

# The Role of Translations in the Eighteenth Century: Transfer of Modern Science and Technology to the Ottoman State

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# THE ROLE OF TRANSLATIONS IN THE EIGHTEENTH CENTURY: TRANSFER OF MODERN SCIENCE AND TECHNOLOGY TO THE OTTOMAN STATE

Dr. Salim Ayduz\*

This article aims at examining books translated from European languages in the field of exact and natural sciences in the Ottoman Empire. Previous researches show that there are many translation activities in different fields in the eighteenth century. Before moving onto the analysis of translated works, this article will provide a short introduction to the history of scientific activities in the Ottoman world until the eighteenth century. History of the Ottoman science, education and technology can be divided mainly into classical and reformist periods within the general framework of Ottoman Science and Education research studies. This article deals with the period of transition from the classical to the reformist period referred to as modernism and focuses on the role of translations during this process. In his research on Ottoman relations with Europe, Prof. Ihsanoglu identified three main channels, which were used to transfer scientific knowledge to the Ottoman world. The first channel was translations from European languages, the second was observations of Ottoman ambassadors and emissaries on their formal visits to Europe and the third channel was new educational institutions which were established in the late XVIII and early XIX centuries.<sup>1</sup>

This article will examine translated materials from European languages in the field of sciences. Previous research shows that there are many translation activities in different fields in the eighteenth century. Before moving onto the analysis of translated works, this article will provide a short introduction to the history of scientific activities in the Ottoman world until the eighteenth century.

## I. TRANSITION FROM THE CLASSICAL TO THE MODERN PERIOD

During its classical period in the fourteenth and sixteenth centuries, the Ottomans enjoyed significant political achievements as well as serious corresponding vitality in the field of scientific research and activity. The Ottomans inherited Islamic science and did not open new horizons to advance it further. Instead they spent their efforts in developing the application of this heritage. Commentaries on and explanations of the earlier works have an important place during this period in the Ottoman world. However, after Mehmed II's (d. 1481) accession to the throne in 1451, scientific activities gained increasing vitality, reaching a zenith during the reign of Suleyman the Magnificent (1520-1566). An observatory was established in Istanbul and a number of important works were produced after almost ten years of research during this scientific vitality, which lasted until the mid-seventeenth century. Nevertheless, closure of the observatory and following crisis in the political arena caused stagnation in the area of learning. Although the Ottoman technicians achieved significant successes in firearm technology in the beginning of the 15<sup>th</sup> century, they failed to invent alternative technologies to counter new technologies, which began emerging in Europe in the

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<sup>1</sup> E. Ihsanoglu, "Some critical notes on the Introduction of Modern Sciences to the Ottoman State and the Relation Between Science and Religion up to the End of the 19<sup>th</sup> Century", *Varia Turcica* IV, Comite International d'etudes pre-Ottomanes et Ottomanes, VIth Symposium, Cambridge, 1-4 July 1984, Proceedings, Istanbul-Paris-Leiden 1987, 235-251; E. Ihsanoglu, "Bati Bilimi ve Osmanli Dünyasi: Bir Inceleme organi olarak Modern Astronominin Osmanli'ya Girişi (1660-1860)", *Belleten*, LVI, December 1992, Nr. 217, 727-780.

beginning of the seventeenth century. They were also not willing to transfer their knowledge to the latter generation. Towards the end of seventeenth century, the Ottomans started to experience defeats and failures in military campaigns due to their failure to follow development in science and technology and to adopt advanced products. Eventually, the Ottomans started to lose their political influence following military failures.

The Ottoman rulers and intellectuals partly turned a blind eye to scientific and technological developments in Europe in a self-confident mood inspired by the fact the Ottoman Empire was the most powerful state until the end of seventeenth century. The Ottoman rulers and intellectuals were extremely confident to the extent that they thought there was nothing of value to transfer from Europe. From the beginning of the thirteenth century there were numerous small states and principalities in Europe and these small states and principalities displayed no significant resistance to the advancement of the Ottoman Empire nor did they possess important science and technology at this time. This state of affairs contributed to the emergence of such a feeling among the Ottoman rulers and intellectuals that they thought there was nothing worthy of following and taking from Europe. Thus, they despised and undervalued new developments in Europe.

