



Math for the people, by the people.

Élie Cartan

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1 Élie Joseph Cartan

French mathematician and mathematical physicist;

Born: April 9th, 1869 in Dolomieu (near Chambéry), Savoie, Rhône-Alpes, France.

Died: May 6th, 1951 in Paris, France.

His brother, Louis—a member of the ‘underground’ French Resistance— was beheaded by the Nazis in December 1943.

1.1 Formal studies:

School inspector Dubost was impressed by Élie Joseph Cartan’s abilities and obtained state funds that paid for Élie to attend the Lycée in Lyons, completed with ‘distinction in Mathematics’. The state stipend was then extended in order to allow him to study at the École Normale Supérieure in Paris.

1. Doctoral student in Paris at the École Normale Supérieure in 1888;
2. Doctorate in 1894

1.2 Academic Appointments:

1. 1894–1896 Faculty appointment at the University at Montpellier
2. 1896–1903 Lecturer appointment at the University of Lyon
3. 1903–1909 Professor at the University of Nancy
4. 1909–1912 Lecturer at the Sorbonne in Paris
5. 1912–1920 Chair of Differential and Integral Calculus in Paris
6. 1920–1923 Professor of Rational Mechanics at the Sorbonne in Paris
7. 1924–1940 Professor of Higher Geometry at the Sorbonne in Paris
8. 1940: Emeritus Professor at 71.

His son, Henri Cartan, later produced brilliant work in Mathematics; he was a close mentor and early coworker of the German-born, (perhaps greatest) French mathematician Alexander Grothendieck. Henri Cartan wrote about <http://www-gap.dcs.st-and.ac.uk/history/Biography/Cartan.html> his father’s work and his own: “[My father] knew more than I did about Lie groups, and it was necessary to use this knowledge for the determination of all bounded circled domains which admit a transitive group. So we wrote an article on the subject together [Les transformations des domaines cerclés bornés, *C. R. Acad. Sci. Paris*: 192 (1931), 709-712]. But in general my father worked in his corner, and I worked in mine.”

1.3 Research Results:

Élie J. Cartan achieved a mathematical synthesis of continuous groups, Lie algebras and differential equations; he also produced a complete Theory of Spinors of fundamental interest both in Mathematics and Mathematical Physics. He also produced results on the representations of semisimple Lie groups; he then developed applications of <http://planetmath.org/Grassmann> algebra to the theory of exterior differential forms. Between 1894 and 1904 he applied his theory of exterior differential forms to a wide variety of problems in differential geometry, classical dynamics, special and general relativity (for example, v. Spinor Theory invented by him in 1913; É. Cartan published the two volume work *Leçons sur la théorie des spineurs* in 1938).

Another great French mathematician Jean Dieudonné wrote about Élie J. Cartan :

“He discussed a large number of examples, treating them in an extremely elliptic style that was made possible only by his uncanny algebraic and geometric insight and that has baffled two generations of mathematicians. ”

In 1945 E.J. Cartan published the book *“Les systèmes différentiels extérieurs et leurs applications géométriques”*.

1.4 Honors and Awards:

Late in his life, Élie Cartan received many awards and honors; only the most prominent ones are listed here. Honorary degrees from the University of Liege in 1934, and from Harvard University in 1936.

He was elected to the French Academy of Sciences on March 9th, 1931 and he was Vice-President of the Academy in 1945 and President in 1946. He was awarded three honorary degrees in 1947 from the Free University of Berlin, the *University of Bucharest, Romania*, and the Catholic University of Louvain, in Belgium. In 1948, he was awarded an Honorary Doctorate by the University of Pisa, Italy. He was elected a Fellow of the Royal Society of London on May 1st, 1947, the Accademia dei Lincei and the Norwegian Academy.