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Hanson; Michael Polanyi's explanation of the role that tacit knowledge and knowing how play in scientific advancement; and Thomas Kuhn's account of paradigms and conceptual revolutions. Brown also develops ideas of his own on the role of presuppositions in shaping the scientist's world. The examples chosen to illustrate these doctrines are, for the most part, the historical incidents that are familiar to philosophers of science.

Ten years ago these ideas did seem to hold out the promise of a conceptual renewal in the philosophy of science. Yet no coherent, or even marginally adequate, new synthesis has unified these diverse trends. The difficulties involved are aptly illustrated by Brown's suggestions for such a synthesis. There is, in his view, no absolute truth. The truth of any scientific theory can only be evaluated relative to the presuppositions guiding the research project of which the theory is a part. In developing this position Brown effectively accepts descriptive accounts of scientific practice as normative accounts of what scientific explanation is.

This book is not suitable as a text for an introductory course in the philosophy of science. Too much is negative, too much outdated, and too little concerned with explaining science. However, it might be useful as a supplementary text, especially for those who find it enlightening to consider the dynamics of paradigm replacement in philosophy itself. The book does have one truly novel feature, a systematic error of two pages in every index reference to the text and notes from page 145 to the end.

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Electron Microscopy in the Study of Materials

P. J. Grundy, G. A. Jones

174 pp. Crane, Russak, New York, 1976.
\$19.50 clothbound, \$9.50 paperbound

For a rapidly developing technique such as electron microscopy, with its increasing importance as a research tool in many areas of science, there is always a need for a good introductory book to keep the non-specialist in touch with the state of the art. The authors of this book feel that, having given undergraduate lectures on the subject at Salford University and having taught some advanced "extramural" courses, they are in a good position to supply the same introductory information to a wider audience.

To some extent their confidence is justified. Their small book offers a quick survey of most aspects of transmission and scanning electron microscopy as it applies to non-biological solids. The in-

troductory chapters cover electron scattering and the principles of construction of the various forms of instruments. The core of the book describes the way the instruments can be used to obtain information of importance in materials science, with emphasis on metallurgical studies. The section on scanning electron microscopy covers applications to semiconductor devices and the use of x-ray microanalysis, Auger spectroscopy, cathodoluminescence and so on. Then there are brief descriptions of "recently developed" techniques such as high-voltage electron microscopy and scanning transmission electron microscopy. Brief appendices give the elements of real-space and reciprocal-space geometry and introductory ideas on diffraction. It is a clear, straightforward exposition.

There are presumably many people for whom a superficial treatment such as this, with a minimum of theoretical content, will be satisfying and sufficient. On the other hand, it is difficult to see how physics students or graduates could be happy with it. There are too many places where the physical principles are glossed over or ignored. For example, for transmission electron microscopy, the resolution and image contrast are topics of fundamental significance which should be treated with some care, but resolution is not defined at all and one looks in vain for a clear indication of what is meant by the terms "phase contrast," "amplitude contrast" and "diffraction contrast," which are used in confusing disorder. This is not really surprising in a field where the imaging of phase objects is habitually discussed, as in this book, in terms of the ideas developed in light optics for the incoherent imaging of amplitude objects, but it is regrettable.



A cobalt alloy with a secondary phase of filamentary silica (emissive mode). Photo reproduced from R. Barlow and P. J. Grundy, *J. Mater. Sci.*, 1970, 5, 1005, with kind permission of Chapman and Hall, Ltd.

Someone who relies on this book as the ultimate guide for his low-level use or appreciation of electron microscopy will probably not be affected by these finer points or by the logical errors such as those in the descriptions of the reciprocity relationship for STEM imaging on page 141 and of anomalous absorption on page 72. On the other hand, part of the function of an introductory book can be to inspire the occasional reader to a more complete involvement with the subject. For such a reader such misstatements can only cause confusion. Perhaps it is not appropriate, after all, for introductory books to be written by those who give introductory courses. The best simplifications of complex concepts are given by those who live with the complexities.

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book notes

History of Twentieth Century Physics (Proc. of the Int. School of Physics "Enrico Fermi", Course 57, Villa Monastero, Varenna on Lake Como, Italy, July-August 1972). C. Weiner, ed. 457 pp. Academic, New York, 1977. \$39.50

In the summer of 1972 the Italian Physical Society's International School of Physics "Enrico Fermi," which usually focusses on "a field on the forefront of contemporary physics research," instead devoted a session to the history of mainly twentieth-century physics. The speakers included not only historians of science, but also physicists (P.A.M. Dirac, H.B.G. Casimir, Edoardo Amaldi, Victor F. Weisskopf and Lew Kowarski) who had actively taken part in the developments in physics over the last half century. Together, in the words of Charles Weiner, they attempted to "take into account the philosophical and historical roots of the concepts and techniques of physics, the styles of individuals and institutions, and the influences of social and political environments."

The Versatile Satellite. R. W. Porter. 173 pp. Oxford U.P., New York, 1977. \$11.00

Richard W. Porter, who was manager (science and technological affairs) of the Aerospace Group at the General Electric Company from 1970 to 1975, argues that "The use of satellites has by now become so involved in the lives of so many different kinds of people in so many different ways that it seems important for almost everyone to have an understanding of what a satellite is, how it is put into orbit (and why it does not promptly fall down

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NUCLEAR STRUCTURE PHYSICS

Proceedings of the Eighteenth Scottish Universities Summer School in Physics, held at the University of St. Andrews in August 1977.

Editors: S. J. Hall, J. M. Irvine.
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