However, this line of thinking began to change gradually following failures in military campaigns after the end of seventeenth century and the Ottoman rulers and intellectuals began to notice new developments in European countries. The Ottoman rulers realised what lied behind the military achievements of Europe; it was scientific and technological developments, which contributed to European military successes. It was only after this realisation did the Ottoman rulers and intellectuals begin to change their old attitudes and developed a new approach to view the European world.

## 1. Changes in Mentality towards Europe

The eighteenth century was the time when enlightenment began to take course in Europe. At this time Europe was in close contact with the Ottoman World. This interaction and geographic connection with Europe gave the Ottomans the opportunity to be acquainted with new inventions there. The close interaction, geographic proximity and active relations of the discoveries with Europe, made the Ottomans aware of the novelties and discoveries in Europe. In the eighteenth century, however, the sources of classical Islam were about to come to an end, and experimental researches were slowing down. Thus the Ottoman men of science studying especially in fields of astronomy, geography, mathematics, medicine, chemistry, and physics felt that they had to have their eyes open to what was happening in Europe. From the beginning of the eighteenth century some Ottoman scholars and statesmen, being aware of these developments in Europe, began to make comparisons between the works of their world and those of Europe.<sup>2</sup> One of the statesmen in this course was Yirmisekiz Mehmed Celebi, an Ottoman envoy who lived in various capitals of Europe, mainly in Paris. After his return from Europe Celebi made his observations available in a book titled *Sefaretname* (Ambassador Account), pointing to new developments that would leave the Ottomans behind. The time when Celebi lived in Paris coincided with the new period of the Tulip Age (Lale Devri), which was regarded as a turning point for the Ottoman State.

<sup>2</sup> Salim Ayduz. "On Sekizinci Yüzyıl Osmanlı Tıbbında Değişim: Doğu Tıbbından Batı Tıbbına Geçiş Üzerine Bir Deneme", Proceedings of the 38th International Congress on the History of Medicine (1–6 September 2002) Volume II, Editors Nil Sari, Ali Haydar Bayat, Yesim Ülman, Mary Isin, Ankara: Türk Tarih Kurumu, 2005, 1031-1038.

## 2. The Tulip Age (Lale Devri)

The Tulip Age stands for the time when the Ottomans made serious and first attempts to contact Europe and know the new culture emerging there. In other words, the process that is called, Modernisation, Westernisation or Europeanization traces back to this period. It covers the years between 1718, when the Pasarofca Agreement was signed, and 1730, when the Patrona Halil Revolt took place. The Sultan of the time was Ahmad III (r. 1703-1730) and the Grand Vizier was Nevsehirli Damad Ibrahim Pasha (d. 1730). This period that went on for about 13 years had witnessed the first examples of cultural activities of European style. Committees that were set up by the Grand Vizier, while translating books from the Islamic, began to translate books from the Western world.<sup>3</sup> Meanwhile the first printing house which was established by Ibrahim Muteferrika with courtesy of Vizier Ibrahim Pasha printed many books in a relatively short time. The first books printed in this house were not of religion but rather dictionaries, and works based on geography and grammar. The Vizier who appreciated science and encouraged scholars was the motivator of establishing a scientific atmosphere in the capital. Unfortunately, as the vizier's power, his scientific atmosphere also weakened and lost pace.

However, the years ahead witnessed the speeding up in the adoption of European science and technology. This was down to two particular causes; firstly, the intellectuals of European origin came to live on Ottoman soil for various reasons; secondly, by way of translations from European languages. Both channels played significant roles in introducing scientific developments of Europe to the Ottoman World.

## 3. Europeans coming to Ottoman soils

We know that many Europeans came to the Ottoman lands for various reasons, either as travellers, or captured in war as slaves, merchants, even those of military personnel and diplomatic envoys. Some of these, either as occasional or permanent visitors played a significant role in transferring modern European science and technology. The intellectuals of European origin who came to live in the Ottoman soil and played an important role in bringing modern science and technology of Europe to the Ottoman World throughout the seventeenth century had various reasons to do so. For example, Ibrahim Muteferrika (d. 1745), a convert of Hungarian origin, came to Istanbul to print books translated into Turkish from European languages, a Frenchman Claude-Alexandre Comte de Bonneval (an engineer in education), a practicing military man, taking the name of Ahmed after converting to Islam came to Istanbul in 1730. Bonneval once served as Commander in Chief of the Queen's Army in France before committing himself to the service of Prince Eugene in Austria. He later had to seek refuge from the Ottomans and lived in Bosnia before settling in Istanbul. He was appointed as the Officer in Chief of a section in the Ottoman army (Humbaracilar Ocagi) with the approval of Sultan Mahmud I and Vizier Topal Osman Pasha. It was not long before the Ottomans appreciated Bonneval. He soon began to train this section of the army in a modern way and brought some

