Great Hungarians in the history of mathematics and physics

Portrait of Sámuel Mikoviny by Sebestyén Zeller with the map of Hungary in his hand and the Castle of Bratislava in the background. Inscription: "*O Cara Patria quae me genuisti, dulcis Panonia*" - "Oh, my sweet homeland, who gave me birth, Pannonia".

Samuel Mikovíny (1686 - 1750) was a renowned mathematician, engineer, map maker, and professor. He was a leading representative of science and technology in the 18th century Kingdom of Hungary and Habsburg Monarchy. As county engineer of Bratislava (Pozsony) he devoted most of his attention to improvement works, especially anti-flood works on the banks of the river Danube to secure navigability.

Mikovíny also made a significant contribution to the making of a new map of the Kingdom of Hungary. He relied on his own measurements and used a scientific method, based on four basic principles: astronomical, geometrical, magnetic, and hydrographic.

Mikoviny was a leading expert on the construction of water reservoirs, mining machinery, foundries, and mills. He greatkly contributed to the development of mining in Upper Hungary, today central Slovakia, helping it to achieve a place among the most technically developed industries in Europe at that time.

Ignác Szentmártony (1718 - 1793)

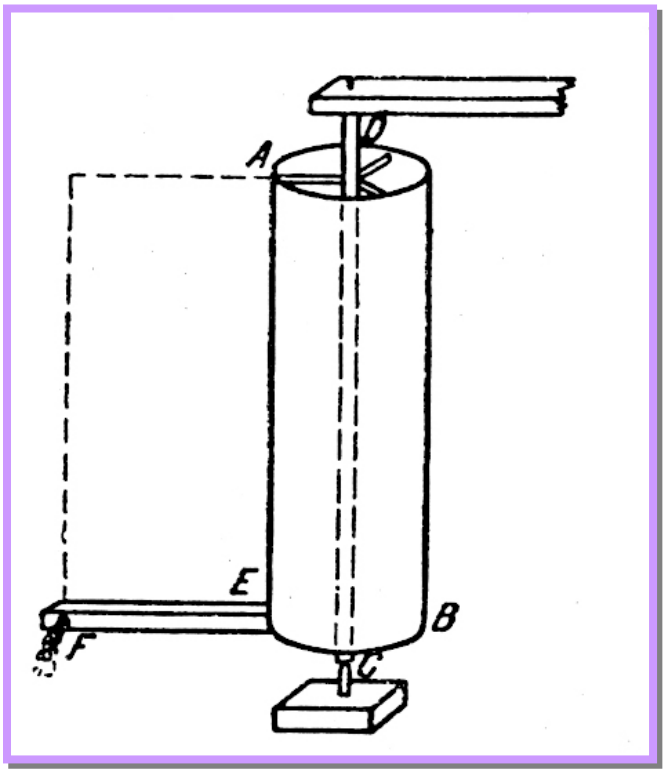
After graduating from secondary school he entered the order of Jesuits in Vienna in 1735. In Vienna and Graz he lectured in mathematics. By the year 1751, he was in Lisbon, Portugal where he obtained the title of royal mathematician and astronomer. With those credentials, he became a member of the expedition that worked on the rearrangement of the frontiers among colonies (Portugal and Spain), in South America. Szentmártony took part in expeditions to the Amazon and the Rio Negro and prepared the first maps of the area. Szentmártony remained a missionary and in 1760 he was deported with other Jesuits. He was released from the prison only in 1777 upon the intervention of the Austrian empress Maria Theresa.

Segner, János András (1704 –1777 Originally a doctor of medicine, Segner made major contributions in mathematics. His studies at Jena were so successful that he was soon offered a post at the university. He had the great distinction of becoming the first professor of mathematics at Göttingen taking up the chair in 1735. While at Göttingen, Segner discovered that every solid body has three axes of symmetry. He used Daniel Bernoulli's theoretical work on the 'reaction effect' to produce a horizontal waterwheel using the same principle which drives a modern lawn sprinkler. Segner's study of gyroscopic theory led to the formulation of Euler's equation of motion of rotating bodies, i.e. turbines.

