

NEWSLETTER

INTERNATIONAL UNION of the HISTORY and PHILOSOPHY of SCIENCE

**COMMISSION on HISTORY of SCIENCE and TECHNOLOGY in ISLANIC
CIVILIZATION**

No. 2 (1994)

President: S. M. R. Ansari
Physics Dept.
Aligarh Muslim University
Aligarh 202002, India

Vicepresident: E. Ihsanoglu
Turkish Society for History of Science
(TBTk)
P. K. 234, Beşiktaş
80692 Istanbul, Turkey

Past President: E. S. Kennedy
37 Wiggins Street
Princeton, NJ 08540
USA

Secretary: S. Brentjes
170 von Neumann Drive
Princeton, NJ 08540
USA

1. New organisations/networks/groups

2. New journals/series/newsletters

3. Conferences/symposia/meetings in 1994¹

The First National Conference on History of Arabic Mathematics, Ghardaia, Algeria, April 5-7, 1993

The Second National Conference on History of Arabic Mathematics, Tlemcen, Algeria, last week of March 1994

International Symposium on Science and technology in Turkish and Islamic World, Istanbul, Turkey, June 3-5, 1994

Les sciences hors d'occident au XXe siècle. Paris, UNESCO, September 19-23, 1994

*International Conference on Science and Technology, Istanbul, Turkey, October 28-30, 1994
(in cooperation with the Japanese-Dutch Institute, Tokyo, Japan and Leiden University, The Netherlands;
Third Meeting in a series called "The Transfer of Science and Technology between Europe and Asia since Vasco da Gama")*

Zeuthen-Heiberg Conference, Magleas Conference Center, Copenhagen, Denmark, August 1-5, 1994

Conference on History of Mathematics in Honor of B. A. Rozenfeld, Pennstate University, USA, August 27-28, 1994

Symposium on "Science and Religion in Islam in Honor of Prof. A. Sayili", Annual Meeting of the History of Science Society, USA, New Orleans, October 1994

4. Forthcoming events

*Sixth International Symposium on History of Arabic Science
Ra's al-Khaimah, United Arab Emirates, December 1996
organized by: Institute for the History of Arabic Science, University of Aleppo, Syria, and the Center for Studies and Texts in Ra's al-Khaimah, United Arab Emirates
address: Prof. Kh. Maghout, Director, Institute for the History of Arabic Science, University of Aleppo, Aleppo, Syria; or: Ms. Amal al-Rifā'i, fax: 963-21-229184*

¹ I added those conferences from 1993, which have not been reported in the first issue.

5. Publications

- Alverny, M-Th. 1994: **La Transmission des Textes Philosophiques et Scientifiques au Moyen Age.** (ed.) Ch. Burnett, Variorum, CS 463
- Berggren, J. L. 1994: **Gūshe-hā'ī az riyāziyāt doure-ye islāmī.** Tehrān
- Hogendijk, J. P. 1994: An Arab Text on the comparison of the five regular polyhedra: "Book XV" of the Revision of the "Elements" by Muhyī al-Dīn al-Maghribī. *ZAIGW* 8, 133-233
- Ibadov, J. Kh. 1993: Mathematical Manuscripts by al-Hubūbī, al-Sajāwandī, and al-'Āmīlī in the Library of the Muslim Religious Board for Central Asia and Kazakhstan. *Studies in History of Medicine and Sciences XII*, 81-88
- Jackson, D. E. P.: **Pappus of Alexandria: The Introduction to Mechanics, with Arabic Version.** to appear: Springer 1995
- Jackson, D. E. P.: **Arabic Scholarship in the Abbasid Period.** to appear: Edingurgh University Press 1995
- King, D. 1993: L'astronomie en Syrie à l'époque islamique. in: Cluzan, S., E. Delpont, and J. Mouliérac (eds.): **Syrie, Mémoire et Civilization.** Paris, Flammarion (Institut du Monde Arabe), pp. 386-395; and: Instruments astronomiques syriens. pp. 432-443; bibliographie: pp. 485-487
- King, D. 1994: Astronomical Instruments between East and West. in: Kühnel, H. (ed.): **Kommunikation zwischen Orient und Okzident.** *Sitzungsberichte der Österreichischen Akademie der Wissenschaften, Phil.-Hist. Klasse*, vol. 619, Veröffentlichungen des Instituts für Realienskunde des Mittelalters und der frühen Neuzeit, vol. 16, Vienna, Österreichische Akademie der Wissenschaften, pp. 143-198
- King, D. 1994: **Astronomy in the Service of Islam.** Variorum, CS 416
- Mathur, M. N. 1993: Risālah dar 'Ilm-i Hay'at-i Jadīd - A 19th Century Persian Treatise on Modern Astronomy. *Studies in History of Medicine and Science XII*, 89-96
- Rosenfeld, B. A. 1993: Tashkent Manuscripts on Mathematical Atomism. *Studies in History of Medicine and Science XII*, 97-102
- Sabra, A. H. 1994: **Optics, Astronomy, and Logic.** Variorum, CS 444
- Samsó, J. 1994: **Islamic Astronomy and Medieval Spain.** Variorum, CS 428
- Tihon, A. 1994: **Etudes d'Astronomie Byzantine.** Variorum, CS 454
- Tolmacheva, M. 1994: An Unknown Manuscript of the *Kitāb al-Fawā'id.* *Journal of the American Oriental Society* 114, pp. 259-62
- Varisco, D. 1993: The Agricultural Marker Stars in Yemeni Folklore. *Asian Folklore Studies* 52, 119-142
- Varisco, D. 1993: A Rasulid Agricultural Almanac for A.H. 808/A.D. 1405-6. *New Arabian Studies* 1, 108-123

