Bibliography of Mathematics in Medieval Islamic Civilization

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This bibliography is a revised, enlarged and updated version of the bibliography on Islamic mathematics by Richard Lorch on pp. 65-86 of Joseph W. Dauben's *The History of Mathematics from Antiquity to the Present: A Selective Bibliography*, New York and London: Garland, 1985.

This bibliography of Islamic mathematics will appear as a chapter in the updated (1999?) version of Dauben's book which will be made available as a CD-Rom. Reactions and suggestions are very welcome, and can be sent to hogend@math.uu.nl. In this preliminary form, no attention has been paid to diacritical marks in Arabic names. The items in the bibliography have been numbered *1, *2, ... *122, *122a, *122b, *123 etc. and many cross-references have been provided.

General Introduction

Islamic mathematics and *Arabic mathematics* are modern historical terms for the mathematical sciences in Islamic civilization from the beginning of Islam (A.D. 622) until the 17th century. Although most of the mathematicians in this period of Islamic civilization were Muslims, some prominent mathematicians had other religious backgrounds (Christian, Jewish, Zoroastrian). Arabic was the main scientific language but not necessarily the native language of a mathematician, who might have been Persian, Turkish, etc.

The Islamic mathematical tradition was a continuation of the traditions of ancient Greece, India and pre-Islamic Iran. Some texts from the medieval Islamic period are lost in Arabic but available in medieval Latin or Hebrew translations. Thus material relevant to Islamic mathematics can also be found in the sections on [Greek](#) (available through the internet), Indian, Hebrew and Latin mathematics in Dauben's (updated) bibliography.

Although the field of Islamic mathematics is still under-researched, the literature is already so extensive that only a small part can be listed in a bibliography of this size. The present selection focuses on recent literature on Islamic mathematics in Western languages. More literature in Western languages can easily be found in the bibliographical works *8 and *9. References to the literature on Islamic mathematics in other languages can be found in *9 for publications in Russian, Arabic, Turkish and Uzbek, *8 for publications in Arabic and Turkish and *13 for publications in Persian. Unfortunately, it is not easy to trace all publications in Eastern languages on a given subject.

This bibliography includes references to non-trivial applications of mathematics to other sciences in Islamic civilization. Examples are publications on the mathematical construction of the astrolabe, technical mathematical explanations of planetary models, optical problems leading to complicated geometrical problems, and so on. However, I have not included publications on topics which are only indirectly related to mathematics, such as the theory of vision, star names, descriptions of the use of the astrolabe, and natural philosophy. I would like to warn the reader that this is not a bibliography on Islamic astronomy, or on optics, or on instruments.

Once a reference to an article or book has been found, it is often a major problem to find the article or book in question. A special section at the end of this bibliography lists collections of articles and reprinted works, containing articles on Islamic mathematics which are often difficult or impossible to find otherwise.

The following journals specialize in Islamic science:

- Suhayl (Barcelona)

- [Arabic Sciences and Philosophy](#) (Cambridge)

- Journal for the History of Arabic Science (Aleppo)

- Zeitschrift für Geschichte der arabisch-islamischen Wissenschaften (Frankfurt)

Articles on Islamic mathematics also appear in journals on the general history of mathematics or science, on Oriental studies, etc. The best sources of information on current research are the sections 01A30 of the *Mathematical Reviews* (free author-lookup available through the internet) and the *Zentralblatt der Mathematik* the Abstracts section in *Historia Mathematica*, and the *Isis* Cumulative Bibliography.

Introductory Works

Good introductions to the history of Islamic mathematics are found in:

- *1. Berggren, J.L. *Episodes in the Mathematics of Medieval Islam.* New York: Springer-Verlag, 1986.
  This book concentrates on mathematics still used in high school, and on the Eastern part of the Islamic world. Written at college level, with exercises, and some bibliographical references.

- *2. Juschkevich, Adolf P. *Geschichte der Mathematik im Mittelalter.* Leipzig: B. G. Teubner, 1964.
  A German translation of the original Russian version of 1961. This book offers and outdated but nevertheless most comprehensive account of achievements of the mathematicians of the Islamic world in the Middle Ages that is available to date. See also *3.

- *3. Youschkevitch, Adolf P. *Les mathématiques arabes (VIIe-XVe siècles).* Paris: J. Vrin, 1976.
  French translation of the chapter in *2 dealing with Islamic mathematics.

- *4 Samsó, Julio. *Las Ciencias de los Antiguos en al-Andalus.* Madrid: MAPFRE, 1992.
  Survey of mathematics and astronomy in Islamic Spain.

- *5. Kennedy, Edward S. The Arabic Heritage in the Exact Sciences. *Al-Abhath* 23 (1970), pp. 327-344. Reprinted in *180.
  Brief introduction to mathematics, astronomy, mechanics, and physics in the medieval Islamic world.

- *6. Sesiano, J. Arabische Mathematik im 8.-10. Jahrhundert. In: Butzer, P.L, Lohrmann, D., eds., *Science in Western and Eastern Civilization in Carolingian Times*. Basel: Birkhäuser, 1993, pp. 399-442.
  Introduction to the first two centuries of Islamic mathematics, with many specific mathematical examples.

  The following book is recommended as a first course in mathematics (and astronomy) written by a medieval Islamic mathematician:

- *7. al-Biruni, Abu al-Rayhan. *The Book of Instruction in the Elements of the Science of Astrology*. Translated by R. Ramsay Wright. London: Luzac and Co. 1934.

Bibliographies and Handbooks

The two most important works are:

- *8. Sezgin, Fuat. *Geschichte des arabischen Schrifttums.* Leiden: E. J. Brill, 1967-.
  This is a fundamental work for the period up to about 1040 A.D. Volumes 5 (1974), 6 (1978), and 7 (1979) are respectively devoted to mathematics, astronomy, and astrology. Sezgin deals with authors writing in Arabic, and with Greek, Indian and Sassanid authors whose works were transmitted into Arabic. For every author Sezgin gives an introduction, all known medieval Arabic manuscripts, references to Arabic editions, medieval translations if any, modern translations if any, and studies (prior to 1974 or 1978).

- *9. Rosenfeld, B. A. and Matvievskaya, G. P. *Matematiki i astronomi musulmanskogo srednevekovya i ikh trudi (VII-XVII vv)* , 3 vols. Moscow: Nauk, 1983.
  This work is organized in roughly the same way as *8. Rosenfeld and Matvievskaya deal with authors in the Islamic world until 1900. Since much of the information in this work consists of names and numbers, readers whose knowledge of Russian is limited to the letters of the Russian alphabet can consult this work with profit. A supplement volume and an English translation of the work are in preparation. There are plans to put an continuously updated English data base, similar to this work and to Sezgin's work, on internet, available free of charge to all interested readers.

- *10. Suter, Heinrich. Die Mathematiker und Astronomen der Araber und ihre Werke. *Abhandlungen zur Geschichte der mathematischen Wissenschaften* 10 (1900),ix+278 pp. Reprinted: New York: Johnson Reprint Corporation, 1971, and in *198. Additions and corrections in *Abhandlungen zur Geschichte der mathematischen Wissenschaften* 14 (1902), pp. 155-185, and by Renaud, H.J.P., *Isis* 18 (1932), pp. 166-183.
  This work is now superseded by the works of Sezgin (*8) and Rosenfeld-Matvievskaya (*9).

- *11 *Encyclopaedia of Islam, 2nd ed.* Leiden: E. J. Brill, and London: Luzac and Company, 1960 - .
  A general encyclopedia, alphabetically arranged, with cross-references and indices. Contains (generally short) articles of varying quality on Islamic mathematicians and Arabic mathematical terms. The second edition is nearing completion.

- *12. *Index Islamicus,* founded by J.D. Pearson, (1906-85), continued as *Quarterly Index Islamicus* (1986-93), continued as *Index Islamicus* (1996 -).
  This review journal appears four times a year, with bibliographic entries on all aspects of Islamic civilization. There is a special section on Science (in the medieval Islamic world).

- *13. Ghorbani, Abu'l-Qasim. *Biographie des mathématiciens de l'époque islamique de 3e à 11e siècle de l'hégire* [in Persian]. Tehran: Presses Universitaires de l'Iran, ca. 1995.
  The most up-to-date work on Islamic mathematicians of Iranian descent (a substantial part of all Islamic mathematicians). 543 pages.

- *14. Storey, C. A. *Persian Literature. A Bio-Bibliographical Survey.* London: Luzac and Co., 1927-1953.
  Volume II, Part I, deals with mathematics and astronomy. Useful for readers who do not know Persian and cannot consult *13.

- *15. Sánchez Pérez, José A. *Biografías de Matemáticos Árabes que florecieron en España.* Madrid: Estanislao Maestre, 1921.
  Information on 191 mathematicians (and astronomers) in medieval Islamic Spain.

- *16 F. Sezgin, ed., *Bibliographie der deutschsprachichen Arabistik und Islamkunde. vol. 5: Wissenschaftsgeschichte.* Frankfurt: Institut für Geschichte der arabisch-islamischen Wissenschaften. 1986.
  Very complete survey of articles and reviews in German, with special sections on mathematics and astronomy.

- *17 Endress, G. Die Wissenschaftliche Literatur, in: Fischer, W., ed., *Grundriss der Arabischen Philologie, 3: Supplement,* pp. 1-152, Wiesbaden: Ludwig Reichert Verlag, 1992.
  Scholarly introduction to Islamic philosophy, sciences and medicine, with many references.

- *18. Nasr, Seyyed Hossein, *An Annotated Bibliography of Islamic Science, volume 3: Mathematics, Optics, Music, Astronomy, Astrology.* Tehran: Cultural Studies and Research Institute, 1991.
  Bibliography of printed works in non-Islamic languages before 1970. Contains more than 1100 items on mathematics, astronomy and optics.

