

# Rosen, Edward

---

## Copernicus' Hispalensis

---

Organon 11, 137-149

---

1975

Artykuł umieszczony jest w kolekcji cyfrowej Bazhum, gromadzącej zawartość polskich czasopism humanistycznych i społecznych tworzonej przez Muzeum Historii Polski w ramach prac podejmowanych na rzecz zapewnienia otwartego, powszechnego i trwałego dostępu do polskiego dorobku naukowego i kulturalnego.

Artykuł został zdigitalizowany i opracowany do udostępnienia w internecie ze środków specjalnych MNiSW dzięki Wydziałowi Historycznemu Uniwersytetu Warszawskiego.

Tekst jest udostępniony do wykorzystania w ramach dozwolonego użytku.



Edward Rosen (USA)

### COPERNICUS' HISPALENSIS

The earliest scientific treatise which correctly viewed the earth as a planet revolving annually around the sun is the *Commentariolus* by Nicholas Copernicus (1473–1543), the founder of modern astronomy. In the course of that treatise Copernicus had occasion to discuss the length of the year, as determined by four of his predecessors. Three of them were famous astronomers of the highest rank: Hipparchus, Ptolemy, Al-Battani. But the fourth, much less well known, was called by Copernicus simply *Hispalensis*.

The unconventional ideas put forward in the *Commentariolus* might have provoked unpleasant consequences for its author. Hence Copernicus prudently distributed only a few handwritten copies to trusted friends. Toward the end of his life, however, his fear abated to the point where he permitted the printing of his *De revolutionibus orbium coelestium*. This mature masterpiece, the *Revolutions*, as we may call it, which is now regarded as one of the classical books in the history of science, inevitably overshadowed the very much briefer and less definitive *Commentariolus*. As a result, the earlier work remained buried in libraries from which it was not exhumed for about three hundred years. By the time it was recovered, the identity of its *Hispalensis* was a dark mystery.

Who could this *Hispalensis* have been? By itself this word means "man from Seville", the city called *Hispalis* by the ancient Romans. The earliest editors of the *Commentariolus* naturally singled out as their first choice the most influential writer in that city's entire history, namely, the learned seventh-century Bishop Isidore of Seville. But this encyclopedist turned out not to be the *Hispalensis* intended by Copernicus. His *Hispalensis*, Copernicus tells us, "determined the tropical year as 365 days, 5 hours, 49 minutes" (365<sup>d</sup>5<sup>h</sup>49<sup>m</sup>). On the other hand, Isidore of Seville always gave 365<sup>d</sup> as the length of the

year, whether tropical or sidereal. This discrepancy of  $5^h49^m$  showed at once that the Christian bishop could not have been Copernicus' *Hispalensis*.

The next candidate was the twelfth-century Muslim Jabir ibn Aflah, called in Arabic "Al-Ishbili", that is, "the man from Seville". But for Jabir, the length of the year was  $365^d5^h55^m12^s$ , or  $6^m 12^s$  longer than the year of Copernicus' *Hispalensis*. Hence, this second proposed identification was seen to be no more satisfactory than the first.

Then the riddle of Copernicus' *Hispalensis* was finally solved by that indefatigable researcher, Ludwik Antoni Birkenmajer (1855-1929), the greatest Polish authority on Copernicus, Poland's foremost scientist. In 1924 L. A. Birkenmajer called attention to Alfonso de Corduba *Hispalensis* whose *Almanach perpetuum* was published in Venice on July 15, 1502<sup>1</sup>. On that very day Copernicus was in residence at the University of Padua, which was then under the control of Venice, some twenty miles away. If Copernicus, already an ardent student of astronomy, examined this *Almanach*, at the outset he would have noticed on sig. al<sup>v</sup> the following reference to the length of the year: *... numerum dierum anni 365. et quartum minus undecim minutis hore* (the number of days in a year [is]  $365 \frac{1}{4} - 11$  minutes of an hour). Now  $365 \frac{1}{4}^d$  may be written as  $365^d6^h$ . If from this minuend  $11^m$  are subtracted, the remainder is  $365^d5^h49^m$ . This is precisely the length of the year attributed to *Hispalensis* by Copernicus, as we saw above. Accordingly, all subsequent writers on this subject wholeheartedly accepted Birkenmajer's solution of the puzzle that had previously eluded him as well as the other investigators of Copernicus' *Commentariolus*.

For nearly half a century Birkenmajer's solution remained unchallenged. Then in 1973 Professor Noel M. Swerdlow of the University of Chicago published a new translation of Copernicus' *Commentariolus* with a commentary in which he said:

The last value cited for the tropical year, 365 days 5 hours 49 minutes is that of the *Alphonsine Tables* so it is likely that *Hispalensis* (*Hispaniensis*?) refers to Alfonso X who was, after all, a Spaniard.

