

”Traveling Sciences” Summer School in Istanbul (22-29 August 2014)



Gürsel Aksoy¹

“Traveling Sciences” was the theme of the Third International Summer School organized by the Prof. Dr. Fuat Sezgin Research Foundation for the History of Science in Islam in Istanbul, 22-29 August 2014. The Fuat Sezgin Research Foundation works with the support and co-operation of Fatih Sultan Mehmet Waqf University. Academics

and postgraduate students from many countries (including Turkey, Iran, Netherland, Germany, Canada, USA, Jordan and Iraq) came together for a total of 24 lectures, presentations, or activities. As usual, presenters are encouraged to accompany their talks with participatory activities.

The venue was the Fuat Sezgin Research Foundation, next to the beautifully converted royal stables in Gülhane Park which now house the Museum of the History of Science and Technology in Islam. Summer School visitors who came early got to know



each other over a game of “Celestial Spheres” (*al-Falakiyya*) researched and reconstructed by Dr. Rob van Gent (Utrecht University, Netherlands). In this board game known in the Middle East and al-Andalus, seven players (who represent the planets thought to orbit Earth) win or lose stakes according to whether their anti-clockwise trajectory lands them on favorable (“sextils” or “trines”) or unfavorable positions (as when they enter into an “opposition”).

Still with our thoughts in the heavens, we were then treated to a

presentation on Arabic star names by Hani Dalee (Arab Union for Astronomy and Space Sciences, Jordan). Hani showed how the ancient Arabs found answers through mythology for questions like “why Sirius is the brightest star in the heavens?”

Monday: Finding Our Bearings

The program proper began with a day of mathematics, and Rob van Gent’s talk on “Determining the Prayer Direction to Mecca”. Inflatable terrestrial globes and string helped the participants to visualize the subject matter, namely how to find the prayer

direction (the *qibla*) mathematically from any location on Earth. First we worked with estimates, then were given a very exact formula for the *qibla* angle based on co-ordinates of latitude and longitude and spherical trigonometry. Finally, we were given a paper representation of an ingenious but accessible *qibla*-finding instrument constructed centuries ago in Isfahan.

After celebrating the 90th birthday anniversary of Prof. Dr. Fuat Sezgin in Gülhane Park, Abouzar Farzpourmachiani and Farnaz Azidhak (Institute for the History of Science, University of Tehran, Iran) presented and discussed reproductions of medieval leveling instruments from al-Karajī's book *Inbāṭ al-miyāh al-khaṭīya*,

including three invented by al-Karajī. The talk provided a fascinating window onto the practical aspects of surveying and geometry in the medieval Middle East.

The session continued with İrem Aslan (Ankara University, Turkey), who gave a wide-ranging survey of "The Travel of Zero over Time and Across Continents". She showed how the zero became the "absorbing element" in multiplication, and the "identity element" in addition.

After lunch Pouyan Rezvani (Institute for the History of Science, University of Tehran, Iran) discussed a "Conical Sundial Called Mukḥula" (so-called because of its cylindrical "kuḥl-holder" shape). Participants then cut out



and made conical sundials prepared for the location of Istanbul, went out and found the hour on the dial, and calculated the watch hour using the relevant coefficient.

In a workshop on "Astronomical Tapestries" given by Wilfred de Graaf (Utrecht University, Netherlands), participants studied a geocentric model of the universe and a heliocentric model

from the late period of Islamic civilization. After information and numerous pictures, participants were asked to find out the approximate date of an astronomical tapestry of Isfahani origin.

The final presentation of the day was by Henk Hietbrink (Utrecht University, Netherlands). Using a replica pair of compasses based on a figure in Abū

Sahl al-Kūhī, Henk showed us how to draw conic sections, with information on conic sections in the works of Euclid and Van Schooten.

Tuesday: Mathematics and Optics

On Tuesday the summer school continued with mathematics and optics. Dr. Amanda Maravelia (Hellenic Institute of Egyptology, Greece) reviewed the “Astronomic and Cosmographic Elements in the Holy Qur’an”. She found there an unchanging cosmic wisdom which is not contradicted by modern science.

Vincent Karels (Utrecht University, Netherlands) presented a “Mathematical Analysis of the Dome of Shah Nematollah Vali’s Shrine in Mahan”, with photographs of its wonderful geometrically-patterned tiles. Vincent used computer images to illustrate the geometric features of the dome.

The astrophysicist Prof. Dr. Ralph Neuhauser took us back to the heavens and the question of “The Moon and the Conversion of the Islamic Lunar and the Julian/Gregorian Solar Calendars”. He noted the rules determining the dates of Ramadan, for example, when the moon is obscured, and pointed out other features which make the conversion to the Julian/Gregorian an uncertain matter. Ralph is interested in hearing from scholars about reports of celestial incidents in medieval Islamic history – one of his special areas of research.

Prof. Dr. Jan P. Hogendijk (Utrecht University, Netherlands), as is well known, is a great admirer of Abū Rayḥān al-Bīrūnī, and has an extensive bibliographic website (including links to manuscripts) at <http://www.albiruni.nl>. Jan’s talk focused on the work that is yet to be done before any proper evaluation of this great 11th century scientific genius can be made.

