LUIGI FERDINANDO MARSİLİ'NİN BİLİMSEL YAŞAM HİKAYESİ

A SCIENTIFIC BIOGRAPHY OF LUIGI FERDINANDO MARSILI

Emin ÖZSOY[1], Nadia PINARDI[2], Franca MORONI[3]
[1]Inst. Of Marine Sciences, Middle East Technical Univ., Mersin, Turkey
[2]Dept. of Environmental Sciences, Univ. Of Bologna, Ravenna, Italy
[3]Dept. of History, Univ. of Bologna, Bologna, Italy
ozsoy@ims.metu.edu.tr

ÖZET: Doğa bilimlerine çok yönlü yaklaşımı çerçevesinde, Luigi Ferdinando Marsili'nin kısa bilimsel yaşam öyküsü sunulmaktadır.

ABSTRACT: A short scientific biography of Luigi Ferdinando Marsili is presented, emphasizing his multi-faceted approach to natural sciences.

Scientific Life of L. G. Marsili

Luigi Ferdinando Marsili was born in Bologna the 20th of July 1658 to an aristocratic family, and was the third of six children. His life may be divided into two parts, before and after 1682, the year in which he started his military career. His early life and scientific work on the Bosphorus are reviewed in Pinardi (2009) and Soffientino and Pilson (2005). A biography of Marsili in relation to 17th century European politics can be found in Stoye (1994). Biographies of Marsili have been given earlier by Lovarini (1934) and Moroni (2003).

His brother, Antonio Felice Marsili, erudite priest and man of letters, played a fundamental role in Luigi Ferdinando's cultural education, introducing him to the various scientific and literary academies formed in the second half of the seventeenth century. Antonio Felice attempted to revitalize the University of Bologna by proposing the philosophical and scientific methods proposed by Galileo Galilei, and supported the intellectual forums (*accademie*) that began from 1660 in Bologna. Luigi Ferdinando Marsili's passion for natural history and scientific and mathematical methods can be traced back to the education he received from his brother.

Fig. 1. Three portraits of Luigi Ferdinando Marsili.

In the years between 1660 and 1700, Bologna was a hotbed of reformist aspirations aiming at transforming the old systems of power and how culture was managed. This ferment, which was barely tolerated by the Catholic Church authorities governing the city, was nourished by the work of key intellectuals of the Galilean School such as Marcello Malpighi (1628-1694), Geminiano Montanari (1633-1687) and Cassini (1625-1712). Responsibility for Luigi Ferdinando's education was handed to Malpighi and Montanari, along with Lelio Trionferri, who was a professor of natural history. Thanks to their teaching, Luigi Ferdinando

acquired a passion for science applied to the solution of concrete problems through field experiments and direct observation of natural phenomena.

Between 1674, when he was sixteen, and 1677, Marsili travelled with his father, visiting Venice, Padua, Rome, Naples, Pozzuoli, Livorno and Lucca. He frequented intellectual circles in these cities, which gave him the opportunity to meet Giovanni Alfonso Borelli (1608-1679), an outstanding scientist of this period. This long travelling period in his youth, led Marsili to appreciate both the exchange of views between scientists and men of letters and the importance of direct observations of the natural phenomena.

Marsili returned to Bologna at the age of nineteen. Upon the death of his mother he decided to go to Padua to study under Geminiano Montanari. He enrolled at the University there but never graduated. He returned once again to Bologna in 1679, and found it difficult to find any employment that satisfied him; in July of 1679 he decided to accompany Pietro Civran, the ambassador of Venice to Constantinople. For eleven months he was to play the part of an erudite traveller, scientist, engineer and military strategist. He would stay in this role up to the end of his life. During his time in Constantinople he set himself to learn Turkish, and met physicians, geographers and historians. He returned to Venice in 1680 after an adventurous overland journey through the plague-ridden Balkans. His father died at the end of 1680, and Marsili returned to Bologna only to move to Rome shortly afterwards, where, in 1681, he and Luca Antonio Porzio (1637-1715), the neapolitan physician and naturalist, carried out a laboratory experiment to show the mechanism associated with the opposing currents in the Bosphorus. Immediately thereof Marsili published the *Osservazioni intorno al Bosforo Tracio* in the form of a letter addressed to Queen Christina of Sweden (1626-1689).