To this remark Swerdlow added the following footnote:

The identification of *Hispalensis* with Alfonso de Cordoba *Hispalensis* ... seems unlikely since  $365^d5;49^h$  [=  $365^d5^h49^m$ ] is simply a rounding of the tropical year in the *Alphonsine Tables* ... The tropical year mentioned by him [Alfonso de Corduba *Hispalensis*] ... is simply the *Alphonsine* value. Could *Hispalensis* in fact be a misreading of *Hispaniensis*, which would undoubtedly refer to good king Alfonso?<sup>2</sup>

<sup>1</sup> L. A. Birkenmajer, *Stromata Copernicana*, Cracow, 1924, p. 353.

<sup>2</sup> N. M. Swerdlow, *The Derivation and First Draft of Copernicus's Planetary Theory: A Translation of the 'Commentariolus' with Commentary*, Proceedings of the American Philosophical Society, Vol. 117, 1973, p. 452.

Swerdlow did not undertake to specify who could have misread *Hispaniensis* as *Hispalensis*.

Although the manuscript of the *Revolutions* written by Copernicus' own hand still survives (it is proudly displayed at the Jagiellonian Library in Cracow), unfortunately the same is not true of his *Commentariolus*. Copernicus' own draft of the *Commentariolus* has never been found. A contemporary copy, however, was listed by Matthew of Miechów, a Cracow professor, in an inventory dated May 1, 1514<sup>3</sup>. This 1514 copy, like Copernicus' own draft, has not been found, nor is it known to have been linked in any manner with the three extant manuscripts of the *Commentariolus*. One of these is now in Vienna,<sup>4</sup> a second in Stockholm, and the third in Aberdeen.

We do not know when, where, and by whom these Vienna and Stockholm manuscripts were written. These two copyists may have been ordinary amanuenses. By contrast, the Aberdeen manuscript, which was found quite recently,<sup>5</sup> was written by no common scribe but by an outstanding scholar, Duncan Liddel (1561-1613). In fact, Liddel was the "first in Germany to teach the theories of the heavenly motions according to the hypothesis of Ptolemy and Copernicus at the same time"<sup>6</sup>. This early

<sup>3</sup> This inventory entry concerning the *Commentariolus* was reproduced in facsimile by L. A. Birkenmajer, *Stromata Copernicana*, p. 201. The entire inventory was printed in Leszek Hajdukiewicz, *Biblioteka Macieja z Miechowa*, Wrocław, 1960, Polska Akademia Nauk, Komitet Historii Nauki, Monografie z Dziejów Nauki i Techniki, Vol. 16, pp. 205-224, with the *Commentariolus* entry at No. 189 on p. 218. At p. 226 Matthew of Miechów's last will and testament disposes of the wooden box containing the *Commentariolus*. This testamentary disposition gave Hajdukiewicz a clue to guide his search for the present whereabouts of Matthew of Miechów's copy of the *Commentariolus*. After a long and patient investigation Hajdukiewicz concluded (p. 99) that this copy no longer exists.

<sup>4</sup> This Vienna copy is called "the first manuscript of the *Commentariolus*" by Swerdlow (p. 431), who adds: "It is lacking a folio containing most of the lunar theory." How could the first manuscript have lacked most of the lunar theory?

<sup>5</sup> The discovery of the Aberdeen manuscript was reported briefly in *Nature* 1965, Vol. 208, p. 1263, and in *Kwartalnik Historii Nauki i Techniki*, 1965, Vol. 10, p. 696.

<sup>6</sup> Priority in the promulgation of Copernicanism in the German universities was awarded to Liddel by Johannes Caselius in a letter written on May 1, 1607 to John Craig and printed in the three editions of Liddel's *Ars medica*, Hamburg, 1607-1608, 1617, 1628: *Rostochii ... quod iam sciam, primus in Germania, Θεωρίας motuum coelestium, simul secundum Ptolemaei et Copernici hypothesin docuit* [Liddel]. Caselius' priority award was not absolute, being wisely restricted to what he then knew: *quod iam sciam*. In 1607 did Caselius know Johannes Kepler's *Cosmographic Mystery* (Tübingen, 1596)? There Kepler gave credit to Michael Mästlin, his professor of astronomy at the University of Tübingen, for having "mentioned Copernicus in his lectures very frequently" in 1590 (Kepler, *Gesammelte Werke*, Munich, 1937, Vol. 1, p. 9). But Mästlin's frequent mention of Copernicus at Tübingen in 1590 may have been less than systematic. In any case Liddel's instruction at Rostock is dated two years earlier by the letter quoted at note 24, below.

propagator of the Copernican astronomy, like many of his countrymen, had left his native Scotland in order to continue his studies at various institutions of higher learning on the continent of Europe. In the course of his travels Liddel matriculated at the University of Rostock in October, 1585<sup>7</sup>. In that year and in that place Liddel made his own copy of the *Commentariolus*.

