

PERSONALITIES OF THE SCIENTIFIC UNIVERSE: Constantin I. Budeanu

The story of his life



He was born on the 16th of February 1886 in Buzău, where he attended the primary courses at „Vasile Alecsandri” High School. He attended the High School in Galați and, for seven years, he was the best student. In 1903 he was admitted as a student

at the National School of Roads and Bridges in Bucharest, and after 5 years, on the 10th of July 1908 he got the constructor engineer diploma with a general average of 18,21. After taking part in a contest, in 1908 the Romanian Academy offers to him an „Adamachi” grant in order to specialize himself in the fields of electrotechnics, energetics and metrology. In 1909 he graduated the Superior School of Electricity in Paris and he got the energetician engineer diploma. It is said that the manager of the school, Paul Janet, was so impressed by Constantin Budeanu’s professional training that, starting with 1909 until 1940 he admitted without entrance examination all the graduates from the electrotechnics university of Bucharest and Timișoara. After graduation, for one year, he had an internship at electric companies from Paris, he continued it in Germany, at the Company of electrical machines and at one of the electricity-generating plants from Berlin.

In 1910 he came back in Romania and he started his activity as an engineer at Romanian Railway Company where he worked until 1919, becoming in a short period of time chief of Diesel-electric Company from Grivița workshops. From 1919, for two years, until 1921, he worked at the Tram Society from Bucharest. It is interesting to mention that the badge used by Constantin Budeanu to travel by tram still exists. The badge no. 2332 has Constantin I. Budeanu’s photo and the following text: „I am aware of the conditions of using this badge from the file Badge Request which was signed by me”. We can also notice the signature and the address written by hand: 32 Washington. The subscription, valid for all lines, cost 960 lei.

Then, for 10 years, between 1921 and 1931, he worked at the Electric Society as a technical

director. During that period he invented the rheostat with liquid for charging electric generators.

From 1931 until 1948 he worked also at the „Credit for electric companies of Romania”.

Thus, for 38 years he was in a direct contact with practical problems, with technical problems related to electric plants, to electric networks, to electrotechnics.

Practice mixed with theory

He was always drawn also by theoretical study, so in 1916 he became an assistant at the course of electricity and electrotechnics of National School of Bridges and Roads. Due to his educational skills, he started to teach the courses of „Electric Machines” and „Electric Tractions”.

In 1920 he was appointed assistant professor at the course of electric measurements, electric tractions, the calculus, the construction and the tryings of electric machines, and in 1921 he became full assistant professor at the Polytechnics School of Bucharest which had been set up in 1920 by transforming the National School of Bridges and Roads and which would become the Polytechnics Institute of Bucharest and later the Polytechnics University of Bucharest. Due to these transformations, the academic system of Romania proved that it can keep pace with the changes from economy, from social life, from the worldwide academic system. In 1926 Constantin Budeanu was 40 and he had a rich practical experience and this is why he was appointed professor to the courses „Electricity and electrical measurements” and „Electrotechnics Theoretical Basics”. Constantin I. Budeanu taught here until his retirement in 1959.

Constantin I. Budeanu’s activity was a mixture of practice and theory, characterized by his permanent desire to understand better the physical meaning of phenomena that he studied in a period when the study of electrotechnics was only at the beginning. This characteristic was met in the treaty „Puissances reactives et fictives”, published in 1927, in which he defined the notion of „deformative power” and its calculus methods. Three years later, in 1930, he defined the notion of „power factor”, the famous $\cos \varphi$, he defined the notion of the „reactive power” and he named its measurement unit – VAR Volt Ampere Reactive. A proof of the importance of these notions is the fact that they were immediately accepted by the International Electrotechnics Conference from

Stockholm. A proof of his scientific value is the fact that, between 1932 and 1935, he was a member in the Management Board of the Society of the French Electricians and president of the International Committee for the study of reactive and deforming phenomena. The importance of these concepts is more obvious nowadays, when the non-linear consumers, such as welding installations, electric ovens, static convertors, has an important role when the household consumer is injured by the industrial consumer by modifying the functioning of electric networks.

During the meeting of the Romanian Academy from 1.10.1943 he presented a vast work entitled "*The problem of electrification in Romania*" and published in the Papers of the scientific department, series IV, Tom XIX. In 1957 he published the book "*The general practice system of units*" at the Academy's publishing house.

Acknowledgements

For his remarkable merits, he was elected in 1938 a correspondent member of the Romanian Academy and in 1955 a full member of the Romanian Academy. He also was a member of several foreign academies and societies, among which Conférence Internationale des Grands Réseaux Electrique (CIGRE). In 1946 he was awarded from CIGRE "*The Gratitude Medal*". Constantin Budeanu and Remus Răduleț are two names included in the "*Hall of savants and inventors*" organized by the International Commission of Electrotechnics from Geneve, together with Maxwell, Faraday, Tesla, Edison.

The Romanian Academy grants annually "Constantin Budeanu" prize for the most valuable scientific papers in the domain of electrotechnics. The Romanian Academy also grants the following prizes: "*Aurel Vlaicu*" Prize, "*Anghel Saligny*" Prize, "*Henri Coanda*" Prize, "*Traian Vuia*" Prize – Technical Sciences Department, "*ILIE MURGULESCU*" Prize the Department of Chemistry and "*LUDOVIC MRAZEC*" Prize.

Other contributions

He had an important contribution also in the development of electrotechnic academic educational system, in publishing of some scientific and technical valuable papers which, by using the most modern mathematical methods, without missing the physical meaning of the studied phenomena. He invented the rheostat with liquid for charging electric generators in order to carry out some specific actions.

He was a founding member of the Bulletin of the Romanian Institute of Energy, an active member of the Society Mathematical Gazette and of AGIR.

Constantin I. Budeanu is the first Romanian engineer who made big discoveries in both electrotechnics as well as in the general theory of science. With his collaborators he "*was discrete, modest, he never showed off regarding his scientific knowledge and he made himself listened without ostentation*".

He died on the 27th February 1959 in Bucharest. Few minutes earlier he had spoken on the phone with a collaborator about organizing a scientific conference. He was 73.

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