- *19. Kennedy, E.S., Kennedy, M.-H. *Geographical coordinates of localities from Islamic sources.* Frankfurt: Institut für Geschichte der arabisch-islamischen Wissenschaften. 1987.
  Sorting of thousands of geographical coordinates of cities from more than 70 medieval Arabic sources. Includes discussion of zero meridian and precision.

- *20 Lamrabet, D. *Introduction à l'histoire des mathématiques maghrébines.* Rabat, 1994.
  Information on more than 500 mathematicians in Islamic Spain and the Maghreb (modern Morocco, Algeria, Tunisia).

- *21 Berggren, J.L. History of Mathematics in the Islamic World: The Present State of the Art. *Middle East Studies Association Bulletin* 19 (1985), pp. 9-33.
  A selective review of the literature from 1970-1985, with 115 references.

- *22 Berggren, J.L. Mathematics and Her Sisters in Medieval Islam: A Selective Review of Work Done from 1985 to 1995. *Historia Mathematica* 24 (1997), pp. 407-440.
  As above (*21), with 182 references.

- *23. Rashed, R., ed., *Encyclopaedia of the History of Arabic Sciences.* London: Routledge, 1996. Volume 1: Astronomy - Theoretical and Applied, Volume 2: Mathematics and Physical

Sciences, Volume 3: Technology, Alchemy and Life Sciences.
Not an encyclopaedia, but a collection of articles by different authors on various topics in the history of science in Islamic civilization. Most articles are syntheses of the research done by its author. The articles on applied mathematics are especially useful. See *134a, *154, *171. Some of the problematic aspects of the articles on pure mathematics are described in a review of this "*Encyclopaedia*" by J.L. Berggren in *Journal of the American Oriental Society* 120.2 (2000), 282-283.

An example of a medieval bibliography, containing a large chapter on mathematics and astronomy:

- *24. Ibn al-Nadim. *Fihrist.* Translated by B. Dodge. New York: Columbia University Press, 1970.
  Originally a bookseller's list from the 10th century and later extended, this is one of the standard Arabic bibliographical sources for the history of Arabic science.

- *24a Brentjes, S. Historiographie der Mathematik im islamischen Mittelalter, *Archives Internationales d'Histoire des Sciences* 42 (1995), 27-63.
  Discusses texts by medieval Islamic authors (such as *24) dealing with the history of mathematics.

Illustrated Works

- *25. King, D. A. *A Survey of the Scientific Manuscripts in the Egyptian National Library.* Winona Lake, Ind.: Eisenbrauns, 1986. American Research Center in Egypt, Catalogs, 5. More than one hunderd beautiful black-and-white photographs of manuscripts.

- *26. Nasr, Seyyed Hussein, *Islamic Science, an Illustrated Survey.* London: World of Islam Festival Publishing Co., 1976.
  The book contains many beautiful colour photos, but the text is unreliable, see the review by D. King, Islamic Astronomy and Mathematics: An Essay Review, *Journal for the History of Astronomy* 9 (1978), pp. 212-219; reprinted in *Bibliotheca Orientalia* 35 (1978), pp. 339-343, and in *186.

- *27 *El Legado Científico Andalusí,* Madrid: Museo Arqueológico Nacional, 1992.
  Catalog of an exposition organized by J. Samsó in 1992. With scholarly introductions in Spanish to various fields in medieval Islamic science, and very good colour photographs of manuscripts and scientific instruments.

- *28 Necipoglu, G. *The Topkapi Scroll - Geometry and Ornament in Islamic Architecture.* Santa Monica: Getty Center for the History of Art and the Humanities, 1995.
  Superb colour reproductions of a 17th century scroll with complicated mosaic and muqarnas drawings in the Topkapi Library in Istanbul, with scholarly commentary, and an essay on the geometry of the muqarnas by Muhammad Asad.

Texts and Commentaries (Specific Authors)

What follows is a listing of the major edited texts currently available in good translations in Western languages, together with some introductory historical studies which focus on a single author. Because an alphabetic listing of Arabic names is somewhat problematic, the authors will be listed in chronological order. The major Greek authors whose works were translated into Arabic have been included in the list. The reader should be aware that many texts have been published in Arabic editions (without translation in a Western language) or in facsimile, and that some important texts are available (only) in Russian translations. References to these publications can be found in the bibliographies *8 and *9.

Euclid

- *29. Klamroth, M. Ueber den arabischen Euklid. *Zeitschrift der deutschen morgenländischen Gesellschaft* 35 (1881), pp. 270-326, pp. 788.
  Still a basic work on the Arabic Euclid.

- *29a. Knorr, Wilbur, The Wrong text of Euclid: On Heiberg's Text and Its Alternatives, *Centaurus* 38 (1996), pp. 208-276.
  Supports Klamroth's view that the Arabic manuscripts are important for the reconstruction of the original text of the Elements text, contrary to the opinion of Heiberg.

- *30. de Young, Gregg, Ishaq ibn Hunayn, Hunayn ibn Ishaq, and the third Arabic translation of Euclid's Elements, *Historia Mathematica* 19 (1992), pp. 188-199.
  A clear introduction to the very complex transmission of Euclid's Elements into Arabic.

- *30a. Sabra, A.I., Simplicius's Proof of Euclid's Parallel Postulate, *Journal of the Warburg and Courtauld Institutes* 32 (1969), pp. 1-24.
  Reprinted in *193. Discussion of a "proof" of the parallel postulate by the Greek philosopher Simplicius (sixth century A.D.) which survives in Arabic texts.

See also *52a, *99, *133a, *201 vols. 14-20.

Archimedes

- *31. Lorch, R. The Arabic transmission of Archimedes' Sphere and Cylinder and Eutocius' Commentary, *Zeitschrift für Geschichte der arabisch-islamischen Wissenschaften* 5 (1989), pp. 94-114.
  Reprinted in *189.

  See also *45a, *147, *149.

Apollonios

*32. Toomer, G.J. *Apollonius Conics, Books V-VII. The Arabic Translation of the Lost Greek Original in the Version of the Banu Musa*, 2 vols. New York: Springer Verlag 1990.
Edition of the Arabic text of the lost Books V-VII of the Conics with English translation, commentary and glossaries.

- *33 Hogendijk, J. Arabic traces of lost works of Apollonius. *Archive for History of Exact Sciences* 35 (1986), pp. 187-253.
Presents fragments of the Plane Loci, the Tangencies and the Neuseis.

- *34. Hogendijk, J. *Ibn al-Haytham's Completion of the Conics.* New York: Springer Verlag, 1985.
Arabic text and English translation of the reconstruction of the lost Book VIII of the Conics of Apollonius by Ibn al-Haytham.

Diocles

- *35. *Diocles On Burning Mirrors. The Arabic translation of the lost Greek original, edited, with English translation and commentary*, by G. J. Toomer. New York: Springer-Verlag, 1976. Sources in the History of Mathematics and Physical Sciences, 1.

Diophantos

- *36 *Books IV to VII of Diophantus'* Arithmetica *in the Arabic Translation Attributed to Qusta ibn Luqa.* Edited by J. Sesiano. Berlin, Heidelberg, New York: Springer-Verlag, 1982.
Edition with English translation of the four books of the Arithmetica of Diophantus, which are lost in Greek but which were discovered in 1968 by F. Sezgin in an Arabic manuscript in Meshed in Iran.

- *37 Diophante *Les Arithmétiques, texte établi et traduit par R. Rashed,*, 2 vols. Paris: Les Belles Lettres, 1984.
Edition with French translation of the four Arabic books of the Arithmetica of Diophantus (based on the same manuscript as *36). On the publication history of this Arabic manuscript, see the review of *36 in *Historia Mathematica* 12 (1985), pp. 82-85, the review of *37 in *Annals of Science* 44 (1987), pp. 308-311, and the account in *Revue des Questions Scientifiques* 156 (1985), pp. 237-241.

Menelaos of Alexandria

- *38. Krause, M., *Die Sphärik von Menelaos aus Alexandrien in der Verbesserung von Abu Nasr Mansur b. `Ali b. `Iraq. Mit Untersuchungen zur Geschichte des Textes bei den islamischen Mathematikern.* Abhandlungen der Geschichte der Wissenschaften zu Göttingen, philol.-hist. Klasse, dritte Folge, 17 (1936).
Edition with German translation of an Arabic revision of the lost Greek original of the Spherics of Menelaos.

Pappos

- *39. Thomson, W., ed. *The Commentary of Pappus on Book X of Euclid's Elements.* Cambridge, Mass.: Harvard Semitic Series 8, 1930.
  Arabic text, translation with commentary of a treatise on irrational magnitudes. The Greek original is lost. Reprinted in *201 vol. 16.

Al-Khwarizmi (Irak-Iran, ca. 830)

- *40. Rosen, F., ed. *The Algebra of Mohammed ben Musa (al-Khwarizmi).* London: Oriental Translation Fund, 1831, Reprint: Hildesheim, Olms, 1986.
  Arabic text of the Algebra of al-Khwarizmi, with English translation. Various medieval Latin translations of the Algebra of al-Khwarizmi have also been published.

- *41. Folkerts, M. *Die älteste lateinische Schrift über das indische Rechnen nach al-Hwarizmi. Edition, Übersetzung und Kommentar.* München: Bayerische Akademie der Wissenschaften 1997.
  This is a new edition of the complete medieval Latin translation of the Arithmetic of al-Khwarizmi (previous editions are all incomplete). This work is lost in Arabic.

- *42. Al-Khwarizmi, Muhammad b. Musa. *The Astronomical Tables of al-Khwarizmi.* Translated by O. Neugebauer. Kongelige Danske Videnskabernes Selskab, hist.-filos. Skrifter (Copenhagen) 4 (1962).
  Based on the medieval Latin translation by Adelard of Bath. The Arabic original is lost. See the review by G.J. Toomer in *Centaurus* 10 (1964), pp. 202-212.

