

## PERSONALITIES FROM THE MERIDIANS OF THE ENGINEERING UNIVERSE

**Vasilescu-Karpen Nicolae** was born on the 28th of November, 1870 in Craiova. He attended primary school and high school at “*Carol I*” High school from Craiova, where he was remarked for his analytic mind and for his passion for experimental branch of the subject he studied, but especially for the practical part of physics.



After graduation, he attended the National College of Bridges and Roads which he graduated in top position in 1891. He started to work at the Public Works Service where he had remarkable contributions to communication systems and to designing and building a 3 kilometer tunnel at Beresti, along the railway between Galați and Bârlad. In 1899 he went to Paris in order to continue his studies at The Superior College of Electricity which he graduated in 1901, and in 1902 he also graduated the Faculty of Sciences from Paris, getting a B.A. diploma in physics, mechanics and mathematics. In 1904 he got his Ph.D. at University of Sorbonne with the thesis entitled *Researches upon the magnetic effect of moving electric corps* which was immediately published by “*Annales de Chimie et de Physique*”. A member of his Ph.D. committee was the famous French physicist Henri Poincaré. By the fundamental theoretical aspects he discussed, but mostly by the experiments he carried out Nicolae Vasilescu-Karpen explained a controversial problem of physics. Professor Berget wrote in his book *La vie et la morte du globe*: “*There is a consequence of the phenomenon of carrying loads, phenomenon which was discovered by Rowland and which was verified by the Romanian Vasilescu-Karpen’s beautiful classical experiments*”.

He started his teaching career at University of Lille where he was a reader at the Department of Electrotechnics where he was remarked due to his teaching talent.

### A leader of technical science

Although he was highly appreciated by the technical scientists in France, he decided to come back to Romania in 1905. In the same year, at the National School of Bridges and Roads it was set up the Department of Electricity where Nicolae Vasilescu-Karpen started to teach the course of electricity and electrotechnics and where he would keep working for 35 years. Even more, together with his colleagues, he set up the basis of the modern electrical teaching which had a complex, multilateral content, with several branches.

In the second decade of the XXth century Romania was ready to graduate engineers in building and maintaining roads at the National College of Bridges and Roads, forest engineers at the Superior College of Forestry at Brănești, agronomist engineers at the Superior College of Agriculture from Herestrău and architects. The specialists in other industrial fields were going to study abroad. In this context he drew up on the 1<sup>st</sup> of September 1920 the project for transforming the National College of Bridges and Roads into Polytechnics College from Bucharest. Here is one of the reasons for this action: “*If in the past we could be content with graduating only engineers, borrowing the science from others, nowadays we can not consider ourselves to be among civilized countries without bringing our own contribution to the fundamental and applicative sciences*”. The Law was signed by the King Ferdinand on the 10<sup>th</sup> of June 1921.

He was appointed Rector in 1920 and he maintained this position until 1940. He gave a special importance to lab classes, to work hours during summer holiday and he introduced in the curricula economical, administrative and law courses. He also introduced courses for foreign languages in order to help the students read the most important scientific publications. He set up the Ph.D. system for engineers. Here is what Remus Răduleț, member of Academy, said about Vasilescu-Karpen: “*Numerous Romanian scientists that were taught by the famous scientist and professor would kept in their minds the figure of the man who tried so hard to bring the Romanian science to the world’s level*”. Among these, Alexandru Proca, one of the students of the first batch of students promoted at the Polytechnics College from Bucharest. He started his activity as engineer in 1922 at the Electric Company from Câmpina, where he worked only for one year, but where he managed to introduce the electrical equipment for mining. After several years, Alexandru Proca was hired by the “*Radium Institute*” from Paris led by Marie Curie, a Nobel Prize winner for Physics in 1903. Here is what Marie Curie said about Alexandru Proca: “*Every time when I have a difficult scientific problem, which needs a lot of patience, competence, practical skills and attention, I go to Mr. Proca. And every time he gave me answers that I liked and every time his results are accurate. You, Romanians, should be proud that you have a scientific researcher as Mr. Proca*”.

### An imposing professor

As a professor, Nicolae Vasilescu-Karpen prepared his lessons with a lot of care, he researched and systemized the information in order

to get to the essence of the phenomenon he studied and to help his students understand his courses that were enriched with a lot of figures and tables drawn on the blackboard.

