

Practice of science

Russell Moseley

Philosophy and Sociology of Science: An Introduction.

By Stewart Richards.

Basil Blackwell/Schocken Books: 1984. Pp.210. Hbk £17.50, \$20; pbk £5.95.

An Introduction to Science Studies: The Philosophical and Social Aspects of Science and Technology.

By John Ziman.

Cambridge University Press: 1984.

Pp.203. £12.95, \$22.95.

The Experience of Science: An Interdisciplinary Approach.

By Martin Goldstein and Inge Goldstein.

Plenum: 1984. Pp.400. \$22.50, £21.38.

THE more dogmatic features of an undergraduate education in science (almost as bad as orthodox theology according to Thomas Kuhn) are well known and are enshrined each year in thousands of examination questions which require candidates to demonstrate their competence in solving puzzles within well-established frameworks. Those examining conventions which today we take for granted have not always been so closely observed. Cambridge science students in the 1850s were invited to consider whether there was "a shadow of proof from the ethnographical and physical history of man that any one of his oldest varieties was derived from a quadruminous progenitor" and were urged to state their own opinions "without hesitation" should they differ from those of the examiner. But by and large undergraduate science students have not been encouraged to question either the status of the knowledge acquired in their apprenticeship or, indeed, the nature of the scientific enterprise more generally. Not surprisingly



Visitors to the cave paintings of Lascaux in France, shortly after the cave's rediscovery in 1940. The picture is reproduced from the new paperback edition of *The Creative Explosion*, by John Pfeiffer, published by Cornell University Press. For review see *Nature* 302, 764 (1983).

then, studies which seek to encourage such questioning have met with a mixed reception.

To reduce the possibility of outright rejection it becomes necessary to establish the legitimacy of "science studies" and to convince students of the need to view them as an integral part of a scientific training rather than something which derives from a nineteenth-century belief in the virtues of a liberal education. In this respect students are more likely to take notice if these matters are addressed by *bona fide* scientists, and all three of the books reviewed here share this advantage. Credibility in students' eyes may be further enhanced by claims for the utility of science studies, and each book contains a justification for such teaching over and above "metascience" (as Ziman calls it) for its own sake. Thus Richards begins with a recollection of the value to his later career of an undergraduate course in the history and philosophy of science, while Ziman sees "a possible guide to action in scientific research, in industrial management, in political administration, and in public affairs". Once credibility has been established a major problem remaining for the would-be teacher of science studies is the choice of material — there is no agreed core curriculum here but a spectrum extending from the philosophy of science to the economics of technological innovation. This is a difficulty which confronts any author writing a book on science studies, and the problem of providing material and a structure which will be sufficiently flexible to find use in a broad range of courses has no easy solution. Since all three books make claims to be suitable undergraduate texts, their success in this respect deserves careful consideration.

An additional obstacle to be overcome stems from the constantly growing specialist literature generated by those historians, philosophers, sociologists, economists and political scientists who contribute to the science studies area. Both Richards and Ziman are acutely aware of this — their titles make it clear that we are dealing with "an introduction" — and both authors offer their work as a guide to an interpretation of the wider literature and as a means of presenting themes which they identify as being of particular importance. For a reviewer this poses a problem. To engage in a discussion of the authors' interpretation of debates in the philosophy of science, the sociology of science, science policy and so on, would be an undertaking which would result in another (introductory) text. Instead it seems preferable to focus on the appropriateness of the particular guided tours we are being offered in the light of their stated purpose.

The routes taken by both Ziman and Richards are, at first glance, very similar, starting with a broad look at selected features of the philosophy of science, moving on to the sociology of science and science policy, bringing us finally to more

general cultural matters. Both tours finish rather abruptly, with neither guide attempting any recapitulation of those features which were of special interest — presumably they are taken to be self-evident if the tourist has been paying attention. Despite the apparent similarities there are some significant differences. On the whole the Ziman route is the more stimulating, revealing some unexpected views, striking out on paths only recently discovered and generally traversing the terrain at a faster pace. The Richards party will certainly get their money's worth, but will miss some of the newer landmarks, will avoid some of the higher slopes, and generally travel more sedately.

Ziman is noticeably the stronger in his discussions of recent work in the sociology of science and is more successful in linking his themes throughout the book. Richards more clearly divides his work into "Methods and Philosophies of Science" and "Interactions of Science and Society". The least satisfactory part of both books is that dealing with the organization of research and development and technological innovation — at this point the tourist may find his or her attention wandering (to be fair, neither author sets out to treat the broad area of science, technology and society comprehensively, but questions concerning the economics of research and development and technical change are a part of science studies, and one for which students often show considerable interest). Similarly, the history of science is allowed little more than a token appearance. Students using either of these books will need to be reminded that the Ziman and Richards routes are not the only ways of seeing the landscape and that others have been mapped out.

The Goldsteins offer an alternative approach, and the intended use of their book as an interdisciplinary introduction to science means that metascientific questions are viewed from a different perspective. There is, in addition, a welcome historical dimension introduced through case-studies, those commodities which are always so eagerly sought by teachers of science studies. As with the other two books it would be possible to direct students to specific sections rather than treat the text as a whole. Indeed, some selection of material is probably inevitable since few science studies teachers have sufficient time at their disposal to permit more than a sampling of the range of topics introduced in the three books, let alone persuade students to read into the chosen areas as suggested. Stimulating as these guided tours may be, the problem remains of translating them into the one or two hour a week teaching session typically allowed for such studies in the science curriculum. □

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