THE ISTANBUL MUSEUM FOR THE HISTORY OF SCIENCE AND TECHNOLOGY IN ISLAM

Prof. Dr.
FUAT SEZGİN

Dedicated to Memory of Fuat Sezgin

PROF. DR. FUAT SEZGİN İSLAM BİLİM TARİHİ ARAŞTIRMALARI VAKFI

TÜBA
Türkiye Bilimler Akademisi
Turkish Academy of Sciences

The Istanbul Museum for the History of Science and Technology in Islam

An Overview

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TÜBA
Türkiye Bilimler Akademisi
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Prof. Dr. Fuat Sezgin

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Foreword

Civilization is humanity's collective legacy. While Europe has long depicted the Middle Ages as a universal "thousand years of darkness," recent studies reveal that the Islamic world was experiencing a significant enlightenment, marked by advancements in science and intellect. This Islamic enlightenment significantly influenced Europe's intellectual revival and helped catalyze the Renaissance and Reformation. These contributions have challenged the traditional Eurocentric view of scientific history, highlighting the need to acknowledge diverse perspectives in the history of science. Understanding these contributions from the Islamic world is essential for a more inclusive and accurate portrayal of global intellectual heritage.

The late Prof. Fuat Sezgin, an honorary member of the Turkish Academy of Sciences (TÜBA), dedicated his career to highlighting the significant impact of Islamic civilization on Western development. His work, including seminal texts such as "Science and Technique in Islam," originally written in German and later translated into Turkish under the auspices of TÜBA, emphasized the depth of Islamic contributions to science. Prof. Sezgin's efforts culminated in the opening of the "History of Islamic Science and Technology Museum" in Istanbul's Gülhane Park in 2008. The museum, which features approximately 600 tools, device replicas, and models, serves as a testament to the enduring scientific legacy of Islamic scholars and the broader importance of acknowledging all contributions to the history of science.

This publication, derived from Prof. Sezgin's seminal "Science and Technology in Islam," includes detailed drawings and photographs of instruments housed in the museum, emphasizing the historical significance of these artifacts. The museum and its associated library underscore the concrete contributions of the collaboration between TÜBA and İBTAV to the scientific community. It is both meaningful and valuable that the library and museum, which host the works, scientific tools and the book archive of Professor Sezgin, -a figure celebrated for his valuable contributions to the history of science, is located in a historically rich place that is Gülhane Park, which is situated within Topkapı Palace. We are proud to present this scholarly work and commemorate Prof. Fuat Sezgin with deep respect.

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❧ *Preface*

The catalogue of the Museum of the Institute for the History of Arabic-Islamic Science at the Johann Wolfgang Goethe University, Frankfurt am Main, which is the mother of the Istanbul Museum for the History of Science and Technology in Islam, was completed and published in five volumes in January 2003 under the title *Wissenschaft und Technik im Islam*. The French translation of the catalogue came out in 2005; it was prepared for an exhibition planned for the year 2006 at the Palais de la Découverte at Paris. The first volume of the Arabic translation was published in 2007 and the second volume will appear in print shortly. The Turkish translation of the catalogue was prepared by the Turkish Academy of Science and was published in collaboration with the Ministry of Culture and Tourism in 2007. A reprint was brought out by the Department of Culture of the Istanbul City Administration in 2008. I hope the English translation of the catalogue, prepared at the Frankfurt Institute, will be ready for the press in a few months.

The present Short Overview, which is printed separately in five editions (Turkish, English, German, French and Arabic), was compiled out of extracts from the large catalogue, as a handy guide for the visitors to the museum. It does not, however, contain the dates of origin of the apparatuses and instruments, their method of function and the bibliographic references; such information is available in the above-mentioned catalogue in five volumes.

The first volume of the large catalogue consists of an "Introduction to the History of the Arabic-Islamic Sciences" and aims to provide an adequate idea of the importance of these sciences in the general history of science.

Frankfurt, 8 July 2009 — Fuat Sezgin

❧ *Prof. Mehmet Fuat Sezgin* [1] *(1924-2018)*

Prof. Mehmet Fuat Sezgin, Honorary Member of the Turkish Academy of Sciences (TÜBA), was born on October 24, 1924 in the Kızıl Mescit district of Bitlis. His father Mirza Mehmet Efendi, who served as the Mufti of Doğubeyazıt, and his mother Cemile Hanım, Sezgin's ancestry goes back to the Shirvan beys who served the Ottoman Empire for centuries and whose origins go back to the Hasankeyf branch of the Ayyubids. Sezgin, whose father passed away in 1943 and mother in 1976, had four siblings, Süphiye, Mehmet Servet, Meliha and Refet.