How did it happen that Copernicus' *Commentariolus* was available at Rostock in 1585? A decade earlier the foremost astronomer of the second half of the sixteenth century, the great Danish observer of the heavens, Tycho Brahe (1546-1601), had attended the ceremonies celebrating the crowning of the Holy Roman Emperor Rudolph II on November 1, 1575 at Regensburg. There Brahe met the emperor's personal physician, Thaddeus Hájek (Hagecius, 1525-1600), who during the previous year had published his *Dialexis*, a study of the nova of 1572, a subject dear to the heart of Brahe<sup>8</sup>. As Brahe himself relates in his *Astronomiae instauratae progymnasmata*, part 2, the *Commentariolus*

was presented to me in handwritten form some time ago at Regensburg by that most distinguished man, Thaddeus Hájek, who has long been my very close friend. Subsequently I sent the treatise to certain other mathematicians in Germany. I mention this fact to enable the persons, into whose hands the manuscript comes, to know its provenience<sup>9</sup>.

Although Brahe informed his readers that he had received the *Commentariolus* from Hájek, he said nothing about the previous history of Hájek's copy.

Hájek had dated the dedication of his *Dialexis* on March 4, 1574. Exactly nine months later Copernicus' disciple, George Joachim Rheticus (1514-1574), died, bequeathing his unfinished trigonometrical works to his younger collaborator. But with regard to the remainder of Rheticus' library, Brahe wrote to Hájek on March 22, 1592: "From a letter recently sent to me by Dr [Johannes] Sager of Lübeck I learned that Rheticus' library had been willed to you"<sup>10</sup>. Hence Hájek may have acquired the *Commentariolus* as part of Rheticus' library.

<sup>7</sup> *Die matrikel der Universität Rostock*, eds. Adolph Hofmeister and Ernst Schäfer, Rostock/Schwerin, 1889-1922, Vol. 2, p. 216.

<sup>8</sup> *Editio Cimelia Bohemica*, Vol. 1, Prague, 1967, ed. Zdeněk Horský, reprinted Hájek's *Dialexis* (Frankfurt/Main, 1574).

<sup>9</sup> Brahe, *Opera omnia*, Copenhagen, 1913-1929, Vol. 2, p. 428. What is now the Vienna manuscript of the *Commentariolus* (*codex Vindobonensis latinus* 10530) was given to a friend by Brahe's principal Danish assistant on July 18, 1600 when he was preparing to return to Denmark from Bohemia (Brahe, *Opera*, Vol. 2, p. 460).

<sup>10</sup> Brahe, *Opera*, Vol. 7, p. 333, lines 39-40. Unaware that Rheticus willed his library to Hájek, Hajdukiewicz (p. 384) conjectured that a copy of the *Commentariolus* was found in Cracow by Rheticus during his residence there in the last two decades of his life, and that he had a copy made and sent to Hájek.

True, Rheticus never mentioned the *Commentariolus* in his own writings. From this silence, L. A. Birkenmajer concluded that Rheticus knew nothing about the *Commentariolus*<sup>11</sup>. By the same token, however, the *Commentariolus* was never mentioned by Copernicus in his other writings. The *Commentariolus* was after all a relatively youthful work, embodying an earlier stage of Copernicus' astronomical thinking that was later superseded. It therefore called for no particular mention on the part of either Copernicus or Rheticus. Nevertheless, when Rheticus came to visit Copernicus in Frombork, bringing an armful of valuable books, in partial exchange Copernicus may have given the *Commentariolus* to his admiring disciple as a sentimental memento. In that case Rheticus preserved Copernicus' *Commentariolus* in his library which he bequeathed to Hájek nearly a year before the emperor's personal physician met Brahe at the coronation in Regensburg.

Brahe was informed about Hájek's acquisition of Rheticus' library by Johannes Sager who enrolled in the University of Frankfurt on the Oder in 1541<sup>12</sup>. Then, from 1552 to 1569, Sager taught school in Wrocław<sup>13</sup>. But he was also studying medicine there with the renowned municipal physician in 1553–1554, when Rheticus arrived for that very purpose<sup>14</sup>. The two medical students became good friends and after an outbreak of the plague induced Rheticus to move on to Cracow, then the capital of Poland, they corresponded with each other<sup>15</sup>. Even after a lapse of a dozen years, on January 26, 1566, Sager promised that their former teacher of medicine would be mentioned honorably in Rheticus' forthcoming works<sup>16</sup>. The personal contact between Sager and Rheticus, leading to their later correspondence, explains how Sager knew that in 1574 Rheticus bequeathed the bulk of his library, including the *Commentariolus*, to Hájek.

After acquiring the *Commentariolus* from Hájek in 1575, Brahe says (it will be recalled): "Subsequently I sent the treatise to certain other mathematicians in Germany." This group undoubtedly included Henry Brucaeus (Van den Brock, 1530–1593), the professor of astronomy at the University of Rostock where Brahe had been a student from 1566 to 1568. During those years Brahe had become quite friendly with Brucaeus<sup>17</sup> and, after the Danish student left Rostock, he exchanged many

<sup>11</sup> L. A. Birkenmajer, *Mikolaj Kopernik*, Cracow, 1900, p. 637.