- *43. King, D. A. Al-Khwarizmi and New Trends in Mathematical Astronomy in the Ninth Century. *New York University: Hagop Kevorkian Center for Near Eastern Studies: Occasional Papers on the Near East* 2 (1983).
  Description and analysis of seven recently discovered minor works related to al-Khwarizmi.

- *44. Van Dalen, B. Al-Khwarizmi's Astronomical Tables Revisited: Analysis of the Equation of Time.
  Published in *182, pp. 195-252. With survey of all work done on the tables of al-Khwarizmi.

See also *201 vols. 1-6.

Ibn Turk (Turkey? Irak? ca. 830?)

- *45. Sayili, Aydin, *Logical necessities and mixed equations by `Abd al-Hamid ibn Turk and the algebra of this time.* Ankara, 1962.
  Arabic text and an English translation of a treatise on algebra.

Al-Kindi (Irak, ca. 800-870)

- *45a. Rashed, R. Al-Kindi's Commentary on Archimedes' "The Measurement of the Circle" *Arabic Sciences and Philosophy* 3 (1993), pp. 7-53.
  Arabic text and English translation.

Banu Musa (Syria-Irak, ca. 830)

- *46. Clagett, M. *Archimedes in the Middle Ages,* vol. 1. Madison: University of Wisconsin Press, 1964.
  Includes an edition of the medieval Latin translation of the *Book on the Measurement of Plane and Spherical Figures* by the Banu Musa (the three sons of Musa), with English translation.

See also *53.

Thabit ibn Qurra (Syria-Irak, 835-901)

- *47 Suter, H. Über die Ausmessung der Parabel von Thabit ibn Kurra al- Harrani. *Sitzungsberichte der Physikalisch-Medizinischen Sozietät zu Erlangen* 48-49 (1916-17), pp. 65-80.
  German translation of a treatise on the measurement of the parabolic segment. Reprinted in *198.

- *48. Thabit ibn Qurra. *Oeuvres astronomiques.* ed. R. Morelon. Paris: Les Belles Lettres, 1987.
  Edition with French translation of 7 works of Thabit on mathematical astronomy.

- *49. Suter, H. Die Abhandlungen Thabit b. Kurras und Abu Sahl al-Kuhi's über die Ausmessung der Paraboloide, *Sitzungsberichte der physikalisch-medizinischen Sozietät zu Erlangen* 48-49 (1916-17), pp. 186-227.
  German translation of two treatises on the measurement of the paraboloid. Reprinted in *198.

- *50. Garbers, K. Ein Werk Tabit b. Qurra's über ebene Sonnenuhren. *Quellen und Studien zur Geschichte der Mathematik, Astronomie und Physik, Abteilung A: Quellen,* 4 (1936), pp. 1-80.
  Text and German translation of a theoretical treatise on sundials. For a commentary see *51. Reprinted in *201 vol. 22.

- *51. Luckey, P. Tabit b. Qurra's Buch über die ebenen Sonenuhren. *Quellen und Studien zur Geschichte der Mathematik, Astronomie und Physik, Abteilung B: Studien,* 4 (1938), pp. 95-148.
  Commentary to *50. Reprinted in *201 vol. 22.

- *52. Luckey, P. Tabit b. Qurra über den geometrischen Richtigkeitsnachweis der Auflösung der quadratischen Gleichungen, *Berichte über die Verhandlungen der Sächsischen Akademie der Wissenschaften zu Leipzig, Mathematisch-physische Klasse,* 93 (1941), pp. 93-114.

Translation of a treatise by Thabit on geometric proofs for solutions of quadratic equations in the way of al-Khwarizmi. Reprinted in *201 vol. 22.

- *52a. Sabra, A.I. Thabit ibn Qurra on Euclid's Parallel Postulate, *Journal of the Warburg and Courtauld Institutes* 31 (1968), pp. 12-32.
  Reprinted in *193.

- *53. Rashed, R. *Les mathématiques infinitésimales du IXe au XIe siècles. Volume 1: Fondateurs et commentateurs.* London: Al-Furqan Islamic Heritage Foundation, 1996. Includes Arabic texts and French translations of the treatises by Thabit ibn Qurra on the measurement of the parabola, the measurement of the paraboloid, and the sections of a cylinder; and of the Book on the Measurement of Plane and Spherical Figures of the Banu Musa, the treatise by Ibrahim ibn Sinan on the measurement of the parabola, a treatise on isoperimetry by Abu Ja`far al-Khazin, two versions of a treatise by al-Kuhi on the measurement of the paraboloid, a Hebrew fragment of Ibn al-Samh on sections of the cylinder, and fragments of the Istikmal of al-Mu'taman ibn Hud on the measurement of the parabola and on isoperimetry. This book does not include the text *65.

See also *152, *201 vol. 21,22.

Al-Hashimi, `Ali ibn Sulayman (Irak? ca. 850-900)

- *54. Al-Hashimi, `Ali ibn Sulayman. *The Book of the Reasons Behind Astronomical Tables. With a translation by Fuad I. Haddad and E.S. Kennedy, and a commentary by David Pingree and E.S. Kennedy.* Delmar N.Y.: Scholars' Facsimiles and Reprints, 1981.
  Translation of an early text on mathematical procedures in astronomical handbooks.

Al-Battani (Syria, ca. 900)

- *55 Al-Battani, Muhammad ibn Jabir. *Opus astronomicum.* Edited by C.A. Nallino. Milano: Osservatorio astronomico di Breva, 1899-1907. Reprinted Frankfurt: Minerva, 1969, New York: Minerva, 1976, and also in the series *201.
  The Arabic text of Al-Battani's Zij (astronomical handbook) with modern Latin (sic) translation, introduction, and commentary (also in Latin). A fundamental work.

Abu Kamil (Egypt? ca. 900)

- *56 Weinberg, J. *Die Algebra des Abu Kamil.* München: Druck des Salesianischen Offizin, 1935.
  Translation of the first part of the Algebra, based on the Hebrew and Latin versions.

- *57. Levey, M. *The Algebra of Abu Kamil, ... in a Commentary by Mordechai Finzi. Hebrew Text, Translation and Commentary with Special Reference to the Arabic Text.* Madison-Milwaukee, and London, 1966.

The translation is based on the Hebrew version of the text of Abu Kamil (not a commentary) by Mordechai Finzi. The Hebrew version does not always reflect the Araic accurately. This is only the first part of Abu Kamil's Algebra. For the second and third part see *58, *59.

- *58. Suter, H. Die Abhandlung des Abu Kamil Shoga` b. Aslam über das Fünfeck und Zehneck. *Bibliotheca Mathematica, dritte Folge* 10 (1909-1910), pp. 15-42.
  German translation of Italian translation of Hebrew translation of the second part of the Algebra of Abu Kamil.

- *59. Sesiano, J. Les methodes d'analyse indeterminée chez Abu Kamil. *Centaurus* 21 (1977), pp. 89-105.
  On the third part of the Algebra of Abu Kamil.

- *60. Suter, H. Das Buch der Seltenheiten der Rechenkunst von Abu Kamil al-Misri. *Bibliotheca Mathematica, dritte Folge* 11 (1910-11), pp. 100-120.
  German translation of a treatise on systems of indeterminate linear equations.

See also *201 vol. 23.

Ibrahim ibn Sinan (Irak, 909-946)

- *61. Suter, H. Abhandlung über die Ausmessung der Parabel von Ibrahim b. Sinan b. Thabit. Aus dem Arabischen übersetzt und kommentiert. *Vierteljahresschrift der naturforschenden Gesellschaft in Zürich* 63 (1918), pp. 214-228
  German translation of a treatise on the measurement of the parabola. Reprinted in *198.

See also *53.

Al-Khazin, Abu Ja`far (Irak-Iran, ca. 920-980)

- *62. Woepcke, F. Traduction d'un fragment anonyme sur la formation des triangles rectangles en nombres entiers, et d'un traité sur le même sujet par Abou Dja'far Mohammad ben Alhoçain. *Atti dell'Accademia Pontificia dei Nuovi Lincei* 14 (1860-1), pp. 211-227, 241-269, 301-324, 343-356.
  French translations of various 10-th century treatises on Pythagorean triples. Reprinted in *197.

- *63. Anbouba, A. Un traité d'Abu Ja`far sur les triangles rectangles numériques. *Journal for the History of Arabic Science* 3 (1979), pp. 134-178.
  Arabic text with French translation. Establishes the identity of Abu Ja`far al-Khazin with Abu Ja`far Muhammad ibn al-Husayn.

- *64. Lorch, R. Abu Ja`far al-Khazin on Isoperimetry and the Archimedean Tradition. *Zeitschrift für Geschichte der arabisch-islamischen Wissenschaften* 3 (1986), pp. 150-229.

Text and translation with commentary of a treatise on isoperimetry which is part of al-Khazin's Commentary on the Almagest. Reprinted in *189.

See also *53.

Al-Karabisi (Irak? 10th century?)

- *65. Bessel-Hagen, E., Spies, O. Das Buch über die Ausmessung des Kreisringes des Ahmad ibn `Omar al-Karabisi, *Quellen und Studien zur Geschichte der Mathematik, Astronomie und Physik, Abteilung B: Studien,* 1 (1931), pp. 502-540.
  Edition and German translation of a treatise on the measurement of the torus, in which al-Karabisi uses infinitesimal arguments (not the classical Greek methods of Eudoxus). See the comments by S. Gandz in *Quellen und Studien zur Geschichte der Mathematik, Astronomie und Physik, Abteilung B: Studien,* 2 (1932), pp. 98-105.

Ikhwan al-Safa' (Irak, first half of 10th century)

The Ikhwan al-Safa' ("brethren of purity") were a (mystical?) group in the city of Basra in Irak. The group authored a series of more than 50 letters on science, philosophy and theology. The first letter is on arithmetic and number theory, the second letter on geometry.

- *65a Goldstein, B. A Treatise on Number Theory from a Tenth-Century Arabic Source, *Centaurus* 10 (1964), pp. 127-164.
  English translation of the first letter.