Marsili's other natural science investigations included Lake Garda, the Danube and Nile rivers, the coasts of Adriatic and the Gulf of Lyons. His later treatise (Marsili, 1725) examining morphology, seawater properties, waves, currents, tides and the biology of the sea is accepted as the first scientific book on oceanography. From 1682 to 1704 Marsili served the Holy Roman Emperor, Leopold I, as a soldier (see accompanying paper). It is this period in the Balkans that led him to his extensive study of the Danube region.

At about the turn of the 18th century, intellectuals exercised frank communications across religious, social or linguistic barriers especially through emerging scientific societies such as the *Royal Society* of London and *Académie des Sciences* of Paris, through their respective periodicals *Philosophical Transactions* and *Journal des Savants* (Rappaport, 1997). Marsili seeked admittance in these societies. He was introduced to Edmond Halley of the Royal Society in London by a letter from the secretary of the British embassy in Vienna, who enclosed a letter from Marsili claiming that he had 'mastered the anatomy of Danube and was able to provide the Society with maps and an account of the geography and natural history of the region'. Marsili was elected a Fellow of the Royal Society in 1691 for his offer of reliable information from hitherto closed parts of Ottoman Europe, which was exactly the information seeked by the English, to map new 'conquests' of Slavonia and Serbia from the Ottomans. Marsili's employment as secretary to the English ambassador to the Ottoman Court in 1691 in Vienna led to his admittance

(McConnell, 1993). Marsili's first book on the Danube, the *Danubius Operis Prodromus*, a slim volume dedicated to the Royal Society, was published at Nuremberg in 1700, dedicated to the Royal Society. The more complete book had to wait about 30 years, during which time Marsili became entangled in power politics of the English and Austrians, visited Istanbul for a second time, assigned the job of mapping the new territories, and finally disgracefully discharged from the Habsburg Emperor's service. In 1706 he settled in France, and became a foreign member of the French Academy in 1715. In 1721 Marsigli visited England and Holland, and in London he was formally admitted as an Honorary Fellow of the Royal Society having been recommended by Isaac Newton (1642-1727). *Danubius Pannonico-Mysicus* was eventually published in Holland and the Royal Society received its copy in 1727.

The time spent in Holland led to the publication of the three works of his maturity, *Histoire physique de la mer*, *Danubius Pannonico-Mysicus* and the *Stato militare dell'Imperio Ottomano*, published in 1725, 1726 and 1732 respectively. The three most important of Marsili's works dealing with science and natural history, *Osservazioni intorno al Bosforo Tracio*, *Histoire physique de la mer* and *Danubius Pannonico-Mysicus*, laid the foundations for modern oceanography.

During the second period of his life Marsili first went to Switzerland and France, spent time in Marseille to study the sea and equipped his little house in Cassis near Toulon to perform chemical analyses, which served as the basis for his later publication of *Histoire physique de la mer* (Quincy, 1741, Mills 2001), and later returned to Bologna, where he continued to move in diplomatic circles and conduct scientific research in natural history (Cavazza, 1980, 1990, 1995, 2002). He founded the Istituto delle Scienze, to which he donated all of his rich collection of scientific and learned material. The Istituto was inaugurated the 11th of January 1712 and, a few years later, in 1714, it merged with the Accademia degli Inquieti (founded 1690) to become the Accademia delle Scienze dell'Istituto di Bologna, attached to the University of Bologna. Later Marsigli established a printing-house furnished with the best types for Latin, Greek, Hebrew, and Arabic. This was put in charge of the Dominican Order, and placed under the patronage of St. Thomas Aquinas. In 1727 he added to the collections the East India material that he collected in England and Holland. Dedicated only to experimental sciences, medicine and physics-mathematics, the Istituto delle Scienze and the Accademia delle Scienze caused an increasing awareness in Bologna of the theories of Malpighi, Descartes and Newton and the doctrines of Copernicus, Galileo and Bacon. The Institute's approach to the practical applications of research was also different from what had often come before: it soon created a new centre of midwifery training and, following interest from Benedict XIV (1675-1758), favoured surgery with the creation of a school specializing in the treatment of kidney stones.