Sezgin started his education in 1936 in Doğubeyazıt and upon his father's death, he completed secondary school in a boarding school with a scholarship in Bitlis. He then continued his high school education, again with scholarship and boarding, in Erzurum in the science department. In 1943, Sezgin, who came to Istanbul with the intention of becoming an engineer, attended the seminar of the German orientalist Hellmut Ritter (1892-1971) and this experience influenced his life. As a matter of fact, he decided to leave his engineering dreams aside and become Ritter's student. Despite the difficulties and Ritter's discipline, he enrolled at Istanbul University's Institute of Oriental Studies and began his undergraduate studies in Arabic and Persian Philology at the Faculty of Literature.

Although Türkiye had not participated in the World War II, the effects of the war had reached Türkiye. When education was temporarily suspended at Turkish universities in 1943, Sezgin used this period to compare the difficult Arabic commentary on the Qur'an by the Islamic scholar Jarîr al-Tabari with Turkish translations. After six months, Sezgin was able to read al-Tabari's commentary with ease. Ritter advised Sezgin, who had a natural talent for language learning, to learn a new language every year, and Sezgin continued this disciplined study throughout his life.

In 1945, when Sezgin started his third year at the university, he enrolled in the undergraduate programs in Arabic Philology with a thesis as well as Old and New Turkish Literature and French Literature without a thesis. When Ritter noticed Sezgin's dedication

1 Retrieved from https://fse.fsm.edu.tr/Prof-Dr-Fuat-Sezgin-Islam-Bilim-Tarihi-Enstitusu-Enstitu-Hakkinda--Fuat-Sezgin-Kimdir- and Şeyma Nur Ünal. "Prof. Dr. Mehmet Fuat Sezgin's Contribution to Arab-Islamic Literature". Unpublished Master's Thesis, Ankara University, 2020.

and determination to scholarly work, he encouraged him to study manuscripts in libraries. These studies gave Sezgin the opportunity to identify the deficiencies in the studies on the history of Islamic science. Especially after reading Carl Brockelmann's Geschichte der Arabischen Litteratur (History of Arabic Literature), he felt the need to complete the missing aspects of the work, and his teacher Ritter accompanied him in this regard. While he was still a student, Sezgin began to collect sources for his research topics in this field, and this is where his project, Geschichtedesarabischen Schrifttums shortened as GAS (History of Arabic-Islamic Sciences), began to take shape.

Fuat Sezgin graduated from the Department of Arabic and Persian Philology at Istanbul University's Faculty of Literature in 1947. For his graduation thesis, he wrote a study on the development of the art of eloquence in classical Islamic civilization, entitled "Bedî' İlminin Tekâmülü ve İstanbul'da Bulunan Bedî'iyyat Yazmalar Kataloğu". In October of the same year, he started his doctoral studies under the supervision of Hellmut Ritter and focused on the Arabic language and on the *Mecâzü'l-Kur'ân* of tafsir scholar Abu Ubaydah Ma'mar ibn al-Muthanna al-Taymi'. This study focused on the figurative expressions used in the Qur'an and he completed his doctoral thesis in 1950. During this period, Sezgin worked at the Istanbul University Library and in the same year he started working as an assistant at Ankara University Faculty of Theology.

He worked as an assistant at Ankara University Faculty of Theology, Department of Basic Islamic Sciences, where Prof. Muhammet Tayyib Okiç was a faculty member, between 1950 and 1953. While continuing his assistantship, he stayed in Cairo for a while to publish his work titled "Mecâzü'l-Kur'ân". He served his military service as a sub-lieutenant between 1951 and 1952. In 1953, he left his assistant position and returned to Istanbul University and on February 28, 1953, he started to work as an assistant in the General Turkish History Chair headed by Prof. Zeki Veli Togan. During this time, he discovered that some parts of al-Bukhārī's book of hadith contained quotations from *Mecâzü'l-Kur'ân*. Sezgin's discovery proved that the common belief that hadith books were based solely on oral tradition was wrong. As a matter of fact, Sezgin, together with Tayyib Okiç at Ankara University, where he worked as an assistant, chose the subject of "Nassların Tedvini" as his associate professorship thesis and this study was published in 1956 under the title "Buhari'nin Kaynakları Hakkında Araştırma".

In 1955, he was appointed as an associate professor at the Institute of Islamic Studies, where he served as the deputy director of the institute.

In 1957, he won a scholarship from the Alexander von Humboldt Foundation and spent 1957-58 as a visiting associate professor in Germany to deepen his scientific research and improve his German. In 1960, as a result of the military coup d'état in Türkiye, Prof. Sezgin was included in the list of 147 academics who were expelled from universities, and after this event, he had to continue his studies outside Türkiye. Prof. Sezgin wrote letters to universities in the United States and Germany, inquiring about the possibility of working at universities in these countries, and received acceptance from Frankfurt, Berkeley and Yale universities and preferred Frankfurt University.