6. Work in progress

Y. Dold-Samplonius, Mathematical Institute, University of Heidelberg, 69120 Heidelberg, Germany works on a computer film on al-Kāshī. Its title is: *A Mausoleum for al-Kāshī: Constructions of Arches, Vaults, and Domes.*

Her report is:

This movie is based on constructions by the Timurid astronomer and mathematician Ghiyāth al-Dīn al-Kāshī (d. 1429 in Samarkand). In the fourth book of his main work "Key of Arithmetics" [Miftāh al-hisāb] al-Kāshī measures geometrical objects. Starting with the triangle and what is connected with it, continuing after plane figures with the calculation of three-dimensional figures the book ends with chapter nine "Measuring Structures and Buildings". This chapter is subdivided into three sections:

- (1) Measuring the Arch and the Vault.*
- (2) Measuring the Qubba (dome, mausoleum).*
- (3) Measuring the Muqarnas (stalactite vaults).*

These structures cover, together with the common solids discussed earlier in the book, all of Islamic architecture.

Al-Kāshī writes for practical purposes, according to his remark at the beginning of the chapter: "The specialists merely spoke about this for the arch and the vault and besides that it was not thought necessary. But I present it among the necessities together with the rest, because it is more often required in measuring buildings than in the rest."

His practical aim is to calculate the surfaces and the volumes of the structures mentioned above. To this purpose he indicates the geometrical constructions of these structures which are very intelligent approximations.

The aim of this movie is to show how near to reality these approximations are. Hence we executed these constructions on the computer: we first drew the two-dimensional constructions, which were then made them three-dimensional, i. e. by giving depth to the façade of the arch and thus showing the arch, or by turning the façade around its axis, which originates a dome (qubba). With the elements thus obtained we constructed a qubba (mausoleum) in honor of al-Kāshī near the observatory where al-Kāshī died in 1429. To complete the picture we also made an elementary reconstruction of the observatory, using only the established facts.

St. Leder, Martin-Luther-University, Germany, works on "Scholars, laymen, and schools in medieval Damascus: a register drawn from contemporary documents" in cooperation with the Syrian Arab Academy

J. Ragep and St. Livesey, University of Oklahoma, Norman, Oklahoma, USA prepare a volume of papers delivered at two conferences in 1992 and 1993 in Norman about "Tradition, Transmission and Transformation" to appear in 1995 at Brill, Leiden. Planned title: **Tradition, Transmission, Transformation: Proceedings of Two Conferences on Premodern Science Held at the University of Oklahoma. March 6-7, 1992 devoted to the Transmission and Transformation of Early Mathematics; February 25-27, 1993 dedicated to A. I. Sabra's Ideas on the Transmission and Transformation of Science.** (eds). Ragep, F. J. and St. Livesey with the assistance of S. P. Ragep

A. I. Sabra, Department of History of Science, Harvard University, Cambridge, Mass., USA prepares for publication the edition and English translation of Ibn al-Haytham's Optics, Bks IV-VIII, the Arabic for Bks IV

and V are planned to appear separately.

S. R. Sarma, Department of Sanskrit, Aligarh Muslim University, Aligarh, India prepares a catalogue on "*Indian Astronomical and Time-Measuring Instruments*". A description can be found in *Science and Empire*, newsletter n 6 of NISTADS (CSIR), pp. 2f.