<sup>12</sup> Aeltere Universitäts-Matrikeln, Vol. 1, Universität Frankfurt a. O., ed. Ernst Friedlaender, Leipzig, 1887; reprinted, Osnabrück, 1965; Publikationen aus den k. Preussischen Staatsarchiven, Vol. 32, p. 84.

<sup>13</sup> Gustav Bauch, *Geschichte des Breslauer Schulwesens in der Zeit der Reformation*, Codex Diplomaticus Silesiae, Vol. 26, Breslau, 1911, p. 346, 10.

<sup>14</sup> Karl Heinz Burmeister, *G. J. Rhetikus*, Wiesbaden, 1967–1968, Vol. 1, p. 128.

<sup>15</sup> Burmeister, Vol. 3, pp. 121, 123.

<sup>16</sup> Bauch, pp. 196–197.

<sup>17</sup> Brahe, *Opera*, Vol. 7, p. 169, line 31: ... *dum Rostochii vobiscum eram* ...

letters with the professor of astronomy there. Consequently, when Brahe was engaged in distributing copies of the *Commentariolus* to German mathematicians, he surely did not overlook his old friend Brucaeus in Rostock. Thus it happened that Copernicus' *Commentariolus* was available at Rostock when Liddel matriculated there in October, 1585.

At that time Liddel was already quite familiar with the Copernican system. Its "first principles" had been imparted to him by his fellow-countryman John Craig who was then teaching at the University of Frankfurt on the Oder but later became chief physician to King James I of England<sup>18</sup>. At the University of Frankfurt on the Oder Liddel had matriculated in 1579, three years later than Paul Wittich of Wroclaw (c. 1550–1587) who was afterward Imperial Mathematician to Rudolph II, according to the university's records<sup>19</sup>. From Wittich's private instruction at Wroclaw in 1582–1584, Liddel "learned more completely about Copernicus' innovative hypotheses which with no impropriety are regarded as marvelous." Copernicus' ideas were thus eulogized in a letter written to Craig on May 1, 1607 by the eminent humanist Johannes Caselius (1533–1613)<sup>20</sup> who was a professor at the University of Rostock when Liddel arrived there in 1585.

Caselius' astronomical colleague, Brucaeus, was an outspoken opponent of Copernican ideas. Thus, before Liddel came to Rostock, Brucaeus wrote to Brahe on June 12, 1584; "In propounding the motion of the earth, Copernicus did not need such elaborate hypotheses, which are undoubtedly false"<sup>21</sup>. Yet Caselius, who was on very friendly terms with both Brucaeus and Liddel, said later: "Although Brucaeus was an excellent mathematician, he learned the Copernican system from this teacher [Liddel]"<sup>22</sup>. At Rostock, Liddel "renewed his studies rather as a companion than a pupil of Brucaeus who, though an excellent mathematician, did not scruple to confess that he was instructed by Mr. Liddel in the more perfect knowledge of the Copernican system"<sup>23</sup>. In 1585, then, when

<sup>18</sup> Caselius' letter to Craig, in Liddel's *Ars medica: prima principia a te* [Craig] *acceperat* [Liddel].

<sup>19</sup> Aeltere Universität-Matrikeln, Vol. 1, pp. 228 (Craig); 253 (Wittich); 277 (Liddel); Gottfried Kliesch, *Der Einfluss der Universität Frankfurt (Oder) auf die schlesische Bildungsgeschichte*, „Quellen und Darstellungen zur schlesischen Geschichte“, Vol. 5, Würzburg, 1961, p. 194 (Wittich).

<sup>20</sup> Caselius to Craig, in Liddel's *Ars medica: ex eo Wittich plenius didicit* [Liddel], *quarum prima principia a te* [Craig] *acceperat*, παράδοξας ὑποθέσεις Copernici, *quae non iniuria habentur admirabiles*.

<sup>21</sup> Brahe, *Opera*, Vol. 7, p. 85, lines 23–25.

<sup>22</sup> Caselius to Craig, in Liddel's *Ars medica: hic [Brucaeus] cum excelleret in mathematicis, Copernicaea illa ex hoc magistro* [Liddel] *didicit*.

<sup>23</sup> John Stuart, *A Sketch of the Life of Dr. Duncan Liddel*, Aberdeen, 1790, p. 2; reprinted in Stuart's *Essays, Chiefly on Scottish Antiquities*, Aberdeen, 1846, p. 44. Stuart based the quoted statement on the second of *Four Funerary Orations (Orationes quatuor funebres*, Helmstedt, 1622) by Rudolph Diephold, a colleague

Liddel arrived at Rostock, he already knew the Copernican astronomy and expounded it to his nominal teacher, Brucaeus, not long after the latter had received from Brahe a copy of Copernicus' *Commentariolus*.

