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Review

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Source: *Isis*, Vol. 77, No. 4 (Dec., 1986), pp. 710-711

Published by: The University of Chicago Press on behalf of The History of Science Society

Stable URL: <http://www.jstor.org/stable/233202>

Accessed: 25-03-2016 17:13 UTC

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Betz's *The Greek Magical Papyri in Translation* (Chicago, 1986), readers unfamiliar with the richness of these quirky mainstream documents of the classical world will quickly uncover the reasons why the so-called literate sources (the well-known poets, for example, or the canonical texts of the New Testament) are far better comprehended when they are set in the context of a common belief in magic at all levels of ancient society.

The representative texts collected in *Arcana mundi* (in six sections, under magic, miracles, demonology, divination, astrology, and alchemy) are accompanied by precise introductions to the materials by Luck. Those unaccustomed to finding clear scientific logic embedded in astrology, magic, and alchemy will perceive why Thorndike titled his monumental study as he did: the presumptions of magic and magicians are certainly the presumptions of modern science—control of nature, however one may devise methodology, from correct spells to controlled experiments. Classical philologists will already know the passages from Virgil, Theocritus, Pausanias, Varro, Aeschylus, Homer, Cicero, Plato, Aristotle, and many other famous names in the literature of classical antiquity, but they may not be aware of similar thoughts and contents in the works under the name of Hermes Trismegistus, the alchemical writings of Zosimus of Panopolis, or the anonymous texts in the *Papyri graecae magicae*. Luck's translations are generally accurate and spritely, with the exception of some of the overtly sexual matter from the papyri; compare, for example, his rendering of *Papyri graecae magicae*, 4.296–466 (pp. 92–93), with that by E. N. O'Neil in Betz's *Greek Magical Papyri* (pp. 42–44).

The format and contents of *Arcana mundi* make the book appropriate for use in university courses on folklore and other classes in the history of ancient science, medicine, and pharmacy. Historians of science desiring an overview of the major texts and secondary works will find Luck's gathering of translated texts and clearly written introductions of great value. *Arcana mundi* should become a standard handbook for a beginning inquiry into ancient magic and the occult, along with Betz's volume. Modern scholars are finally admitting the role of magic for the creation of modern science, documented in detail

half a century ago by Thorndike and explicated by Dodds for Greek antiquity in 1951.

JOHN SCARBOROUGH

■ Middle Ages

William Heytesbury. *On Maxima and Minima: Chapter 5 of Rules for Solving Sophismata, with an Anonymous Fourteenth-Century Discussion.* Translated with an introduction by **John Longeway.** (Synthese Historical Library Texts and Studies in the History of Logic and Philosophy, 26.) x + 201 pp., bibl., indexes. Dordrecht/Boston/Lancaster: D. Reidel, 1984. (Distributed in the U.S. and Canada by Kluwer Academic Publishers, Hingham, Mass.) Dfl 85; £21.75; \$29.50. (Photo-offset from typescript.)

This book had its origin in John Longeway's edition of an anonymous *Treatise Concerning Maxima and Minima* found in MSS Vat. lat. 2130, fols. 173r–177r, and Venice, Biblioteca Marciana, Z.1.277, fols. 17–22. From his edition and translation of this work, included here, Longeway proceeded to translate Chapter 5 of William Heytesbury's *Rules for Solving Sophismata*, on which the anonymous treatise directly depends. Because it was more original and influential, the Heytesbury work receives top billing in the title of this volume. In addition to these items, the book contains an introduction, a forty-page study of the two works, several sets of notes, a brief bibliography, and indexes.

