication of a work written in Polish!

Martin Bylica's astronomical sphere in the Museum of the Jagiellonian University in Cracow has already been the subject of numerous researches. L. A. Birkenmajer described it, and by laborious calculation of the star coordinates discovered much about the date (1480) and circumstances of its construction; Ernst Zinner found strong reasons for supposing that it was made by Hans Dorn, colleague of Regiomontanus at Vienna, for Martin Bylica when the latter was astrologer to Matthias Corvinus at Buda. The author of this monograph presents a great deal of independently assembled information, much of it pointing to Zinner's conclusion and casting much light on a fascinating period. The chief concern is, however, with

the superb engravings of the constellations and their iconographic relation to Arabic sources and the later globes of Conrad Celtes and printed maps of Albrecht Dürer. The engravings have been photographed with great skill and beautifully reproduced on forty-six plates. The translation by Andrzej Potocki reads very smoothly.

WILLIAM P. D. WIGHTMAN

WAVE MECHANICS IN CHEMISTRY AND PHYSICS

Modern Quantum Chemistry

Istanbul Lectures. Edited by O. Sinanoğlu. Part 1: Orbitals. Pp. xvi + 242. 80s. Part 2: Interactions. Pp. xvi + 311. 96s. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1965.)

Quantum Mechanics

Vol. 1: Fundamentals. By Kurt Gottfried. Pp. xvii + 494. (New York and Amsterdam: W. A. Benjamin, Inc., 1966.) \$13.50.

DURING the summer of 1964, Istanbul played host to a distinguished international gathering of theoretical chemists who collaborated to give a series of lectures to the Istanbul international summer school of "Quantum Chemistry". These lectures have now been published in three volumes, under the general title *Modern Quantum Chemistry*, entitled *Orbitals*, *Interactions* and *Action of Light and Organic Crystals*. The first two parts are considered in this review.

Part 1, which treats the orbital theory of molecules, has sections devoted to σ and to π electronic systems. Each section is lucidly introduced by Robert G. Parr and there follow lectures which are more specialized in their scope. The first part concludes with a stimulating discussion and critical appraisal of the Hückel and of the Pariser-Parr-type methods for π electronic systems. Each contribution supplies an adequate bibliography and it should be mentioned that much of the material presented had not been previously published. This volume could be read with benefit by chemists of all shades of interest and not merely by those who consider themselves to be "quantum mechanics", to use the phrase coined by Professor Gottfried. An outstanding feature of this volume (and of Part 2) is the effort made by each contributor to correlate theory with experiment. The non-specialist will thus be able to read the book and gain insight into the application of quantum mechanics to some systems with which he is familiar. The fresh graduate, whose degree course emphasized the theoretical aspects of wave mechanics, will also gain a more balanced outlook with the aid of this book.

If Part 1 will prove to be of general interest, it is likely that Part 2 will be read more selectively, although here, too, there is much to interest the non-specialist reader. The volume is sub-divided into three sections, namely, "Atoms and Molecules", "Solvent Effects" and "Intermolecular Forces". The topics of more general interest include: electrons in liquids; solvent effects and chemical reactivity; solvent dependence of wave number of optical absorption or emission; crystal stability; electrons in metals; forces in metals.

A high standard of scholarship is maintained throughout the first two parts of the publication. Much credit is due to the editor, Otkay Sinanoğlu, whose hand is light but