At the University of Rostock Liddel taught the Copernican system not only to the professor of astronomy, but also to some students. In this regard our informant is not an avowed admirer of Copernicus and Liddel, like Caselius, but the Lutheran theologian and church historian Daniel Cramer (1568–1637), an embittered opponent of Liddel:

In the year 1588 and in the following year, when I was an auditor, Duncan Liddel, the Scot, taught mathematics at the University of Rostock. Among other things he expounded also the second motion [that is, the motion of the planets] according to the threefold hypothesis, first, the Alfonsine; second, the Copernican; and third, another new one ... He used to defend the Copernican hypothesis tenaciously<sup>24</sup>.

The reason for the strong feeling against Liddel was his alleged plagiarism of the third planetary system, that proposed by Brahe. With his customary vehemence Brahe conducted a vigorous campaign against Liddel, after the latter had moved on April 15, 1591 to the University of Helmstedt where he soon became a professor of the liberal arts<sup>25</sup>. According to a printed schedule of lectures,

“Duncan Liddel, the Scot, publicly expounds the doctrine of sines and triangles. When that is finished, he will tackle the theories of the planets, according to the hypothesis of Ptolemy and Copernicus and the hypothesis of the system of the universe which is described by Tycho Brahe.”

So Brahe reported in a letter sent to Daniel Cramer on September 16/26, 1599<sup>26</sup>. In that letter Brahe also quoted from a printed notice posted by Franciscus Parcovius of Rostock, the dean of the medical faculty at Helmstedt, in awarding the M. D. degree to Liddel on 30 September 1596:

---

of Liddel and Caselius at the University of Helmstedt. Whereas Stuart still had access to Diephold's oration commemorating Liddel, the work in which it was published was not available to Peter John Anderson, “A Bibliography of Duncan Liddel,” in *Papers of the Edinburgh Bibliographical Society: 1911–1913*, p. 42.

<sup>24</sup> Brahe, *Opera*, Vol. 8, p. 38, line 42; p. 39, line 4; p. 40, line 22; in a letter, dated March 31, 1598, from Daniel Cramer to Holger Rosenkrantz (1574–1642). Liddel's attachment to Copernicanism lasted throughout his life. On December 9, 1613, eight days before he died, he provided an endowment for a “professor of mathematics well versed in Euclid, Ptolemy, Copernicus, Archimedes and other mathematicians” (language modernized; *Notes and Records of the Royal Society of London, 1954–1955*, Vol. 11, p. 147).

<sup>25</sup> *Album Academiae Helmstadiensis*, eds. Paul Zimmermann and Werner Spiess, Hannover, 1926–1955, Vol. 1, pp. 88, 94. For a defense of Wittich against similar charges by Brahe, see J. L. E. Dreyer, “On Tycho Brahe's Manual of Trigonometry” in *Observatory*, 1916, Vol. 39, pp. 127–131.

<sup>26</sup> Brahe, *Opera*, Vol. 8, p. 185, lines 20–23.



Quod æquabilitas motuum non ad æquinoctia  
sed ad stellarum fixarum referatur

Cum igitur æquinoctialia puncta ratione mundi cardines plurimum  
tentari solent non necesse est quicquam ab huius æquabilitate commota rem  
utrovis deducere conatur quæ obrem sub diversis abscissis multis  
minutis observata reperita est. Hanc Hipparchus 33 diebus in quadam  
anno diei Albatrogis circa 8 gradus regit talem annu ex 38<sup>is</sup> die  
3 horis 46. h. 33<sup>is</sup> huius tunc unus munit a ptolemao breviori  
Rursus autem Hipparchus hunc longius 25<sup>ta</sup> parte unus hora sequit  
ex 38<sup>is</sup> diebus 5 horis 43 annu constanti consistit. Ne autem  
fidei ex observationibus error processisse videtur si que singula  
accuratius aduertet inveniet eum cum mutabilitate æquinoctialium  
punctorum semper correspondisse. de p. igitur mundi cardines in ceteris  
annis uno gradu mutabuntur quomodo ptolemao suo reportat  
est. erat tunc anni quantitas que ab ipso ptolemao tradita est  
Quando autem subsequens seculus potius mutabilitate movetur  
motibus inferioribus obviat tanto brevior annus factus est quod  
translatum eadem esset motus. Nam velocius breviori tempore  
annu computat puncta. Rursus igitur agit quicquam annu æqu  
libit ad stellarum fixarum referat quomodo circa Argonis spira  
ferimus invenimus annu 38<sup>is</sup> diebus 6 horarum et scilicet sex un  
hora posse qualis etiam in Hipparchi antiquitate reperitur  
eodem etiam modo in alijs abscissis fieri habenda est quod affi  
dum et scilicet sub firmamento mundi. Leges docent hoc celi  
ipsi errorum testimonio. fid. B. D. D. fol. 100

Figure 1. The relevant passage of Duncan Liddel's Aberdeen manuscript of the *Commentariolus*, line nine down: *Rursus autem Hispalensis*

