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Arianna Borrelli. Aspects of the Astrolabe: “Architectonica Ratio” in Tenth- and Eleventh-Century Europe.

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when one word is translated differently in the secondary sources. With the rapid globalization of “traditional Chinese medicine” and its growing economic and political strength, who has the authority to determine fixed translations has become an important political issue. For the Han period, however, the shifting meanings are still manageable, and with the plentiful character combinations and examples Tessenow and Unschuld have done a good job in representing inevitable nuances in context. The dictionary will be most useful for those who already have a good understanding of the history of Chinese medicine and the transformation of its traditions. Attempting to translate the *Suwen* is, in any case, neither for the beginner in Chinese nor for the faint of heart.

Modeled on legal and administrative traditions employed in the imperial administration, medical knowledge set out in the dialogic style of the Yellow Emperor corpus claimed a legitimacy akin to that of government rather than logical coherence. In part, the lack of internal coherence is an intrinsic feature of the way the text was compiled; but for me there was also a personal confusion, induced by the poor quality of the translations and reference works available at a time when my own reading of classical Chinese was in its infancy. This new dictionary marks an important stage in European access and, with the addition of a digital searching device in the accompanying CD, will facilitate a new generation of rapid research. It is a very welcome new tool that I will certainly put to good use.

VIVIENNE LO

■ Middle Ages and Renaissance

Arianna Borrelli. *Aspects of the Astrolabe: “Architectonica Ratio” in Tenth- and Eleventh-Century Europe.* (Sudhoffs Archiv, 57.) 270 pp., illus., apps., bibl., indexes. Stuttgart: Franz Steiner Verlag, 2008. €44 (cloth).

The primary transmission of mathematics and astronomy from the Islamic world to medieval Europe took place in the form of Latin translations from Arabic made in the twelfth century A.D. The book under review concerns the history of the astrolabe in Christian Europe before the twelfth century. In the tenth and eleventh centuries, the astrolabe was well known in the Islamic part of the Iberian Peninsula, and two splendid examples from the 1020s survive today. Knowledge about the astrolabe had trickled

down to Christian Europe, and the instrument is described in a corpus of brief and disorganized, mostly eleventh-century Latin texts, which ultimately go back to Arabic sources. Some of the texts contain very interesting diagrams. One may wonder to what extent the astrolabe was understood by the authors of these texts and why Latin scholars were interested in this instrument at all. *Aspects of the Astrolabe* is devoted to these questions.

Arianna Borrelli begins with a description of the astrolabe and a survey of the sources and of previous studies by modern historians. Her main theses are as follows. (1) In the tenth and eleventh centuries, knowledge about the astrolabe was transmitted (from the Islamic to the Christian world and inside Christian Europe) not only through texts, but also by other means—for example, orally, through drawings, by memorizing, and by note taking during lectures. (2) “Much more knowledge was stored and diffused in Latin Europe than would appear from the rather poor contents of the earliest astrolabe texts” (p. 21). (3) Although the astrolabe could be used for time-keeping, other devices were more suitable for that purpose, so the main reason why the astrolabe was studied by eleventh-century Latin scholars was philosophical. The astrolabe made it possible to attain knowledge of the cosmic order and thus to comprehend the rational patterns that were employed by God to create the world (p. 161). Theses (1), (2), and (3) are discussed in Chapters 4 and 5 from many different points of view, and the book concludes with a number of appendixes and an extensive and very useful bibliography.

While I would subscribe to Borrelli’s main theses (1) and (3), I am more hesitant about (2). Take, for example, the construction of the zodiacal signs on the astrolabe in the eleventh-century European sources that Borrelli studies in Chapter 4.6. The different sources provide the sizes of certain relevant angles, but the numbers are usually wrong or presented in the wrong order. Only one text presents the numbers in the correct way, and Borrelli interprets this fact somewhat optimistically as “evidence of the high level of competence reached” (p. 154). Another example is the drawing of the astrolabe plate for the first climate in the eleventh-century Latin manuscript Paris, BnF lat. 7412, f. 23a (p. 208). Borrelli agrees that the scribe had an Arabic astrolabe in front of him, but she suggests (p. 204) that the diagram was not drawn by copying this astrolabe but, rather, by repeating the geometrical constructions that had also been used by the Arabic astrolabe maker. This interesting hypothesis would presuppose a high mathematical competence on the part of the Latin scribe. However, the Andalusian astrolabe maker probably de-

terminated the center and radius of the circles on the astrolabe not by means of geometrical constructions but by means of numerical tables, which were available in Arabic astrolabe treatises. This method is much more accurate, as I know from my own experience in preparing astrolabe workshops. And if Borrelli's hypothesis were true and the scribe understood what he was doing, what would be the point of copying out the astrolabe inscriptions (including the name of the maker) in Arabic in a Latin manuscript?