- *65b Brentjes, S. Die erste Risala der Rasa'il Ihwan al-Safa' über elementare Zahlentheorie - ihr mathematischer Gehalt und ihre Beziehungen zu spätantiken arithmetischen Schriften, *Janus* 71 (1984), pp. 181-274.
  German translation of the first letter with historical analysis.

Al-Uqlidisi (Irak-Iran, 10th century)

- *66. Al-Uqlidisi. *The Arithmetic of al-Uqlidisi.* Translated and Annotated by A.S. Saidan. Dordrecht and Boston: Reidel, 1978.
  Al-Uqlidisi was the first to use decimal fractions.

Al- Saghani, Abu Hamid (Irak-Iran, ca. 940-1000)

- *67. Lorch, R. Al- Saghani's Treatise on Projecting the Sphere.
  Published in *181, pp. 237-252. Reprinted in *189. Al- Saghani studies central projection of a sphere on a plane from a point not on the sphere, and an astrolabe constructed in this way. Many curves on this astrolabe are conic sections.

Al-Kuhi, Abu Sahl Wayjan ibn Rustam (Irak-Iran, ca. 940-1000)

- *68. Woepcke, F. Trois traités arabes sur le compas parfait. *Notices et extraits des manuscrits de la Bibliothéque Impériale et autres bibliothèques.* 22 (1874), pp. 1-175.
  Includes an edition and French translation of a treatise on the perfect compass (for drawing conic sections) by Al-Kuhi. Reprinted in *197.

- *69. Berggren, J.L. Al-Kuhi's "Filling a Lacuna in Book II of Archimedes" in the Version of Nasir al-Din al-Tusi. *Centaurus* 38 (1996), pp. 140-207.
  Edition and English translation of a treatise by al-Kuhi on the construction of a certain spherical segment by means of conic sections.

- *70. Berggren, J.L. The Correspondence of Abu Sahl al-Kuhi and Abu Ishaq al-Sabi. *Journal for the History of Arabic Science* 7 (1983), pp. 39-124.
  Edition and translation of a 10-th century correspondence between two friends on (meta) mathematical matters.

- *71. Berggren, J.L. Abu Sahl al-Kuhi's Treatise on the Construction of the Astrolabe with Proof: Text, Translation and Commentary. *Physis* 31 (1994), pp. 141-252.

- *72. Hogendijk, J. Al-Kuhi's Construction of an Equilateral Pentagon in a Given Square. *Zeitschrift für Geschichte der arabisch-islamischen Wissenschaften* 1 (1985), pp. 100-144.
  English translation of a text related to conic sections.

See also *49, *53.

Abu al-Wafa' (Irak-Iran, ca. 940-998)

- *73. Suter, H. Das Buch der geometrischen Konstruktionen des Abu'l-Wefa'. *Abhandlungen zur Geschichte der Naturwissenschaften und der Medizin* 4 (1922), pp. 94-109.
  Translation of part of a treatise on geometrical constructions. Reprinted in *198.

- *73a. Carra de Vaux, B. L'almageste d'Abu'l-Wefa Albuzdjani. *Journal Asiatique* 8. series, 19 (1892), pp. 408-471.
  Discusses Abu'l-Wafa's ``Almagest'', a treatise on mathematical astronomy named after Ptolemy's famous work.

- *73b. Sesiano, J. Le traité d'Abu'l-Wafa' sur les carrés magiques. *Zeitschrift für Geschichte der arabisch-islamischen Wissenschaften* 12 (1998), pp. 121-244.
  Arabic text and French translation of a work on magic squares.

Abu Sa`d al-`Ala' ibn Sahl (Irak-Iran, ca. 940-1000)

- *74. Rashed, R. *Géométrie et Dioptrique au Xe siècle: Ibn Sahl, al-Quhi et Ibn al-Haytham.* Paris: Les Belles Lettres, 1993.

Arabic texts with French translations of all available works by Al-`Ala, with a work by al-Kuhi on the astrolabe (also published in *71), and a fragment of the Optics of Ibn al-Haytham. See also *75.

- *75. Rashed, R. A Pioneer in Anaclastics: Ibn Sahl on Burning Mirrors and Lenses. *Isis* 81 (1990), pp. 464-491.
  Argues that Ibn Sahl used Snell's law of refraction in his study of hyperbolic lenses.

Al-Sijzi, Ahmad ibn Muhammad (Iran, ca. 940-1000)

- *76. Al-Sijzi, Ahmad ibn Muhammad, *Treatise on Geometrical Problem Solving,* ed. Bagheri, M., Hogendijk, J. Tehran: Fatemi Publications, 1996.
  Arabic text with Persian and English translations of a treatise on problem solving strategies in geometry, which resembles G. Polya's *How to Solve It.*

Ibn Yunus (Egypt, ca. 950-1010)

- *77. King, D. A. Ibn Yunus' *Very Useful Tables* for Reckoning Time by the Sun. *Archive for History of Exact Sciences* 10 (1973), pp. 342-394.
  Study of a set of tables used in medieval Cairo. Reprinted in *186.

- *77a. King, D.A. A Double-Argument Table for the Lunar Equation Attributed to Ibn Yunus, *Centaurus* 18 (1974), pp. 129-146.
  Reprinted in *186. Computation of the position of the moon according to the sophisticated Ptolemaic theory.

See also *201 vols. 24,25.

Abu Nasr ibn `Iraq (Irak-Iran, ca. 950-1030)

- *78 Samsó Moya, J. *Estudios sobre Abu Nasr b. `Ali b. `Iraq.* Madrid, Barcelona: Asociación para la Historia de la Ciencia Española, 1969.
  Abu Nasr was one of the astronomers credited with the sine-theorem in spherical trigonometry. This book is a study of his trigonometry and includes a Spanish translation of several of his works.

See also *38.

Kushyar ibn Labban (Iran, ca. 960-1010)

- *79. Kushyar ibn Labban. *Principles of Hindu Reckoning,* ed. Levey, M., Petruck, M. Madison and Milwaukee: University of Wisconsin Press, 1965.
  English translation and facsimile of an Arabic manuscript of a treatise on arithmetic, which also exists in a Hebrew version.

- *79a Berggren, J.L. Spherical Trigonometry in Kushyar ibn Labban's Jami` Zij, in *181, pp. 15-33.

- *79b. Van Brummelen, G. Mathematical Methods in the Tables of Planetary Motion in Kushyar ibn Labban's Jami` Zij. *Historia Mathematica* 25 (1998), 265-280.

Al-Karaji (Iran, ca. 970-1030)

- *80. Sesiano, J. Le traitement des équations indeterminées dans le Badi` fi'l-hisab d' Abu Bakr al-Karaji. *Archive for History of Exact Sciences* 17 (1977), pp. 297-379.
  On indeterminate equations in the work of al-Karaji.

- *81. Woepcke, F. *Extrait du Fakhri, traité d'algèbre par Abou Bekr précédé d'un mémoire sur l'algèbre indeterminée chez les Arabes.* Paris, 1853.
  French translation plus a few extracts in Arabic. Most of these problems were taken from Diophantus' Arithmetica, see *36. Reprinted in *197, also separately: Hildesheim: Olms, 1982.

Ibn al-Haytham (Irak-Egypt, ca. 965-1040)

- *82. Suter, H. Die Abhandlung über die Ausmessung des Paraboloides von ... b. el-Haitham, *Bibliotheca Mathematica, dritte Folge,* 12 (1911-12), pp. 289-332.
  German translation with commentary of Ibn al-Haytham's treatise on the measurement of paraboloids of revolution. Reprinted in *198.

- *83. Suter, H. Die Kreisquadratur des Ibn al-Haitam. *Zeitschrift für Mathematik und Physik, historisch-litterarische Abteilung* 44 (1899), pp. 33-47.
  Arabic text and German translation of a treatise by Ibn al-Haytham on the quadrature of the circle. Reprinted in *198.

- *84. Rashed, R. Ibn al-Haytham et la mesure du paraboloïde. *Journal for the History of Arabic Science* 5 (1981), pp. 262-291.
  Arabic text with French translation of Ibn al-Haytham's treatise on the measurement of paraboloids of revolution.

- *84a Rashed, R. Ibn al-Haytham et les nombres parfaits, *Historia Mathematica* 16 (1989), 343-352.
  Reprinted in *192. Argues that Ibn al-Haytham, in his treatise on analysis and synthesis, stated and tried to prove the theorem of Euler to the effect that every even perfect number is of the form given by Euclid. See for a different interpretation the review in Mathematical Reviews 91d:01002.

- *85. Rebstock, U. Der Mu`amalat-Traktat des Ibn al-Haytham. *Zeitschrift für Geschichte der arabisch-islamischen Wissenschaften* 10 (1995-6), pp. 61-121.

Edition with German translation of Ibn al-Haytham's treatise on practical arithmetic.

- *86. Dallal, A. Ibn al-Haytham's Universal Solution for Finding the Direction of the Qibla by Calculation. *Arabic Sciences and Philosophy* 5 (1995), pp. 145-194.
  Text and English translation of a treatise on finding the direction of Mecca.

- *87 Sabra, A.I. *The Optics of Ibn al-Haytham. Books I-III: On Direct Vision.* 2 vols. London: The Warburg Institute, 1989.
  English translation of a fundamental treatise on optics, with much mathematics. A small part of Book V has also been translated in *88.

- *88. Sabra, A.I. Ibn al-Haytham's Lemmas for Solving ``Alhazen's Problem.'' *Archive for History of Exact Sciences* 26 (1982), pp. 299-324.
  English translation of part of Book V of Ibn al-Haytham's Optics. Reprinted in *193. See also *103a and *146a.

- *89. Rashed, R., ed. *Les mathématiques infinitésimales du IXe au XIe siècles. Volume 2: Ibn al-Haytham.* London: Al-Furqan Islamic Heritage Foundation, 1993.
  Includes Arabic texts and French translations of nine treatises by Ibn al-Haytham: on the quadrature of lunes (2), the quadrature of the circle, the measurement of the paraboloid, the measurement of the sphere, isoperimetry, and root extraction (2), and on proposition X:1 of Euclid's *Elements*.

