RUĐER JOSIP BOŠKOVIĆ (May 18, 1711 – February 13, 1787)

by HEINZ KLAUS STRICK, Germany

On the Yugoslavian and Croatian stamps issued in honour of the polymath, the spelling RUĐER JOSIP BOŠKOVIĆ is uniformly used (RUĐER - pronounced Rudjer), but in the baptismal register one finds the Italian version RUGGERO GIUSEPPE BOSCOVICH.

RUĐER JOSIP BOŠKOVIĆ was born in Ragusa (today Dubrovnik in Croatia), a small, independent republic on the Adriatic coast.

From the 14th century, this republic asserted itself through a skilful policy of neutrality between the Ottoman Empire and the Habsburg Empire, which was growing stronger. After the defeat of the Ottomans in 1699, the powerful city-state of Venice unsuccessfully tried to isolate its trade rival on the Adriatic but it was only under NAPOLEON that the republic was dissolved.

RUĐER's father was a merchant from Dubrovnik, his mother the daughter of a merchant who immigrated to Dubrovnik from Bergamo (Northern Italy). The family was very religious; of the nine children (six boys, three girls), two joined the Jesuit order, one the Dominican order; one of the girls also joined a convent; only RUĐER's eldest sister married.

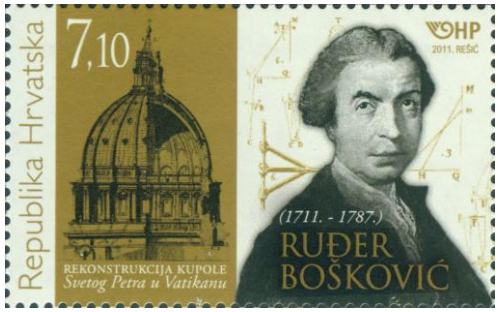
At the age of nine, RUĐER was admitted to the local Jesuit college *Regusinum* and at 14, the highly gifted student made his way to Rome, where he was allowed to enter the famous *Collegium Romanum* two years later.

When he finished his studies in theology, mathematics and philosophy at the age of 21, he was immediately employed as a teacher at the *Collegium Romanum* without any stops in between.

He began astronomical observations and in 1737 published the results of his measurements of Mercury's transit in front of the sun (*De Mercurii novissimo infra solem transitu*).

In the same year – parallel to his preparation for ordination to the priesthood – he wrote a work on spherical trigonometry and on the northern lights.

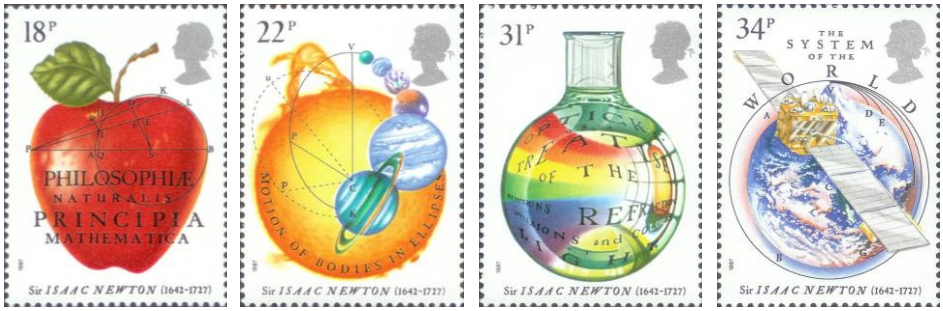
In 1740 RUĐER JOSIP BOŠKOVIĆ was appointed professor of mathematics at the *Collegium Romanum*; at the same time, the new pope commissioned him to investigate the cracks that had appeared in St. Peter's Basilica (he recommended in his report that an iron ring be placed around the dome and this was implemented).



He wrote a total of seventy works, some of them extensive, in various mathematical-physical fields. He wrote poems in Latin on scientific subjects, including *De solis et lunae defectibus* (On Solar and Lunar Eclipses).

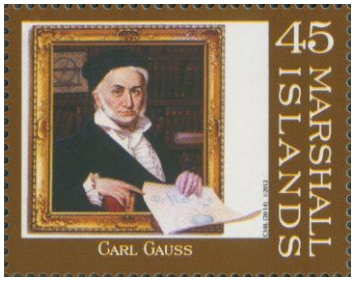
Today, more than 2000 letters of his correspondence still exist, among others with EULER, LAGRANGE, D'ALEMBERT and LAPLACE. He was always coming up with new ideas to improve astronomical instruments; for example, he made experiments with lenses filled with liquids to reduce the effect of chromatic aberration.

He intensively studied the writings of ISAAC NEWTON (1643 - 1727), especially the *Principia Mathematica* of 1687 and *Opticks* of 1704. He was the first scientist on the European continent to propagate NEWTON's theory of gravitation. Inspired by NEWTON's work, he investigated local gravitational fluctuations.



In 1750, he accepted the Pope's commission to measure the length of the meridian arc between Rome and Rimini (approx. 200 km) in order to determine the local radius of the Earth and thus obtain knowledge about the shape of the Earth and at the same time, he produced an excellent map of the Papal States.

He had to forego a similar commission to lead a Portuguese expedition in Brazil.