Along the years, he had a lot of significant contributions regarding the practical rule for determining the direction of electromotor force, the distribution of lines of a magnetic field, the proportion between the mass and energy of the electron. His books, „*Manual of general electrotechnics*” written in 1925 and „*The Electricity*” are proofs of his value, an argument being the review of the academician Șt. Procopiu: „*After all, „The Electricity” of Mr. Vasilescu-Karpen represents an interesting and original approach of the continuum and of the electric field. The organization is represented by gathering the electricity in a deductive unit, replacing the magnetic notions and reducing the magnetism to electricity; finally, the advanced students will be happy to follow the deductions of Mr. Karpen*”. An imposing figure, famous for his calm, he remained in his students’ memory for the intelligent examinations he carried out.

#### Research activity

He studied the mechanism of the flight of the birds on unsteady wind. He had original theoretical and practical contributions in the following fields: electricity, electrostatics, wireless technology, electric piles, aerodynamics, thermodynamics, electrochemistry and physics chemistry. In 1909 he was the first who proposed, in a note entitled „*On a long distance telephony*”, addressed to the Science Academy from Paris, the usage of the high-frequency currents in long distance wired telephony, which were also used in wireless telephony. We have to notice that August Maier was the first scientist who set up in 1907 a simultaneous communication with 5 separate lines on one 15 kilometer transmission line in Budapest. In 1963, Nicolae Vasilescu Karpen evoked Augustin Maier in a paper, saying “In this paper I want to mention the inventors of this procedure used nowadays for long distance wired telephony”.

#### Important achievements

A priceless achievement is represented by the Karpen Pile, also known as K Pile which functions using exclusively the environment temperature. By creating this pile, Vasilescu-Karpen has brought a significant contribution to setting up the technical means for flying to the Moon, namely the electric pile. He started to work to the theory of electric pile which will be able to generate energy endlessly even before the World War I, but he got the patent in 1922. The theoretical work refers to the dimensions the apparatus should have and to the materials the apparatus should be built. Vasilescu-Karpen wrote in this paper that the pile he invented will provide electric energy endlessly.

After finishing his theory, he started to work. He wanted to demonstrate that these calculations were correct by building a prototype. The prototype was ready in 1950. It consisted of two electric piles connected in parallel which supplied a galvanic small motor. This, in his turn, it moved a palette connected to a switch. Every half of rotation, the palette opened the circuit and at the second half of rotation it closed it. The rotation time was calculated in order to give time to the pile to charge themselves and to remake to polarity when the circuit was open. The motor and the palettes were used to show that the piles provided electric power.

Unusual was the fact that an electric pile which is the ancestor of battery will not function more than 5-10 years because one of the electrodes will corrode, and its replacement practically means a new electric pile. The Karpen pile which exists at the Technical Museum from Bucharest still works, after 95 years.

#### Engineer and Member of Academy

Apart from his teaching activity, he had several industrial activities. From 1906 he was chief of the Technical Department of the Mail, telegraph and telephones. During this period he built in Herăstrău wireless telegraph used during the World War I in order to communicate with the other European countries. The emission station was very similar to the one installed on the Eiffel Tower, he was, the antenna was 80 meters high and the area covered by the signal was 2.000 km. During 1914- 1915 it assured the connection with the stations from Paris, Lyon, Athens, Sevastopol. He designed the electrification works of Constanța, Vaslui, Câmpina , Râmnicu Sărat.

During 1931-1934 he was the president of the General Association of Engineers from Romania.

Nicolae Vasilescu-Karpen became a full member of the Romanian Academy in 1922, an Honorary member of the “*Société française des électriciens*” with Niels Bohr, Lord Rutherford, Nikola Tesla. In the history of science he is the scientist who was preoccupied by the complex researches related to practical aspects. He represents an engineer and a researcher who, after his retirement at 70, kept on working and writing. Out of his 82 works, 25 were written after he was 70.

He died on the 2nd of March 1964 at Bucharest. He was 94.

As homage to the memory of this remarkable scientist, many technical High schools, especially those specialized in telecommunications, are named after him.

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