See also *34.

Al-Biruni (Iran-Afghanistan, 973-1048)

- *90. Kennedy, E.S. Al-Biruni's Masudic Canon, *Al-Abhath* 24 (1971), pp. 59-81. Reprinted in *180.
  A detailed listing of the contents of Al-Biruni's most important astronomical treatise, *al-Qanun al-Mas`udi*. This work has not yet been translated into a Western language.

- *91. Schoy, C. *Die trigonometrischen Lehren des persischen Astronomen ... Al-Biruni.* Hannover: Heinz Lafaire, 1927.
  German translation of one chapter of al-Qanun al-Mas`udi. Reprinted in *199.

- *92. Al-Biruni, Muhammad b. Ahmad, Abu Rayhan. *The Determination of the Coordinates of Positions for the Correction of Distances between Cities. A translation from the Arabic of al-Biruni's Kitab Tahdid Nihayat al-Amakin Li-tashih Masafat al-Masakin by Jamil Ali.* Beirut: The American University of Beirut, 1967.
  Translation of an important medieval work on mathematical geography. There is also a commentary in *92a.

- *92a Kennedy, E. S. *A Commentary upon Biruni's Kitab tahdid [nihayat] al-amakin, an 11th Century Treatise on Mathematical Geography.* Beirut: The American University of Beirut,

1973.
See *92.

- *93. Al-Biruni, Muhammad b. Ahmad, Abu Rayhan. *The Exhaustive Treatise on Shadows. Translation and commentary by E.S. Kennedy,* 2 vols. Aleppo: University of Aleppo, 1976.
The English translation of al-Biruni's text on sundials (Volume I) and extensive commentaries (Volume II).

- *93a. Debarnot, M.-T. *al-Biruni, Kitab maqalid `ilm al-hay'a (Les clefs de l'astronomie). La trigonométrie sphérique chez les Arabes de l'est à la fin du Xe siècle.* Damascus: Institut Français de Damas, 1985.
Arabic text and French translation of al-Biruni's *Maqalid* with extensive commentary on the history of spherical trigonometry.

- *94. Suter, H. Das Buch der Auffindung der Sehnen im Kreise von ... al-Biruni. *Bibliotheca Mathematica, dritte Folge,* 11 (1910), pp. 11-78.
Translation of Al-Biruni's treatise on chords, dealing with trigonometry. Reprinted in *198.

- *95. Berggren, J.L. Al-Biruni on Plane Maps of the Sphere. *Journal for History of Arabic Science* 6 (1982), pp. 47-112.
Translation of Al-Biruni`s treatise *Maqala fi tastih al-suwar wa-tabtikh al kuwar*, with facsimile of an Arabic manuscript.
See also the translation of the preface of the same text in *95a.

- *95a. Richter-Bernburg, L. Al-Biruni's Maqala fi tastih al-suwar wa-tabtikh al kuwar: A Translation of the Preface with Notes and Commentary. *Journal for History of Arabic Science* 6 (1982), pp. 113-122.

- *96. Saffouri, M., Ifram, A. *Al-Biruni on Transits. A Study of an Arabic Treatise Entitled Tamhid al-mustaqarr li-tahqiq ma`na al-mamarr. Translated by M. Saffouri and A. Ifram. With a Commentary by E.S. Kennedy.* Beirut: American University, 1959.
The treatise deals with mathematical astronomy and astrology.

- *97. Al-Biruni. *In den Garten der Wissenschaft. Ausgewählte Texte ... übersetzt und erläutert von G. Strohmaier.* Leipzig: Verlag Philipp Reclam junior, 1988.
Anthology of 98 selected passages from the scientific work of al-Biruni.

See also *7, *201 vols. 32-36.

Ibn Mu`adh al-Jayyani (Spain, ca. 1030-1090)

- *98. Villuendas, M. V. *La trigonometria en el siglo XI. Estudio de la obra de El Kitab mayhulat.* Barcelona: Instituto de Historia de la Ciencia de la Real Academia de Buenas Letras, 1979.
Arabic text and Spanish translation, plus commentary of a treatise in which Ibn Mu`adh

derives theorems for solving spherical triangles from Menelaos's theorem.

- *99. Plooij, E. B. *Euclid's Conception of Ratio and his Definition of Proportional Magnitudes as Criticized by Arabian Commentators.* Rotterdam: W.J. van Hengel 1950.
  Includes English translation (and facsimile of the Arabic manuscript) of Ibn Mu`ad's commentary to Book V of the *Elements* of Euclid. Reprinted in *201 vol. 19.

Ibn al-Zarqalluh (Azarquiel, al-Zarqali) (Spain, ca. 1030-1090)

- *100. Millás Vallicrosa, J. *Estudios sobre Azarquiel.* Madrid: Escuelas de Estudios Arabes de Madrid y Granada, 1950.
  Still a standard work on Ibn al-Zarqalluh.

- *101. Ibn al-Naqqas al-Zarqalluh, *al-Shakkaziyya. Edición, traducción y estudio por R. Puig.* Barcelona: Instituo ``Millas Vallicrosa'' de Historia de la Ciencia Árabe, 1988.
  Edition of the Arabic text and Spanish translation of Ibn al-Zarqalluh's treatise on the Azafea, his new astrolabe plate for all geographical latitudes.

- *101a. Puig, R.: Al-Zarqalluh's Graphical Method for Finding Lunar Distances. *Centaurus* 32 (1989), pp. 294-309.

- *102. Samsó, J. Trepidation in al-Andalus in the 11th century.
  Published in: *194. Analysis of Ibn al-Zarqalluh's theory.

Items *182 and *194 contain various other papers on Ibn al-Zarqalluh.

Al-Mu'taman ibn Hud (Spain, ca. 1080)

- *103. Hogendijk, J. The Geometrical Parts of the Istikmal of Yusuf al-Mu'taman ibn Hud: An Analytical Table of Contents. *Archives Internationales d'Histoire des Sciences* 41 (1991), pp. 207-281. \rv On a mathematical encyclopaedia, whose author was the king of Saragossa in the period 1081-1085.\erv

- *103a. Hogendijk, J. Al-Mu'taman's Simplified Lemmas for Solving Alhazen's problem.
  Published in *182 vol. 1 pp. 59-101. This fragment shows the originality of Al-Mu'taman, the king of Saragossa, as a geometer. See *88.

See also *53.

al-Khayyam, `Umar (Iran, ca. 1050-1130)

- *104. Woepcke, F. *L'algèbre d'Omar Alkhayyami.* Paris: B. Duprat, 1851.
  Edition and French translation of `Umar Khayyam's *Algebra*, with translations of related texts by 10th century authors. Still useful.

- *105. R. Rashed and A. Djebbar, eds., *L'oeuvre algèbrique d'al-Khayyam.* Aleppo: IHAS, 1981.
  Includes the famous *Algebra* of al-Khayyam and a short algebraic treatise by al-Khayyam which was unknown to Woepcke. See also *178.

- *106 Kasir, D. *The Algebra of Omar Khayyam.* New York: Columbia University, 1931.
  English translation of the *Algebra* of al-Khayyam.

al-Tusi, Sharaf al-Din (Iran, ca. 1150-1215)

- *107. al-Tusi, Sharaf al-Din. *Oeuvres Mathématiques: Algèbre et Géométrie au XIIe siècle.*, ed. R. Rashed, 2 vols. Paris: Les Belles Lettres. 1986.
  Includes Arabic text and French translation of the Algebra of Sharaf al-Din, in which he "solved" cubic equations by means of conic sections.

- *107a. Hogendijk, Jan P. Sharaf al-Din al-Tusi on the Number of Positive Roots of Cubic Equations. *Historia Mathematica* 16 (1989), pp. 69-85.
  English summary and analysis of the *Algebra* of Sharaf al-Din.

See also *142.

Ibn Mun`im (Maghreb, ca. 1210)

- *108. Djebbar, A. *L'analyse combinatoire dans l'enseignement d'Ibn Mun`im (XIIe-XIIIe siècles).* Université de Paris-Sud: Départment de Mathématique, 1982.
  An important contribution to a previously unexplored aspect of Western Islamic mathematics.

al-Marrakushi (Morocco, 13th century)

- *109. Sedillot, J.-J., Sedillot, L.-A. *Traité des instruments astronomiques des Arabes.* Paris: Imprimerie Royale, 1834.
  Translation of the *Jami' al-mabadi' wa-l-ghayat fi `ilm al-miqat* (all beginnings and ends in the science of timekeeping) of al-Marrakushi. This text, which contains much information on arithmetic, trigonometry and sundials, was reprinted in 1984 by the Institute for the History of Arabic-Islamic Sciences in Frankfurt.

al-Tusi, Nasir al-Din (Iran, 1201-1274)

- *110. Nasir al-Din al-Tusi. *Traité du quadrilatère.* ed. A. Carathéodory. Constantinople, 1891.
  Text and French translation of Nasir al-Din's book on Menelaos's theorem. Contains many historical remarks. On the history of this theorem see also *152.

- *111. Ragep, J. *Nasir al-Din al-Tusi's Memoir on Astronomy.* New York: Springer, 1993.

Edition with English translation, commentaries and glossaries, of a fundamental introductory text on the structure of the universe.

Ibn Baso, Abu `Ali al-Husayn (Spain, ca. 1250-1320)

- *112. Ibn Baso, Abu `Ali al- Husayn. *Risalat al- Safiha al-Yami`a li-Yami` al-'Urud - Tratado sobre la lámina general para todas las latitudes,* ed. E. Calvo. Madrid: Instituto de Cooperación con el Mundo Árabe, 1993.
  Edition of the Arabic text and Spanish translation of a treatise by Ibn Baso, the time-keeper of the mosque of Granada in the late 13th century, on a new kind of astrolabe plate for all geographical latitudes.