<sup>3</sup> Salim Aydüz, "Lale Devrinde Yapılan Ilmi Faaliyetler", *Divan Ilmi Arastirmalar Dergisi*, III, Istanbul 1998, 143-170. See also Mehmet Ipsirli, "Lale Devrinde Teskil Edilen Tercume Heyetine Dair Bazı Gözlemler". *Osmanlı ilmi ve Mesleki Cemiyetleri* (ed. E. Ihsanoglu), Istanbul 1987, 33-42; Can Erimtan. "The Sources of Ahmed Refik's Lale Devri and the Paradigm of the "Tulip Age": A Teleological Agenda". *Essays in Honour of Ekmeleddin Ihsanoglu*, (compiled by M. Kacar-Zeynep Durukal). Istanbul: (IRCICA) Islam Tarih, Sanat ve Kultur Arastirma Merkezi, 2006, 259-278; Wilhelm Heinz. "Die Kultur der Tulpenzeit des Osmanischen Reiches", *Weiner Zeitschrift für die Kunde des Morgenlandes*, band V XI (1967), 62-116; Ariel Salzman. "The Age of Tulips: Confluence and Conflict in Early Modern Consumer Culture (1550-1730)". *Consumption Studies and the History of the Ottoman Empire: 1550-1922*. Ed. Donald Quataert, (Albany: SUNY Press, 2000), 83-106; Kemal Silay. *Nedim and the poetics of the Ottoman court: Medieval inheritance and the need for change*. Bloomington: Indiana University Turkish Studies Series, 1994.

number of experts from France. During his stay in the Ottoman lands, around 20 years, he taught mathematics in the military school established by himself for Humbaracilar Ocagi as well as training the army. Another of his tasks was to write reports and small booklets<sup>4</sup> on how the Ottoman army can be improved<sup>5</sup>. He also wrote a diary that covered his life story while he was in Turkey<sup>6</sup>.

Baron de Tott, was another European military man and engineer was present in the Ottoman state. He was famous for his expertise on artillery. He came to Istanbul in the last quarter of the 18<sup>th</sup> century and established the artillery house of Haskoy on the demand of Sultan Mustafa III. He made use of Diderot's work titled *Encyclopedie* in shaping a new cannon foundry (tophane) to produce new artillery weapons by using modern techniques. Hence, it was Baron de Tott who first introduced the Ottoman world with modern techniques of artillery weapons production.<sup>7</sup>

## II. TRANSLATIONS FROM EUROPEAN LANGUAGES DURING THE EIGHTEENTH CENTURY

The Ottoman translations from European languages focused on four disciplines. Astronomy came first because of its importance in determining the schedule for daily prayers and some annual religious prayers and festivals. The second is geography, because the Ottomans recognised its military importance and the finding of the Qible direction for daily religious prayers. The third was medical science about which translations had begun towards the end of the century. This was because of the new current in medical science in Europe, which was called by the Ottomans 'tibb-i cedid' (the new medical science). In the meantime for the purpose of following closely the developments in military fields, books concerning cannon casting had been brought from Europe. Some of these books were used without translations while others were translated. At this point we can have a look at each discipline more closely as they will be the main points of attention in this article.

### 1. Astronomy

Astronomy best illustrates the way the Ottomans pursued Western science. This is because the entry of Copernican heliocentric system, which caused a serious debate in Europe, constitutes an excellent example that can be clearly traced over time. There are two reasons to investigate the entry of the Copernican heliocentric system to the Ottoman Empire as a model; first, it is one of the most important discoveries of modern European science; secondly, besides it's contribution to science, it had a deep impact on philosophy and religion. On the other hand its easier to trace the transfer of astronomy to the Ottoman State because astronomy was an exact science about which the Ottomans had previous familiarity, it's certainty and its novelty as a field of occupation.