At Frankfurt University, Fuat Sezgin focused on the history of Arab-Islamic natural sciences. A decision taken in 1962 allowed him to return to his post at Istanbul University,

and although he resumed his post in 1964, he resigned soon afterward and returned to Frankfurt University, ending his academic life in Türkiye for good. In 1965, he completed his habilitation thesis on Jabir ibn Hayyan at the Institute for the History of Natural Sciences at the University of Frankfurt, and the following year he was awarded a professorship in the history of science. In 1967, he published the first volume of his comprehensive and pioneering series on the History of Arabic-Islamic Sciences, *Geschichte des Arabischen Schrifttums*, as a result of his work on improving Carl Brockelmann's *Geschichte der Arabischen Litteratur*, which he had begun as a student. This 17-volume work covers fields as diverse as the Qur'an, hadith, history, fiqh, theology, mysticism, poetry, medicine, pharmacology, zoology, veterinary medicine, alchemy, chemistry, botany, agriculture, mathematics, astronomy, astrology, meteorology and grammar. In his evaluation of Sezgin's work, Hellmut Ritter congratulated his student, stating that such a profound work had not been done before and would not be done again. Fuat Sezgin was awarded the King Faisal Prize for Islamic Sciences in 1978, and after receiving this award, he founded the Institute for the History of Arabic-Islamic Sciences at Johann Wolfgang Goethe University in 1982.

The German physicist Eilhard Wiedemann, who began his studies in 1900, had made an effort to introduce the instruments of the history of Islamic science by making accurate models of them. In this process, which lasted about 30 years, he was able to complete the models of only five instruments. Aiming to do more in this field, Prof. Fuat Sezgin set out with the dream of establishing a museum in Frankfurt. Sezgin achieved great success by successfully modeling more than 700 instruments in the Museum of the History of Islamic Science, which he founded himself. The museum is also home to the History of Sciences Library, which houses a collection of 45,000 volumes of books that Sezgin collected from around the world and meticulously organized throughout his life.

Prof. Fuat Sezgin decided to open a Museum of the History of Islamic Science in Istanbul, Türkiye, similar to the one he had successfully established in Germany. His aim was to enable the Turkish people to experience in a tangible way the contributions of their own civilization and Muslim scientists to the history of science. Upon his return to Türkiye, he began work on the museum's establishment, and his long-held dream, the Museum of the History of Islamic Science and Technology, was inaugurated by Recep Tayyip Erdoğan on May 25, 2008. The museum is located in Istanbul's Gülhane Park and contains approximately 600 artifacts. These museums comprehensively showcase developments in various disciplines of the history of Islamic science and the inventions and discoveries that Muslim scientists have brought to humanity over the centuries.

In 2010, The Prof. Dr. Fuat Sezgin Institute for the History of Science İn Islam was established to support the work of Prof. Dr. Fuat Sezgin's Museum of the History of Islamic Science. Under Prof. Fuat Sezgin's leadership, the Department of History of Science was opened at Fatih Sultan Mehmet Vakıf University in 2013 and this department started to offer undergraduate, graduate and doctoral education. In 2017, Sezgin, together with his wife Dr. Ursula Sezgin, founded the Prof. Dr. Fuat Sezgin and Dr. Ursula Sezgin History of Sciences Library, which consists of 27,000 volumes, in order to contribute to the history of science studies in Türkiye. Fuat Sezgin received continuous support from his wife Dr. Ursula Sezgin during this process. In addition, Fuat Sezgin often visited the students of the History of Science Department of Fatih Sultan Mehmet Vakıf University, supported by

the foundation, emphasizing that they should maintain their commitment to the history of Islamic science and explaining the importance of their studies. He maintained his interest in the history of Islamic science and books until the last days of his life.

The Turkish Academy of Sciences, as the most important representative of science in Türkiye and its representative in the world, was one of the institutions where Prof. Fuat Sezgin gave a conference for the first time in Türkiye. On April 12, 2004, his conference titled "İslam Kültür Dünyasının Bilimler Tarihindeki Yeri" was published by TÜBA.[2] Prof. Fuat Sezgin has written a 5-volume catalog entitled "İslam'da Bilim ve Teknik" published by the Turkish Academy of Sciences. This museum catalog was published in four languages: Turkish, English, German and French. The first volume was also translated into Russian and Kyrgyz by TÜBA.[3]

According to the Presidential Circular published in the Official Gazette, 2019 was declared as the "Prof. Dr. Fuat Sezgin Yılı"(Year of Prof. Dr. Fuat Sezgin)[4] and many scientific events were organized throughout Türkiye in this year. Based on this decision, TÜBA also established the "Fuat Sezgin Awards" on behalf of Fuat Sezgin.