7. Institutions

The *Institute of Microfilmed Hebrew Manuscripts*, a department of the Jewish National and University Library, Jerusalem, is charged with filming all extant Hebrew manuscripts. Our collections now number over 55,000 items; and when projects now under way to film collections housed in libraries in the former Soviet Union are completed (hopefully in about two years' time), we will have on film just about all of the world's public libraries, and a good part of the private collections known to exist. The great majority of the films are of manuscripts in the Hebrew language, but several thousand items are in Arabic, written out in Hebrew script; and there are smaller numbers of texts in Persian, Tartar, Spanish, and other languages, again written out in Hebrew script.

Very many of these items are of interest to people working on the history of science in Islamic civilization. We have many hundred of items that are either transcriptions into the Hebrew language, or translations into the Hebrew language, or Hebrew treatises otherwise relating to medicine, astronomy, and other sciences as these developed in Islamic civilization.

Much of my own research comes directly out of my full-time work cataloguing these materials at the Institute. Forthcoming publications of general and/or bibliographic interest include:

"*Some New Medical Manuscripts from Moscow*", to appear in the next issue of *Koroth*;

"*Transcriptions from the Arabic Language into the Hebrew Alphabet: An Underappreciated Mode of Transmission*", to appear in a volume of essays honoring Professor A. I. Sabra, edited by J. Ragep;

and a preliminary relisting of Arabic Writings in Hebrew Script, to appear in a forthcoming issue of *Arabic Science and Philosophy*.

I would be pleased to answer all inquiries, either by regular mail to me c/o the Institute, or by electronic mail at this address: richler@hujivms.

Tzvi Langermann

The *Research Faculty of History and Philosophy of Science* is one of seven divisions of the **Institute for Humanities and Cultural Studies**, the new name for the **Cultural Studies and Research Institute (CSRI)** in Tehran. Founded in Spring of 1992, it is currently housed together with the *Research Faculty of Philosophy and Religions* in the old buildings of the Academy of Philosophy in Tehran under the directorship of Dr. Abdol-Karim Soroush. The research conducted by the members of this faculty, fall under three divisions: *History of science*, *Philosophy of natural sciences*, and *Philosophy of social sciences*, all to be published by the institute's own publishing house.

Of interest to the readers of this newsletter is the forthcoming publication of a supplement to the third volume of the *Annotated Bibliography of Islamic Science on Mathematical Sciences* (by S. H. Nasr with the collaboration of William Chittick), published together with the first volumes by the same publishing house (vol. 1-2, in 1978, and vol. 3, in 1991). The supplement which has been my own research project since last

year, will include more than 900 sources published after 1970, the last year covered by the third volume, together with the listing of important reviews, and it is planned to be published with a long historical introduction in English in the course of the present academic year.

Another development which will be of interest to the historians of Islamic science in particular is the planned publication of critical editions or facsimiles of texts in Arabic and Persian - primarily selected from libraries throughout Iran. Regular issues of the Institute's periodical publication, are to be devoted to the history and philosophy of science, with the intention of containing texts of important manuscripts, including unique and uncatalogued ones, together with original studies and reviews of important works (with English translations/abstracts).

In addition to this source oriented research, there are a number of projects being carried out in the fields of philosophy of science and epistemology in the context of contemporary issues, the exact nature of which can be obtained from the Institute directly.

Elaheh Kheirandish

Research faculty of History and Philosophy of Science
P.O. Box 14155-4643
Tehran 11336
Iran
Tel: 98-21-6405445; Fax: 98-21-686317

Surveys on History of Science in Turkey by F. Günergun and in India by S. M. R. Ansari can be found in: *Studies in History of Medicine and Science XII (1993) 103-108, 109-130*

9. Research reports

For his research about Greek and Islamic astronomical tables Dr. Benno van Dalen has written a number of user-friendly DOS programs using which various types of problems concerning astronomical tables can be solved. These programs, which come with an on-line help system and/or short manuals can be obtained from the author. Present address:

Dr. Benno van Dalen
Institut für Geschichte der Naturwissenschaften
Postfach 111932
D-60054 Frankfurt am Main
Germany
email: Dalen@em.uni-frankfurt.de

Short Descriptions of the Programs:

1) *CALH (CALendar - Historical version): using this program dates in the calendars most commonly used in medieval astronomical handbooks can be converted. For each specified date the Julian day number, the day of the week, and the corresponding dates in all calendars included are displayed. By pressing a single key, the date can then be changed by a day, week, month, year, decade, or century. The calendars included are the Byzantine, Chinese Uighur, Coptic, Egyptian, Gregorian, Hebrew, Islamic, Julian, and Persian calendars. Of several calendars more than one version is included, for instance the Era Nabonassar and Era Philip of Ptolemy's Egyptian calendar, the astronomical and civil versions of the Islamic calendar,*

and the two possible locations within the year of the five epagomenal days in the Persian calendar (Yazdgird Era).