Ibn al-Banna' (Maghreb, ca. 1300)

- *113. Ibn al-Banna', Ahmad b. Muhammad. *Talkhis a`mal al-hisab.* Edited by M. Souissi. Tunis: Université de Tunis, 1969.
  Text of a treatise on arithmetic with French translation and commentary.

Al-Farisi, Kamal al-Din (Iran, ca. 1300)

- *113a. Agargün, A. G. and Fletcher, C.R. Al-Farisi and the Fundamental Theorem of Arithmetic. *Historia Mathematica* 21 (1994), pp. 162-173.
  English translation and analysis of a treatise on divisibility of numbers.

Al-Khalili, Shams al-Din (Syria, ca. 1350-1400)

- *114. King, D. A. Al-Khalili's Qibla-Table. *Journal of Near Eastern Studies* 34 (1975), pp. 81-122.
  Study of a set of tables for determining the direction of Mecca compiled by the astronomer Al-Khalili of Damascus.

- *115. King, D. A. Al-Khalili's Auxiliary Tables for Solving Problems of Spherical Astronomy. *Journal for the History of Astronomy* 4 (1973), pp. 99-110.

- *116. Van Brummelen, G. The Numerical Structure of Al-Khalili's Auxiliary Tables. *Physis* 28 (1991), pp. 667-697.
  Discusses mathematical methodology for analyzing tables.

Ibn al-Shatir (1306-1375)

- *117. Kennedy, E. S. and Ghanem, I. *The Life and Work of Ibn al-Shatir, an Arab Astronomer of the Fourteenth Century.* Aleppo: University of Aleppo, 1976.
  This volume contains biographical and bibliographical material on Ibn al-Shatir, as well as reprints of papers on the works of this astronomer, who is known for his non-Ptolemaic

planetary and lunar theory. See also *160a.

Al-Kashi, Ghiyath al-Din Jamshid ibn Mas`ud (Iran, Uzbekistan, ca. 1420)

- *118. Luckey, P. *Die Rechenkunst bei Gamsid b. Mas`ud al-Kasi mit Rückblicken auf die ältere Geschichte des Rechnens.* (Abhandlungen für dei Kunde des Morgenlandes, 31.) Wiesbaden: F. Steiner, 1951, 143 pp.
  Analysis of part of the Key of Arithmetic (Miftah al-Hisab) of al-Kashi. This fundamental work has not yet been translated into a Western language.

- *118a. Aaboe, A. Al-Kashi's Iteration Method for the Determination of Sin 1, *Scripta Mathematica* 20 (1954), 24-29.
  Discusses a method of al-Kashi on the basis of reports by commentators, see *122c. Al-Kashi's own treatise on the subject is lost.

- *119. Luckey, P. *Der Lehrbrief über den Kreisumfang von Gamshid b. Mas'ud al-Kashi.* Translated by P. Luckey, Edited by A. Siggel. Berlin: Akademie Verlag, 1953.
  Arabic text and German translation of the ``Treatise on the Circumference'' of al-Kashi with commentary. Al-Kashi determines pi to 16 significant decimal digits.

- *120. Kennedy, E.S. Spherical Astronomy in Kashi's Khaqani Zij. *Zeitschrift für Geschichte der arabisch-islamischen Wissenschaften,* 2 (1985), pp. 1-46.

- *121. Dold-Samplonius, Y. Practical Arabic Mathematics: Measuring the Muqarnas by al-Kashi. *Centaurus* 35 (1992), pp. 193-242.
  Includes edition and English translation of the relevant chapter of the Key of Arithmetic, related to architecture.

- *121a. Dold-Samplonius, Yvonne, *Video: Qubba for Al-Kashi*. Heidelberg: university of Heidelberg, 1995
  This video is distributed by the American Mathematical Society. Computer-generated construction of a mausoleum with cupola (qubba) for al-Kashi, according to his own mathematical methods. Explanations are provided in a voice over the videotape and in an accompanying booklet.

- *122. Kennedy, E.S. A Letter of Jamshid al-Kashi to His Father: Scientific Research at a Fifteenth Century Court. *Orientalia* 29 (1960), pp. 191-213.
  Reprinted in *180. Translation of a letter which offers interesting details on life and work of mathematicians and astronomers in the court of the astronomer-king Ulugh Beg in 15th-century Samarkand. See also *122a and *122b.

- *122a. Sayili, A. *Ghiyath al-Din al-Kashi's Letter on Ulugh Bey and the Scientific Activity in Samarqand.* Ankara: Türk Tarih Kurumu Basimevi, 1960
  Persian text with Turkish and English translation of the same letter as in *122. See also *122b.

- *122b. Bagheri, M. A Newly Found Letter of Al-Kashi on Scientific Life in Samarkand. *Historia Mathematica* 24 (1997), pp. 241-256.
  English translation of another letter of al-Kashi to his father on scientific life in Samarkand, different from the letter in *122 and *122a.

Ulugh Beg (Iran, Uzbekistan, 1394-1449)

- *122c. Sédillot, L.P.E.A. *Prolégomènes des tables astronomiques d'Oloug-Beg.* Paris: Typographie de Firmin Didot Frères, 1853.
  Persian text and French translation of the long introductory chapters to the astronomical tables produced at the court of king Ulugh Begh of Samarkand, who was a mathematician and astronomer himself. Includes passages on the determination of the sine of 1 degree by means of a cubic equation and iteration, see also *118a.

Al-Qalasadi (Maghreb, 15th century)

- *123. Woepcke, F. Traduction du traité d'arithmétique d'Aboul Haçan Ali Ben Mohammad Alkalçadi. *Atti dell'Accademia Pontificia dei Nuovi Lincei* 12 (1858-9), pp. 230-275.
  French translation of a Western Arabic treatise on practical computation. Reprinted in *197.

Studies on specific topics

Transmission of Mathematics

- *124. Rosenthal, F. *The Classical Heritage in Islam.* Berkeley and Los Angeles: University of California Press, 1973.
  On the impact of Greek science in general on Islamic civilization.

- *125. Sabra, A.I. The Appropriation and Subsequent Naturalization of Greek Science in Medieval Islam: A Preliminary Statement. *History of Science* 25 (1987), pp. 223-243.
  Also on the problem of decline. Reprinted in *193.

- *126. Berggren, J.L. Islamic Acquisition of the Foreign Sciences: a Cultural Perspective. In: *184, pp. 263-284.

- *127. Høyrup, J. The Formation of ``Islamic Mathematics'': Sources and Conditions. *Science in Context* 1 (1987), pp. 281-329.

- *128. Høyrup, J. Al-Khwarizmi, Ibn Turk and the Liber Mensurationum: On the Origins of Islamic Algebra. *Erdem* 5 (1986), pp. 445-484.

- *129. Hogendijk, J. Transmission, Transformation and Originality: the Relation of Arabic to Greek geometry. In: *184, pp. 31-64.

- *130. Pingree, David. The Greek Influence on Early Islamic Mathematical Astronomy. *Journal of the American Oriental Society* 93 (1973), pp. 32-44.

See also *17, *29 - *39, *69, *147, *149, *150. *184, *185.

Mathematics in Specific Areas of the Islamic World

- *131. Djebbar, A. Mathematics in Medieval Maghreb. *AMUCHMA Newsletter* 15 (1995), pp. 3-42.
  Fundamental paper on medieval mathematics in the Western Islamic world. Available on internet at www.math.buffalo.edu/mad/AMU/amu_chma_15.html.

- *132. Djebbar, A. *Enseignement et recherche mathématiques dans le Maghreb des XIIIe-XIVe siècles.* Université de Paris-Sud: Départment de Mathématique, 1980.

- *133. Kennedy, Edward S. The Exact Sciences in Abbasid Iran, The Exact Sciences in Iran under the Saljuqs and Mongols, and The Exact Sciences in Timurid Iran, all chapters in *The Cambridge History of Iran*, 8 vols. Cambridge: Cambridge University Press, 1968.

- *133a De Young, G. Euclidean Geometry in the Mathematical Tradition of Islamic India, *Historia Mathematica* 22 (1995), 138-153.
  On mathematics education in Islamic India, with emphasis on the transmission of Euclid's *Elements* and Arabic and Persian commentaries.

- *134. King, D. A. The Astronomy of the Mamluks. *Isis* 74 (1983), pp. 531-555.
  Surveys the achievements in mathematical astronomy in 13th- to 16th-century Egypt and Syria. Reprinted in *186.

- *134a. Samso, J. and Vernet, J. The Development of Arabic Science in Andalusia.
  published in: *23 (vol. 1) pp. 243-275.

For mathematics in Islamic Spain see also *4, *15, *182, *194, for the Maghreb see also *20, *108, *135.

Arithmetic

- *135. Djebbar, A. Le traitement des fractions dans la tradition mathématique arabe du Maghreb. in: Benoit, P., Chemla, K., Ritter, J., eds., *Histoire de fractions, fractions d'histoire,* Basel: Birkhäuser, 1992. pp. 223-245.

- *136. Luckey, P. Die Ausziehung der n-ten worzel und der binomische Lehrsatz in der islamischen Mathematik, *Mathematische Annalen* 120 (1948), pp. 217-274.
  Survey article.

- *137. Rebstock, U. *Rechnen im islamischen Orient: die literarischen Spuren der praktischen Rechenkunst.* Darmstadt: Wissenschaftliche Buchgesellschaft. 1992.
  Survey of practical arithmetic in Islamic civilization.

- *138. Rashed, R. L'extraction de la racine n-ième et l'invention des fractions décimales (XIe-XIIIe siècles). *Archive for History of Exact Sciences* 18 (1978), pp. 191-243.
  Reprinted in *190 and *191.

- *139. Rashed, R. L'induction mathématique: al-Karaji, as-Samaw`al, *Archive for History of Exact Sciences* 9 (1972), pp. 1-21.
  On binomial coefficients in a lost work of al-Karaji. Reprinted in *190 and *191.