<sup>4</sup> Prime Ministry Archive (BA), *Mühimme Defteri*, no. 136, p. 292; BA, Cevdet-Hariciye, no. 7897; Mehmed Ârif, "Humbaracibasi Ahmed Pasa (Bonneval)", *Tarih-i Osmânî Encümeni Mecmuası*, III/18 (1328), 1153-1157; Cavid Baysun, "Ahmed Pasa", *MEB İslam Ansiklopedisi*, I, 199; Abdülkadir Özcan, "Humbaracı Ahmed Pasa", *Diyanet İslam Ansiklopedisi*, XVIII, 350-353; Necdet Sakaoglu, "Ahmed Pasa (Humbaracı)", *Dünden Bugüne İstanbul Ansiklopedisi*, I, 129-130; Resat Ekrem Kocu, "Ahmed Pasa (Kumbaracı)", *Türk Ansiklopedisi*, I, 418-419; Mustafa Kacar, *Osmanlı Devleti'nde Bilim ve Eğitim Anlayışındaki Degismeler ve Mühendishânelerin Kurlusu*, University of Istanbul, unpublished PhD, 1996, 4-20.

<sup>5</sup> *Mülûk ve Milel-i Nasârâ'da Olan Havâdisin Takrîr-i İcmâli*, Süleymaniye Library, Esad Efendi, no. 3889; *Nemce Çari Memleketinin Ahvaline Dair Rapor*, Library of Istanbul University, TY, no. 6102; *İcmâlû's-sefâin fi bihârî'l-âlem*, Süleymaniye Library, Esad Efendi, no. 2062.

<sup>6</sup> *Mémoires du Comte de Bonneval*, Paris 1737.

<sup>7</sup> S. J. Shaw, "The Established Ottoman Army Corps under Sultan Selim III (1789-1807)", *der Islam*, 40/2-3 (1965), p. 171; Kacar, *ibid.*, p. 35-45.

Zigetvarli Tezkireci Köse Ibrahim Efendi was the first to mention the Copernican system in the Ottoman world. Ibrahim Efendi translated the work of French astronomer Noel Durret that (d. c. 1650) entitled *Ephemerides Motuum Celestium RicheHasue ex Lansbergi Tabulis*, this book was translated from Latin first to Arabic and then to Turkish with the title of *Sajanjal al-Aflak fi Ghayat al-Idrak*. Ottoman scholars received this new theory well, although they were traditionally accustomed to the geocentric system due to belief in its practical benefits. This new system that received enormous rejection from religious circles in Europe had never received a negative reaction among the Ottomans. For instance Ibrahim Muteferrika who published the work of Hajji Khalifa, known as Katip Chelebi (1609-1658) on geography, *Jihannuma*, wrote an introduction to it where he mentioned the Copernican system in a great detail, Ibrahim Muteferrika, who was well aware of the religious reactions against the Copernican system in Europe, acted very cautiously commenting in his introduction that religion, i.e. Islam, made no explicit statement on this issue. The work had received no negative reactions comparable to Europe. Consequently a year later Muteferrika discussed the same issue in the translation of the *Atlas Coelestis*, which he translated upon a request from Mahmud I. *Durret Zici* was translated in 1772. This work was concerned European astronomy and was followed by *Cassini Ziji*. Later it was followed by *Lalande Ziji*, which was translated between 1808-1839. The purpose in the translation of astronomical tables was to meet the needs of daily and otherwise astronomical calculations in the most exact way. The Ottoman scholars of astronomy and calendar making had been traditionally relying on the *Ulugh Bey Zij*. Yet the more exact, i.e. that which had been produced by European observatories superseded his astronomical tables. A new observatory was built in Istanbul by Taqi al-Din al-Râsid (d. 1585) to correct the mistakes and implements of deficiency of the Astronomical tables of *Ulugh Bey* in about 1577. Yet this observatory was destroyed for political reasons after a few years of activity. As a result the astronomical tables of *Ulugh Bey* continued to be used until the middle of the eighteenth century.<sup>8</sup>



*Figure 1. A fountain in the Topkapi Palace, Istanbul (@Salim Ayduz).*

<sup>8</sup> Salim Ayduz. "Ulugh Bey Zic'nin Osmanlı Astronomi Calismalarındaki Yeri ve Onemi", *Bilig*, Ankara, Spring 2003, issue 25, 139-172.