Alfonsus astronomus Castellae rex ac Hispaniae fuit quem  
hanc interpretatur quasi alto fontem. Dicitur e aut. ab alto  
fonte & sapia qz gposuit has tabulas no quid p se. Sz  
p gduum do Astronomo quibus hac summa pecunie dedit  
Dedit 100000 florenorum & ceteros eas pntatiff  
& mercedem Ideli

Figure 2. The handwritten note on fol. A2v of Copernicus' copy of the *Alfonsine Tables*, now at Uppsala. The first line reads: *Alfonsus astronomus Castellae rex ac Hispaniae fuit*. This note was unquestionably written by someone other than Copernicus

"As far as mathematics is concerned, not only is Liddel well informed about the hypothesis of the ancients, but he knows very well the more recent, difficult, and complicated hypothesis of Copernicus"<sup>27</sup>.

From the mouths of his admirers and opponents alike we learn that Liddel knew the Copernican system well, expounded it alongside its competitors, and defended it. Hence, we can readily imagine how happy he must have been to find the *Commentariolus* at Rostock, how eager to copy it for himself (he finished doing so on November 2, 1585, shortly after his arrival), and how careful to respect the text written by Copernicus.

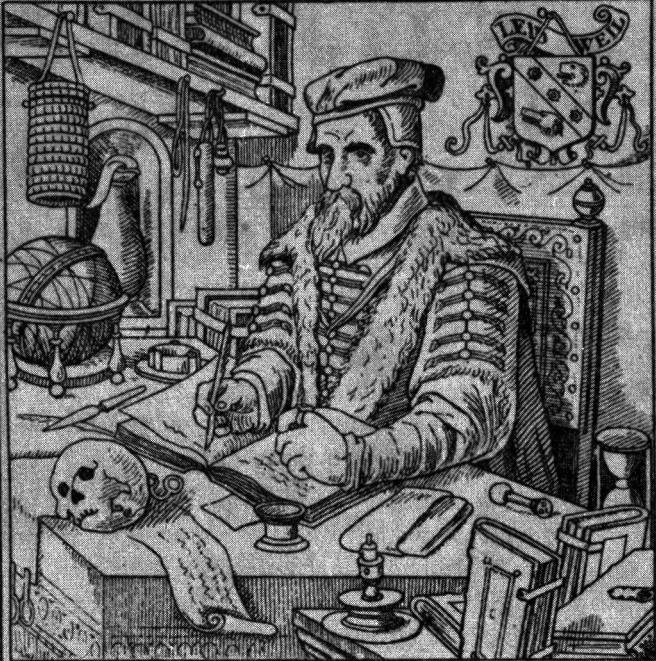
That text of the *Commentariolus*, transmitted to Liddel through Rheticus, Hájek, Brahe, and Brucaeus, designated the fourth authority on the length of the year as *Hispalensis*. That reading (not *Hispaniensis*) was seen and copied by Liddel. The relevant portion of what he wrote in the Aberdeen manuscript of the *Commentariolus* is reproduced here in figure 1. Nothing can be plainer than that Liddel wrote *Hispalensis*. Since that is also the reading of the other two extant manuscripts of the *Commentariolus*, those at Vienna and Stockholm, there is no paleographical basis whatever for Swerdlow's question "Could *Hispalensis* in fact be a misreading of *Hispaniensis*?"

Had Copernicus written, not *Hispalensis*, but *Hispaniensis*, that term, Swerdlow confidently assures us (p. 452), "would undoubtedly refer to good king Alfonso", "who was, after all, a Spaniard." It was that monarch who had sponsored the *Alfonsine Tables*, which were so named in his honor. Copernicus owned a copy of the second edition (Venice, 1492) which refers to the sponsor of the *Alfonsine Tables* four times. In three passages it calls him "king of the Romans and of Castile"

<sup>27</sup> *Album Academiae Helmstadiensis*, Vol. 1, p. 128; Brahe, *Opera*, Vol. 8, p. 186, lines 4-7.

SVB SPE BEATÆ RESVRRECTIONIS

OBII T XVII. DECEMBR. ANNO DOMINI M. DC. XIII. ÆTATIS SVÆ LI.



HIC QUIESCIT D. DVNCANVS LIDDELYS DOCTOR MEDICVS.

ÆTERNÆ MEMORIÆ  
 DDVNCANI LIDDELI DOCT.  
 MEDICI, QVEM VIRTVS NASCEN-  
 TEM EXCEPIT, RECONDITA IN  
 MEDICINA ET OMNIBVS PHILOSO-  
 PHIÆ AC MATHIESEOS PARTIBVS  
 PERITIA NATVM EXCOLVIT, LI-  
 BERALITAS SVpra ÆQVALES EX-  
 TVLIT, CVI ANNVVM STIPENDI-  
 VM DEBET PVBLICVS MATHIESEOS  
 IN ACADEMIA ABREDONENSI  
 PROFESSOR VICTVMQ. EIVSDEM  
 ACADEMIE SEX ALVNI,  
 FAMA POSTHVMA MERITORVM PERPETVA TESTIS  
 M. H. D. C. Q.