See also *41, *66, *79, *85, *113, *118, *123.

Irrational magnitudes

- *140. Matvievskaya, G.P. The Theory of Quadratic Irrationals in Medieval Oriental Mathematics.
  Published in *181, pp. 253-277. Survey article, on medieval developments of Euclid's theory of irrational magnitudes in Book X of the Elements.

See also *39, *99, *136, and see the section on Algebra.

Algebra

- *141 Anbouba, A. L'Algèbre Arabe aux IXe et Xe siècles. Aperçu général. *Journal for the History of Arabic Science* 2 (1978), pp. 66-100.

- *142. Rashed, R. Résolution des equations numériques et algèbre: Sharaf al-Din al- Tusi, Viète. *Archive for History of Exact Sciences* 12 (1974), pp. 244-290.
  Argues that Viète's methods for the numerical solution of equations were influenced by Islamic predecessors. Reprinted in *190 and *191.

- *143 Ruska, J. *Zur ältesten arabischen Algebra und Rechenkunst.* Heidelberg: Carl Winter's Universitätsbuchhandlung, 1917.
  Terminological study of Islamic algebra. With index. Reprinted in *201 vol. 5.

See also *40, *45, *52, *56, *57, *81, *104, *105, *106, *107, *107a.

Number theory, Indeterminate Equations, Magic Squares

- *144. Naini, Alireza Djafari. *Geschichte der Zahlentheorie im Orient.* Braunschweig: Klose and Co. 1982
  The emphasis is on amicable and perfect numbers.

- *145. Sesiano, J. Herstellungsverfahren magischer Quadrate aus islamischer Zeit (I, II, II', III) *Sudhoffs Archiv* 64 (1980), pp. 187-96, 65 (1981), pp. 251-65, 71 (1987), pp. 78-89, 79 (1995), pp. 193-226.
  On a variety of Arabic treatises on methods of construction of magic squares.

- *146. Sesiano, J. *Un traité médiéval sur les carrés magiques. De l'arrangement harmonieux des nombres.* Lausanne: Presses polytechniques et universitaires Romandes, 1996.
  Arabic text and French translation of an anonymous treatise on the construction of magic squares.

See also *36, *37, *59, *60, *62, *63, *65a, *65b, *73b, *80, *84a, *113a.

Geometry

- *146a. Bode, P. Die Alhazensche Spiegel-Aufgabe in ihrer historischen Entwicklung nebst einer analytischen Lösung des verallgemeinerten Problems. *Jahresberichte des Physikalischen Vereins zu Frankfurt am Main* (1891-1892), pp. 63-107.
  Discusses the ``problem of Alhazen'' and its mathematical context in the Optics of Ibn al-Haytham. See *88, and see *103a for some corrections to Bode's article.

- *147. Hogendijk, J. Greek and Arabic Constructions of the Regular Heptagon. *Archive for History of Exact Sciences* 30 (1984), pp. 197-330.
  With editions of treatises on the heptagon by pseudo-Archimedes and al-Sijzi.

- *148. Jaouiche, Kh. *La théorie des parallèles en pays d'Islam.* Paris: Vrin, 1986.
  Includes French translations of all available Arabic texts on the parallel postulate.

- *149. Knorr, W. *Textual Studies in Ancient and Medieval Geometry.* Basel: Birkhäuser 1992.
  Includes editions of Arabic texts on the trisection of the angle and the construction of two mean proportionals. The methods and conclusions of this book are analyzed and in part refuted in a review by J.L. Berggren in *Ancient Philosophy* 12 (1992), pp. 522-528.

- *150. Kunitzsch, P. Letters in Geometrical Diagrams: Greek - Arabic - Latin, *Zeitschrift für Geschichte der arabisch-islamischen Wissenschaften* 7 (1991-2), pp. 1-20.
  With an appendix by E.S. Kennedy on pp. 21-22.

- *151. Rosenfeld, B.A, *A History of non-Euclidean Geometry.* New York: Springer 1988.
  Translated from the Russian by Abe Shenitzer. This book contains a large chapter on Islamic work on the parallel postulate.

See also *30a, *34, *35, *38, *47, *49, *52a, *53, *58, *61, *64, *65, *67, *68, *69, *71 - *76, *82 - *84, *88, *89, *103, *119, *133a, *189, and the section on Trigonometry.

Trigonometry

- *152. Bjørnbo, A. *Thabits Werk über den Transversalensatz (liber de figura sectore) mit Bemerkungen von H. Suter. Herausgegeben und ergänzt durch Untersuchungen über die Entwicklung der muslimischen sphärischen Trigonometrie von H. Bürger und K. Kohl.* Erlangen: Mencke, 1924.
  The edition of (the medieval Latin translation of) Thabit's treatise on the transversal theorem is followed by a survey of the work of many Islamic authors on the theorem of Menelaus and related theorems in spherical trigonometry.

- *153. Debarnot, M.T. Introduction du triangle polaire par Abu Nasr ibn `Iraq. *Journal for the History of Arabic Science* 2 (1978), pp. 126-136.
  On the introduction of the polar triangle in spherical geometry.

- *154. Debarnot, M.T. Trigonometry.
  Published in: *23, vol. 2, pp. 495-538.

- *155. King, D.A. Universal Solutions to Problems of Spherical Astronomy from Mamluk Egypt and Syria, in: Kazemi, F., McChesney, R.D. eds., *A Way Prepared: Essays on Islamic Culture in Honor of Richard Bayly Winder,* New York: New York University Press, 1988, pp. 153-184, reprinted in *188.
  ``Universal'' means: for all localities.

- *156. Lorch, R. Jabir ibn Aflah and the Establishment of Trigonometry in the West.
  Published (only) in: *189 no. VIII.

- *157. Luckey, P. Zur Entstehung der Kugeldreiecksrechnung, *Deutsche Mathematik* 5 (1940), pp. 405-446.
  A fundamental study of the emergence of the concept of angle in a spherical triangle in the 10th century.

See also *38, *78, *79a, *91 - *95, *98, *110, *118a, *120, *180, *189, and see the sections on Timekeeping, Instruments, Mathematical Astronomy and Astrology.

Timekeeping

- *158. King, D. Article: Mizwala, in *Encyclopaedia of Islam, 2nd edition,* 7 pp. 210-211. Leiden: Brill, 1991.
  Survey of sundials and sundial theory. Reprinted in *188.

- *159. King, D. Article: Mikat, in *Encyclopaedia of Islam, 2nd edition,* 7 pp. 27-32. Leiden: Brill. 1990.
  Survey of timekeeping methods in the medieval and modern Islamic world. Reprinted in *188.

- *160. Schoy, C. Die Gnomonik der Araber. In: E. von Basserman-Jordan, *Die Geschichte der*

Zeitmessung und der Uhren. Berlin: De Gruyter, 1923.
A study of Islamic sundial theory, reprinted in *199.

- *160a. Janin, L. Le Cadran Solaire de la Mosquée Umayyade à Damas, *Centaurus* 16 (1972), pp. 285-298.
  Drawings of an elaborate 19-th century horizontal sundial in the Omayyad Mosque in Damascus, which is a copy of the sundial of Ibn al-Shatir (14th century). Reprinted in *117.

See also *43, *50, *51, *77, *93, *180, *182, *187, *189.

Interpolation, tables, analysis of tables

- *161. Kennedy, Edward S. A Survey of Islamic Astronomical Tables. *Transactions of the American Philosophical Society, New Series* 46 (ii) (1956), pp. 121-177.
  Introduces the Arabic *zijes* (= astronomical handbooks with tables), listing the known ones, and gives details of twelve of them. A basic reference work, in which the author bases his conclusions upon the study of unedited Arabic and Persian manuscripts. Reprint: Philadelphia: American Philosophical Society, 1989.

- *162. King, D. On the Astronomical Tables of the Islamic Middle Ages, *Studia Copernicana*, 13 (1975), pp. 37-56.
  Survey article. Reprinted in *186.

- *163. Hamadanizadeh, J. A Survey of Medieval Islamic Interpolation Schemes.
  Published in *181, pp. 143-152.

- *164. Rashed, R. Al-Samaw`al, Al-Biruni et Brahmagupta: Les méthodes d'interpolation. *Arabic Sciences and Philosophy* 1 (1991), pp. 101-160.
  Includes Arabic text and French translation of a passage from a work by al-Samaw`al, which contains information on a lost work by al-Biruni in which the latter described non-linear interpolation methods by Brahmagupta. Reprinted in *192.

- *165. Mielgo, H. A Method of Analysis for Mean Motion Astronomical Tables.
  Published in: *182, pp. 159-179.

- *166. Van Dalen, B. A Statistical Method for Recovering Unknown Parameters from Medieval Astronomical Tables. *Centaurus* 32 (1989), pp. 85-145. [150,1400]
  With applications to the solar equation tables in the *Shamil Zij* (13th century) and an oblique ascension table in the *Sanjufini Zij* (14th century).

See also *19, *42, *44, *55, *77, *79b, *180, *181, *186, and the section on Astronomy.

Cultural context; Islamic Aspects

- *167. King, D. Science in the Service of Religion: the Case of Islam, *Impact of Science on Society* 159 (1990), Paris: Unesco.
  Very accessible survey. Reprinted in *188.

- *168. King, D. Article Kibla, in *Encyclopaedia of Islam, 2nd edition,* Leiden: Brill, 1979, vol. 5, pp. 83-88.
  Introduction to medieval methods for finding the qibla (or direction of Mecca) for prayer. Reprinted in *188.

- *169 King, D. The Earliest Islamic Mathematical Methods and Tables for Finding the Direction of Mecca, *Zeitschrift für Geschichte der arabisch-islamischen Wissenschaften* 3 (1986), pp. 82-149.
  Reprinted in *188.

- *169a. Sabra, A.I. Situating Arabic Science: Locality versus Essence. *Isis* 87 (1996), pp. 645-670.