Cinari Halifezade Ismail Efendi translated Cassini's *Tables Astronomiques* (Paris 1740) with the title of *Tuhfe-i Behic-i Rasini Tercume-i Zic-i Kasinî* in 1770<sup>9</sup>. This work was translated with the purpose of correcting the mistakes of Ulugh Bey's classical work while it was used in the new observatories<sup>10</sup>. This work has also contributed to the introduction of logarithm to the Ottoman world.<sup>11</sup> Sooner after the translation of the work the chief astronomer in the palace begun to rely on it.

Another work which mentions the Copernican system is by Erzurumlu Ibrahim Hakki in his encyclopaedic work, *Marifetname*. Hakki discusses general sciences, astronomy, astrology, medicine, geography as well as several religious disciplines. Ibrahim Hakki advocated that as Islam did not have a standpoint contradicting the Copernican system, and as the Copernican system is based on scientific observation, it should be accepted as valid.

## 2. Medicine

The Ottoman doctors inherited the concept of classical medicine based on Islamic sources and wrote works that include their own experiences. However, they were also aware of the then developing modern medicine in Europe, and followed it closely. Beginning in the 18<sup>th</sup> century they translated some of the newly written medicine books in Europe. It is, however, only in the last quarter of the 19<sup>th</sup> century they caught up to the age of modern or scientific medicine.<sup>12</sup> While maintaining classical Islamic medicine on the one hand, the Ottoman doctors translated modern European medicine and tried to incorporate both. Abbas Vesim b. Abdurrahman Efendi (b.1760) is the leading doctor, in this context, who carried out serious studies and produced outstanding works. His *Dusturu Vasim fi tıbb al-jadid wa'l-kadim*,<sup>13</sup> *Vasilat al matalib fi ilm al-tarakib*<sup>14</sup> and *Tıbb-i Kimya-i jadid* are among those written in this subject and in their bibliographies both Islamic medicine books and that of Europe were cited.



**Figure 2.** Chief Physician (Topkapi Place Museum Library).

<sup>9</sup> Kandilli Rasathanesi Library, Nr. 200.

<sup>10</sup> Adnan Adivar, *Osmanlı Türklerinde İlim*, Istanbul 1982, 199-201.

<sup>11</sup> Salih Zeki, *Kâmus-u Riyaziyyât*, Istanbul 1315, I, 315-318.

<sup>12</sup> R. Murphy, "Ottoman Medicine and Transculturalism from the Sixteenth through the Eighteenth Century", *Bulletine of History of Medicine*, LXVI, 1992, 376-403.

<sup>13</sup> Bâyezid Devlet Library, no. 4097; Ragip Pasa Library, no. 946, no. 947, I-II volume.

<sup>14</sup> University of Istanbul, Tip Fak., Tip Tarihi Library, TY, no. 235.

Chief Physician Suphizade Abdülaziz Efendi (b. 1783) is another eminent doctor who transferred knowledge from Europe in an authentic way. Abdülaziz Efendi translated Herman Boerhaave's aphorisms into Turkish with the name *Kitaat-i Nakaha fi Tarjama-i Kalimat-i Boerhaave*. The most important aspect of this translation is that it mentions the blood circulation in such a broad manner in Turkish.<sup>15</sup>

### 3. Geography

The Ottomans followed the developments in Europe concerning geography also. European geographic discoveries were followed and works written in this subject were translated in short periods. Ottoman scientists, who translated some geographical works beginning from the 15<sup>th</sup> century, began to write other works in this subject by benefiting from some of the compiled works in Europe. The *Jihannuma* by Hajji Khalifa, known as Katip Chelebi by the Ottomans, which was written by benefiting from not only Islamic sources but also European works, was updated with the addition of some modern topics and published by Muteferrika in 1732.<sup>16</sup> After this work, *Tarjama-i Kitab-i Cografya* is another book that entered the Ottoman intellectual world by direct translation from European sources. *Geographia Generalis in Qua Affectionnes Generalles Telluris Explicantur*, the work of Bernhard Varenius, who is one of the leading figures of physical geography in Europe, with the order of Köprülüzade Ahmed Pasha, was translated into Turkish by Osman b. Abdülmennan in 1751. Apart from this work Osman b. Abdülmennan translated many works from European languages. Among these there is a work of Pierre-Andre Mathidi pertaining medicine. Moreover, he prepared in Turkish a work concerning geometry, *Hadiyyat al-Muhtadi*, which also covers topics related to artillery and ballistics between 1770-1774. The book, to a great extent, is a translation-compilation work and was prepared by means of German and French sources. The most important aspect of this book is that it is one of the first translations from European languages<sup>17</sup>.

