

Gräffe, Karl Heinrich | Encyclopedia.com

Complete Dictionary of Scientific Biography COPYRIGHT 2008 Charles Scribner's Sons
3 minutes

(b. Brunswick, Germany, 7 November 1799; d. Zurich, Switzerland, 2 December 1873)

mathematics.

Gräffe was the son of Dietrich Heinrich Gräffe, a jeweler, and Johanna Frederike Gräffe–Moritz. Born in simple circumstances, he studied from 1813 until 1816 with a jeweler in Hannover. Then, almost ready to begin a career as a goldsmith, through unflagging industry he made up his educational deficiencies and in 1821 was accepted as a scholarship student at the Carolineum in Brunswick. In 1824 he entered the University of Göttingen, attended the classes of Bernhard Thibaut and C. F. Gauss, and concluded his studies with the prize-winning dissertation “Die Geschichte der Variationsrechnung vom Ursprung der Differential und Integralrechnung bis auf die heutige Zeit” (1825).

In 1828 Gräffe became a teacher at the Technische Institut in Zurich, and in 1833 a professor at the Oberen Industrieschule there, working also as a *Privatdozent*. He was appointed extraordinary professor of mathematics at the University of Zurich in 1860. His name remains attached to a method for the numerical solution of algebraic equations, which he invented in response to a prize question posed by the Berlin Academy of Sciences. Let (1) $f(x) = x^n + ax^{n-1} + \dots + a_n = 0$, and let it then be supposed that all roots a_1, \dots, a_n are real and different from each other: (2) . Let it further be possible to find an equation (3) $F(x) =$, whose roots are the m th powers of (1). It follows from (2) that (4) . Since , it follows from (4) that , for large m , is approximately equal to A_1 , . Correspondingly, and so on. One can find an equation (3) with $m = 2$ by constructing $g(x) = (-1)^n f(-x)f(x)$; proceeding in this manner one obtains, with $m = 2^k$, the equation $F(x) = 0$.

The method may be extended to equations with equal roots and to equations with complex roots. The method has found application in modern numerical mathematics.

BIBLIOGRAPHY

A bibliography of Gräffe’s works may be found in *Historisch biographische Lexikon der Schweiz*, III (Neuenburg, 1926), 621 ff. His most important work is *Die Auflösung der höheren numerischen Gleichungen* (Zurich, 1837; with additions, 1839).

A biography is Rudolph Wolf, “Carl Heinrich Gräffe; Ein Lebensbild,” in *Neue Zürcherzeitung*, nos. 30 and 31 (1874), also pub. separately (Zurich, 1874).

J. J. Burckhardt