In order to "compensate" for the deviating measurement results, he developed the idea of minimising the sum of the deviations – in the documents of CARL FRIEDRICH GAUSS (1777-1855) one finds indications that he was inspired by BOŠKOVIĆ's work to develop "his" compensation calculation.

He developed a method of calculating the orbit of a planet or a comet from only three determinations of its position, and also a geometric method of determining the position of the equator of a planet from three observations of its surface, as well as the duration of its rotation. He applied this to the Sun by calculating the position of the equatorial plane from three measurements of a sunspot.

In 1752 he submitted a paper on observations of Saturn and Jupiter for the annual prize of the *French Academy of Sciences*; although he did not win the annual prize (LEONHARD EULER received it), the high quality of his work was particularly emphasised.

In 1758, he published his main work, the *Theoria philosophiae naturalis redacta ad unicam legem virium in natura existentium*, in which he – going beyond NEWTON's ideas – included not only forces of attraction but also forces of repulsion in his theory of gravitation.

He introduced the concept of the point mass into theoretical physics; his idea of a point-like atom without extent influenced science until the 19th century and his work inspired MICHAEL FARADAY (1791-1867) to develop an electric field theory.

Commissioned by the Pope, the linguistic polymath (he published works in Latin, Italian and French) mediated as a diplomat in a dispute between the Habsburgs and the Italian city states concerning the withdrawal of water from a lake in Tuscany.

His workload was so enormous that his health suffered as a result. In 1754, after his vicar-general described his work as "dangerous", he felt too restricted in his research at the *Collegium Romanum* and asked to be allowed to leave Rome. His first destination was Paris, where he attended the meetings of the *Academy of Sciences*. He continued to London, where he was elected a member of the *Royal Society*.

With diplomatic skill, he was able to convince the British government that his home town of Ragusa was not involved in the secret armament of the French fleet.

He proposed an expedition to the *Royal Society* to observe the transit of Venus in June 1761. He himself wanted to observe this event in Constantinople (Istanbul) – but there were delays on the journey there and he missed the event.

In 1764, he accepted a professorship in mathematics at the University of Pavia and at the same time, he was entrusted with the planning and management of an observatory in Milan (Brera).

In 1769, when the *Royal Society* wanted to appoint him to lead a Venus transit expedition to the Spanish colony of California, he became a victim of his affiliation with the Jesuit Order. For alleged or actual interference in politics, more and more European governments banned the Jesuits from their countries; Portugal (1759) was followed by France, Spain and the Kingdom of the Two Sicilies. Spain forbade BOŠKOVIĆ from entering California. – The newly elected Pope feared a schism in the Church and (temporarily) dissolved the Order in 1773.

BOŠKOVIĆ lost his posts in Pavia and Milan, emigrated to France and took up the post of "Director of Optics" in the French navy ("*Optique Militaire de la Marine Royale de France*") in Paris. Soon, however, he was involved in an unpleasant dispute about priorities concerning the astronomical instruments he had developed and was also massively attacked by the young PIERRE SIMON LAPLACE (1749-1827) because of the methods he had developed for dealing with errors in observation.

In 1782 he resigned, ended the activity that was no longer satisfying for him and returned to Italy (which he had always considered his home). In 1785 he published his *Opera pertinentia ad opticam et astronomiam* as a five-volume work; then, however, his physical and mental powers declined dramatically fast and he died in mental confusion in Milan.

An English musicologist who met BOŠKOVIĆ in Milan wrote: "... if all Jesuits were like this father, who uses the higher science and the work of mind to advance science for the happiness of mankind, then it were to be wished that this society were as durable as is this world."

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https://www.spektrum.de/wissen/ruggero-giuseppe-boscovich-1711-1787/956614

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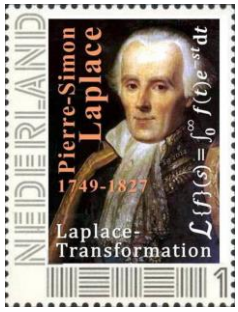

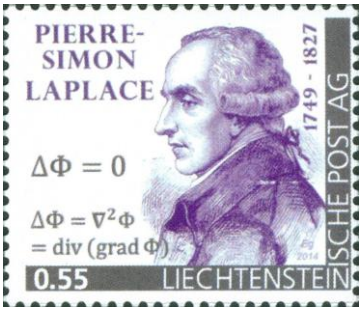

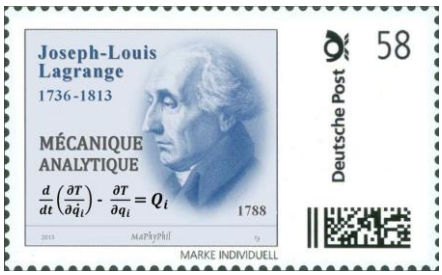

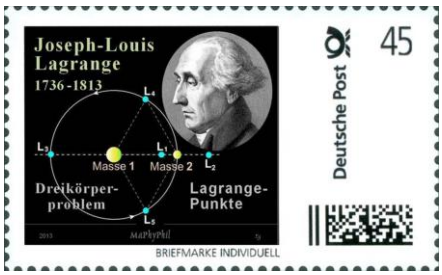

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