It is now relatively well known that scholars in mid-fourteenth-century Oxford produced a body of work that does not fall easily within the bounds of any single modern discipline, but overlaps what would now be categorized as physics, logic, mathematics, and perhaps other fields. The specific character of this body of work seems to have been influenced not only by previous developments in each of the overlapped disciplines—for instance, by Aristotle's *Physics*, by the development of supposition theory within logic, and by Thomas Bradwardine's *On the Ratios of Velocities in Motions*—but also by the prominence of disputations *de sophismatibus* within Oxford undergraduate education. In these disputations, toward which Heytesbury's *Rules for Solving Sophismata* is directed, logic, physics, mathematics, and sometimes other disciplines are in-

terwoven in a way seldom found before or since. Although the enterprise was very much connected to teaching, it also led to what might be considered scientific (or logical or mathematical) advances.

Longeway argues that the selections on maxima and minima he edits or translates here may be considered mathematical works, abstracting the properties of continua from physical powers or capacities, and he attempts to relate them to Richard Dedekind's work on the continuum in the late nineteenth century. The ostensible subject is the limits of active and passive powers or capacities, such as the limit of Socrates' capacity to carry weights or to see objects at a distance, but within this framework the focus of attention is on determining whether such limits are intrinsic or extrinsic: for instance, is there a maximum weight that Socrates can carry or a minimum weight too heavy for him to carry? Longeway's introductions and notes generally raise philosophical points and clarify the texts using the tools of modern logic or mathematics. Since most of Longeway's own work on the texts has been analytical rather than historical, this book will be useful to the historian of science mainly for the access it provides to the texts, not for new historical information about the context in which they were written.

On the whole this is a serviceable working edition, although not a completely polished product. The translation of Heytesbury is based mainly on the edition of 1494. A critical edition of the work based on all the known manuscripts is now in progress but is not likely to appear for several years. This book is reproduced from typescript and contains quite a few typing errors and misspelled names and words, most of which can easily be detected as such by the reader and do not detract from comprehension. As they must be, given the technical nature of the texts and the importance of word order in medieval logic, the translations are quite literal. I would like to think that with more work the translations could have been made clearer and more attractive in English without losing their exact technical sense, but as they stand they are quite adequate for the purpose. I fear this book will not attract new students to the study of fourteenth-century logic-mathematics-physics, but for those already interested it provides much useful grist for the mill.

EDITH D. SYLLA

■ Islamic Cultures

Sharon Gibbs; George Saliba. *Planispheric Astrolabes from the National Museum of American History*. (Smithsonian Studies in History and Technology, 45.) viii + 231 pp., illus., apps., bibl., index. Washington, D.C.: Smithsonian Institution Press, 1984. (Paper.) No charge to institutions; available to individuals on microfiche.

This book is a catalogue of the astrolabes in one of the largest collections in the world: some forty-eight instruments are described, most of them of Near Eastern provenance. The first critical catalogue to appear for any of the major astrolabe collections, it was prepared by two historians of science who are both specialists in scientific instruments and who, between them, master the necessary languages. Yet the work is far more than a mere catalogue; indeed, with the wealth of descriptive material that it contains, it is a basic reference work on astrolabes. Unfortunately, it has been published in a limited edition, so that it is likely to be hard to obtain in the near future.

A useful introduction on the design of the astrolabe (pp. 1–11) precedes a historical overview of the collection by century (pp. 12–22) and a comparative analysis arranged according to the different features (pp. 22–60). The latter is a particularly welcome contribution to the literature, although I should have preferred to see Islamic and European astrolabes treated separately. Also, I feel that the authors are too kind to later astrolabes; most of these could not have been used for any serious scientific purpose, and they constitute a good half of the collection. The fact that they are a few centuries old and are preserved in a major collection does not in itself make them interesting. The book concludes with appendixes (pp. 190–222) containing information on the geographical gazeteers and star names occurring on the astrolabes.

The catalogue proper (pp. 61–189) is arranged in an order that is, from a scientific or historical perspective, quite arbitrary (see p. 61). (The order is in fact that of S. Gibbs, J. Henderson, and D. J. de Solla Price, *A Computerized Checklist of Astrolabes*, New Haven, 1973, before sortings by date.) The opportunity to arrange the material chronologically by provenance has thus been missed. The most interesting ex-