

# Weber, Heinrich | Encyclopedia.com

Complete Dictionary of Scientific Biography COPYRIGHT 2008 Charles Scribner's Sons  
5-6 minutes

---

(*b.* Heidelberg, Germany, 5 May 1842; *d.* Strasbourg, Germany [now France], 17 May 1913), *mathematics*.

Weber, son of the the historian G. Weber, began the study of mathematics and physics in 1860 at the University of Heidelberg. He then went to Leipzig for a year but subsequently returned to Heidelberg, where he obtained the Ph.D. in 1863. After working at Königsberg under Franz Neumann and F. J. Richelot, he qualified as *Privatdozent* in 1866 at Heidelberg and obtained a post as extraordinary professor there in 1869. He subsequently taught at the Eidgenössische Polytechnikum in Zurich, the University of Königsberg, the Technische Hochschule in Charlottenburg, the universities of Marburg and Göttingen, and, from 1895, at Strasbourg.

Weber was rector of the universities of Königsberg, Marburg, and Strasbourg; member of many German and foreign academies; and recipient of an honorary doctorate from the University of Christiania (now Oslo). He was a cofounder of the Deutsche Mathematiker-Vereinigung and member of the editorial board of *Mathematische Annalen*.

In 1870 Weber married Emilie Dittenberger, daughter of a Weimar court chaplain. Their daughter translated the philosophical writings of Henri Poincaré into German, and their son Rudolf Heinrich became professor of theoretical physics at Rostock. Weber's closest friend was Richard Dedekind, with whom he often collaborated and with whom he edited Riemann's works (1876). Weber's students included [Hermann Minkowski](#) and [David Hilbert](#).

An immensely versatile mathematician, Weber focused his research mainly on analysis and its application to mathematical physics and [number theory](#). The direction of his work was decisively influenced by his stay at Königsberg, where Jacobian mathematics still flourished. There he was encouraged by Neumann to investigate physical problems and by Richelot to study algebraic functions. Weber began his research with an examination of the theory of differential equations, which he conducted in Jacobi's manner. Then, building on Carl Neumann's book on Riemann's theory of algebraic functions and on the work of Alfred Clebsch and Paul Gordan on Abelian functions, Weber demonstrated Abel's theorem in its most general form. He also worked on the mathematical treatment of physical problems concerning heat, static and current electricity, the motion of rigid bodies in liquids, and electrolytic displacement. He brought together a portion of this research in *Die partiellen Differentialgleichungen der mathematischen Physik* (1900-1901), a complete reworking and development of a similarly titled book prepared by Karl Hattendorff from Riemann's lectures that had gone through three editions.

Weber investigated important contemporary problems in algebra and [number theory](#), the fields in which he did his most penetrating work. With Dedekind he wrote a fundamental work on algebraic functions that contained a purely arithmetical theory of these functions. One of Weber's outstanding accomplishments was the proof of Kronecker's theorem, which states that the absolute Abelian fields are cyclotomic—that is, they are obtained from the rational numbers through adjunction of roots of unity. In 1891 Weber gave a complete account of the problems of complex multiplication, a topic in which analysis and number theory are inseparably linked. His studies culminated in the two-volume *Lehrbuch der Algebra* (1895-1896), which for decades was indispensable in teaching and research.

Weber was an enthusiastic and inspiring teacher who took great interest in educational questions. In collaboration with Joseph Wellstein and with the assistance of other mathematicians, he edited the *Enzyklopädie der Elementar-Mathematik*, a three-volume work designed for both teachers and students.

## BIBLIOGRAPHY

Weber's works include "Ueber singuläre Auflösungen partieller Differentialgleichungen erster Ordnung," in *Journal für die reine und angewandte Mathematik*, **66** (1866), 193–236; "Neuer Beweis des Abelschen Theorems," in *Mathematische Annalen*, **8** (1874), 49–53; "Theorie der algebraischen Funktionen einer Veränderlichen," in *Journal für die reine und angewandte Mathematik*, **92** (1882), 181–290, written with R. Dedekind; *Elliptische Funktionen und algebraische Zahlen* (Brunswick, 181; 2nd ed., 1908, as vol. III of *Lehrbuch der Algebra*); *Lehrbuch der Algebra*. 2 vols. (Brunswick, 1895-1896; 2nd ed., 1989-1899); *Die partiellen Differentialgleichungen der mathematischen Physik*, 2 vols. (Brunswick, 4th ed., 1900-1901; 5th ed., 1910-1912); and *Enzyklopädie der Elementar-Mathematik*, 3 vols. (Leipzig, 1903-1907), written with Joseph Wellstein *et al.*

There is an obituary by A. Voss in *Jahresberichte der Deutschen Mathematiker-Vereinigung*, **23** (1914), 431–444, with portrait.