Prof. Fuat Sezgin married Ursula Stein, a scholar like himself, whom he met at the Frankfurt Muslim Students' Association in 1966, and they had a daughter named Hilal. Prof. Mehmet Fuat Sezgin continued his studies in Istanbul in the last years of his life and died on June 30, 2018. Sezgin, who led a life full of rare perseverance and hard work that pushed the limits of human capacity, dedicated his life to science and left behind valuable works and thoughts. Known for his contributions to the history of Islamic science and thought, Sezgin was a special personality who was followed with great interest by scientists and left an important legacy through his works.

Publications & Scientific Achievements of Prof. Fuat Sezgin

- **(1955).** "Hadith Musannafâtının Mebdei ve Ma'mer b. Rashid'in Camii", Türkiyat Mecmuası, XII, (1955): 115-134.

- **(1956).** "The Value of Narratives in Islamic History", V. Turkish History Congress, (1956): 243-252.

- **(1956).** "Research on the Sources of Bukhārī", Istanbul: İbrahim Horoz Publications, 1956; Bukhārī's Sources. Ankara: Otto Publications, 2019.

- **(1957).** "The Importance of Hadith as a Source of Islamic History". Journal of the Institute of Islamic Studies, II, (1957): 31-35.

- **(1967).** "Geschichte Des Arabischen Schrifttums" (GAS), I-IX, Leiden: Brill Publications, 1967-1984; X-XVII, Frankfurt: Institut für Geschichte der Arabisch Islamischen Wissenschaften an der Johann Wolfgang Goethe Universität Publications, 2000-2015; History of Arab-Islamic Sciences, I, Istanbul: Islamic Science History Research Foundation Publications, 2015; Tarîhu't-Turâsi'l-Arabî, X, Riyadh: Câmiatu'l-Imâm Muhammad b. Su'ûdi'l-Islamiyya Publications, 1991.

2 İslâm Kültür Dünyasının Bilimler Tarihindeki Yeri | Türkiye Bilimler Akademisi (tuba.gov.tr)

3 TÜBA'dan 6 Dilde İslam'da Bilim ve Teknik | Türkiye Bilitüba fuat sezginmler Akademisi (tuba.gov.tr)

4 20180906-6.pdf (resmigazete.gov.tr)

- **(1986).** "Bibliographie der deutschsprachigen Arabistik und Islamkunde von den Anfängen bis 1986 nebst Literatur über die arabischen Länder der Gegenwart, Bibliographie der deutschsprachigen Arabistik und Islamkunde: 1987-1994, XXI+V, Institut für Geschichte der Arabisch- Frankfurt am Main: Islamischen Wissenschaften an der Johann Wolfgang" Goethe Universität Yayınları, 1990-2001.

- **(1993).** "The Importance of Isnād in Arabic Language and Islamic Sciences". UÜİFD, V/V, (1993): 301-310.

- **(1993).** "Old Arabic poetry between authenticity and plagiarism (Authenticity)". transl. Hasan Taşdelen, UÜİFD, V/V, (1993): 311-313.

- **(1998).** "The Importance of Isnad in Arab-Islamic Science", transl. Habil Nazlıgül, EÜİFD, X, (1998): 251-263.

- **(2002).** "The Issue of the Causes of the Dulling of Islamic Civilization", transl. Dursun Hazer, HUIFD, II, (2002): 295-303.

- **(2003).** "Wissenschaft und Technik im Islam, Frankfurt: Institut für Geschichte der Arabisch-Islamischen Wissenschaften an der Johann Wolfgang Goethe-Universität Yayınları, 2003; Science and Technique in Islam", transl. Abdurrahman Aliy, Istanbul: Istanbul Metropolitan Municipality Kültür A.Ş. Publications, 2008; Science and Technique in Islam, transl. Abdurrahman Aliy, Ankara: TÜBA Publications, 2015.

Organizations Established under the Leadership of Prof. Fuat Sezgin

- Prof. Fuat Sezgin, the world's greatest historian of science, wrote the most comprehensive work on the history of Islamic science, **the 17-volume Arap-İslam Bilim Tarihi** (History of Arab-Islamic Science), the product of 65 years of work in the field of Islamic history of science. He is also a great founder who pioneered the establishment of important institutions.

- In 1982, he founded **the Institute for the History of Arabic-Islamic Sciences at Frankfurt Goethe University.**

- In 1983, he founded **the Museum of the Institute for the History of Arab-Islamic Sciences**, where more than 800 objects are on display.