Lunch was followed by two contributions on Ibn al-Haytham’s *Kitāb*

al-Manāẓir. Zeynep Kuleli (Fatih Sultan Mehmet Waqf University, Turkey) examined the experiment using the “Camera obscura” from Ibn al-Haytham’s Arabic text. We then had the chance to see the inversion of light rays in a wooden camera obscura produced by Yücel Aşıkoğlu (Istanbul University, Turkey), and to adapt cardboard boxes and repeat Ibn al-Haytham’s observations for ourselves.

Wednesday (and Tuesday pm): The Travels of the *Kitāb al-Manāẓir*

The spreading influence of *Kitāb al-Manāẓir* in the science of the East and Latin West is the focus of a website-based project of Prof. Dr. Elaheh Kheirandish, with Maera Siddiqi and Esam Goodarzy (all of Harvard University, USA). The team gave an illustrated description of their timelines and multimedia maps, which bring together references to the famous book, as far as possible giving precise dates and locations in order to show how the advances made by Ibn al-Haytham came to be known.

Above all books are physical evidence of the spread of science, and on Wednesday Elaheh led a group to see the important manuscripts of the *Kitāb al-Manāẓir* in the Süleymaniye Library, not far away. The tour of the library included many other works of important for the history of science in Islam. A smaller group went instead to the Sultans’ Topkapı Library to order the copy of a different manuscript on CD.

Participants had the chance to use the multimedia website, ask questions, and gain insights into the spread of science in the Islamic world.

Thursday: Plants for the Mind and Body

Thursday was the day for the history of medicine. Participants were required to use all their senses for the workshop of Prof. Dr. Ingrid Heymeyer (Ryerson

University, Canada), who gave each table a variety of seeds (all used in medicine) to be sorted and, where possible, identified. The exercise was repeated on fresh herbs. Such ‘materia medica’ were often grown in medical gardens like the one in Salerno, set out according to whether the plant is hot, cold, dry or moist, and the strength of its effects.

A clear example of how medicines could be obtained from plants was provided by Mervenur Limon (Fatih Sultan Mehmet Waqf University, Turkey). Mervenur divided the “Distillation Workshop” into two parts, the oretical and practical. She explained the chemical principles behind the

process, and noted references to distillation in Ibn Sīnā’s *Qānūn*. In the second part she demonstrated distillation by extracting the essential oil from fresh lavender taken from the nearby medical garden of the museum.

Hamed Ahansazan and Roya Shariat (Shahid Beheshti University, Iran) discussed *Hidāyat al-muta’allimīn fī al-ṭibb*, an early work in Persian including sections on psychiatry, among other topics. The author, Akhawaynī, describes “sleep paralysis” (nightmares) and its treatment. Some of the difficulties of the terminology were clarified by comparing passages in Greek and other works.

Returning to Ibn Sīnā, Prof. Dr.



Kadircan Keskinbora (Bahçeşehir University, Turkey) reviewed the detailed “Contributions to Anatomy” in the doctor-philosopher’s Works and talked about a possible influence of Ibn Sīnā on Leonardo da Vinci. In spite of the scruples about dissection in Islamic society, Ibn Sīnā’s part in the spread of knowledge in this area was impressive.

After a restorative tea break, Dr. Detlev Quintern and Dr. Peter Starr (Fuat Sezgin Foundation and Fatih Sultan Mehmet Waqf University,

Turkey) distributed a recipe for “ink for immediate use” from al-Qalalūsī, together with equipment, reeds and knives to make pens, and such key ingredients as oak galls and iron sulphate. Participants were then asked to go to the park outside and make ink in the medieval style and test it with the pens. Some Iranian students came back with beautiful examples of calligraphy written with their newly-prepared ink.

In the evening there was an excursion to the Observatory of Istanbul

University, kindly arranged by Saliha Budak (Fatih Sultan Mehmet Wakf University, Turkey). As well as the astronomers of the university, we were informed (and entertained) by Jordanian astronomers Hani Dalee and Ahlam Farhan. There was an evening meal after the outing.

Friday: The Measure of All Things

Speaker Viktor Blåsjö (Utrecht University, Netherlands) rounded off the Utrecht contribution with a richly-illustrated survey of the methods for measuring celestial distances and geodesy developed in Greek, Chinese, Islamic and Dutch contexts. He called it “A Cultural History of Trigonometry” because, as he argued, some of the differences in the mathematical methods used can be understood in terms of the special societal and geographic features of the various cultures.

Gürsel Aksoy (Fatih Sultan Mehmet Waqf University, Turkey) described compass usage by the Muslim navigators in the Indian Ocean between 1450 and 1550 AD. Gürsel pointed out the importance of the compass usage for the Indian Ocean, in contrast to the

methods of navigation in the Mediterranean. In the workshop, he focused especially on the findings of Prof. Dr. Fuat Sezgin detailed in the GAS². Towards the end of the workshop, Yücel Aşıkoğlu’s replica of a floating compass modeled on Islamic sources was displayed, and Yücel gave information about how it was made and its working principles.

The last activity was a visit to Fuat Sezgin’s collection in the Museum of the History of Science and Technology in Islam (administered by the Cultural Ministry of Turkey), and this year special attention was given to the water-lifting devices. We were guided by Ingrid Hehmeyer, who, by combining activities with carefully-documented information, provided a suitable finale to the 2014 summer school.

For information about next year’s summer school you can apply to Dr. D e t l e v Q u i n t e r n (cdquintern@ibtav.org).

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²*Geschichte des Arabischen Schrifttums*

