

Four of the conference papers are printed in this volume (two others are on the way to becoming books themselves), and the remaining chapters were solicited specifically for the volume. Thus, this immensely useful collection may be said to represent the state of the art in regard to Philoponus, and its editor announces a forthcoming series of translations that will make Philoponus's scientific thought available to a wider circle of readers. Both occasions call for as heady a celebration as academics can manage.

To the editor's and the contributors' great credit, the religious motives and circumstances of Philoponus's anti-Aristotelianism are fully laid out, both in individual essays (especially Henry Chadwick on Philoponus's theology, but also in Sorabji's two papers and in the essay by Lindsay Judson on generability and perishability) and in the general tone of the treatment of specific topics (dynamics, place and void, space, and self-awareness). Philippe Hoffman provides a learned and important analysis of Simplicius's polemic against Philoponus, so that (with Chadwick's essay) we can see precisely how Philoponus appeared to both pagans and Christians. There are essays on Philoponus in the Arabic tradition (Fritz Zimmermann) and in the sixteenth century (Charles Schmitt). There is an extensive bibliography and an *index locorum* to the writings of Philoponus, as well as a general index. The book is remarkably free of errors.

Moreover, this volume is also the occasion for a very intelligent rehearsal of some of the conventional ideas in the history of science. Michael Wolff's essay "Philoponus and the Rise of Preclassical Dynamics" contains an important review of the nature and history of impetus theory. David Sedley and David Furley provide, respectively, a text-illustrated account of Philoponus's conception of space and a vivid summary of Philoponus's corollaries on place and void. Wolfgang Bernard argues cogently for Philoponus's place in the history of psychology. Richard Sorabji's two essays are characteristically learned and lucid, ranging widely over Philoponus's life and thought and his doctrines of infinity and creation. Christian Wildberg offers a pathbreaking analysis of Philoponus's *Contra Aristotelem*. This is exactly the sort of many-handed volume one needs to approach a thinker as complex and important as Philoponus. Obviously crucial to

the history of science, it will serve a far wider circle of readers, and it will serve them well.

EDWARD PETERS

■ Far East

Joseph Needham. *Science and Civilisation in China*. Volume V: *Chemistry and Chemical Technology*. Part 1: *Paper and Printing*, by **Tsien Tsuen-Hsui**. xxv + 485 pp., illus., figs., app., bibls., index. Cambridge/London/New York: Cambridge University Press, 1985. \$89.50.

Tsien Tsuen-Hsui, professor emeritus of the University of Chicago, is responsible for this long-awaited volume in Joseph Needham's *Science and Civilisation in China*, as is immediately evident from the now-famous format. And it is distinguished, as have been all of the preceding volumes, by its bulk, accounted for by an ample treatment of the subject coupled with a more than adequate discussion of the history of the topic in other cultures.

Unlike some of the earlier volumes, this one does have worthy predecessors in English, notably the writings of Dard Hunter on paper (comprising small volumes on oriental papers, published in the 1930s, and his large *Papermaking* of 1943) and T. F. Carter's *The Invention of Printing in China* (1925). But as usual these contributions are overwhelmed by the encyclopedic treatment in the Needham series.

And of course the treatment here is more up to date. The date of the invention of paper is now carried back "several centuries before the start of our era" (p. 2; Hunter had placed it the first century A.D.), and that of printing earlier (but not by much) than the long-familiar eighth-century Buddhist charm from Japan.

These claims are supported by recent archaeological discoveries, but the chronologies remain somewhat vague and are less interesting, except to fanatical priority seekers, than detailed information typical of the Needham history. What was paper used for before the invention of printing? For writing, of course—but first, apparently, for wrapping, for the mold and sizing, without which paper was worse than imperfect for writing, are here dated between A.D. 200 and 300. Thereafter, paper fans and umbrellas, clothing, kites, lan-

