

## »Light and Shadow« Summer School in Istanbul, 17–22 August 2015

In the context of UNESCO's »Year of Light« the Fourth International Summer School, organized by the Prof. Dr. Fuat Sezgin Research Foundation (FSRF) for the History of Science in Islam, focused on a cross-disciplinarily approach to various aspects of »Light and Shadow«. Located in the former stables of the Topkapı Palace, the foundation is cooperating with the Fatih Sultan Mehmet Vakıf University in Istanbul (FSMVU).

### Vision and Light

After Dr. Detlev Quintern (FSRF) had welcomed the attendees, the scope and the activities of UNESCO's year of the light were introduced by Selçuk Aktürk (Istanbul Technical University). Following a historical time-line, theories of vision and light (Plato, Euclid) were presented along with problems of translation (Greek–Arabic), notably in the Chapter »On Sight« by Nemesius, which was translated by Işhâq b. Hunayn (809–873). Elaheh Kheirandish's (Harvard University, USA) presentation »The Checkered History of Early Optics« covered the development of optics as an early interdisciplinary study, combining mathematical and geometrical methods with physical and optical experiments. Zeynep Kuleli (FSMVU) introduced Ibn al-Haytham's (965– c. 1040) book of optics (*Kitāb al-Manāẓir*). Known in the West as Alhazen, Ibn Haytham is considered the father of modern optics. He underlines that a scientist should always be critical of the sources he is studying, she/he should also be self-critical in order to avoid preconceptions. Ibn al-Haytham established not only the optical laws of light's movements, but analyzed at the same time the anatomy of the eye to which the rays of light are reflected from the objects in straight lines. For the first time he scientifically reflected the phenomena of the Camera Obscura, and in our summer school these were demonstrated practically in a darkened room by Maryam Farahmand (University of Teheran, Iran). Her presentation »Light, Shadow and Images – Historizing the Camera Obscura« elucidated the long knowledge-waves in the history of optics which led to new techniques of painting (central perspective) and finally to photography.

Modern applications were presented by Yücel Aşıkoğlu (Istanbul University, Istanbul): e.g. the nineteenth century paraxinoscope, a mirror effects based entertainment device.

## Mathematics

The famous Alhazen Problem was introduced by Henk Hietbrink (Utrecht University, Netherlands) who demonstrated the methods which are necessary to find the point on a mirror from where the light ray is reflected to the eye, given a light source and a spherical mirror. This also led Ibn al-Haytham mathematically to an equation of the fourth degree. Ruward Mulder and Sander Kooi (Utrecht University, Netherlands) demonstrated the determination of  $\pi$  to 16 decimals, following thereby a manuscript of al-Kāshī (d. 1429). In a workshop the square root of 3 was computed and checked by recalculation.

## Medicine and Ophthalmology

Alicia Maravelia (Hellenic Institute of Egyptology, Athens) framed the development of »Enlightening Ophthalmic Surgery from the Alexandrian Medicine to Islamic Medicine«, while emphasizing especially on old Egyptian contributions to the history of eye surgery. Kadircan Keskinbora (History of Medicine and Ethics, Bahçeşehir University, Istanbul) outlined »Classic Arabic-Islamic Contributions to Ophthalmology«, introducing further developments in the field of cataract surgery from the tenth century onwards. In a »Historical Note on the Light Reflex« Mojtaba Heydari (Shiraz University of Medical Sciences, Iran) shed light on pathophysiology and clinical applications, focusing on what is set out in al-Rāzī (d. 925), thereby emphasizing the progress he made compared to Galen. In »Medical Aspects of Light in Islamic Medicine« Seyyed Hamdollah Mosavat (Shiraz University of Medical Sciences, Iran) deduced on the basis of historical texts light effects on health, e.g. the moonlight's stimulating and self-healing effects. Antonia Viertel (Münster University, Germany) gave an insight into »Spiritual Medicine in Islam,« introducing the book »Mufarriḥ an-nafs« written by Ibn Qaḍī Ba'albakkī (thirteenth century). »Cheering up the Soul« can be achieved not

only with a specific nutrition or medicine, but also with melodies, fragrances and not least by visual perception of cheerful colors.

