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(b. Berlin, Germany, 14 February 1877; d. Berlin, 19 February 1938)

mathematics.

Landau was the son of the gynecologist Leopold Landau and the former Johanna Jacoby. He attended the “Französische Gymnasium” in Berlin and then studied mathematics, primarily also in Berlin. He worked mostly with George Frobenius and received his doctorate in 1899. Two years later he obtained the *venia legendi*, entitling him to lecture. He taught at the University of Berlin until 1909 and then became full professor at the University of Göttingen, succeeding [Hermann Minkowski](#). [David Hilbert](#) and [Felix Klein](#) were his colleagues. Landau was active in Göttingen, until forced to stop lecturing by the National Socialist regime. After his return to Berlin he lectured only outside of Germany, for example, in Cambridge in 1935 and in Brussels in 1937, shortly before his sudden death.

Landau was a member of several German academies, of the academies of [St. Petersburg](#) (now Leningrad) and Rome, and an honorary member of the London Mathematical Society. In 1905 he married Marianne Ehrlich, daughter of [Paul Ehrlich](#); they had two daughters and one son.

Landau's principal field of endeavor was analytic [number theory](#) and, in particular, the distribution of prime numbers. In 1796 Gauss had conjectured the [prime number](#) theorem: If $\pi(x)$ designates the number of prime numbers below x , then $\pi(x)$ is asymptotically equal to $x/\log x$, i.e., as $x \rightarrow \infty$, the quotient of $\pi(x)$ and $x/\log x$ approaches 1. This theorem was demonstrated in 1896 by Hadamard and de la Vallée-Poussin, working independently of each other. In 1903 Landau presented a new, fundamentally simpler proof, which, moreover, allowed the [prime number](#) theorem and a refinement made by de la Vallée-Poussin to be applied to the distribution of ideal primes in algebraic number fields. In his two-volume *Handbuch der Lehre von der Verteilung der Primzahlen* (1909), Landau gave the first systematic presentation of analytic [number theory](#). For decades it was indispensable in research and teaching and remains an important historical document. His three-volume *Vorlesungen über Zahlentheorie* (1927) provided an extremely comprehensive presentation of the various branches of number theory from its elements to the contemporary state of research.

Besides two further books on number theory, Landau was author of *Darstellung und Begründung einiger neuerer Ergebnisse der Funktionentheorie*, which contains a collection of interesting and elegant theorems of the theory of analytic functions of a single variable. Landau himself discovered some of the theorems and demonstrated others in a new and simpler fashion. In *Grundlagen der Analysis* he established arithmetic with whole, rational, irrational, and complex numbers, starting from Peano's axioms for natural numbers. Also important is *Einführung in die Differentialrechnung und Integralrechnung*.

Written with the greatest care, Landau's books are characterized by; argumentation which is complete, and as simple as possible. The necessary prerequisite knowledge is provided, and the reader is led securely, step by step, to the goal. The idea of the proof and the general relationship are, to be sure, not always clearly apparent, especially in his later works, which are written in an extremely terse manner—the so-called Landau style. Through his books and his more than 250 papers Landau exercised a great influence on the whole development of number theory in his time. He was an enthusiastic teacher and sought contact with fellow scientists. Harald Bohr and G. H. Hardy were often his guests in Göttingen.

BIBLIOGRAPHY

I. Original Works. Landau was the author of more than 250 papers published in various journals. His books are *Handbuch der Lehre von der Verteilung der Primzahlen* 2 vols. (Leipzig-Berlin, 1909); *Darstellung und Begründung einiger neuerer Ergebnisse der Funktionentheorie* (Berlin, 1916; 2nd ed., 1929); *Einführung in die elementare und analytische Theorie der algebraischen Zahlen und Ideale*, (Leipzig-Berlin, 1918; 2nd ed., 1927); *Vorlesungen über Zahlentheorie*, 3 vols. (Leipzig, 1927); *Grundlagen der Analysis* (Leipzig, 1930); *Einführung in die Differentialrechnung und Integralrechnung* (Groningen, 1934); *über eilnige Fortschritte der additiven Zahlentheorie* (Cambridge, 1937).

II. Secondary Literature. A biography with portrait is in *Reichshandbuch der deutschen Gesellschaft*, II (Berlin, 1931), 1060; see also the obituaries in *Nachrichten von der Gesellschaft der Wissenschaften zu Göttingen* for 1937–1938, 10; by J. H. Hardy and Heilbronn in *Journal of the London Mathematical Society*, **13** (1938), 302–310; and by Konrad Knopp in *Jahresberichte der Deutschen Mathematiker-Vereinigung*, **54** (1951), 55–62.

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