- Throughout his life, he established a library with 45 thousand volumes of books and nearly 10 thousand microfilm archives, which he bought from all over the world with his own means, which is unique in the world in the field of history of sciences.

- In 2008, he founded **the Istanbul Museum of the History of Islamic Science and Technology.**

- In 2010, Prof. Fuat Sezgin established **the Foundation for Research on the History of Islamic Science.**

- In 2013, he ensured the establishment of **the Department of History of Science** at Fatih Sultan Mehmet Vakıf University.

- In 2013, he ensured the establishment of **Prof. Dr. Fuat Sezgin Institute of Islamic History of Science** within FSMVU.

- In 2015, he ensured the establishment of **Prof. Dr. Fuat Sezgin Islamic History of Science Research Foundation Publishing House.**

Awards and Memberships

- Republic of Türkiye Presidential Culture and Art Grand Prize
- Honorary Member of Turkish Academy of Sciences
- Ministry of Culture and Tourism 2016 Special Award
- Honorary Member of Cairo Academy of Arabic Language
- Honorary Member of Damascus Academy of Arabic Language
- Honorary Member of the Royal Academy of Rabat, Morocco
- Honorary Member of Baghdad Academy of Arabic Language
- German Federal Service Medal First Class
- Germany Distinguished Service Medal
- Iranian Islamic Sciences Book Prize
- Hessian Culture Award
- King Faisal Award

❧ *The Foundation of the Museum*

Shortly after the foundation of the Institute of History of Arabic-Islamic Science at the J.W. Goethe-University in Frankfurt in 1982, and in the context of that Institute, the idea emerged to reconstruct the instruments and devices which had been used in the creative period of Arabic-Islamic Science, between the beginning of the ninth and the end of the sixteenth centuries. In the course of the assimilation of science from other cultures, the Muslims adapted a series of instruments and devices, in particular from ancient Greece. Most of these instruments were further developed in the Islamic civilization, and the Muslims invented many new instruments on their own. From this very rich tradition, only a few instruments in astronomy, medicine, chemistry and time measurement have come down to us. But it is very fortunate for the history of science that many of the instruments and devices which were used by the Arabic-Islamic scientists, were described by them in numerous treatises and large works, often accompanied by detailed drawings. Some of these works have been preserved, including the large medical work *Kitāb at-Taṣrīf* of Abu l-Qāsim az-Zahrāwī (10th century CE), the *al-Jāmiʿ bain al-ʿilm wa-l-ʿamal* of Ibn ar-Razzāz al-Jazarī (1200 CE) on physics and time measurement, and the astronomical work *Jāmiʿ al-mabādiʾ wa-l-ghāyāt* von Abu l-Ḥasan al-Marrākushī (13th century CE).

Already in the nineteenth century, several orientalists have drawn attention to the importance of these works and of other treatises on instruments. The most important of them is the physicist and historian of science Eilhard Wiedemann from Erlangen, who devoted more than half a century, between 1875 and 1928, to the investigation of the Arabic-Islamic scientific achievements, and who published more than 200 articles on the subject. For me it is a very pleasant duty to mention with recognition and with gratitude that Wiedemann was the first who began, around 1900, with the reconstruction of some of the instruments that had been made by the Arabic-Islamic scientists. Five of these replicas were purchased in 1911 by the Deutsches Museum in Munich.

When I started in 1983 to reconstruct the instruments and devices which were known to me from original sources and modern studies, I was thinking of a goal

which now, in hindsight, appears to have been too modest: a collection of 20 or 30 reconstructions of instruments which have not been preserved, or which were unknown to my orientalist predecessors or had not been described by them. I had to trace them down in manuscripts and then find the persons who could rebuild them: mere patience was not enough.

Already in 2003, the crammed rooms of the Institute in Frankfurt contained a museum with 800 exhibits related to the history of science and technology in Islam. This museum has not yet been officially opened, but every year it receives several thousands of interested visitors by appointment. About 12 years ago it was stimulating and encouraging for me to experience the great interest and surprise of about 1500 persons who visited the museum on the occasion of the Day of the Open Door (Tag der Offenen Tür) of the universities in the German province of Hesse.

This museum had already become known, to some extent, when a comprehensive catalogue in five volumes was published in 2003 under the title "*Wissenschaft und Technik im Islam*" (*Science and Technology in Islam)*. The French translation appeared one year later, and since two years, a Turkish translation has also been available. The English translation will soon go to the press. The first volume of the Arabic translation has appeared two years ago; the second volume will be printed in two or three months.

