Preserving the historical record

SOURCES FOR HISTORY OF QUANTUM PHYSICS. By Thomas S. Kuhn, John L. Heilbron, Paul L. Forman, Lini Allen. 176 pp. The American Philosophical Society, Philadelphia, 1967. $5.00

by R. Bruce Lindsay

It is now generally agreed that one can not hope to understand adequately a scientific theory without some acquaintance with the manner in which it evolved. But the history of science is a difficult discipline in many respects, not the least of which is the often fragmentary and misleading character of the historical record. Contemporary physicists are now waking up to a realization that if we are to pass on to our descendants a full understanding of the development of quantum theory, or for that matter, if we hope to understand it ourselves, it is imperative that the relevant sources be uncovered and preserved. The story of an important move in this direction is presented in the volume under review.

In 1960 a joint committee of the American Physical Society and the American Philosophical Society agreed to sponsor a project to develop sources for the history of quantum physics. Thomas S. Kuhn, then professor of the history of sciences at the University of California (Berkeley) and now at Princeton University, was asked to direct the project. Through the auspices of the American Institute of Physics a supporting grant was obtained from the National Science Foundation. Work on the project extended essentially from 1961 to 1966. Kuhn and his collaborators have now provided a report on their accomplishments. Of the coauthors, John Heilbron, the assistant director, and Lini Allen are at Berkeley, and Paul Forman, who has acted as senior editor and archivist, is at the University of Rochester.

The book consists of four principal sections, of which the first describes in some detail the methods of procedure and activities of those in charge. This provides a clear picture of the way the source material was collected and how it was later handled. Investigation was made of the scientific records of some 170 individuals who contributed in some significant degree to the development of quantum physics. Brief professional biographies of these are included in the section along with records of manuscripts and correspondence located and interviews held. About 95 of the persons noted were interviewed, and tape recordings were made in the majority of cases. There is an admirably perceptive discussion of the techniques that make such recorded interviews meaningful. Careful transcripts of all recordings were prepared, and copies have been deposited at Berkeley, Philadelphia and Copenhagen. The book contains a complete inventory of the oral records as well as of the microfilms of manuscripts and correspondence. There is a complete and carefully prepared index.

Without question this volume will prove a mine of useful information for historians of quantum physics. All who were concerned with the carrying out of the project are to be congratulated on the contribution they have made. The book will also aid the contemporary research physicist in this general area in placing his work in proper perspective. It is hard to see how any quantum physicist can fail to extract valuable material from it. As a matter of fact the sources recorded here have already been utilized to good purpose in the recent historical survey by Max Jammer, *The Conceptual Development of Quantum Mechanics* (McGraw-Hill, New York, 1966), reviewed in PHYSICS TODAY, March 1967, page 102.

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FERMI, HEISENBERG AND PAULI relaxing on Lake Como in September 1927.

Quantum mechanics applied to chemistry

THE THEORY OF THE ELECTRIC AND MAGNETIC PROPERTIES OF MOLECULES. By D. W. Davies. 279 pp. Wiley, New York, 1967. $10.00

by Howard B. Levine

Continuing improvement in fast computers and hard work by many people make it evident that meaningful calculations of molecular, electric and magnetic properties will soon be available in great profusion. Thus it is appropriate to have on hand monographs that review and unify the existing work and provide a general point of view from which it can be examined in a logically ordered way. The present book represents a fine endeavor along these lines. Starting with classical electrodynamics, the Schrödinger equation and Pauli's treatment of spin, the author provides a systematic derivation of the theoretical expressions for molecular properties such as electric and magnetic moments, polarizabilities and susceptibilities. He then considers spin interactions of various types, both with external fields and internally, and finally treats interactions with radiation in the presence of electric and magnetic fields, for example, the Kerr, Stark and Zeeman effects. In addition to general formulas in terms of matrix elements, he discusses with much care the practical evaluation of these expressions in terms of approximate wave functions and re-