

Brianchon, Charles-Julien | Encyclopedia.com

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(*b.* Sèvres, France, 19 December 1783; *d.* Versailles, France, 29 April 1864)

mathematics.

There appears to be no record of Brianchon's early years. He entered the École Polytechnique in 1804 and was a pupil of the noted geometer Gaspard Monge. While a student there, he published his first paper, "Sur les surfaces courbes du second degré" (1806), which contained the famous theorem named after him.

Brianchon graduated first in his class in 1808 and became a lieutenant in artillery in the armies of Napoleon. He took part in the Peninsular campaigns, serving in Spain and Portugal, and is said to have distinguished himself both in bravery and ability. The rigors of his army service affected his health, and after the cessation of hostilities in 1813, Brianchon applied for a teaching position. He was finally appointed professor at the Artillery School of the Royal Guard in 1818.

By this time he had published several works in geometry, including "Sur les surfaces courbes du second degré" (1816), *Mémoire sur les lignes du second ordre* (1817), *Application de la théorie des transversales* (1818), and "Solution de plusieurs problèmes de géométrie" (1818).

Brianchon's teaching duties apparently affected both his output and his interests. In 1820 there appeared "Recherches sur la détermination d'une hyperbole équilatère, au moyen de quatre conditions données," written with Poncelet. It is notable for containing the nine-point circle theorem and is an instance of the many times this theorem has been rediscovered by independent investigators. At any rate, this paper contains the first complete proof of the theorem and the first use of the term "nine-point circle."

Brianchon's next publication, "Description du laboratoire de chimie de l'École d'Artillerie de la Garde Royale" (1822), indicates his change of interests. Two works appeared in 1823: "Des courbes de raccordement" and *Mémoire sur la poudre à tirer*. His last known work, *Essai chimique sur les réactions foudroyantes*, appeared in 1825. Brianchon ceased writing after 1825 and devoted all his time to teaching. Details of his personal life are singularly scarce.

Brianchon's fame rests ultimately on one theorem. In 1639 Pascal had proved that "If all the vertices of a hexagon lie on a circle, and if the opposite sides intersect, then the points of intersection lie on a line." He then boldly extended this result to a hexagon inscribed in any conic, since he recognized that his theorem was projective in nature. Oddly enough, it took 167 years before someone else—Brianchon—realized that since the theorem is projective in nature, its dual should also be true. Simply stated, Brianchon's theorem is "If all the sides of a hexagon are tangent to a conic, then the diagonals joining opposite vertices are concurrent." The theorem is useful in the study of the properties of conics and—if the hexagon is specialized in various ways—for the study of properties of pentagons, quadrilaterals, and triangles.

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Brianchon's writings are "Sur les surfaces courbes du second degré," in *Journal de l'École Polytechnique* (1806); "Sur les surfaces courbes du second degré," *ibid.* (1816); *Mémoire sur les lignes du second ordre* (Paris, 1817); *Application de la théorie des transversales* (Paris, 1818); "Solutions de plusieurs problèmes de géométrie," in *Journal de l'École Polytechnique*, 4 (1818); "Recherches sur la détermination d'une hyperbole équilatère, au moyen de quatre conditions données," *ibid.* (1820); "Description du laboratoire de chimie de l'École d'Artillerie de la Garde Royale," in *Annales de l'industrie nationale* (1822); "Des courbes de raccordement," in *Journal de l'École Polytechnique*, 12 (1823); *Mémoire sur la poudre à tirer* (Paris, 1823); and *Essai chimique sur les réactions foudroyantes* (Paris 1825).

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