IO. LIDDELI CIVIS ABREDON. FILIVS.

(*Regis Romanorum et Castelle*)<sup>28</sup>. In the remaining passage, Alfonso is styled less pretentiously "king of Castile" (*regis Castelle*)<sup>29</sup>. Alfonso inherited the throne of Castile from his father, but on his mother's side his descent helped him to be elected Holy Roman Emperor. Hence, these four references to Alfonso in Copernicus' edition of the *Alfonsine Tables* are historically appropriate.

Somewhat less appropriate is the handwritten entry on sig. A2<sup>v</sup> in Copernicus' copy which is preserved today in the library of Uppsala University in Sweden. That entry, which is reproduced here in Figure 2, begins as follows:

"Alfonso, the astronomer, was king of Castile and of Spain" (*Alfonsus astronomus Castelle rex ac Hispanie fuit*). But Alfonso was not so much an astronomer as a patron of astronomy<sup>30</sup>. "King of Spain" is not unknown as his title (*rey despanna*)<sup>31</sup>. Yet, "although some writers occasionally referred to the 'king of Spain', constitutionally the title did not exist. The monarch used the various titles corresponding to each of his states"<sup>32</sup>. These two questionable characterizations of Alfonso (as an astronomer and as the King of Spain) appear in the copy of the *Alfonsine Tables* once owned by Copernicus. But he himself had nothing to do with this entry on sig. A2<sup>v</sup>, which is not in his handwriting<sup>33</sup>. Moreover, the other scribe, whoever he may have been, wrote *Castelle* and *Hispanie*, whereas Copernicus, good humanist that he was, used the classical ligature *-ae* in such cases<sup>34</sup>.

<sup>28</sup> Sig. A4<sup>r</sup>, the heading over the canons; sig. a1<sup>r</sup>, the heading over the tables; sig. k6<sup>r</sup>, the colophon.

<sup>29</sup> Sig. B1<sup>r</sup>, Proposition 8.

<sup>30</sup> In their Prologue the authors of the *Alfonsine Tables* explained: "This book has been named by us the book of the tables of Alfonso because it was made and compiled by his command." *Libros del Saber de Astronomia*, ed. Manuel Rico y Sinobas, Madrid, 1863-1867, Vol. 4, p. 112: *possiemos nombre á este libro. el libro de las taulas Alfonsies, porque fue fecho et copilado por su mandado.*

<sup>31</sup> Antonio Ballesteros-Beretta, *Alfonso X El Sabio*, Barcelona, 1963, p. 247.

<sup>32</sup> J. M. Batista i Roca, in *New Cambridge Modern History*, Vol. 1 (1964), pp. 322-323.

<sup>33</sup> Nevertheless, when Ludwig Prowe printed this entry, he implicitly assumed that it had been written by Copernicus; see Prowe's *Nicolaus Copernicus*, Vol. 1, part 2, p. 417, and Vol. 2, p. 209, in the 1967, Osnabrück reprint of the Berlin 1883-1884 edition.

<sup>34</sup> In his *Mikolaj Kopernik*, p. 28, L. A. Birkenmajer also ascribed this entry to Copernicus, although Birkenmajer was aware that Copernicus regularly preferred the humanist ligature *-ae* to the medieval contraction *-e*.

---

Figure 3. Contemporary Portrait of Duncan Liddel, reproduced from *Papers of the Edinburgh Bibliographical Society: 1911-1913*, Vol. 10 (Edinburgh, 1913), Plate VIII, between pp. 16 and 17. Liddel was the first university teacher to expound the new Copernican astronomy. He endowed the annual salary of a public professor of mathematics at Aberdeen University, who was expected to be an expert in the Copernican astronomy

Neither in the *Commentariolus* nor in the *Revolutions* did Copernicus mention Alfonso or the *Alfonsine Tables*. However, Copernicus also wrote a *Letter against Werner*, a German astronomer who had cited both the king and his tables. Hence, in his *Letter* Copernicus referred once to the "Alfonsine canons" (*canones Alfonsinos*) and once to the king (*Alfonsus*). In neither case did he associate the canons or the king with Seville or Spain. The *Alfonsine Tables* loom somewhat larger in the *First Report* by Copernicus' only disciple, Rheticus, who mentions the *Alfonsine Tables* eight times, but likewise never links them with Seville or Spain. When Rheticus was engaged in composing his *First Report*, he was living in Poland as Copernicus' guest. Neither the guest nor the host explicitly connected Alfonso and the *Alfonsine Tables* with Seville or Spain. Therefore, when in the *Commentariolus* Copernicus mentioned *Hispalensis* he surely had in mind someone other than Alfonso X.