I have been asked several times by institutions in other countries if the objects of our museum could be displayed for a certain period, or if a museum could be established with copies of the objects in our museum at Frankfurt. Thus, Mr. Attila Koç, the Turkish minister for culture and museums, who visited the Institute in Frankfurt in 2005, expressed his wish to found a similar museum in Istanbul. For me, this was the fulfillment of a dream, but unfortunately, the building proposed at that time appeared to be inappropriate. Similar wishes to establish a museum were expressed by the Turkish Academy of Sciences (TÜBA) and (the Turkish Association for Technology, Science and Research (TÜBITAK).

It was a great fortune when I heard, during a visit to Istanbul in September 2006, through my friend Mr. Cevdet Akçali about a historic complex of buildings in Gülhane Park, namely the Sultan's stables, the restauration of which had been nearly finished after six years of work. When I visited the place, I was fascinated by the buildings and their location. Then it was important to obtain the support of the City of Istanbul, which owns the buildings of the Sultan's stables (Has Ahırlar Binalar), for the museum. The mayor, Dr. Kadir Topbaş, was abroad at that time, but less than a week after he had been informed about the idea, he came to Frankfurt – I mention this with gratitude – in order to visit the Institute and especially the museum. A few days after his return to Istanbul, he informed me of the approval by the City, on the condition that the foundation of the museum and the installation of the instruments would be carried out as soon as possible. In January 2007, the contract for the foundation of the museum was signed. The next day I was able to visit the Turkish president, Mr. Recep Tayyip Erdoğan, who was very interested and

gave his full approval. The cabinet decided to approve the foundation of a center for the history of science in the two buildings adjacent to the museum.

By a happy coincidence we had started, 23 years earlier, with the preparations for an exhibition in the USA at the request of a generous Arab friend and with his financial support. With permission of this sponsor we could donate approximately 80 per cent of the instruments to the Istanbul Museum. The remaining part of the exhibition has been financed by the Turkish government, who never hesitated to generously allocate the necessary funds to this project.

The foundation of the museum for the history of science and technology in Islam in Istanbul and previously in Frankfurt was inspired by our conviction that the universal history of science is a united whole. With this we wish to supply a missing link in the historiography of science, namely the gap due to the incorrect notion that the European Renaissance is an immediate continuation of Greek antiquity. We want to present the original contributions of the creative scientists in the Arabic-Islamic civilization, which were made between 900 and 1600, after a period of reception and assimilation. These contributions have created the conditions for creative work in Europe from the second half of the sixteenth century onwards.

In the eighteenth century, the historiographic concept of a scientific "Renaissance" became increasingly widespread in Europe; this concept implied ignoring or rejecting the scientific contributions of the entire Middle Ages, in Europe as well as in the Islamic civilization. But at the same time, the scientific orientation of the scholars of Arabic and Islamic studies, from the seventeenth century onwards, was also beginning to bear fruits. Through the valuable work of these pioneers and their tireless successors, who increased in number in the following centuries, several important corrections were made in a few areas in the history of science. Nevertheless, even the educated people today do not know enough about the real importance of the Arabic-Islamic civilization within the universal history of science. Therefore, the common incorrect view of "Renaissance" has not been challenged.

I hope that this museum which has been founded at such a beautiful location in Istanbul will contribute to a correction of this wrong and outdated historical view.

Frankfurt/Main, 17 April 2009 Fuat Sezgin

❧ *One of the addresses delivered*
at the inauguration of the Istanbul Museum
for the History of Science and Technology in Islam
on 24 May 2008

Honorable Prime Minister, dear guests,

Ever since the appreciation of history is sufficiently developed, people began to ask themselves when and where certain type of devices and instruments were developed for the first time. For a long time, however, historiography understood its task to be the recording of primarily political, military and up to a certain degree also economic events and changes, and treated the developments in the fields of science and technology in a step-motherly manner.

It is not easy to trace the individual stages of development undergone by science and technology before the Greek period. The Greeks themselves give us hardly any clues about the predecessors of their own important stage of development of the sciences which lasted for roughly eight hundred years. The custom of citing the sources did not develop strongly enough among them.

The attitude of the modern historiography of science of the last three hundred years to regard the important position of the Greeks as the starting point has hardly experienced any significant revision despite the archeological discoveries related to the cultures of the Sumerians, Babylonians, Assyrians, Hittites, Canaanites, Aramaeans and Egyptians, and the insights gained by the decipherment of inscriptions. Little attention was paid even to the thesis postulated during almost half a century by the eminent Austrian historian of science, Otto Neugebauer, that the Greeks did not stand at the starting point of the scientific development but belonged to its middle phase, that is to say, that we should add to the 2500 years which passed since the Greeks assumed the leading role in the history of science, an earlier period of once again 2500 years for forerunners of the Greeks.

