STARRY MECHANISMS: THE KASSEL GLOBES


This large and profusely illustrated book describes in elegant detail a series of beautiful mechanical globes associated with Wilhelm IV's court in Kassel, and culminating with Joost Bürgi's small masterpiece of 1594. The challenge to the clockmaker was to construct a rotating globe that also exhibited the non-uniform movement of the Sun along the ecliptic.

Wilhelm originally had available the best printed celestial globe, Mercator's of 1551. The first mechanical globe of Kassel, from 1561–63, is part of a planetary clock, constructed by the Landgrave's instrument maker Eberhard Baldewein. Concerning the second, made in 1566–67 and now in the Dresden collection, we are unusually well informed because of more than fifty letters from Baldewein to his brother in Marburg.

The first free-standing celestial globe at Kassel, with the mechanism inside the globe itself, dates from 1574 and was also Baldewein's work in collaboration with the clockmaker Hans Bucher. The globe was probably influenced by a mechanical globe made in 1560 by Christian Heiden in Nuremberg, which Baldewein could have seen in Dresden. (This globe was destroyed in the Dresden bombings in 1945.) Joost Bürgi, who arrived in Kassel in 1579, had conceivably worked in the Heiden circle. He may have seen Heiden's highly complicated model (which included the Moon) dating from 1570; it is still preserved in Vienna.

Of the first pair of large Bürgi globes made for the Landgrave, one remains in Kassel and the other is in Dresden. Of the second pair, made after 1582, one is in Paris and the other in Kassel. Bürgi later made a variety of other clocks, and a spectacular smaller mechanical globe, which is now in Switzerland.

Each of these devices, and several related ones, are illustrated with high-quality colour pictures. Numerous black-and-white photographs show further details, clear diagrams depict the internal mechanisms, and tables give the teeth counts for all of the gears. The book is full of technical detail and very carefully documented; it also contains, by the way, the inventory of the Kassel Observatory's library in 1573. J. H. Leopold has produced a thorough scholarly work beautiful enough to compete with the most sumptuous coffee table books.

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THE FARNESE PLANISFEROLOGIO


In 1725, Bernardo Facini, by origin a Venetian mathematical instrument-maker, completed a commission for the Duchess Dorotea Sofia of Piacenza.
The object that he had created for the Duchess was a "universe in miniature", a cosmic model that was at once ingenious, original, elaborate and beautiful. Neither time (three to five years) nor expense (Facini was told to use whatever precious materials he might need) was spared on the mechanism, which was intended by both its maker and his patron to be impressive. It is difficult today, when wealth and social status are indicated by possession of a collection of chefs d'œuvres from the past, rather than contemporary products, to understand the extraordinary appeal and the political and social importance of such elaborate cosmological models.

The planisferologio was a clockwork drive, double-faced, vertical astronomical model which provided the following indications:

Astronomical hours and minutes (i.e., equal hours counted from midnight to noon to midnight).
Italian hours and minutes (i.e., equal hours counted from sunset to sunset), marked on a separate dial moving independently within the astronomical hours ring so as to indicate the difference between the two hour systems in latitudes between 35° and 55°.
Rise and set of the Sun and time of twilight.
Day of the year, date, and day of the month in mean motion.
Position of the Sun in the ecliptic and the degree of the equator to which it corresponded with compensation made for anomalies in the solar motion.
Bissextile with Julian/Gregorian intercalation.
Equinoxes, solstices and precession.
Equation of time.
Major fixed stars.
The Moon with its epicycle, lunar synodical month, mean lunar motion, nodes.

In addition the clock struck the hours and the quarters.

Such a device in the early eighteenth century was more than just a princely plaything. The Duchess Dorotea seems to have had more than just a passing interest in timepieces and cosmic models. Even had she not, such a device could only have graced her court, adding to its lustre and prestige. That a visiting English doctor could remark that nothing like such a "miraculous machine" could be seen at London (p. 130) was the very highest praise, and underlines the importance of such princely commissions in sustaining a tradition, however tenuous, of fine technology in regions that were incapable of supporting a regular commerce in mathematical instruments and precision engineering. The fundamental reasons for the failure in Italy and in Germany are to be sought in the social and economic structure of politically fragmenting societies. What craftsmanship there was could only be sustained (except perhaps in Venice) by patronage. Facini, product of the small Venetian trade, but who realized his masterpiece thanks to patronage, is a particularly interesting and revealing figure for the study of the development of precision-instrument-making as a trade in Europe.

Thanks to Bedini's efforts, we now know more about Facini and his chef