(fl. Seville, first half of the twelfth century)

astronomy, mathematics.

Usually known in the West by the Latinized name Geber, Jābir has often been confused with the al-chemist Jābir ibn Hayyān and occasionally with the astronomer Muhammad ibn Jābir al-Battānī. He should also be distinguished from Abū Aflah ha-Saraqīstī, the author of the mystical Book of the palm, and from the Baghdad poet Abū’l Qāsim ‘Ali ibn Aflāh’s life. He can be roughly dated by Maimonides’ citation in his Guide of the Perplexed: “... Ibn Aflah of Seville, whose son I have met ....” That he came from Seville is deduced from the name “al- Ishbīlī” in manuscripts of his works and in the above quotation from Maimonides.

Jābir’s most important work was a reworking of Ptolemy’s Almagest in nine books. Its title in one Arabic manuscript (Berlin 5653) is Iṣlāḥ al-Maṣjīṣī (“Correction of the Almagest”), but it had no fixed title in the West—Albertus Magnus calls it Flores, presumably short for Flores Almagesti, in his Speculium astronomiae. According to the contemporary historian Ibn al-Qīṭī, the text was revised by Maimonides and his pupil Joseph ibn ’Aqīnū. This revision seems to have been done about 1185, and so it was almost certainly from the unrevised text that Gerard of Cremona made his Latin translation. The Iṣlāḥ was translated from Arabic into Hebrew by Moses ibn Tibbon in 1274 and again by his nephew Jacob ben Māḥir; the latter translation was revised by Samuel ben Judah of Marseilles in 1335.

Jābir describes the principal differences between the Iṣlāḥ and the Almagest in the prologue: Menelaus’ theorem is everywhere replaced by theorems on right spherical triangles, so that a pro-portion of four quantities is substituted for one of six; further, Ja-ir does not present his theorems in the form of numerical examples, as Ptolemy did. So far the changes seem to be the same as those made by Abū’l Wafā, but Jābir’s spherical trigonometry is less elaborate. It occupies theorems 12-15 of book I and follows a theorem giving criteria for the sides of a spherical triangle to be grater or less than a quadrant (so that the sides may be known from their sines). In modern notation it may be summarized as follows:

Theorem 12. If all the lines in the figure are arcs of great circles, then

\[
\frac{\sin \text{AG}}{\sin \text{GA}} = \frac{\sin \text{AB}}{\sin \text{BG}} \quad \frac{\sin \text{AD}}{\sin \text{DZ}} = \frac{\sin \text{AN}}{\sin \text{NP}}.
\]

Theorem 13. In any spherical triangle \(\triangle ABG\), \(\sin \text{BG} : \sin \text{Â} = \sin \text{GA} : \sin \text{AB} : \sin \text{Ğ}\).

Theorem 14. In spherical triangle \(\triangle ABG\), \(B\) is right, then \(\sin \text{Â} : \sin \text{B} = \cos \text{Ĉ} : \cos \text{AB}\).

Theorem 15. In spherical triangle \(\triangle ABG\), \(B\) is right, then \(\cos \text{AG} : \cos \text{BG} = \cos \text{AB} : \sin \text{(quadrant)}\).

Theorems 13 and 15 are the most frequently used. Because of the differences in treatment it is unreasonable to suppose that Jābir copied directly from Abū’l Wafā, whose writings have survived. They may both have derived their fundamental theorems from Thābit ibn Qurra’s tract on Menelaus’ theorem, or all three may depend upon some source that in turn depends upon the third book of Menelaus’ Spherics. As a trigonometer Jābir is important only because he was translated into Latin, whereas works such as Abū’l Wafā’s—which carried an equivalent, or a better, trigonometry—were not.

Jābir criticized Ptolemy—sometimes very vio-lently—on a number of astronomical matters. Ptolemy’s “errors” are listed in the prologue of the Iṣlāḥ. The most substantial, and most famous, devia-tion from the Almagest concerns Venus and Mercury. Ptolemy placed them beneath the sun, claiming that they were never actually on the line joining the eye of the observer and the sun. Jābir contradicted this justification, putting Venus and Mercury above the sun. The Iṣlāḥ is the work of a theorist. The demon-strations are free of all numbers and there are no tables. Jābir does, however, describe a torquetum-like instrument, which he says replaces all the instruments of the Almagest.

Although Jābir was quoted in the twelfth century by al-Bītrūjī and by the author of the compendium of the Almagest ascribed to Ibn Rushd, and although the Iṣlāḥ was epitomized by Qutb al-Dīn al-Shīrāzī in the thirteenth century, Jābir was better known in the West through Gerard of Cremona’s translation. His name was used as that of an authority who criticized Ptolemy. But more serious was his influence on West-ern trigonometry. For instance, Richard or Walling-ford cited him several times in the Albion and in the De sectore (a variant of the Quadrantipartium); Simon Bredon took a great deal from Jābir...
in his commentary on the *Almagest*; and part of a commentary on the Islāh i which Já’s theorems are made more general is extant. But his most important influence was upon Regiomontanus’ *De triangulis*, written in the early 1460’s and printed in 1533, which systematized trigonometry for the Latin West. The core of the fourth book of this treatise is taken from Jābir without acknowledgement; the plagiarism was the subject of several pungent remarks by Cardano. Jābir was still quoted in the sixteenth and seventeenth centuries—for instance, by Sir Henry Savile and Pedro Nuñez. Copernicus’s spherical trigonometry is of the same general type, but we have no reason to believe it was taken straight from the Islāh. He called Jābir “egregious calumniator of Ptolomy.”

**NOTES**


2. See Erfurt, Wissenschaftliche Bibliothek, MS Q223, fols. 106r-106v, and other MSS. The 1891 ed. is somewhat corrupt at this point.

3. Ta’rikh al-hukamā’, J. Lippert, ed. (Leipzig, 1903), pp. 319, 392-393. The text is the abridgment by Muhammad ibn ‘Ali al-Zawzānī (1249); the original is lost.

**BIBLIOGRAPHY**


There are some 20 Latin MSS plus five fragments; the text was published by Peter Apian (Nuremberg, 1534) together with his *Instrumentum primi mobilis*. There is a description of a different but similar instrument in the Latin version, but the original diagrams remain. Jacob ben Māhir describes both instruments.

The commentary on Thābit ibn Qurra’s tract on Menelaus’ theorem and the commentary on Menelaus’spherics (fragment) occur together and are extant only in Hebrew. MSS are Bodleian Hunt. 96 (Neubauer 2008), fols. 40v-42v, and Bodleian Heb. d.4 (Neubauer 2773), fols. 165r-177v. Berlin Q 747 (Steinschneider catalog no. 204) contains part of this text.

The anonymous Latin commentary on the Islāh is in Paris, B.N. Lat. 7406, fols. 114ra-135rb.

The six-book *Parvum Almagestum*, which exists only in Latin, is almost certainly not by Jābir; as has sometimes been held—see Lorch (below), ch. 3. Pt. 1.


For further references, see G. Sarton, *Introduction to the History of Science*, II (Washington, D.C., 1931), 206.

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