

## BOOK REVIEWS

***Sternbilder des Mittelalters und der Renaissance: Der gemalte Himmel zwischen Wissenschaft und Phantasie, Volume 2, three books by Dieter Blume, Mechthild Haffner and Wolfgang Metzger. (Berlin, Walter De Gruyter GmbH, 2016). Pp. 1,660. ISBN 978-3-11-037601-2 (hardback), 220 x 290 mm, €298.***

The second segment of this enormous contribution to art historical scholarship encompassing illustrated astronomical manuscripts from the start of the thirteenth through the fifteenth centuries has arrived. It is even more comprehensive than the first set of two volumes produced by the same three art historians in 2012; both works are in German. The initial volumes included illustrated astronomical manuscripts created between the ninth and twelfth centuries. Each set provides full details of pertinent information, including commentaries, related essays and a small selection of illuminations from each manuscript.



The most recent publication consists of a voluminous three-volume set; just lifting them is almost a herculean task. The most recent volumes follow the same organizational pattern as the original two-volume set and are printed on high quality paper. All material in the three volumes is collaborative, credited to the trio of authors; none is given individual credit for any of the commentaries or detail work.

The first two books, consisting of 1,031 pages numbered consecutively, begin with eight sub-

stantial essays that discuss several key illustrated astronomical manuscript traditions such as Michael Scotus, al-Šūfī, and the Germanicus Aratea. The authors' commentaries most conveniently include the illustration numbers in the margin next to the images they are discussing. These initial essays are followed by a listing of surviving astronomical manuscripts, all produced between the start of the thirteenth and the end of the fifteenth centuries; these are held in libraries throughout Europe, the United States, and one in Turkey. Each individual manuscript receives a thorough description including codicology (the study of medieval manuscripts and their place in history and culture), the author of the astronomical text on each folio, a commentary, a complete listing of the miniatures, the provenance, and relevant scholarly literature. The initial volume of this massive work covers 67 different manuscripts; the second volume picks up with number 68 and continues to number 143 and adds a celestial globe produced in the fourteenth century and a celestial ceiling in the Old Sacristy of San Lorenzo, Florence created in the mid-fifteenth century. The third volume of the set contains a selection of illuminations from each described manuscript; the initial illuminations are in color, 38 pages in all; the total comprises 1,237 manuscript illustrations and 22 images of the astronomical globe and frescoed ceiling for an enormous total of 1,259 photographic images. The comprehensive bibliography of pertinent scholarly literature itself is a valuable resource as it covers 38 pages.

These three volumes, in addition to the earlier publications covering astronomical manuscripts from the Carolingian era to the start of the Gothic, obviate the need previously required to visit a large number of libraries to consult astronomical or astrological texts and view the images. This second set of books includes the especially creative and expansive period of astronomical advances that became available to the Latin West after the translation period of the twelfth century in Spain and Sicily. At that time, European scholars acquired an entirely new assemblage of texts thought entirely lost, including Ptolemy, Plato, Aristotle and the Hellenistic astrologers. This convenient and invaluable resource provided a prodigious contribution of ancient and Islamic knowledge and opened a whole new world of research opportunities for those studying scientific data and research. By organizing and cataloging a large quantity of information from the most prominent authors of fundamental astronomical data, the authors have created a new resource tool of great erudition.

Due to the increased interest in astronomical

and astrological topics and a wider distribution of wealth at the time, the numbers of illuminated manuscripts that were produced and survive from the later Middle Ages and early Renaissance is shown to be enormously greater than those extant from the earlier Medieval period. These manuscripts are more varied in their textual compositions and much more experimental and creative in their illustrative iconography. The fascination with the Classical past that develops during the Renaissance can now be easily accessed by viewing the evolution and expansion of various authors' writings and illustrations. One can witness why the long-held viewpoint of Fritz Saxl (1890–1948) and others, that the artistic interest during the Renaissance was strictly to recreate images and artworks of the Classical past, has been challenged. The images gathered for this edition prove that patrons and artists commissioning and creating manuscripts in the fifteenth century were extremely creative in designing and implementing entirely new constellation and astrological illuminations.

Some constellation cycles, such as the Aratea of Cicero and Germanicus retained their very traditional images based on Late Antique prototypes and the astronomy of Aratus, derived from Eudoxus, but their poetic text describing the rising and setting of the forty-two to forty-six Ptolemaic constellations became corrupted through the centuries, augmented with myths from Hyginus and overwhelmed with commentaries and scholia.

Other traditions, for example the al-Šūfī (903–986) *Kitāb Šuwar al-Kawākib al-Thābita* (*Book of Pictures of Fixed Stars*), and its Latin translations, the al-Šūfī Latinus manuscripts can be traced through this resource, as the precisely-placed stars of each constellation are carefully recorded. In the original manuscript of al-Šūfī (although only early copies survive—see Hafez et al., for details), he plotted the individual stars by name and even devised his own system for indicating their magnitudes (Hafez et al., 2015a, 2015b); he also noted their colors. His writings combined native Bedouin astronomy with his Persian sources that consisted of a consolidation of Babylonian, Indian and Greek astronomical knowledge. The Šūfī Latinus copies circulating in the West retained that stellar accuracy, so that by studying these, one could actually locate and identify a constellation in the night sky. By following the series of copies published in these volumes, it is possible to witness the attention continually paid to positioning each star accurately. Identifying a constellation from a manuscript drawing was not possible before al-Šūfī's masterpiece became known, for in Latin constellation images, the stars were simply sprinkled at random (except for the Lei-

den Aratea, c. 820) which had the correct number of stars as per Ptolemy, but not their accurate positioning (see Dekker, 2010). These reference books provide a rich resource to locate numerous diverse astronomical works from the Middle Ages.

