Théophile, Ernest **DE DONDER**

Born: August 19, 1872 (Schaarbeek, near Brussel)
Died: May 11, 1957 (Brussel)

Biography
In 1899 he obtains the degree of doctor in mathematics and physics whilst still a teacher at a primary school of St.Gilles.Later on he teaches math at the lyceum of St. Gillis. Incidentally, one of his pupils is Raymond Defay.
After receiving his doctors degree De Donder obtains a burse to study in Paris where he is won over by the "invariants integraux" of Henri Poincaré. On his return he is appointed professor of theoretical physics at the ULB (Free University of Brussels). The closure of the ULB during WWI puts temporarily an end to the further development of this branch of physics. This does not keep him from secretly teaching a number of students, among them Frans van den Dungen and Raymond Defay (1887-1988). When the ULB opens its doors again in 1918, De Donder is appointed professor of theoretical physics at the Faculty of Sciences and Applied Sciences of his alma mater, specializing in thermodynamics and physical chemistry.
To assist the students, De Donder publishes a course on the theory of thermodynamics for engineers. Thanks to the support of Frans Van den Dungen, those lectures become the base of Ilya Prigogine's famous school of thermodynamics of Brussels. His students and followers include Maurice Nuyens (1901-1970; builder of the first electron microscope in Belgium), Léon Van Hove (1924-1990, the future leader of the CERN theoretical physics), Jacques Van Mieghem (1905-1980, thermodynamics and meteorology) and Georges Lemaître (1894-1966) and creates the Belgian school of the relativity theory.
De Donder obtains the title of professor emeritus in 1942.Since 1919 he is corresponding member of the Académie royale des Sciences et Belles-Lettres de Bruxelles, becomes a full-fledged member in 1929 and is head of the Class of Sciences in 1937. He is founding member of the Belgian Mathematical Society and since 1924 an active member of the Solvay Conferences. He holds a seat in the council of the NFWO (National Fund for Scientific Research) and the international jury of the Francqui Prize (with Arthur Eddington and Paul Langevin he awards the prize to Georges Lemaître in 1934).
He is an exceptionally gifted musician and composes a number of pieces for piano.
In 1958 the Théophile De Donder prize is founded in his honor.
In 1922 he joins in signing a petition to put forward Albert Einstein for the Nobel Prize, to thwarth the opposition of Lenard, an ardent Nazi.

Prestations and bibliography

Théophile De Donder writes over 200 papers, 10 books and communicates on numerous occasions with Louis-Victor de Broglie (1892-1987), Arthur Eddington (1882-1944), Hendrik Antoon Lorentz (1853-1928), Vito Volterra (1860-1940) and Albert Einstein (1879-1955).
He is laureate of the decennial Prize for Applied Mathematics for the period 1913-1922. The subject of his doctorate is "Sur la Théorie des Invariants Intégraux".

Mathematical Subjects
The ideas of De Donder lay the foundation of the reputation of school of mathematics of the ULB. New applications of the external differential calculus are due to Théophile Lepage, a student of De Donder. Thanks to Poincaré, De Donder develops new ideas about integration and differentiation which are of invaluable importance in mathematics and theoretical physics. He departs from the early publications (1914) of Elvin Christoffel (1829-1900), Gregorio Ricci (1853-1920) and Tullio

Levi-Civita (1873-1941). Joseph-Marie de Tilly inspires him for new vision on the non-euclidic mechanics.

Einstein's theory of Relativity
Since 1916, De Donder is one of the first to maintain a correspondence with Albert Einstein. His student Jules Géhéniau follows in his tracks.
In 1922 De Donder publishes "La Gravifique Einsteinienne" in an attempt to interpret the general theory of relativity in terms of the principles of variation. His mathematical views often disagree with the purely physical interpretation of Einstein.

Thermodynamics
De Donder develops a new interpretation of the chemical affinity. In spite of his predilection for fundamental physical theories and abstract mathematical interpretations he goes beyond the second law of thermodynamics (Gibbs) and considers affinity related to non-equilibrium of a chemical reaction. In the next decennia this idea is further developed and finally leads to the Nobel Prize being awarded in 1977 to Ilya Prigogine, a student of de Donder.
De Donder is the founder of the Brussels school of thermodynamics of non-reversible equilibria and mathematical physics, whose nucleus are his lectures for the engineering students.

Physical-chemistry of the surfaces
The subject of low-dimension systems (electrodes, membranes, catalytic surfaces, micro-emulsions, films) draws the attention of Belgian chemists and one of the first studies by De Donder and his pupil Georges van Lerberghe is about galvanistic batteries.

(Translation Yves De Cock)