Nevertheless, let us consider Swerdlow's proposed emendation. In place of *Hispalensis*, the unanimous reading of all three manuscripts, Swerdlow (p. 451) suggested "Hispaniensis?" (would be written *Hispāiensis*), "which would undoubtedly refer to good king Alfonso". But Swerdlow points to no instance of good king Alfonso being called "Hispaniensis". Would that renowned king of Castile and Leon have been curtly called "Hispaniensis" by Copernicus, as though he were talking about a mere commoner instead of the royal and imperial patron of the celebrated *Alfonsine Tables*? A somewhat later set of tables owed its existence to "King Peter, the third of the kings of Aragon to bear that name," not to any "Hispaniensis"<sup>35</sup>.

A copy of the second edition (Venice, 1492) of the *Alfonsine Tables* was owned by Copernicus, as we have already seen. In his bibliography, however, Swerdlow lists (p. 510), not the edition owned and used by Copernicus,<sup>36</sup> but a later edition of the *Alfonsine Tables*<sup>37</sup>. When Swerdlow says that the "value cited for the tropical year, 365 days 5 hours 49 minutes is that of the *Alphonsine Tables*," he does not indicate where that value is to be found in Copernicus' edition of the *Alfonsine Tables*. Had Copernicus seen that value in his edition, would he not have cited the famous *Alfonsine Tables* rather than the relatively obscure author whom he somewhat cryptically called simply *Hispalensis*? Would not *Alfonsus* (or *Tabulae Alfonsinae*) have been the worthier choice to join that distinguished trio, Hipparchus, Ptolemy, Al-Battani?

In order to obtain the length of the year, Alfonso de Corduba, the *Hispalensis* cited by Copernicus in the *Commentariolus*, subtracted 11<sup>m</sup> from 365<sup>d</sup>6<sup>h</sup>, so that his value was 365<sup>d</sup>5<sup>h</sup>49<sup>m</sup>, as we saw above. On

<sup>35</sup> "Isis", Vol. 41, 1950, p. 283: ... *regis Petri tertii nomine regum ... Aragonum*.

<sup>36</sup> A copy of the 1492 edition is available in many libraries, including the Newberry Library in Chicago.

<sup>37</sup> This later edition is misdated by Swerdlow.

the other hand, the corresponding subtraction in the *Alfonsine Tables* was not  $11^m$ , but "about  $10^m44^s$ , which is a little more than  $1/6^h$ ," according to Erasmus Reinhold in his edition of Peurbach's *New Theory of the Planets*<sup>38</sup>. Hence in 1542, the year before the publication of Copernicus' *Revolutions*, Reinhold, the future author of the widely consulted *Prussian Tables*, did not find  $365^d5^h49^m$  as the length of the year in the *Alfonsine Tables*. Nor had Copernicus in the *Commentariolus* found  $365^d5^h49^m$  as the length of the year in the *Alfonsine Tables*. But Copernicus did find  $365^d5^h49^m$  as the length of the year in Alfonso de Corduba Hispalensis, whom he cited simply as *Hispalensis*.

A Spanish archival entry reads as follows: "Alfonso, the illustrious king of Castile and Leon, of blessed memory died in the city of Seville" (*Apud yspalensem urbem obiit bone memorie dominus Aldefonsus Rex illustris Castelle et Legionis*)<sup>39</sup>. As usual, here *yspalensem* signifies Seville, and Alfonso X is called King of Castille, *Rex Castelle* not *Hispaniensis* (a Spaniard in general). Not *Hispaniensis*, but *Hispalensis* (a man from Seville) was cited in the *Commentariolus* by Copernicus. His edition of the *Alfonsine Tables* did not give the length of the year as  $365^d5^h49^m$ . That length was given by Alfonso de Corduba Hispalensis in a work published in 1502, in Venice, when Copernicus was close by in Padua.

For all the foregoing reasons we may conclude that Swerdlow erred with regard to the following four matters:

- (1) Copernicus' edition of the *Alfonsine Tables* did not give  $365^d5^h49^m$  as the length of the tropical year;
- (2) Alfonso X was not referred to as *Hispaniensis*;
- (3) *Hispalensis*, not *Hispaniensis*, is the unanimous reading of all three manuscripts of the *Commentariolus*;
- (4) The identification of *Hispalensis* with Alfonso de Corduba "seems unlikely" to Swerdlow, but is virtually a historical certainty.

Hence, in rejecting Swerdlow's quadruply mistaken attack on L. A. Birkenmajer's correct identification of Copernicus' *Hispalensis* with Alfonso de Corduba Hispalensis, we may feel reasonably sure that in this respect we are really in communication with the founder of modern astronomy.

<sup>38</sup> Peurbach, *Theoricae novae planetarum*, ed. Reinhold, Wittenberg, 1542, sig. e4v-5r: *Annus enim faciunt [Alfonsini] 365 dierum cum quadrante minus 10 scrupulis 44 secundis fere, id quod paulo plus est sextante unius horae.*

<sup>39</sup> Ballesteros-Beretta, p. 1056.