This is the base of the known Segner's wheel, the ancestor of reaction turbines. This innovation is the basis of turning the blade-wheels of turbines by flowing water, gas or steam, driving by propellers.

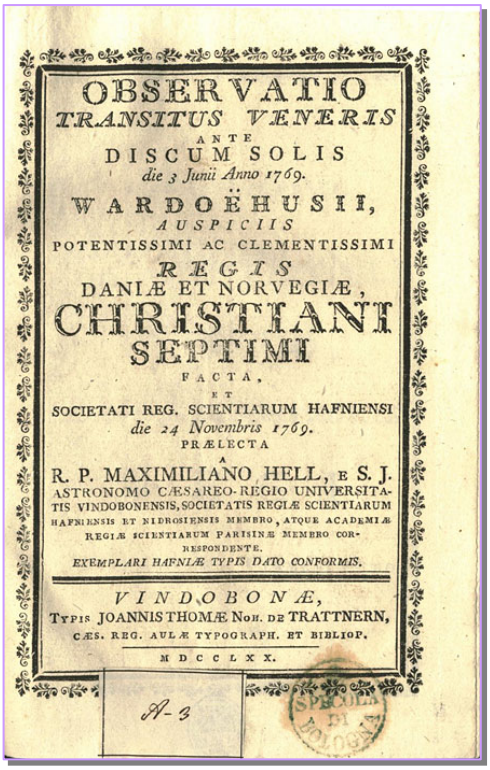
In 1751 Segner introduced the concept of the surface tension of liquids. Other work which he undertook included the theory of spinning tops. His publications include *Elements of Arithmetic and Geometry* and *Nature of Liquid Surfaces.*

From 1755 he taught mathematics, physics and astrology at the Halle University.



Segner's own drawing of the Segner Wheel.

Maximilian Hell [Höll] (1720 - 1792) - An astronomer and an ordained Jesuit priest, Hell became the director of the Vienna Observatory in 1755. He published the astronomical tables Ephemerides astronomicae ad meridianum Vindobonemsem ("Ephemerides for the Meridian of Vienna"). He went to Vardø in the far north of Norway (then part of Denmark) to observe the 1769 transit of Venus. There was some controversy about Hell's observations because he stayed in Norway for eight months, collecting non-astronomical scientific data about the arctic regions for a planned encyclopedia. The publication of his results was delayed, and some accused Hell posthumously of falsifying his results. He was exonerated a century after his death in Vienna.


OBSERVATIO
TRANSITUS VENERIS
ANTE
DISCUM SOLIS
die 3 Junii Anno 1769.
WARDOËHUSII,
AUSPICIIS
POTENTISSIMI AC CLEMENTISSIMI
REGIS
DANIÆ ET NORVEGIÆ,
CHRISTIANI
SEPTIMI
FACTA,
ET
SOCIETATI REG. SCIENTIARUM HAFNIENSI
die 24 Novembris 1769.
PRÆLECTA
A
R. P. MAXIMILIANO HELL, E S. J.
ASTRONOMO CÆSAREO-REGIO UNIVERSITATIS VINDOBONENSIS, SOCIETATIS REGIÆ SCIENTIARUM HAFNIENSIS ET NIDROSIENSIS MEMBRO, ATQUE ACADEMIÆ REGIÆ SCIENTIARUM PARISINÆ MEMBRO CORRESPONDENTE.
EXEMPLARI HAFNIÆ TYPIS DATO CONFORMIS.
VINDOBONÆ,
TYPIS JOANNIS THOMÆ NOB. DE TRATTNERN,
CÆS. REG. AULÆ TYPOGRAPH. ET BIBLIOP.
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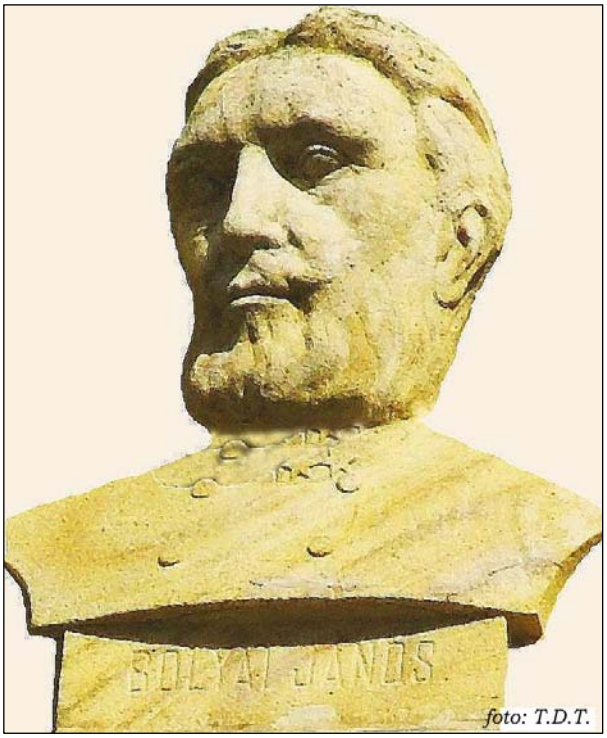
Besides astronomy, Hell also had an interest in magnet therapy (the alleged healing power of magnets), although it was Franz Anton Mesmer who went further with this and received most of the credit.