Again in the same period, Petros Baronian translated Jacques Robbs' *La Methode Pour Apprendre Facilement La Geographie* in the name of *Risala-i Cografya (Fan-numa-yi Jaam-i jam az-Fann-i Cografya)*.

### 4. Military Technology

During the last quarter of the eighteenth century several engineering schools were opened in Istanbul where European engineers served as instructors. The first engineering school (Imperial School of Naval Engineering) was opened in 1774 while the second (Imperial School of Military Engineering) was opened in 1795. The European instructors who introduced modern disciplines in these schools had also contributed to the introduction of modern sciences to the Ottoman Empire in general.<sup>18</sup>

Prior to the declaration of Tanzimat, there was a need for medical science, astronomy and other modern disciplines. The state needed in particular modern knowledge in the fields of military technology.

<sup>15</sup> Adivar, *ibid*, p. 190.

<sup>16</sup> Fikret Saricaoglu, "Cihannümâ ve Ebûbekir b. Behrâm ed-Dimeskî-Ibrahim Müteferrika", *Prof. Dr. Bekir Kütükoglu'na Armagan*, Istanbul 1991, 1121-142; Aydüz, "Lâle Devrine Yapılan İlmî Faâliyetler", 143-170.

<sup>17</sup> E. Ihsanoglu, "Ottoman Science in the Classical Period and Early Contacts with European Science and Technology", *Transfer of Modern Science and Technology to the Muslim World*, ed., E. Ihsanoglu, Istanbul 1992, 1-48; R. Sesen, "The Translator of the Belgrade Council Osman b. Abdülmennan and his Place in the Translation Activities", *Transfer of Modern Science and Technology to the Muslim World*, ed., E. Ihsanoglu, Istanbul 1992, 371-383

<sup>18</sup> Kacar, *ibid*.





*Figure 3. Justice Tower of Topkapi Palace, Istanbul.*

The French engineer L. Claude (d. 1792) who taught in the navy engineering school in Istanbul between 1784-1788 wrote a text book to be used in the instruction of engineering students in the school. The title of this work is *Usulu Maarif fi tartibil ordu ve tahsinihî muvakkatan*. This book was published in 1786-1787 at the print house of the French Consulate.

### III. THE ROLE OF SULTANS AND STATESMEN IN THE TRANSLATION EFFORT

Both the Sultan and the statesman of the time had encouraged the translation of scientific work from European languages with the purpose of increasing of the familiarity of the Ottomans with Western science and new developments. During the Tulip Age, Sultan Ahmed III and Grand Vizier Nevsehirli Damat Ibrahim Pasha commissioned translations of certain works to teams of scholars and encouraged some scholars specifically to make translations. Yanyali Esad Efendi translated for instance *Kitâb al-samâniya fî simai't-tabîî* on a request from Ibrahim Pasha and Sheikh al-Islam Abdullah Efendi.<sup>19</sup> The three chapters of this classical book on physics was translated by a team under Esad Efendi from Greek to Arabic with the title of *Tarjamat al-Mucallad al-Samaniye li-Aristoteles*<sup>20</sup>. Another work, which was written by the encouragement of Ibrahim Pasha is *Safaratnama-i Fransa*, which is written by Yirmisekiz Mehmet Celebi (d. 1732). Celebi who visited Paris on an official trip presented his observations to Ahmed III and Ibrahim Pasha<sup>21</sup>. With an enjoyable and informative style, he also included pictures in his works.

<sup>19</sup> BA, *Mühimme Defteri*, 132, sh. 91; BA, D. CMH, Bâb-i Defteri, Cizye Muhasebesi Kalemi, Genel Defter no. 26727; H. Ziya Ülken, *Uyanis Devirlerinde Tercümenin Rolü*, Istanbul 1935, 203-213; Mahmut Kaya, "Some Findings on Translations Made in 18<sup>th</sup> Century from Greek and Es'ad Efendi's Translation of the Physica", *Transfer of Modern Science and Technology to the Muslim World* (ed. E. Ihsanoglu), Istanbul 1992, p. 387.