Another important group of manuscripts discussed is that of Muhammad Abū Ma'shar al-Balkhī (787–886), who according to John North (2008: 195 traditions – the Greek, the Indian, the Iranian and the Syrian." Abū Ma'shar (Latinized to Albumasar) worked in Baghdad under the Abbasid Caliphate al-Ma'mūn (813–833), as court astronomer and astrologer. His writings on astronomy and especially on astrology reintroduced the 'wretched' topic into Western science and became enormously influential. A mysterious author Georgius Zothorus Zaparus Fendulus is credited with writing an abridged and illustrated version of a Latin translation of *Introductorium maius in astronomiam*, by Abū Ma'shar, completed by Hermann of Carinthia in Toledo about 1140. This translation and interpretation was inspired by Hermann's work, commonly called the *Greater Introduction*. Illuminations from a thirteenth-century manuscript, Paris BN Ms. lat. 7330, are pictured in color in *Sternbilder des Mittelalters ...*, including a full-page image of Fendulus on folio 1 wearing the garb of a Muslim potentate; these images and their text help to explain the astrological sources and various aspects of the paranatellonta (stars or asterisms on either side of a constellation that help to identify the zodiacal signs when the constellations are not clearly visible) and decans (used by Egyptians to represent each ten degrees of the zodiacal circle amounting to thirty six).

By the mid-twelfth century manuscript production had expanded far beyond the work of lone monks or scriptoria behind thick monastic walls, to the domain of lay scribes and artists in dynamic urban workshops creating texts for the wealthy and for new urban schools and universities. Each illuminated astronomical manuscript, as a condensed cultural and educative object, tells a fascinating story all its own, constituted by its patron, designer, scribe and artist. Each has complex historical roots with associations that continually change according to time, place and other factors. Every codex requires design choices in organizing text, decoration and illustration—no two are alike. Surprisingly, even when looking at what appears to be an exact copy, there are always slight differences that reveal pertinent information. Because of these complex interactions, medieval illustrated manuscripts provide a window into the beliefs, practical knowledge and particular interests of their patrons and users.

Other than Ptolemy, most authors of astro-

nomical treatises in the Middle Ages included a full cycle of constellation illustrations as well as a celestial map and planetary diagrams. Most illuminated manuscripts were quite labor-intensive and extremely costly to produce when considering the cost of parchment, precious minerals and plant substance for paints, and sheets of gold for enhancements. Of course, the more elaborate the manuscript presentation, the better were its chances for survival. In contrast astronomical manuscripts did not require precious minerals or costly pigments but were still a product requiring significant material and human resources.

Although by far the most popular astronomical treatise in the later Middle Ages, the *de Sphaera* of Sacrobosco (ca. 1195–1244), the English monk, scholar and astronomer, does not appear in this work. His composition was one of the most influential and widely-used textbooks throughout Europe for almost 500 years, remaining popular until its astronomical information became outmoded at the start of the scientific revolution in the seventeenth century, but his manuscripts do not include an illustrated constellation cycle. Sacrobosco's surviving texts are often embellished with astronomical diagrams that helped to clarify his descriptions of solar, lunar and planetary motions; hundreds of medieval manuscripts of Sacrobosco's *de Sphaera* survive, but they are not included.

Among the essays published in this book is a discussion and partial explanation of an outburst of production of illuminated manuscripts containing the Aratea of Germanicus in the fifteenth century. They reveal a fascinating story of an early Germanicus manuscript that had been discovered in Sicily between 1465 and 1467 which was transferred directly to the Kingdom of Naples where King Ferdinand d'Aragon (or Ferrante) then reigned after a contentious takeover by his father Alfonso d'Aragon. A document survives that demonstrates that the ancient astronomical manuscript was copied there almost immediately, in either 1467 or 1468; it was copied at least three more times by humanist scholars and scribes at the court of Naples. A copy of this Germanicus manuscript was then taken to Florence where it was reproduced for the Medici court, Francesco Sasseti and for Frederico da Montefeltro. Unfortunately the original 'newly discovered' manuscript is now lost, but text scholars have determined that it was based on a manuscript now in Madrid, which itself had an earlier exemplar. Thus the twelfth century manuscript was regarded as an extraordinary find, leading to antiquity; it was reproduced multiple times, accounting for many of the twenty-six Germanicus Aratea surviving from the fifteenth century. The explosion of illuminated astronomical manuscripts during

the fifteenth century Italian Renaissance was also inspired in part by the rise of humanism.

This set of volumes encompasses the highest peak of medieval manuscript production as well as its conclusion, for the appearance of less-expensive printed books initiated the elimination of those handmade. *Sternbilder des Mittelalters* ... provides new and invaluable research assistance for scholars investigating not only the transmission of medieval astronomy and astrology, but also mythology, classicism, history, historiography, education, science and medicine. The authors will be greatly thanked for their efforts many times over.

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***The Complex Itinerary of Leibniz's Planetary Theory* by Paulo Bussotti (Birkhauser/Springer, 2015; Science Networks Historical Studies 52). Pp. x + 188. ISBN 978-3-319-21236-4 (hardback), 240 x 163 mm, €103.99.**

This informative study provides illuminating new insight into an otherwise somewhat dark corner of Leibniz's physical theory.

Leibniz had no problem with the mathematics of Newtonian planetary theory. But he was dissatisfied with its metaphysics. For Newtonian gravitation was at odds with his own conception of the fundamentals of natural philosophy. And