

PTOLEMY'S HANDY TABLES

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Before constructing and interpreting a client's horoscope, an astrologer in Roman Egypt would require the client's birthdate, something like 'Year 4 of Domitian, 9th day of the month Thoth, in the 6th hour of day'. The astrologer might have had almanacs listing planetary positions keyed to dates in regnal years of emperors running through several past decades; but if he wished to calculate the positions directly using more sophisticated, mathematically structured astronomical tables, he would need to be able to convert the date as given according to a regnal year into the continuous chronological framework of the tables, counting time from an epoch or 'zero date' in the more remote past. In this monograph D. presents and edits the resources for making these conversions that formed part of the *Handy Tables*, the comprehensive and practically oriented set of astronomical tables that Ptolemy produced on the basis of his major theoretical treatise, the *Almagest* (or *Mathematical Composition*). This 'Table of Kings' takes the form of a tabular list of consecutive rulers with three columns containing respectively their names, the durations of their reigns as whole numbers of years and the running totals of years down to the beginning of each reign. Despite the superficial simplicity and uniformity of its structure, it turns out to be a remarkable, composite document.

In the introduction to the *Handy Tables* (J.L. Heiberg [ed.], *Claudii Ptolemaei Opera quae exstant omnia*. Vol. II: *Opera astronomica minora* [1907], p. 160) Ptolemy makes a glancing reference to a 'preliminary table [προκαθόντιον] of the chronography of the kings starting from the epoch', that is, starting from the beginning of the first regnal year (according to the Egyptian calendar) of Philip Arrhidaeus, the epoch date of the *Handy Tables*, 12 November 324 BCE. This table, he says, was placed between the first group of tables – those of right and oblique ascensions – and the tables providing the mean motions of the Sun, Moon and planets. In medieval and post-medieval manuscripts containing the *Handy Tables* the Table of Kings typically comes before the tables of ascensions, and it obviously does not simply reproduce Ptolemy's 'preliminary table' since the sequence of rulers continues long after Ptolemy's time. D. considers the row naming Antoninus Pius (omitting the length of his reign and running total of years) to be the final one of the authentic Ptolemy, though, since the *Almagest* is known to have been completed after Antoninus' tenth year (146/147 CE, the date of Ptolemy's 'Canobic Inscription'), while at least two major compositions, the astrological *Tetrabiblos* and the *Geography*, can be dated between the *Almagest* and the *Handy Tables*, it is not impossible that Ptolemy's table reached the reign of Marcus Aurelius.

The list, from Philip Arrhidaeus onwards, is ostensibly a list of the kings of Egypt, comprising (after Alexander IV) the Ptolemaic dynasty followed by Augustus and his successors. Down to Cleopatra VII the numbers of years associated with each reign are reckoned straightforwardly according to the Egyptian civil calendar, which is the chronological system employed in Ptolemy's tables. Beginning early in the reign of Augustus, the civil Egyptian calendar was reformed, replacing the previous constant years of 365 days with a cycle of three 365-day years followed by a 366-day year, but in Ptolemy's tables, as in many other astronomical tables from the Roman period, the

old unintercalated calendar is assumed, so that dates according to the tables diverge from civil dates by one additional day every four years. One might expect the regnal years of the Roman emperors in Ptolemy's Table of Kings to represent the old calendar, but the numbers associated with Trajan and Hadrian (who succeeded Trajan in different years according to the two versions of the calendar) show that they count civil years. This makes sense, in fact, because the normal use of the table would be to convert a given civil date to a continuous count of years *before* making the conversion from the civil to the old calendar.

In most manuscripts of the *Handy Tables* the regnal table that begins with Philip and totals the years from the beginning of his reign is preceded by a second table beginning with the Babylonian king Nabû-nāšir ('Nabonassar') and continuing through the Babylonian kings – including Assyrian and Persian kings during the periods of foreign rule – to Alexander the Great, totalling years from the beginning of Nabû-nāšir's reign, which is the epoch year of the astronomical tables in the *Almagest*. D. argues for treating this too as part of Ptolemy's original contribution to the *Handy Tables*; I am not so sure of this, though its presence as part of the corpus surely goes back to antiquity, and one is grateful that it survived in this way. Although its position and conformity of format with the Era Philip table would seem to imply that its years too are to be understood as Egyptian, the lengths of reigns consistently match those recorded in cuneiform documentation, where the assumed calendar is the lunisolar Babylonian one. The substance of this table, I suspect, was transmitted into Greek in conjunction with the extensive transmission of Babylonian eclipse and planetary observational records that we know of from the selection that Ptolemy incorporated in the *Almagest*. Babylonian observations preceding the institution of the Seleucid Era would have been dated by regnal years, and a regnal list would have been essential for the kinds of astronomical research based on them that Ptolemy conducts in the *Almagest* and that we know Hipparchus was already engaged in during the second half of the second century BCE. For the intended users of the *Handy Tables*, chiefly astrologers, a table covering the interval 747–324 BCE and designed to convert dates to an epoch not used in the *Handy Tables* would have been useless, and its inclusion can probably be explained as an antiquarian, scholarly intervention analogous to the inclusion of a transcript of Ptolemy's 'Canobic Inscription' in some ancient copies of the *Almagest*.

From a philological perspective D.'s edition leaves nothing to be desired. The edition (taking up all of two pages) is based on eight versions of the tables in six manuscripts, dating from the ninth to the eighteenth centuries. A thorough analysis of the interrelations of nearly thirty manuscripts, several of which contain more than one version of the table, is a substantial contribution to our understanding of the complex textual history of the *Handy Tables*, a work that on account of its practical nature was much more liable to expansions and modifications by later users than Ptolemy's other writings. This fluidity makes especially welcome the series of chapters that D. devotes to the textual history of the Table of Kings, which extends beyond the contents of the Greek manuscripts to Syriac and Arabic adaptations.

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