

## Octav ONICESCU

b. 20 August 1892 - d. 19 August 1983

**Summary.** Onicescu is principally known as co-founder, together with Gheorghe Mihoc (1906-1981), of the Romanian school of probability as well as for his contributions to mechanics.

Octav Onicescu was born in 1892 in Botoşani, a town of North Moldavia, into the family of a small landowner. After his baccalaureat in 1911 he became a student of the University of Bucharest. He took a degree in mathematics in 1913, becoming then a teacher of mathematics at the reputed military gymnasium of Dealu Monastery, near Tâgovişte. After having been called for military duty in the period 1916-1918, he left for Rome in 1919, where in the feverish atmosphere generated by the Einstein theory of general relativity, he started a scientific activity which was to last for more than six decades. Guided by Tullio Levi-Civita (1873-1941) at the University of Rome, Onicescu has already defended his doctoral thesis *Sopra gli spazi einsteiniani a gruppi di trasformazioni* by June 1920. In the autumn of 1920 Onicescu left for Paris, where he attended the lectures given at the Sorbonne by Émile Picard and Élie Cartan, and delivered papers on absolute differential calculus at the seminar led by Jacques Hadamard (1865-1963) at the Collège de France.

Onicescu's interest in probability theory and mechanics originated in his Italo-French period of studies. He got interested in probability by attending a seminar led by Francesco Paolo Cantelli (1875-1966) and his interest in mechanics stemmed from Cartan's lectures on integral invariants.

Back in Bucharest, Onicescu began (1922) a forty-year long university career of a great variety. In 1924 he started teaching the first university course on probability theory in Romania, an enterprise which went on without interruption until his retirement in 1962. In 1938 Onicescu was tenured as full professor at the chair of algebra of the Mathematics Section of the Faculty of Sciences of the University of Bucharest, where he played a dominant part in modernizing the teaching of the subject. After the reorganization (1948) of higher education in Romania, Onicescu was until his retirement the head of the chair of probability theory of the Faculty of Mathematics and Physics of the University of Bucharest. He organized and guided (even after retiring) the scientific seminars of the chair, which together with the expected chapters from probability and stochastic processes were dedicated to the most varied

topics such as functional analysis, Lie groups and algebras, game theory, and mathematical logic. In the same period Onicescu was also the head of the Probability Theory Section of the newly (1949) founded Institute of Mathematics of the Romanian Academy.

On the organizational side, Onicescu founded in 1931, under the auspices of the University of Bucharest, the School of Statistics, which was to become, ten years later, the Institute of Statistics, Actuarial Science and Computation of the University of Bucharest. The creation of this school was an answer to the lack of specialists in statistics, pointed out by the 1930 general population census in Romania. The students of the institute were university graduates and the duration of instruction was one year. The institute, dismantled in 1947, should be considered as one of the first institutions of postgraduate studies in statistics and computation in the world.

At the international level, Onicescu was one of the initiators of the Balkan Union of Mathematicians (founded 1934), which assembles the representatives of mathematicians from Albania, Bulgaria, Greece, former Yugoslavia, Romania and Turkey. The setting up in 1968 of the International Centre for Mechanical Sciences in Udine (Italy) owes much to the scientific prestige of Onicescu, who acted as one of its nine initial sponsors.

In fact, Onicescu was not only an academic and a scientist. He was a great personality of Romanian culture and, especially in the inter-war period, he played an important part in the cultural, scientific and social activities of his country. In that period Onicescu co-edited such periodicals as *Natura* (*Nature*) and *Ideea europeană* (*European Idea*), where he contributed scores of papers on most various scientific, cultural and philosophical matters. He wrote frequently in newspapers on social, economic, demographic, and political issues - he even belonged for a while on an independent basis to the Chamber of Deputies of Romania - and took an active part in the organization or reorganization of several social, financial, teaching, and scientific institutions. The last group includes the Romanian Society of Sciences, where Onicescu was secretary general for many years and then president. He also presided over the Central Commission for the 1941 general population census in Romania. In 1938, as recognition of his many achievements, Onicescu was elected corresponding member of the Romanian Academy. He lost this rank in 1948, when the institution was reorganized, and it was only in 1965 that the injustice was repaired and Onicescu was made a full member of the Romanian Academy.