2) **SCTR** (Sexagesimal Calculator with TRigonometric functions): using this program complicated calculations with sexagesimal numbers can be performed in an easy way. The numbers can be entered purely sexagesimally, in rotations, zodiacal signs and degrees, or in the so-called Greek system, i. e. with a decimal integer part. Besides the standard arithmetical operations, the following functions are included: square root, sine, cosine, tangent, chord, arc sine, arc cosine, arc tangent, and "arc chord". The radius of the base circle for the trigonometric functions can be specified by the user. All functions and operations are calculated to an accuracy of 15 sexagesimal digits. Decimal computations can be performed parallel to the sexagesimal ones and numbers can be converted from one system to the other. SCTR uses the so-called Revers Polish Notation (instead of $1 + 2 =$ one types $1 <enter> 2 +$), which is more flexible in evaluating complicated expressions. There are ten memory positions, which can be labeled with a description and are automatically saved on disk to be used again on a later occasion.

3) **TA** (Table Analysis): using this program ancient and medieval astronomical tables of most of the types occurring in Ptolemy's "Almagest" and in medieval astronomical handbooks can be entered, saved on disk, edited, printed, mathematically analysed, and recomputed. Many types of tables can be entered by adjusting predicted tabular values instead of typing the whole numbers. Of each tabular value a so-called "manuscript version" (which could be used for an edition) and a "corrected version" (which is used for the mathematical analysis included in the program) can be stored. The tables can be printed on the screen or on a printer or can be written to a file (e.g. a L^AT_EX source code) in various formats (including multiple tables, multiple columns, special format for errors). The mathematical analysis includes four different ways of determining single or multiple unknown parameter values underlying an astronomical table, various other statistical operations that can be useful in determining an unknown tabulated function, tests of the symmetry relations that many types of tables are expected to satisfy, etc. Finally, tables can be recomputed using the modern formula for the underlying function or practically any other algorithm desired. These algorithms can involve intermediate rounding or truncating, interpolation, or inverse interpolation in auxiliary tables, etc. The program Table Analysis has an "on-line help system": the user can press F1 at any time to obtain information about the available commands and the expected input.

4) **MM** (Mean Motions); this program is much like TA, but is especially designed for analysing mean motion tables. It deals with the various subtables of such tables (collected years, single years, extended years, months, days, hours, and fractions of hours), with the various types of calendars that were in use (Arabic, Egyptian, Persian, and Byzantine), and with the fact that all multiples of 360 degrees were dropped from the mean motion values. The tabular differences of all subtables can be computed, the underlying mean motion parameters can be determined with an indication of their accuracy, and the tables can be recomputed for any desired value of the parameters.

9. Teaching

Germany:

- B. van Dalen: - Seminar on medieval astronomical tables
Johann-Wolfgang-Goethe-University, Institute for History of Science, Frankfurt a. M.
- D. King: - Seminar on Arabic scientific texts
- Seminar on medieval astronomical instruments
Johann-Wolfgang-Goethe University, Institute for History of Science, Frankfurt a. M.

The Netherlands:

J. P. Hogendijk: - Applied mathematics in antiquity and the Middle Ages
Rijksuniversiteit Utrecht, Mathematical Institute, Utrecht

USA:

J. Ragep: - Islamic Science
lecture for undergraduates
- Seminar on Copernicus
for graduates
University of Oklahoma, Department of History of Science, Norman

A. I. Sabra: - The Cultural History of Arabic Science
lecture for undergraduates and graduates
- Islam and Hellenism
graduate seminar
Harvard University, Department of History of Science

10. Thesis

Awilah, F.: **Plane Geometry by Ibn al-Haytham & Editing Treatise 1 of his book "Ḥall shukūk Kitāb Uqlidis fī Luṣūl wa-sharḥ ma'ānīhī"**. Thesis for the Master Degree in the History of Basic Science; supervisor: S. Chalhoub, Institute for the History of Arabic Science, University of Aleppo, Aleppo, Syria; defended: 1994

