Boulliau, Ismael | Encyclopedia.com

(*b* Loudun, France, 28 September 1605; *d*. Paris, France. 25 November 1694)

mathematics, astronomy.

Boulliau was born of Calvinist parents, but he became a Roman Catholic at the age of twenty-one. About four years later, he was ordained a priest. His early studies had been in law and the humanities, but upon settling in Paris in 1633, he resumed an early interest in astronomical observation, a taste he had shared with his father. Therafter, he pursed a predominantly scientific career, becoming known as Clarissimus Bullialdus. In addition to the usual French and Latin spellings of his name, there were such variants as Bouillalds, Boulliaud, and Bulliald.

The Galilean storm broke during the very year that Bouliau joined the Parisian scientific circle. Arecent convert both to Catholicism and tom science, he nevertheless joined his friend Gassendi in support of Galileo. Boulliau's publication of the *Philolaus* in 1639 placed him squarely in the Copernican camp, although not yet as a Keplerian. In assuming that the sun stood still, so that he could retain uniform circular motions, Copernicus had been right for the wrong reason. So it was with Boulliau. In the *Philolaus*, Boulliau went further than Copernicus in suggesting the resolution of rectilinear accelebrated motion in free fall into two uniform circular components. His law of fall (equivalent to $s = k$ vers t) is in close agreement with the definitive Galilean formulation for small intervals of time only.

In 1645 Boulliau published his most significant scientific work, a more accomplished heliocentric treatise entitled *Astronomia philolaica*. He had now become one of the very few astronomers to accept the ellipticity of orbits, but he categorically rejected all those suggestions of variation in celestical forces which had made Kepler's *Astronomia nova* of 1609 more revolutionary, in a sense, than the work of Copernicus. As against Kepler's astrophysics. Boulliau preferred a geometrical astronomy which saved uniformity of circular motion. He asserted, however, that *if* a planetary moving force did in fact exists, then it should vary invesely as the square of the distance—and not, as Kepler had held, inversely as the first power. The inverse-square hypothesis, which Boulliau published in his *Astronomia philolaica*, evidently had been carried over from his *De natura lucis* of 1638, in which the inverse-square law for intensity of illumination, used earlier by Kepler, had appeared.

Rejecting all dynamic hypotheses, including the inverse-square hypothesis in astronomy, Boulliau proposed instead a kinematic representation of planetary motion in which a planet moved along a linear element of an oblique cone while the element in turn revolved uniformly about the axis of the cone. In this way, he reconciled ellipticity of orbits with uniformity of circular motion. Seth Ward modified the scheme shortly afterward in a hypothesis by which the motion of the planet is uniform as seen from the "blind" focus of the ellipse.

The *Astronomia philolaica* was one of the most important treatises written in the period between Kepler and Newton. In his *Principia*, Newton referred to Boulliau's inverse-square hypothesis and praised the accuracy of his tables (Bk. 3, Phen. 4). Boulliau was also highly regarded as a mathematician. Before he was thirty, he had prepared the first printed edition (1644) of the *Arithmetic* of Theon of Smyrna; in his fifties, he published (besides several minor works) the *De lineis spiralibus* (1657), a work inspired by Archimedes; and when he was more then seventy-five years of age, he published a ponderous *Opus novum adarithmeticam infinitorum* (1682), purporting to clarity the *Arithmetic infinitirum* of Wallis. The mathematical works of Boulliau had little influence on the development of the subject, however, because they were old-fashioned. He evidently failed to see the significance of the Cartesian contributions, whether to mathematics or to science, and seems pointedly to have avoided mentioning Descartes's name. Boul-liau's astronomical observations at Paris covered over half a century, but it has been ungenerously said that Boulliau's only permanent contribution to science id the word "evection" in astronomy. Nevertheless, it was Boulliau who, in his *Ad astronomos monita duo* of 1667, first established the periodicity of a variable star, Mira Ceti. His explanation of the phenomenon as a rotating semiluminous body or "half sun" was incorrect, but his estimate of the period as 333 days was accurate, exceeding by less than days that determined since then.

Boulliau was one of the last reputable scholars to maintain confidence in astrology. Among the works he edited were the *A stronomicon* of Marcus Manlius (1655) and the *De judicandi jacultate* of Ptolemy (1667). Despite all his publications, Boulliau's contribution to science should perhaps he measured less by his treatises and ideas then by his scientific activity. He rivaled Mersenne as a correspondent. He served as librarian, first to the brothers du Puy, then to de Thou, French ambassador in Holland, and ultimately to the Bibliothèque Royal in Paris. There he joined the groups which gave rise to the Académic des sciences. Although never elected to the Academy, in 1663 he was among the first foreign associates elected to the Royal society of London. It was to Boulliau that Huygens first entrusted his secret of the rings of Saturn and to him that he sent his earliest pendulum clocks. The distribution in Paris of Huygens" *System sarturnium* (1658) was entrusted to Boulliau; and it

was through Boulliau that Pascal's *Letters D'Amos Dettonville* (1658–1659) went to English and Dutch mathematicians. Prince Leopold in Italy and Hevelius in Danzig depended upon Boulliau to keep them informed of scientific news from Paris, although at times Boulliau was himself traveling to English or Poland or the Levant, seeking out manuscripts, books, and information.

BIBLIOGRAPHY

I. Original Works. Thirty-nine volumes containing Boulliau's unedited papers and correspondence are to be found in Paris (Bibliothèque National, fonds franc. 13019–13058). His published works include *De natura lucis* (Paris, 1638); *Philolaus*(Amsterdam, 1639); *Astronomia philolaica*(Paris, 1645); *De lineis apiralibus*(Paris, 1657);*Ad astronomos monita duo* (Paris, 1667); *Opus novum ad arithmeticam infinitirum* (Paris, 1682). He also edited works of Theon of Smyrna (Paris, 1644), Ptolemy, and Marcus Manlius, as noted in the text.

II. Secondary Literature. There is no biography of Boulliau. Some information on his life and work may be found in G. Bigourdan, *histoire de l'astromie d'observation et des observatoires en France*, pt. I (Paris, 1918), and in J. P. Niceron, *Mémoires pour sercir à l'histoire des hommes illustres dans la république des letters* (Paris, 1727–1745), Vol. I, X.

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