In more recent times, Onicescu's involvement in cultural and social mat-

ters manifested itself by his intensive participation in the activities of the Romanian Committee for the History and Philosophy of Sciences and above all by the organization and leadership of a Seminar on the applications of statistical and mathematical methods to economics at the Central Board of Statistics in Bucharest. Opened in January 1965, this seminar met regularly every week except for holidays. After some 450 sessions, it only ended with the physical disappearance of its initiator in 1983. Actually, in his last 20 years Onicescu took a keen interest in economics. In this context he was led to reconsider Gini's 1912 homogeneity coefficient  $1 - S$  under the name of *information energy* and to strongly advocate its use in various fields and as a basis for the constructing of the so-called *information statistics*; see [4], [5], [8].

Onicescu received international recognition for his mathematical researches. Elected as an ordinary member of the International Statistical Institute in 1935, he became an honorary member in 1982. Onicescu was also a member of the Academy of Sciences of Turin (since 1976).

Onicescu's mathematical career eludes normal appreciation and assessment. Fortunately, he provided a marvellous characterization of this scientific endeavour in a speech delivered at the Romanian Academy on the occasion of the celebration of his 75th birthday as follows:

“I am not first of all a mathematician, by no means a probabilist as most agree, not even a mechanician as some do not want to consider me. I regard myself as a researcher of human actions, either social or economic, and natural phenomena, who used mathematical tools, preferably probabilistic or mechanical, who all his life strove to assimilate as much mathematics as he could for using it in his researches. I cultivated probability as a science of measurement of random events and processes. I cultivated mechanics as a support or a model of any science of natural motion. In this long and difficult way I met geometry, algebra, and analysis, sometimes topology, and I did not hesitate to take up the problems raised. It was my chance that at any important moments of my scientific or social enterprises I enjoyed ideas, and enthusiasm to materialize my projects that become common to all of us”. [Translation from the Romanian of *An. Acad. R.S. România* (4) **18**(1986), p.295.]

Fully in accordance with these words, the emphasis in Onicescu's math-

ematical work is on concepts, motivation and applicability rather than on technicalities.

There are two distinct phases in Onicescu's work in probability. In a first phase (up to 1958) he collaborated intensively with his first doctoral student Gheorghe Mihoc (1906-1981). Onicescu and Mihoc introduced and studied the concept of a chain with complete connections (see [2]), did an exhaustive study of the asymptotic behaviour of partial sums associated with finite Markov chains by using the method of characteristic functions and wrote several books on probability and mathematical statistics. This joint work laid down the basis of the Romanian school of probability theory. Mention should also be made here of Onicescu and Mihoc's co-founding in 1955 of the Braşov Conferences on Probability Theory, which clearly put this school into the limelight. This phases of Onicescu's work in probability is very well described in Mihoc's essay [3]; also in Onicescu's obituary notice on Mihoc [7].

In the second phase (after 1958), Onicescu's main achievement in probability was the elaboration of a new framework of probability theory, which replaces the classical event space, viewed as a point set equipped with a  $\sigma$ -field of subsets (Kolmogorov's axiomatization), by an abstract Boolean  $\sigma$ -algebra, thereby avoiding the consideration of the 'elementary event'. The new system based on the concepts of a sum function, which is an analogue of the indefinite integral, and a separator, which is an analogue of the family of sets  $\{\omega : f(\omega) < \alpha\}_\alpha$  where  $\alpha$  runs over the reals and  $f$  is a random variable (in the Kolmogorov system). The monograph [4] aimed at clarifying the part the new theory could play in the foundations of probability theory.

A fairly complete list of publications of Onicescu containing 222 papers and 32 books can be found in [1].

Onicescu died in Bucharest on 19th August 1983, the eve of his 91st birthday, after a short illness. He was a man with a great deal of charm and wit, who enjoyed an exceptional family life. This is apparent from the two volumes of memoirs [6] he was able to complete.

## References

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Marius Iosifescu