Readers who want to work through all of Borrelli's arguments should have access to an edition of the *Planispherium* of Ptolemy, a text that was studied in tenth-century Al-Andalus and was transmitted to Christian Europe in fragmentary form. This will make it possible to understand pages 132–133, where a construction of the tropics and the ecliptic is described in terms of points *A*, *B*, *C*, *D*, and so forth, without a figure, and also to identify the (corrupt) diagram in the Latin manuscript Paris BnF 7412, f. 14b (see p. 190). Borrelli claims that the diagram was taken from proposition 10 of the *Planispherium*, but since she does not in fact discuss that proposition the reader cannot verify the claim.

Borrelli has investigated many interesting questions relating to the early European history of the astrolabe, using a wealth of cross-disciplinary material. Her book will be of interest to all researchers concerned with the transmission of the exact sciences from the medieval Islamic world to Christian Europe.

JAN P. HOGENDIJK

Antonio Clericuzio; Germana Ernst; Maria Conforti (Editors). *Le scienze*. (Il Rinascimento Italiano e l'Europa, 5.) xviii + 820 pp., illus., index. Treviso: Fondazione Cassamarca; Costabissara: Angelo Colla Editore, 2008. €95 (cloth).

This large volume does not offer an exhaustive or comprehensive survey of the disciplines of natural inquiry and the developments that took place between 1400 and 1650. Nor does it engage directly with the status and utility of the term “scientific revolution” by tracking the emergence of novelty in the early modern period, as recent volumes on early modern science have done (e.g., Lorraine Daston and Katharine Park, *Wonders and the Order of Nature, 1150–1750* [Zone, 2006]). Instead, *Le scienze* focuses on cosmology, secrets, the human body, and the transmission of knowledge in order to characterize the changes made to traditional disciplines assigned to the study of nature and to look again at how those changes allowed minor studies

such as mathematics and engineering to achieve more recognition and new studies such as chemistry, botany, and zoology to emerge. The essays in this volume attend to knowledge and knowledge-making practices, airing out the relationship between them in an impressively wide range of printed and archival sources. For example, the first unit, on cosmology, begins with Quattrocento astronomy and ends with a historical account of instruments that were designed to measure space as well as time and to fill a demand, perhaps felt most keenly in Florence, in an expanding market for collectibles.

Though most volumes of this size sacrifice geographical specificity in an effort to make historical narratives thematically or chronologically coherent, *Le scienze* leads with the question of specificity. In a concise introduction, the editors offer three ways to conceive of the specificity of the Italian context and to distinguish Italian developments from their Continental and English counterparts: the first is the pronounced role of classical studies, the requisite foundation of knowledge for all of the humanistic disciplines of the period; the second is the polycentrism of the courts, which (while not solely an Italian phenomenon) opened up the possibility for mathematicians, physicians, naturalists, alchemists, and engineers to pursue their work and research in nonuniversity settings; the third—which the editors indicate is an open debate—is the role of ecclesiastical censure, self-censure, and *dissimulazione onesta* in shaping the content of curricula and the transmission of books and ideas.

The volume is divided into six units, each with between four and eight essays. The units reveal both the theoretical and the practical issues at stake in the growth and development of disciplinary knowledge. Most of the essays offer a traditional account of a discipline before examining innovative developments in the period, a balancing act that is an asset amid the widening of diffuse historiographical fields that contribute to our understanding of early modern science. These features will make this volume essential to specialists and to nonspecialist readers who come to the subject as graduate students or as scholars working in other fields, other historical time periods, or other national traditions. The first unit, on cosmology, includes essays on astronomy, astrology and its reform, and the role of measuring devices. These essays set traditional approaches to the topic of cosmology against humanist recoveries of texts, reforms, and the powerful forces of the market. A similar effect is obtained in the second unit, on the secrets of nature, where treatments of natural