In the first half of the seventh century, after the sciences which had reached a

high standard among the Greeks had developed in a weaker form in the Eastern Mediterranean and in Sassanid Persia, Islam entered the arena of history as a force that encompassed these cultural centres. Since the representatives of those cultural centres were integrated, regardless of their belief, with great tolerance and understanding by the Muslims and were accorded the status of teachers, the sciences experienced a new impetus. In the middle of the eighth century Indian sources were added. Thus after a phase of reception and assimilation that lasted for two hundred years, the Muslims entered a period of creativity.

The Islamic world reached the phase of creativity in certain fields already in the second half of the eighth century, in certain others only towards the middle of the ninth century. This period of creativity lasted roughly eight hundred years until the end of the sixteenth century, although there was later on some decline in speed and quantity. Of its total achievements, only relatively few are known today. Instead of enumerating them one by one, we can describe their importance in the following way. The Muslims developed the sciences further which they had taken over from other cultures, particularly from the Greeks; they opened up new areas of knowledge and, during the period of their predominance, they prepared the way for some of the sciences which were to emerge in the succeeding cultural world. In this phase of the history of science which we call "great" and "creative", a not insignificant role was played by the Christian and Jewish fellow citizens who wrote in Arabic.

We are far from knowing everything or even a large part of all that was achieved in this creative phase of the history of science, and perhaps we shall never learn all of it. But that which we know already now is enough to make us realize that we encounter here one of the most significant phases of the history of science. There is no doubt that the character and nature of these achievements were influenced by factors of time and other prerequisites, and by the achievements of the predecessors and the successors. In general it is also not easy for the historian of science to define the fundamental values that characterize a significant phase of culture. For my own part, I believe to have found out in the course of time the following specific characteristics of the Islamic period of science:

1. The principle of objective criticism.
2. The notion of a clear law of development.
3. A greater readiness than in other cultures to name one's sources.
4. Historiography of sciences, beginning in the tenth century and developing further.
5. The principle of achieving a balance between the experiment and theory, and to draw upon the experiment as a resource for research, to be employed systematically.
6. The principle of long-term observation of astronomical phenomena; as a con-

sequence of it the creation of observatories.

7. Acquiring knowledge not merely from books, but from books in association with a teacher and, as a consequence of this, the emergence of the first universities.

One of the most important traces of the beginning of the history of science could be seen in the fact that since the second half of the tenth century books, instruments and medicaments from the Islamic cultural sphere reached Western Europe via Spain. Through the conquest of the Iberian peninsula in 711 the Arabs established a connection of the Islamic culture area with Europe, and thus pre-determined the future destiny of the sciences, which had been developed by them to spread out several centuries later in another culture area.

In the course of time, the number of channels connecting the two cultural spheres increased. The most important channels passed through Sicily, Italy and Byzantium. The crusades played a role primarily in the introduction of technology of the Islamic world in Europe.

The phase in which science and technology from the Islamic world reached Europe – and which consisted of the two steps of reception and assimilation – lasted for at least five hundred years. Strictly speaking, the period of creativity in Europe began only in the sixteenth century and in the second half of the same century began the stagnation of sciences in the Islamic world. Only at the beginning of the seventeenth century the Europeans reached their dominant position in sciences.

In this connection I should draw attention to a historical fact, though with some reluctance. The absorption of Arabic-Islamic sources did not take place in the Latin culture area with the same kind of openness that the Muslims had displayed towards their Greek sources. The Muslims called Aristotle the "first teacher"; what they took over from the books by Hippocrates, Galen and others, they cited with the appellation "highly esteemed Hippocrates", "highly esteemed Galen" and so on. As against this, in the case of quite a few of the Latin translations of Arabic books, even the names of the true authors were not retained. There was also practically no habit of citing the sources correctly.

As a consequence of this, Europeans in the seventeenth century were not aware of how they had reached their dominant position. Both the Europeans and the Muslims believed that this was a heritage stemming from a superior past going back several centuries. Because of this there arose among the Europeans a feeling of superiority towards the Muslims, and among the Muslims gradually a feeling of inferiority. The feeling of superiority of the Europeans found already after a short while in the eighteenth century a fixed notion in the term Renaissance which it has hardly lost until our own days. As a consequence, the new phase of sciences in Europe known since a few centuries was viewed as the new beginning which went back directly to the Greek sciences. With sincere gratitude we may recall that in

the same century a reaction emerged against this attitude which was ridiculed by the French philosopher Etienne Gilson as the "Renaissance of the Professors". This reaction, inspired by the humanistic spirit, came from scholars like the French philosopher and historian Voltaire and the Germans Johann Gottfried Herder, Johann Wolfgang von Goethe and Alexander von Humboldt.