The crater Hell on the Moon is named after Hell.

Farkas Bolyai (1775 - 1856) Farkas Bolyai was educated in Nagyszeben from 1781 to 1796 and studied in Germany during the next three years at Jena and Göttingen, where he began a lifelong friendship with Carl F. Gauss. From 1804 to 1853 he was professor of mathematics at Marosvásárhely. His primary interest was in the Euclidean parallel postulate. His principal work, the Tentamen (1832–33), inspired by his mathematically gifted son János, is an attempt at a rigorous and systematic foundation of geometry (Vol. I) and of arithmetic, algebra, and analysis (Vol. II).

János Bolyai (1802 - 1860)



János Bólyai as appearing on a relief of the Culture Palace in Marosvásárhely (Tirgu Mures, Romania)

Bolyai was educated by his father, famed matmematician Farkas (Wolfgang) Bolyai, in Maros-vásárhely and by the time he was 13 had mastered calculus and other forms of analytical mechanics. Bolyai also became an accomplished violinist and he performed in Vienna. He received military training and studied at the Imperial Engineering Academy in Vienna from 1818 to 1822. He soon joined the army engineering corps in which he spent 11 years. He was an accomplished linguist speaking nine foreign languages including Chinese and Tibetan.

János Bólyai's absolute geometry laid the foundations of modern geometry by resolving the 2000 year old problem of geometry. It opened new horizons in mathematics, physics, and even in philosophy since it refuted the Kantian concept of "a priori space." Bolyai was plagued with a fever which frequently disabled him and in 1833 he was pensioned off from his army career. Although he never published more than the 24 pages of the Appendix, he left more than 20000 pages of manuscript of mathematical work when he died. These are now in the Bolyai-Teleki library in Marosvásárhely (Tirgu-Mures).

The tomb of Bolyai and his father at Marosvásárhely

Baron Loránd Eötvös - (1848 - 1919)

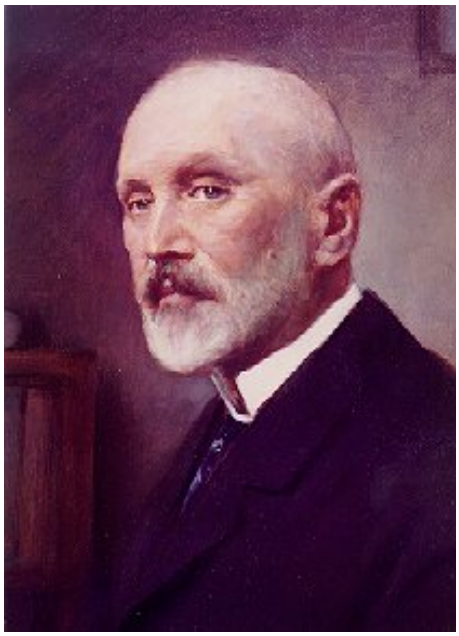
The first torsion balance field measurements carried out by Eötvös on Ság Hill of Transdanubia in August 1891 (courtesy of Eötvös Loránd Geophysical Institute)

