

Saint-Venant, Adhémar Jean Claude Barré De l'Encyclopedia.com

Complete Dictionary of Scientific Biography COPYRIGHT 2008 Charles Scribner's Sons
4-5 minutes

(b. Villiers-en-Bière, Seine-et-Marne, France, 23 August 1797; d. St.-Ouen, Loir-et-Cher, France, 6 January 1886)

mechanics, geometry.

Saint-Venant entered the École Polytechnique in 1813. Upon graduating he joined the Service des Poudres et Salpêtres and in 1823 transferred to the Service des Ponts et Chaussées, where he served for twenty years. He devoted the remainder of his life to teaching and, especially, to scientific research. In 1868 he was elected to the mechanics section of the Académie des Sciences, succeeding Poncelet.

Saint-Venant's investigations deal chiefly with the mechanics of solid bodies, elasticity, hydrostatics, and hydrodynamics. Closely related to engineering, they frequently had immediate applications to road- and bridge-building, to the control of streams, and to agriculture. On the basis of his work on the torsion of prisms or cylinders of any base and on the equilibrium of elastic beams, Saint-Venant presented a memoir to the Académie des Sciences in 1844 dealing with gauche curves. In it he introduced the term "binormal," which is still used: "This line is, in effect, normal to two consecutive elements at the same time."

In "Mémoire sur les sommes et les différences géométriques et sur leur usage pour simplifier la mécanique" (1845), Saint-Venant set forth a vector calculus displaying certain analogies with the conceptions of H. G. Grassmann. In a subsequent priority dispute Saint-Venant asserted in a letter to Grassmann, written in 1847, that his ideas dated from 1832.

Saint-Venant used this vector calculus in his lectures at the Institut Agronomique, which were published in 1851 as *Principes de mécanique fondés sur la cinématique*. In this book Saint-Venant, a convinced atomist, presented forces as divorced from the metaphysical concept of cause and from the physiological concept of muscular effort, both of which, in his opinion, obscured force as a kinematic concept accessible to the calculus. Although his atomistic conceptions did not prevail, his use of vector calculus was adopted in the French school system.

BIBLIOGRAPHY

I. Original Works. The [Royal Society Catalogue of Scientific Papers](#), I, 189–191; VIII, 812–814; and XI, 262, lists 111 works by Saint-Venant and four of which he was coauthor. Among his some 170 published writings are *Leçons de mécanique appliquée faites à l'École des ponts et chaussées* (Paris, 1838); "Mémoire et expériences sur l'écoulement de l'air," in *Journal de l'École polytechnique*, **16** (1839), 85–122, written with Laurent Wantzel; "Mémoire sur les courbes non planes," *ibid.*, **18** (1845), 1–76; "Mémoire sur les sommes et les différences géométriques et sur leur usage pour simplifier la mécanique," in *Comptes rendus ... de l'Académie des sciences*, **36** (1853), 582–585; *Mécanique appliquée de Navier, annotée par Saint-Venant* (Paris, 1858); "Deux leçons sur la théorie générale de l'élasticité," in Chanoine Moigno, *Stratique* (Paris, 1868), lessons 21 and 22; R. Clebsch, *Theorie de l'élasticité des corps solides*, translated by Saint-Venant (Paris, 1883), and "Résistance des fluides: Considérations historiques physiques et pratiques relatives au problème de l'action dynamique mutuelle d'un fluide et d'un solide, spécialement dans l'état de permanence supposé acquis dans leurs mouvements," in *Mémoires de l'Académie des sciences*, **44** (1888), 1–192, 271–273.

II. Secondary Literature. See J. Boussinesq and A. Flamant, "Notice sur la vie et les travaux de M. de Saint-Venant," in *Annales des ponts et chaussées*, 6th ser., **12** (1886), 557–595, which includes a very comprehensive bibliography; Michel Chasles, *Rapport sur les progrès de la géométrie* (Paris, 1870), 197–199; Michael J. Crowe, *A History of Vector Analysis* (Notre Dame, Ind., 1967), 81–85; René Dugas, *Histoire de la mécanique* (Paris, 1950), 421–422; and E. Phillips, "Notice sur M. de Saint-Venant," in *Comptes rendus ... de l'Académie des sciences*, **102** (1886), 141–147.

Jean Itard