Arising partly from these humanists, growing partly and primarily from being unaffected by the Eurocentric historiography of science, there emerged a new important humanist current. Here it was no longer a question exploring the Islamic sciences through Latin translations of Arabic, Persian and Turkish books, but through the direct study of original sources. This current emerged, though only slowly, already in the seventeenth century and gained such strength in the nineteenth century that the conservative historiography of sciences saw itself forced to make revisions in some fields. In the field of philosophy, the historian of religion and philosophy, Ernest Renan, in his book *Averroès et l'Averroïsme*, published in 1852, demonstrated unambiguously how deeply Ibn Rušd from Arabic Spain influenced philosophical thought in Western Europe and Italy. Renan's contemporary, the philosopher Heinrich Ritter, propounded the thesis that the influence of the Islamic (Arabic) sciences on Europe had been very great even outside philosophy and that the physical side of Arabic philosophy had brought about a strong change in the knowledge of the Christian Middle Ages. The Frenchman Jean-Jacques Sédillot and his son Louis-Amélie astonished their contemporary colleagues with their research spanning sixty years during which they could show a large part of the successes achieved by Muslims in the field of astronomy. At the same time Joseph-Toussaint publicized the achievements of the Islamic culture in the field of geography through his studies, lasting more than fifty years.

In the field of mathematics the young Franz Woepcke, whom Alexander von Humboldt had sent to Paris to work for his PhD under the above named scholars, forced the conservative historians of mathematics of his days to make serious revisions with his forty studies which caused a sensation. In the most popular contemporary book on the history of mathematics there was to be found, e.g., the contention that in the field of algebra the Arabs had not gone beyond the quadratic equations. With his edition and French translation of the algebra of 'Umar Khayyām of the eleventh century which contains a systematic treatment of cubic equations, Woepcke furnished a positive proof to show how unfounded the judgments were in his field.

In the second half of the nineteenth century vigorous efforts were undertaken to publicize Islamic science. Thus, for example, in the field of geography the Dutchman Michael Jan de Goeje and the German Ferdinand Wüstenfeld, in the course of their studies spanning half a century, edited the extant works of almost all important

Arabic geographers and translated certain parts into European languages. Having found a manuscript of the book by the traveller and geographer al-Maqdisī from the tenth century in India in 1864, Alois Sprenger, a contemporary of Goeje and Wüstenfeld, declared al-Maqdisī as „the greatest geographer of all times". In his subsequent studies Sprenger could easily establish that the standard which had been achieved in the human geography by the Islamic world as early as the tenth century could be reached in Europe only in the nineteenth century. Since 1875 the physicist from Erlangen, Eilhard Wiedemann, took part in the research of the history of natural sciences in Islam. With his more than 200 studies, published until 1928, this indefatigable scholar holds an immortal place in the history of science. The Islamic world cannot be thankful enough to him. We may also recall here that he was the first to reconstruct some instruments from the Islamic world. As far as I know, some of his models are preserved in the stores of the Deutsches Museum in Munich.

In their works spanning several centuries, the orientalists had produced enough convincing results to show that the Muslims hold an important position in the history of science. Even so, we are far from knowing in an adequate manner how important in fact this position was, and perhaps we will never find out. In order to proceed a step forward on the path of gathering information, we founded the Institute for the History of Arabic-Islamic Science at the Johann Wolfgang Goethe University in Frankfurt in 1982. In the course of our work arose the idea of reconstructing devices and instruments improved or newly invented by Muslims. Thus a museum was established at the institute in Frankfurt. Now we hope that many visitors will be able to see the corresponding instruments in the *Istanbul Museum for the History of Science and Technology in Islam*, which is being inaugurated today, and we believe that this is a unique place to demonstrate our basic idea that the history of science is a common heritage of all mankind.

I thank Dr. Kadir Topbaş, the Mayor of Istanbul, for the very special building which he provided for the museum. The Prime Minister, Recep Tayyip Erdoğan, took keen interest in the establishment of the museum and assured financial support to it. I should like to express my heartfelt thanks to him. I am especially grateful to the Minister of Culture and Tourism, Mr. Ertuğrul Günay, for having accompanied and supported the realization of the museum project to its final completion with infatigable interest. Finally, I wish to express my sincere thanks to Prof. Dr. Nüket Yetiş, the president of the Türkiye Bilimsel ve Teknolojik Araştırma Kurumu (TÜBITAK) and to Prof. Dr. Engin Bermek, the president of the Turkish Academy of Sciences (Türkiye Bilimler Akademisi), for their contribution to the setting up of the museum from its foundation to its inauguration.

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