The son of a progressive writer and politician, Eötvös graduated of law first, but in 1867 he entered the university in Heidelberg and studied physics, mathematics and chemistry. After a short period of lecturing at the Pest University (now bearing his name), in 1872 the king awarded him chair of theoretical physics. In 1874 he was allowed to give lectures in experimental physics and four years later he became professor. He was then appointed as director to the newly established physical institute. In 1889 he was elected president of the Aacademy of Science.

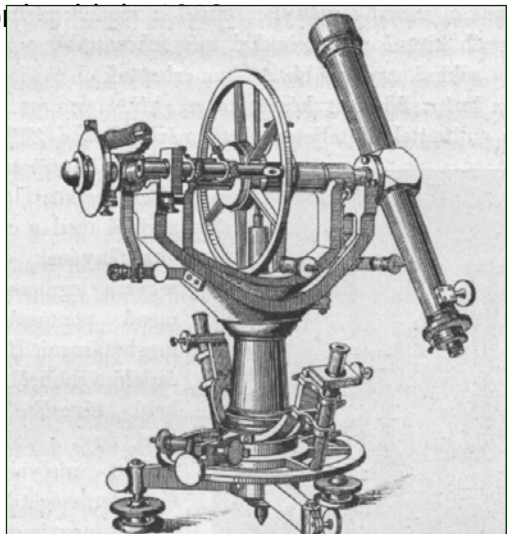
Eötvös was acclaimed and received several awards at home and abroad for his scientific work including the French Legion of Honour, the Franz Josef award from the Hungarian king, and the Saint Sava award from the king of Serbia. He was also elected honorary member of the Prussian Royal Academy of Sciences in Berlin and was given honorary doctorates from the Jagello University in Cracow and the Norwegian Royal Frederick University in Christiania (now Oslo).

Eötvös founded the Hungarian Society for Mathematics in 1885 and after physicists also wished to be part of the Society, he founded the Mathematical and Physical Society in 1891. Eötvös gained the reputation as one of Europe's most famous mountaineers. In the Dolomites there is a peak named after him. Climbing also fitted in with photography, another of Eötvös's several hobbies.

Scientific literature and usage bears ample evidence of his inventions: the *Eötvös Law of Capillarity;* the *Eötvös Unit of Gravitation* (roughly one-billionth of a gram); the Eötvös Gravitational Torsion Balance of almost incredible sensitivity; the *Eötvös Effect:* and inventions of instruments for measuring terrestrial magnetism for decades to come. The torsion balance made it possible to explore for natural resources like oil, coal, and different ores. Eötvös also recognized the correlation between surface tension and molecular weights of liquids measured at various temperatures. This led to the *Law of Eötvös* which was declared by Einstein to be one of the pillars of his theory of relativity and was applied in his "theory of equivalence."



Gyula Fényi (1845 – 1927) a Hungarian Jesuit and astronomer was born in Sopron, Hungary, the eleventh child of a merchant family. In 1864 he became a member of the Society of Jesus. He studied at the university at Innsbruck beginning from 1874, where he trained in theology, mathematics and physics. After completing his studies in 1878, he would return to teaching and also serve as an assistant at the Haynald Observatory in Kalocsa. In 1885 he became the director of the observatory, and would remain at this post until retiring due to poo



One of Fényi's telescopes

Fényi Gyula was noted for his observations of the Sun, including spectroscopic studies of solar prominences, as well as sun spots. He was the first person to demonstrate a correlation between the number of solar prominences and the number of sun spots. Between 1880 until 1919 he assembled over 6,000 drawings of the Sun, all using the same instrument. He published over 200 scientific papers in several languages. In 1916 he was elected a corresponding member of the Hungarian Academy of Sciences.

The Fényi crater on the Moon was named after him.