

book reviews

Essays on Needham and China

Chinese Science: Explorations of an Ancient Tradition. Edited by Shigeru Nakayama and Nathan Sivin. Pp. xxxvi+334. (MIT East Asian Science Series, Vol. 2.) (MIT: Cambridge, Mass and London, 1973.) £5.65.

THE purpose of this compilation of essays, according to the preface prepared by the second editor (Sivin) is twofold: to provide perspectives on the work of Joseph Needham, to whom the volume is dedicated, and to provide a sample of representative 'explorations' of Chinese science. In offering to relieve the reviewer of the burden of reading each essay, the editor invites evaluation of his book in terms of the purposes he sets out.

Because the history of Chinese science and technology has been dominated in the West by the work of Joseph Needham, the efforts to put it in perspective have been few, indeed. The measure of *Science and Civilisation in China* is best taken in terms of its purpose, which Needham himself describes in his essay in the present volume:

"One of the greatest needs of the world in our time is the growth and wide dissemination of a true historical perspective, for without it whole peoples can make the gravest misjudgments about each other. Since science and its applications dominate so much our present world, since men of every race and culture take so great a pride in man's understanding of Nature and control over her, it matters vitally to know how this modern science came into being . . . distinctively modern science did in fact come into being only in Western Europe during the 'scientific revolution' of the fifteenth and sixteenth centuries, culminating in the seventeenth. But this is indeed far from being the whole story, and to tell this part of it alone is to be deeply unjust to the other civilizations."

Needham has begun a preliminary exploration, according to the present editor, putting forward tentative hypotheses, rather than providing a definitive summary of the Chinese scientific and technical traditions. The first three essays evaluate Needham's work from different perspectives. To Derek de Solla Price, it is a "definitive classic", a systematic presentation of the raw material for generations of scholars and a point of departure for all sub-

sequent work. Shigeru Nakayama analyses the elements in Needham's thought in relation to his personal life and his views as a biochemist, which have influenced his interpretation of the history of Chinese scientific and technical development: an evolutionary rather than a mechanistic viewpoint; a preference for synthesis over analysis; and dialectical materialism. These, in Nakayama's view, have led to "a number of insecurely based speculations", which contradict both conventional scholarship and historical facts. Summarising the views of Needham's critics and analysing the more controversial of Needham's views, Nakayama evaluates *Science and Civilisation in China* as a body of "heuristic suggestions and unelaborated ideas", which remain to be synthesised by future scholars. It is in this sense that Needham's work is a "determinant" of modern awareness of China. A. C. Graham comments on the development of Needham's response to the problem of why there was a Scientific Revolution in Europe but not in China, from a "fairly straightforward Marxist answer influenced by the early Wittfogel" [in *On Science and Social Change* (1944)] to "his sociological explanation but in a much more developed and refined form, for which he acknowledges a debt to Jean Chesneaux and Andre Haudricourt". Needham's thought on Chinese scientific development no more springs from a single origin than the modern science whose roots he traces to a number of cultures and societies.

The remaining six essays, by Mitukuni Yosida, Kiyosi Yabuuti, A. C. Graham and Nathan Sivin, Ho Peng Yoke, Beda Lim and Francis Morsingh, William C. Cooper and Nathan Sivin, and Saburo Miyasita, represent current scholarship based, like Needham's, on the use of primary documents, of "high intellectual and critical standards", in the editors' view. The body of scholarship which can meet such criteria is admittedly small, though its composition is ecumenical. An important contribution of this volume is in presenting representative works by Japanese scholars, which until now have rarely been accessible to the non-specialist in English translation. It is, as the editors acknowledge, regrettable that contemporary scholarship in China itself is not represented in this collection, but it is also to be regretted that the

reasons for this lack and, indeed, the present state of Chinese scholarship in this field are not discussed in the preface.

For the layman about to begin his own explorations in Chinese science, these papers provide a frame of reference for the monumental work of Joseph Needham by "de-mythologizing" the role of one man in studies of the science and technology of traditional China. With this collection of essays as a beginning, and further guided by the introductory bibliography with which this volume concludes, the layman's understanding of Chinese science should no longer have to be "determined" by Needham's work to the same extent. On the other hand, one of the motivations for the compilation of these essays was the editor's view that "everyone who is concerned about the central problems of our time has a stake in the deeper understanding of science in ancient China". Of the scholarship which deepens understanding of traditional Chinese science, it is surely that of Joseph Needham which extends understanding to those whose concern is the present.

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Fish chromosomes

Fish Chromosome Methodology. By Thomas E. Denton. Pp. vii+166. (Thomas: Springfield, Illinois, 1973.) n.p.

THE chromosomes of fishes are, characteristically, small in size and large in number. For these reasons they are difficult to handle and this book represents, in the main, a survey of cytological methods for the preparation and study of fish chromosomes.

One may well ask what justification there is for a book devoted to fish chromosomes alone. First, from a practical standpoint, there is unquestionably a big future in fish breeding for which a thorough knowledge and understanding of the chromosomes will be essential; particularly, as seems likely, where hybridisation between species may prove useful. Second, from a strictly cytological standpoint, there are many reports among fishes of Robertsonian changes associated with divergence in chromosome number between species within genera, between and within populations of the same species and even between somatic cells within individuals. It is by no means clear whether such widespread chromosome numerical variation,