Science and Mathematics

Motto:
Blessed Franciscus Borgia By His Virtue Ennobles His Lineage.
Subscriptio:
O, Nothing: but it thus makes numbers numberless. Just as a single letter adds its weight to numbers, so a single virtue gives value to everyone. Virtue added to lists establishes from nothing innumerable numbers.

In Jesuit schools, the natural sciences were a subset of philosophy—hence the term natural philosophy—with an emphasis on the works of Aristotle. The natural philosophy curriculum thus focused on physics, which meant questions of matter, motion, and cosmology. Mathematics would have remained another subset of philosophy if not for the efforts of Christoph Clavius, named the "Euclid of the Sixteenth Century" by his contemporaries, who championed the inclusion of a separate chair of mathematics in the Ratio studiorum. The professor of mathematics would generally teach the elements of Euclid, then proceed to more difficult applications of geometry. The most able students could advance to work on astronomy, optics, geography, or music.

Astronomy was the area in which Jesuit scientists most excelled. By the end of the seventeenth century, there were observatories in almost every Jesuit college in France, as well as important observatories in Lisbon, Vienna, Milan, and Prague. By the middle of the eighteenth century, Jesuits ran thirty of the world's one hundred and thirty astronomical observatories.

Christoph Clavius (1538-1612) used his knowledge of astronomy and mathematics to complete the Gregorian calendar reform, as well as write a treatise on the construction of sundials; his work on Euclid became the standard geometry text in Jesuit colleges.

Matteo Ricci (1552-1610) translated many of Clavius's works into Chinese, thus extending the influence of this Jesuit master to China.

Christoph Scheiner (1573-1650) discovered sunspots independently of Galileo and explained that the apparent elliptical form of the sun when near the horizon was due to atmospheric refraction of light. His invention for enlarging and reducing drawings and maps, the pantograph, can still be purchased in a stationary store today.

Giovanni Battista Ricciolio (1598-1671) published the first dependable selenograph (lunar map), which now stands at the entrance to the lunar exhibit at the Smithsonian Museum.

Athanasius Kircher (1601-1680), a remarkable polymath whose Museum in Rome delighted and astonished visitors of his day, could with equal skill discuss the layout of the solar system, music and harmony, geometry, or the surface of the sun.

Ruggero Giuseppe Boscovich (1711-1787), best known for developing the first coherent description of atomic theory, was renowned in his day for his skills in astronomy as well as geography, physics, and chemistry.

By their curiosity and ingenuity, Jesuit scientists contributed to the growth of mathematics and science. Jesuits were fully alive to the new influences at work in mathematics and the sciences; they were not simple followers of trends, but were often on the front lines of scientific and mathematical discovery. Descartes, the renowned philosopher recognized as well for his work in analytical geometry, was educated by the Jesuits and remained in communication with them throughout his life.

—Joseph MacDonnell, S.J. in *Ratio Studiorum: Jesuit Education, 1540-1773*
(John J. Burns Library, Boston College, 1999)

Figure 1.
Emblem 722
Imago primi saeculi Societatis Iesu
(Antwerp: Plantin Press, 1640)
Special Collections,
Saint Joseph's University