Luigi Ferdinando Marsili died in Bologna in 1730.

Fig. 2. Aula Magna, Biblioteca Universita Bologna.

ACKNOWLEDGEMENTS

We thank the director and personnel of the Marsili Museum, University of Bologna (Fig. 2), where most of the Marsili archives are kept, for their support and supply of materials.

REFERENCES

CAVAZZA, M., 1980. Bologna and The Royal Society in the seventeenth century, Notes Rec. R. Soc. Lond. 35, 105–123.

CAVAZZA, M., 1990. Settecento inquieto, il Mulino, Bologna.

CAVAZZA, M., 1995. Malpighi and the Royal Society, in: Universal Scientist Marcello Malpighi.

CAVAZZA, M., 2002. The Institute of Science of Bologna and The Royal Society in the eighteenth century, Notes Rec. R. Soc. Lond., 56, 3-25.

FRANCESCHELLI, C., MARABINI, S., 2006. Luigi Ferdinando Marsili (1658–1730): A pioneer in geomorphological and archaeological surveying Geological Society of America Special Papers January, 411, p. 129-139.
LOVARINI, E. (ED.), 1930. Autobiografia di Luigi Ferdinando Marsili messa in luce nel secondo centenario della morte di lui dal Comitato Marsiliano (Autobiography of Luigi Ferdinando Marsili highlighted in 2nd centenary of his death by the Committee Marsili), Bologna, Nicola Zanichelli.
MARSILI, L. F. Memories of the Canal of Constantinople, Ms. 94, 1044, University of Bologna Library (undated).
MARSILI, L. F., 1724. Histoire Physique de la Mer, edited by Giorgio Dragoni, Amsterdam, 173 pp.
MILLS, E. L., 2001. 'Enlightened Natural History or the Beginnings of Oceanic Science?', Annals of Science, 58 (4), 403 – 408.
MILLS, E. L., 2009. The Fluid Envelope of our Planet: How the Study of Ocean Currents Became a Science, University of Toronto Press, Scholarly Publishing Division.
MORONI, F., 2003. Osservazioni intorno al Bosforo Tracio overo canale di Costantinopoli di Luigi Ferdinando MARSİLİ (1658-1730), PhD Thesis, University of Bologna, Faculty of Cultural Heritage, 154 p.
PINARDI, N., 2009. Misurare il mare. luigi ferdinando marsili nell'egeo e nel bosforo 1679-1680, bononia university press (collana grandi opere), 83pp.
QUINCY, L. D., 1741. Memoires Sur La Vie De Mr. Le Compte De Marsigli, De l'Academie Royale des Sciences de Paris & de Montpellier, De la Societé Royale de Londres, & Fondateur de l'Institut de Boulogne, Orell, Zurich, 234p.
STOYE, J., 1994. Marsigli's Europe: 1680-1730: The Life and Times of Luigi Ferdinando Marsigli, Soldier and Virtuoso, Yale University Press, New Haven, London.
SARTORI, R. 'Luigi Ferdinando Marsili, fondatore dell'oceanografia'. In: Quadricentenario della parola Geologia: Ulisse Aldrovandi 1603 in Bologna. Ed. G.B. Vai and W. Cavazza, Minerva Edizioni.
SOFFIENTINO, B., PILSON, M.E.Q., 2005. The Bosphorus Strait. A Special Place in the History of Oceanography, Oceanography, 18(2): 16-23.