Kaestner, Abraham Gotthelf | Encyclopedia.com

(*b*. Leipzig, Germany, 27 September 1719; *d*. Göttingen, Germany, 20 June 1800)

mathematics.

Kaestner's father, a professor of jurisprudence, began early preparing him to enter that field but the young man' interests turned to philosophy, mathematics, and physics. After his *Habilitation* at the University of Leipzig in 1739, Kaestner lectured there on mathematics, logic, and natural law, as privatdocent until 1746, and then as extraordinary professor. In 1756 he was appointed professor of mathematics and physics at the University of Göttingen, where he remained for the rest of his life, becoming an influential figure through his teaching and writing; Göttingen's reputation as a center of mathematical studies dates from that time. Kaestner is also known in German literature, notably for his epigrams. He was a devout Lutheran. Kaestner married twice and had a daughter by his second wife.

Kaestner owes his place in the history of mathematics not to any important discoveries of his own but to his great success as an expositor and to the seminal character of his thought. His output as a writer in mathematics and its applications (optics, dynamics, astronomy), in the form of long works and hundreds of essays and memoirs, was prodigious. Most popular was his *Mathematische Anfangsgründe*, which appeared in four separately titled parts, each going through several editions (Göttingen, 1757–1800). Of lesser significance was his other four-volume work, *Geschichte der Mathematik* (Göttingen, 1796–1800).

From today's point of view Kaestner's historical significance lies mostly in the interest he promoted in the foundations of parallel theory. His own search for a proof of Euclid's parallel postulate culminated in his sponsorship of, and contribution of a postscript to, a dissertation by G. S. Klüugel (1763) in which thirty purported proofs of that postulate are examined and found defective. This influential work prompted J. H. Lambert's important researches on parallel theory. The three men who independently founded non-Euclidean (hyperbolic) geometry in the early nineteenth century were all directly or indirectly influenced by Kaestner: Gauss had studied at Göttingen during Kaestner's tenure there; Johann Bolyai's father, Wolfgang, who personally taught his son geometry, had studied under Kaestner and had tried his own hand at proving Euclid's postulate; Lobachevsky studied mathematics at the University of Kazan under J. M. C. Bartels, a former student of Kaestner's

As a student, Gauss is said to have shunned Kaestner's lectures as too elementary. Yet the *princeps mathematicorum* shows the influence of Kaestner, not only in the matter of parallelism but in others areas as well. Kaestner opposed, as did Gauss, the concept of actual infinity in mathematics (see, for example, Kaestner and G. S, Klügel, *philosophische-mathematische Abhandlungen* [Halle, 1807]); and he felt the need, later clearly expressed by Gauss (Werke [Güottingen, 1870–1927], VIII, 222), for postulates of order in geometry, Indeed, Kaestner anticipated M. Pasch in explicitly postulating the division of the plane, by a line, into two parts, and in enunciating the needed assumptions concerning the intersections of a circle with a line or another circle (*Anfangsgründe*, I).

BIBLIOGRAPHY

I. Original Works. Most of Kaestner's scientific publications are listed in the article on him in Poggendorff, I, cols. 1217–1219. Also valuable is the bibliography in the article on Kaestner in the *Biographie universelle* (Paris, 1852–1868), XXI, which includes literary works. Neither of these two bibliographies cites Kaestner's sponsorship of and contribution to the dissertation by G. S. Klügel, *Conatuum praecipuorm theoriam demostrandi recensio, quam publico examini submittent Abrah. Gotthelf Kaestner et auctor respondens Grorgius Simon Klügel* (Göttingen, 1763). For details of Kaestner's life, see his autobiography, *Vita Kestneri* (Leipizig, 1787).

II. Secondary Literature. References to Kaestner's preparatory role in the development of non-Euclidean geometry are found in Friedrich Engel and Paul Stäckel, *Theorie der Parallelinien von Eucli bis auf Gauss* (Leipizig, 1895), pp. 138–140; and in Roberto Bonola, *Non-Euclidean Geometry: A Critical and Historical Study of Its Developments,* trans. by H. S. Carslaw (Nwe York, 1995), pp. 50, 60, 64, 66, For Kaestner's anticipations of Pasch, see George Goe, "Kaestner, Forerunner of Gauss, Pasch, Hilber," in *Proceedings of the 10th International Congress of the History of Science*, II (Paris, 1964), 659–661.

George Goe