<sup>20</sup> Library of Istanbul University, AY, no. 534; Süleymaniye Library, Esad Ef., no. 1936 and 1939; Hamidiye, no. 874; Ragip Pasa, no. 680 (824); Besir Aga, no. 414.

<sup>21</sup> *Yirmisekiz Çelebi Mehmed Efendi Sefâretnâmesi*, (ed. A. Uzman), Istanbul 1975, 5-8; F. R. Unat, *Osmanli Sefirleri ve Sefaretnameleri*, Ankara 1987, 53-58.



Figure 4. The first pages of Hajji Khalifa's book *Jihannuma*, Suleymaniye Library, Istanbul.

Ibrahim Muteferrika, the founder of the printing house in the Ottoman Empire was familiar with European languages. Ahmed III and Ibrahim Pasha supported him. Muteferrika held a wide knowledge about the printing houses, machines and books published in Europe. He brought some of the important books from Europe for translation into Turkish. In addition to the works mentioned above, he translated another book to Turkish; *Macmuat al-Hay'at al-Kadima va'l-Jadida*<sup>22</sup>. This is the translation of the work of the Dutch scholar Andreas Cellarius, *Atlas Coelestis*, which was written originally in Latin<sup>23</sup>. This book was translated on an order from Ahmed III, and was completed in 1733. Muteferrika was unsuccessful in his effort to publish this book<sup>24</sup>. The other translation Muteferrika made is *Judasz Tadeusz Krusink's* Latin work on the history of the Safawid Empire between 1500-1720. It was translated and published by Muteferrika 1729 with the title of *Târîh-i Sayyâh dar Bayân-i Zuhûr-i Agvaniyân ve Sabab-i Inhidam-i Binâ-i Dawlat-i Shâhân-i Safawîyân*<sup>25</sup>. In addition Muteferrika made a concise translation of a book, which was originally published in Leipzig. The work is entitled *Fuyuzati Miknâtiyya* and concerns compasses<sup>26</sup>.

Another translator who worked by the encouraged of Ibrahim Pasha is Tercuman Osman Aga who was familiar, besides other European languages, with Hungarian and German. Osman Aga made a translation on the history of Austria in 1722, which was titled as *Nemce Tarikhi*.<sup>27</sup>

Grand Vizier Koca Ragip Pasha who was interested in modern European physics wanted the translation of *Elements de la philosophie de Newton*<sup>28</sup>. We cannot verify whether the translation was realised or not, yet even the suggestion serves as an indication to the interest of Ottoman statesman in modern sciences.

In general the Sultans, Grand Viziers and other statesman adopted a supportive attitude toward the introduction of modern sciences to the Ottoman State. Nevertheless the interest of the state did not go beyond a particular level of scholarship. The concentration of the state was not transferring European science as a whole; instead it was on the practical needs of running the state. Considering translations from

<sup>22</sup> Nûshası, Askeri Müze Library, no. 5203.

<sup>23</sup> "Cellarius, Andreas", *Biographie Universelle*, VII, Paris 1813, p. 504; Copy of translation: Istanbul Library of Military Museum, Nr. 5302.

<sup>24</sup> Adivar, *ibid*, 172-173.

<sup>25</sup> Süleymaniye Library, Resid Ef., no. 1119 ve Yazma Bagislar, no. 2415; Türk Tarih Kurumu Library, no. 649.

<sup>26</sup> Şahabettin Demirel, "Ibrahim Müteferrika'nın Füyûzât-i Miknâtiyye (Miknâtişin Yararları) Adlı Kitabı", AU, DTCF 1982, Ankara: *Atatürk'ün 100. Doğum Yılına Armagan Dergisi* (1982), 265-330.

<sup>27</sup> Köprülü Library, Hacı Ahmed Pasa, no. 220, p. 1.

<sup>28</sup> A. Toderini, *De la Literature des Turcs*, trans. A. Cournand, I, Paris 1789, p. 118.

European languages during the 18<sup>th</sup> century it not possible to say that the state had a systematic policy towards translations. However, we see that developments in Europe were followed, translated and transferred due to the practical benefits of this.

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