## Astronomy and Astrology

Fathi Jarray (University of Tunis, Tunisia) discussed »The Measurement of Time in Tunisia through History«. Mainly horizontal, vertical and equatorial sundials were used to indicate shadows which change in direction and length due to the earth travelling round the sun in an elliptic orbit. The earth's axis is tilted at about 26 degrees. Hani Muhammad Ismail Dalee (Astronomy Outreach/QEERI-Qatar Foundation) proved to us the accuracy of the sundial which is in the center of the arches to the south of Al-Aqsa Mosque in the old city of Jerusalem. During an out-door workshop and considering the latitude of Istanbul (41°), the sun time was computed with self-made sundials (cardboard). Amir Moosavi and Elahe Javadi (University of Tehran, Iran) instructed a workshop, in which an astrolabe was constructed in cardboard and determined on a latitude of 40° (near to Istanbul), showing the sky with the stars and planets, noting the months, days and hours. The positions of stars and planets at a given time were determined.

Viktor Blåsjo (Utrecht University, Netherlands) discussed »The Rationale for Astrology,« showing why it was thought that certain constellations and positions of stars and planets might influence human moods and decisions. Wilfried de Graaf (Utrecht University, Netherlands) prepared an Astrolabe (cardboard) computed and designed by Zawraqī, based on the detailed descriptions by the great mathematician and astronomer Abū Rayḥān al-Bīrūnī (d. 1048). While using the zodiacal signs with the corresponding Iranian months and western dates, the local time on the birthdays of the participants were computed, supposing the sun is on a certain degree above the horizon.

## Philosophy and Mystic

Qudratullah Qorbani (Kharazmi University, Tehran, Iran) discussed »Suhrawardī's (1155–1191) Illuminationist Philosophy« (*hikmet-ul ishrak*), emphasizing the central role of light and darkness in Suhra-

wardī's philosophy. Everything that is alive, moves and exists as »light.« Another understanding of »existence« was brought into the discussion by Nader Schokrollahi (Kharazmi University, Tehran, Iran), referring to the philosophy of Mulla Şadrā (d. 1641), who took up Suhrawardī's light-philosophy and conceptualized »evolutionary stages of being«. Here »light« was replaced by »existence« and »shadow« by »quiddity. »Who is Ibn Yaḥyā in Tschai-kovsky's Opera Jolanta?« by Detlev Quintern (FSMVU) raised the question of human sense perception. Jolanta, who became blind in her early childhood, was taught by the Arab physician Ibn Yaḥyā from Cordoba. Tschai-kovsky's opera deals with the complex issue whether »seeing« is replaceable with other senses such as touching or »seeing with the heart.«

## Poetry, Coloring and Architecture

Christiane Czygan (University of Hamburg, Germany) analyzed the poetry of »light and darkness in the imagery of Kanuni Sultan Süleyman's Third Divan« and embedded the Sultan's poems into the historical context. »Natural Dyes from Plants and their Practical Applications« by Ingrid Hehmeyer (Ryerson University, Canada) applied specific plants used in dyeing to natural cloth (cotton) during a workshop. Muhammad Mahdi Abdollahzadeh's (Shahid Behesti University Iran) concluded the summer school with »Natural Light's Effect on Human Health«, emphasizing the importance of light in our surroundings. Architects should be careful to plan bright living spaces. Even bathrooms, where mostly no windows are installed, should have wide windows.

To round off the »Light and Shadow« Summer School a workshop was held by the Black Sea Coast of Şile. With a telescope, brought by Zeynep Aydoğan (FSMVU), stars were observed. Hani Dalee and Maryam Farahmand taught how to identify stars, constellations and zodiac signs.

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