Gifford Lectures

The Relevance of Science: Creation and Cosmogony. Gifford Lectures, 1959 and 1960. C. F. von Weizsäcker. Harper and Row, New York, 1964. 102 pp. $5.

This is a philosophy of science highly subversive of the Cult of Progress. The method of this discourse is to trace the history of Western thought through its concepts of creation and cosmogony, an appropriate subject for an astrophysicist of von Weizsäcker's stature. After tracing and interpreting the historical cosmogonies, he concludes that today's faith in science plays the role of a dominating religion, differing little in its mythical ("theoretical") components from the universal myths of the past.

The central concepts of modern science are historical extensions of the Judeo-Christian concept of a single God (that orders the universe) and of the Platonist concepts of unity, mind, and "pure idea." The science myth has considerable relevance to modern life, although the substantive basis upon which relevance is claimed (the authority and objectivity of the scientific method) is neither unique nor necessarily relevant to questions of political and social judgment. The uncertainties and mysteries have not been fundamentally altered, nor has the place of human desires and values been diminished. Herein lies the basic ambiguity and ambivalence of science.

In a prose of singular line and clarity, the author assaults some of the precious assumptions of scientific pride. The scientific method is seen as employed with as much (or as little) rigor under the rubric of other universal myths as under the rubric of science. What has basically changed is the underlying technology and those social institutions that rise and fall as mankind continually adapts his relations to nature through his artifacts and tools. Whatever the rationalizing myth of an epoch, man finds the possible ways of doing and making more or less pragmatically. The mental images and symbols of an epoch derive from a metaphysical commitment, which, to the extent that man has power to predict or control his environment (a power dependent on technology), is modified by pragmatic necessity.

Modern science claims the credit and the credibility bestowed upon it by the process of technological accretion and complication, and its chief relevance may lie in its religious component. "Scientism" comprises both the ideology of a new priestly caste (the technologist and expert) and the trust that modern technology induces in believers. The myth is evidenced by the ubiquity with which the word "science" is claimed for all manner of human activity. "Scientism" may be held in contempt by many scientists but nonetheless it provides the conceptual framework in which are structured the thoughts of today's knowledgeable men.

This incisive tome, which contains the Gifford Lectures delivered at the University of Glasgow in 1959 and 1960, represents a reduction of science to sociology, similar in many respects to the reduction of religion in the theology of Paul Tillich. The contemporary scientist who knows himself in the presence of mystery should find much to admire here; the scientist who feels too great a confidence in his theories should find this book an exercise in self-examination.

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A Collection of Reprints

Free-Electron Theory of Conjugated Molecules: A Source Book. Papers of the Chicago Group, 1949–1961. J. R. Platt and others. Wiley, New York, 1964. Unpaged. Illus. Paper, $2.95; cloth, $4.95.

This book, which has been published jointly with a closely related, companion volume, *Systematics of the Electronic Spectra of Conjugated Molecules*, consists of 21 reprints of papers written by one-time members of the Department of Physics or the Laboratory of Molecular Spectra and Structure at the University of Chicago. They are preceded by a one-page preface by J. R. Platt, the only one of the authors who has not changed his institutional affiliation.

First developed by Sommerfeld as a theory for metals in 1928, the free-electron approach came into its own as a powerful tool in quantum chemistry about 20 years later. At that time several researchers, notably N. S. Bayliss, W. T. Simpson, and H. Kuhn, working almost simultaneously on three different continents, showed how this model gave good predictions of the spectra of long-chain polyenes. It was also during this period that the "Chicago Group" started its pioneering researches which, from the brilliant intuitions of Platt to the mathematical wizardry of Ruedenberg, form the subject of this reprint collection. Throughout the 12-year period involved, the group not only showed how the free-electron theory could be used to interpret a wealth of experimental data on conjugated molecules, but it also analyzed the close mathematical relations between this approach and other forms, notably the LCAO approach, of the molecular orbital method. The scientific merit of the contents of these papers hardly needs any further emphasis.

I am familiar with several volumes of "Collected Papers" of distinguished scientists, usually (if not always) printed posthumously. In 1963, W. A. Benjamin, Inc., published Robert G. Parr's *Quantum Theory of Molecular Electronic Structure*, in which 125 pages of "lectures" were supplemented with 340 pages of reprints. To the best of my knowledge, the "source books" now brought out by John Wiley and Sons, Inc., are the first in our field which consist *exclusively* of a set of reprints. The success of this venture, which may literally flood the market with similar publications, depends in part on economical and practical factors that are hard to predict. Eighteen out of the 21 papers (177 pp.) which constitute the volume under review, appeared originally in the *Journal of Chemical Physics*, a periodical that is readily accessible. It remains to be seen whether researchers in the field will prefer to stock their bookshelves with "source books" or their notebooks and file cabinets with reprints and photocopies.

To quote from Platt's preface, the free-electron-network model has been established as "the most fruitful and, in fact, the only natural way of conceptually grasping LCAO wave functions in conjugated systems. It is therefore a useful teaching device and a valuable subject of study for the beginner and the advanced chemist alike. Moreover, it permits a number of interesting problems to be solved quantitatively even by first-year chemistry students." These remarks strongly sug-