Bilāl, L.: **Astrolabe in the Arabic Scientific Heritage and the "Risāla fī l-'amal bi'l-aṣṭurlāb" by 'Abdaraḥmān al-Ṣūfī**. Thesis for the Master degree in the History of Applied Science; supervisor: S. Chalhoub, Institute for the History of Arabic Science, University of Aleppo, Aleppo, Syria; defended: 1994

Chalkī, B. : **Ibn al-Haytham's Optics**. Thesis for the Master Degree in the History of Basic Science; supervisor: S. Chalhoub, Institute for the History of Arabic Science, University of Aleppo, Aleppo, Syria; defended: 1994

Dalen, B. van: **Ancient and Mediaeval Astronomical Tables: mathematical structure and parameter values**. Mathematical Institute of Utrecht University, Netherlands; defended: September 20, 1993

Autoreferat: The thesis describes a number of advanced mathematical and statistical tools that can be used for determining the way in which astronomical tables were computed by Greek, Islamic, and early European astronomers. In particular, four statistical estimators are introduced with the aid of which the parameter values underlying astronomical tables can be reliably determined. The methods of computation of the tables as well as the parameter values used often turn out to be typical for certain astronomers, periods, or localities. Thus, the results that are found by means of the methods introduced by van Dalen can often be used to draw conclusions about the origin of tables that are not found in their original context. Van Dalen's most interesting results are:

1. A complete mathematical analysis of the table for the equation of time found in Ptolemy's "Handy Tables". Ptolemy turns out to have used various simplifications in order to reduce the amount of computational work

involved without the tabular values becoming significantly less accurate.

2. A complete mathematical analysis of the spherical-astronomical tables in the 13th century Zij written by al-Baghdādī. Some of al-Baghdādī's tables were apparently newly computed on the basis of theory and parameter values deriving from Ḥabash al-Ḥāsib (Baghdād, 9th century), and some were copied from from Kushyār ibn Labban (Baghdād, 10th century). On the basis of information found in the "Almagest" by Abū I-Wafā' (Baghdād, 10th century) and in the version of the Zij by Ḥabash al-Ḥāsib extant in Berlin, van Dalen conjectures that a set of nine highly accurate tables in the Baghdādī Zij stems from Abū I-Wafā'.

Supervisors of van Dalen's doctoral research were Prof. Henk J. M. Bos and Dr. Jan P. Hogendijk. The research was financially supported by the Dutch Organization the Scientific research (NWO). From January 1994 till June 1995 Dr. Benno van Dalen carries out a research project at the Institute for History of Science in Frankfurt am Main (Germany).

Hofelich, M.: Analysis of two ephemerides from Rasulid Yemen (including investigation of daily positions of the sun, moon, and planets and assessment of the sources of the astrological content). supervisor: D. King, Institute for History of Science, Johann-Wolfgang-Goethe-University, Frankfurt a. M., Germany

Lindsay, J. E.: Professors, Prophets, and Politicians: 'Alī Ibn 'Asākir's *Ta'rikh madīnat Dimashq*. University of Wisconsin, Madison, USA; defended: 1994

Moaz, 'A. R.: Les Madrasas de Damas d'al-Ṣālihiyya, depuis la fin du V/XIe siècle jusqu'au milieu de VII/XIIIe siècle. Textes historiques et études architecturales. Institut Français d'Études Arabes de Damas, Syria, Université de Provence, Aix-Marseille, France

Ohashi, Y.: A History of Astronomical Instruments in India. Lucknow University, Lucknow, India; defended 1992

Sah, J. N.: Algebra of 'Umar Khayyām and Bhaskaracarya - a Comparative Study. L. N. Mithila University, Darbhanga, India; defended 1990

Stautz, B.: Analysis of astronomical markings on medieval Islamic and European instruments (including star-positions on astrolabe retes, curves on horary quadrants, and sundials). supervisor: D. King, Institute for History of Science, Johann-Wolfgang-Goethe University, Frankfurt a. M., Germany

11. Death

12. Awards

E. Ihsanoğlu received the Honorary Doctorate of Mimar Sinan University, Turkey.

E. S. Kennedy received the honorary membership of the Turkish Society for History of Science (TBTK).

A. Terzioğlu received the "Große Ehrenzeichen für Verdienste um die Republik Österreich".

The contents appearing in
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For further information, please contact:
Dr. Munawar A. Anees, Editor-in-Chief, Periodica Islamica



BERITA PUBLISHING

22 Jalan Liku, 59100 Kuala Lumpur, Malaysia
Tel (+60-3)282-5286 Fax (+60-3)282-1605