Most items in this bibliography on Islamic mathematics involve the cultural or Islamic context to a greater or lesser extent. See especially *7, *24, *24a, *70, *86, *97, *114, *122, *122a, *122b, *125, *126, *133a, *137, *172, *188, *193, and see the section on Mathematics, Art and Architecture.

Mathematical astronomy and astrology

- *170. Saliba, G. Arabic Planetary Theory after the Eleventh Century A.D.
  Published in: *23 vol. 1, pp. 58-127.

- *171. Kennedy, Edward S. The Astrological Houses as Defined by Medieval Islamic Astronomers.
  Published in *182 pp. 535-578. Survey article.

See also *7, *8 vols. 6, 7, *43, *48, *54, *73a, *77a, *90, *96, *100, *101a, *102, *111, *117, *161, *172, *174, *176, *177, *180 - *183, *186 - *189, *194, *196, *201, and see the section on Instruments.

Instruments

- *172. Sayili, A. M. *The Observatory in Islam and its Place in the General History of the Observatory.* Ankara: Turkish Historical Society, Turkish Historical Society Publications, series 7, no. 38, 1960.
  The standard source on the subject.

- *173. Schmidt, F. *Geschichte der geodätischen Instrumente und Verfahren im Altertum und Mittelalter,* Erlangen, 1929.
  Description of the astronomical and geodetical instruments of antiquity and the middle ages,

in 400 pages with index. Reprinted in *202 vol. 5.

- *174. King, D. The Medieval Yemeni Astrolabe in the Metropolitan Museum of Art in New York City. *Zeitschrift für Geschichte der arabisch-islamischen Wissenschaften* 2 (1985), pp. 99-122.
  A nice example of an astrolabe, with photographs and some explanation of the underlying mathematics. Reprinted in *187.

- *175 King, D. An Analog Computer for Solving Problems of Spherical Astronomy: the shakkaziya quadrant of Jamal al-Din al-Maridini. *Archives Internationales d'Histoire des Sciences* 24 (1974), pp. 219-242.
  Includes a mathematical analysis of the instrument. Reprinted in *187.

- *176. Michel, H. *Traité de l'astrolabe.* Paris: Gauthier-Villars, 1947, viii+202 pp., 24 pls.
  This book explains the use and mathematical theory of astrolabes.

- *177 Schmalzl, P. *Zur Geschichte des Quadranten bei den Arabern.* München: Druck der Salesianischen Offizin, 1929.
  On the history of the quadrant in Islamic mathematics and astronomy. Reprinted in *202 vol. 6.

See also *67, *101, *109, *112, and the sections on Timekeeping and astronomy. For a brief elementary explanation of the astrolabe in English, see North, J. D. The Astrolabe, *Scientific American* 230 (i) (January 1974), pp. 96-106.

Mathematics, art and architecture

- *178. Özdural, A. Omar Khayyam, Mathematicians and Conversazioni with Artisans, *Journal of the Society of Architectural Historians* 54 (1995), pp. 54-71,
  Establishes a connection between a certain triangle constructed by al-Khayyam in a work on algebra (see *105) and mosaic drawings.

- *179. Özdural, A. On interlocking similar or corresponding figures and ornamental patterns of cubic equations. *Muqarnas* 13 (1996), pp. 191-211.
  Partial analysis of a 16th-century Persian manuscript with mosaic drawings, some of which cannot be constructed by means of ruler and compass.

See also *28, *73, *121, *122.

Optics

See *35, *74, *75, *87, *114, *115, *116, *183, *192, *193.

Geography

See *19, *92, *92a, *95.

Reprinted works and collections of articles

- *180. Kennedy, E. S., et al. *Studies in the Islamic Exact Sciences.* Edited by D.A. King and M.-H. Kennedy. Beirut: American University of Beirut Press, 1983.
  Numerous articles by E.S. Kennedy, colleagues, and students are reprinted in this volume.

- *181. King, D. A. and G. Saliba, eds., *From Deferent to Equant: a Volume of Studies in the History of Science in the Ancient and Medieval Near East in Honor of E.S. Kennedy.* New York: The New York Academy of Science, 1987.

- *182. Casulleras, J, Samsó, J., eds., *From Baghdad to Barcelona: Studies in the Islamic Exact Sciences in Honour of Prof. Juan Vernet.* 2 vols. Barcelona: Universitat de Barcelona 1996.

- *183. Wiedemann, E. *Aufsätze zur arabischen Wissenschaftsgeschichte*, 2 vols. Hildesheim: Olms, 1970.
  This is a reprinting, in two volumes, of Wiedemann's articles on Islamic science which originally appeared in the *Sitzungsberichte der phys.-mediz. Sozietät in Erlangen* as *Beiträge zur Geschichte der Naturwissenschaften* (1902-1928). The other papers of Wiedemann were reprinted in *200.

- *184. Ragep, F.J., and S.P. Ragep, eds., *Tradition, Transmission, Transformation. Proceedings of two conferences on pre-modern science held at the University of Oklahoma.* Leiden: Brill, 1996.

- *185. Folkerts, M., ed., *Mathematische Probleme im Mittelalter: Der lateinische und arabische Sprachbereich.* Wiesbaden: Harrassowitz, 1996.
  Ten articles in this conference proceedings concern Islamic mathematics.

- *186. King, D. *Islamic Mathematical Astronomy.* Aldershot: Variorum, 1985, 2nd edition 1993.
  Reprints of 18 articles, with index.

- *187. King, D. *Islamic Astronomical Instruments.* Aldershot: Variorum 1986.
  Reprints of 22 articles, with index.

- *188. King, D. *Astronomy in the Service of Islam.* Aldershot: Variorum. 1985.
  Reprints of 14 articles, with index.

- *189. Lorch, R. *Arabic Mathematical Sciences: Instruments, Texts, Transmission.* Aldershot: Variorum, 1995.
  Reprints of 18 articles, with index.

- *190. Rashed, R. *Entre arithmétique et algèbre. Recherches sur l'histoire des mathématiques Arabes.* Paris: Les belles lettres, 1984.
  Reprints of articles in the period 1970-1984. See *191.

- *191. Rashed, R. *The development of Arabic mathematics: between arithmetic and algebra.* Dordrecht: Kluwer. 1994.
  English translation of *190.

- *192. Rashed, R. *Optique et mathématiques. Recherches sur l'histoire de la pensée scientifique en Arabe.* Aldershot: Variorum. 1992.

- *193. Sabra, A.I. *Optics, Astronomy and Logic.* Aldershot: Variorum, 1994.
  Reprints of 17 articles, with index.

- *194. Samso, J. *Islamic Astronomy and Medieval Spain.* Aldershot: Variorum, 1994.
  Reprints of 20 articles, with index.

- *195. von Gotstedter, A., ed., *Ad Radices: Festband zum fünfzigjährigen Bestehen des Instituts für Geschichte der Naturwissenschaften der Johann-Wolfgang Goethe-Universität Frankfurt am Main.* Stuttgart: Franz Steiner Verlag, 1994.
  Some papers are on Islamic mathematics and mathematical astronomy.

- *196. Saliba, G. *A History of Arabic Astronomy: Planetary Theories during the Golden Age of Islam.* New York: New York University Press, 1994.
  Reprints of articles on non-Ptolemaic planetary theories in the later centuries of Islamic astronomy.

Since 1985 the Institute of the History of Arabic-Islamic Sciences in Frankfurt (Germany) has reprinted almost all of the literature on Islamic mathematics published before ca. 1960. These publications are enormously useful for finding obscure articles and books in the field. A list of the most important reprints on Islamic mathematics in Western languages follows. In addition, the Institute is also putting out reprints of Arabic editions and facsimiles of Arabic manuscripts of mathematical and astronomical texts. These will not be mentioned below.

- *197. Woepcke, F. *Études sur des mathématiques arabo-islamiques. Nachdruck von Schriften aus den Jahren 1842-1874.* 2 vols. Frankfurt: Institut für Geschichte der arabisch-islamischen Wissenschaften, 1986.
  The collected works of Franz Woepcke.

- *198. Suter, H. *Beiträge zur Geschichte der Mathematik and Astronomie im Islam. Nachdruck seiner Schriften aus den Jahren 1892-1922,* 2 vols. Frankfurt: Institut für Geschichte der arabisch-islamischen Wissenschaften, 1986.
  The collected works of Heinrich Suter.

- *199. Schoy, C. *Beiträge zur arabisch-islamischen Mathematik und Astronomie. Nachdruck

von Schriften aus den Jahren 1911-1926. 2 vols. Frankfurt: Institut für Geschichte der arabisch-islamischen Wissenschaften, 1988.
The collected works of Carl Schoy.

- *200. Wiedemann, E. *Gesammelte Schriften zur arabisch-islamischen Wissenschaftsgeschichte,* 3 vols., ed. D. Girke. Frankfurt: Institut für Geschichte der arabisch-islamischen Wissenschaften, 1984.
With index. Contains reprints of all papers not included in *183.

- *201. Sezgin, F., ed., *Islamic Mathematics and Astronomy,* Frankfurt: Institut für Geschichte der arabisch-islamischen Wissenschaften, 1997-9.
This is a collection of (mostly) reprints, consisting of 112 volumes to date. Practically all the literature on Islamic mathematics published before 1960 will be reprinted in these volumes. The volumes are compiled thematically, for example vols. 1-4 are about Al-Khwarizmi, vols. 14-20 on Euclid in the Arabic tradition, vols. 21-22 on Tabit ibn Qurra, vol. 23 on Abu Kamil, vols. 24-25 on Ibn Yunis, vols. 32-36 on al-Biruni, etc. Detailed table of contents.

- *202. Sezgin, F., ed., *Arabische Instrumente in orientalistische Studien.* Frankfurt: Institut für Geschichte der arabisch-islamischen Wissenschaften, 1990.
Reprints of articles on Islamic astronomical instruments in Western languages and in Arabic, published between 1801 and 1931, in six volumes.

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