

**PETRU BOGDAN – A LIFE DEDICATED TO ROMANIAN SCIENCE  
AND EDUCATION**

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The paper highlights the personality of the prestigious scientist of Iași, chemist professor Petru Bogdan (1873–1944), being dedicated to the 150<sup>th</sup> celebration of his birth. As a student and collaborator of the scientist Petru Poni, in 1913, professor Petru Bogdan taught the first physical chemistry course in Romania and published the first specialized books in this field. The paper presents the research activity within the University of Iași, aspects regarding his family life, and the publishing activity of this tireless supporter of cultural life.

*Keywords:* Petru Bogdan, Romanian scientific and technical culture, education

Petru Bogdan embodies a brilliant pioneering in Romanian technical culture, his achievements representing an essential benchmark in the history of Romanian science, an example of passion and competence, of assiduous and generous work.

Born in 1873, in Miroslăvești (Suceava county), Petru Bogdan attended primary courses in his native village, then, in 1884, at Târgu Frumos, and at the National High School in Iași, where he obtained a bachelor's degree in 1891.

In 1893 he began his university studies in Iași, where he obtained his degree in physico-chemistry. From December 1893 until 1899, he worked as a university assistant and conservator in the “Petru Poni” Mineral Chemistry Laboratory. Between October 1, 1894 and 1899 he was an assistant at the Physics (Optics and Acoustics) Laboratory of the University of Iași.

The famous professor Dragomir Hurmuzescu appointed Petru Bogdan as conservator of the Physics Cabinet, then substitute teacher in the Department of Heat and Electricity and, later on, collaborator in the establishment of the Electrotechnical Institute in Iași.

Petru Poni, who highly appreciated the scientific ability of Petru Bogdan, encouraged him to continue his studies in the field of physical chemistry at the “Friedrich Wilhelm” University at Berlin (Germany) [1]. Here, he will attend the courses of renowned professors: Jacobus Henricus Van't Hoff (the first laureate of the Nobel Prize for Chemistry in 1901), Hans Heinrich Landolt (director of the second

Institute of Chemistry of the University of Berlin), Hans Jahn (professor of Physical chemistry) and Emil Fischer (professor of Mineral chemistry). Between 1898 and 1902, Bogdan worked in Berlin, at Van't Hoff's Institute of Chemistry, and in the Physics Laboratory of Professor Warburg, as well as in Leipzig, in the Laboratory of Professor Wilhelm Ostwald. There he devoted himself to the study of the Arrhenius theory in electrochemistry, a new and emerging field of research. He also studied kinetic theory and radioactivity. Thus, he practically proved new hypotheses such as: the different speed of ions, the transport of electricity, the influence of electrolytes or non-electrolytes on dissociation. In Berlin, Petru Bogdan got in touch with the ideas of some scientists who revolutionized science, which he quickly absorbed and which he developed during his lifetime. Between 1902 and 1912, he held a physics chair at the "Internat", "National" High Schools in Iași and also at "Vasile Lupu" Pedagogical School, being appointed by order no. 8230B of July 27, 1902 [2].

From 1906 on, professor Petru Bogdan worked at the University of Iași, being the one who founded and led, since 1913, the first chair of physical chemistry in the country. Through the research undertaken under the leadership of professor Bogdan, new teaching staff and new specialists were formed in the field of physical chemistry. On May 16, 1906, he obtained a PhD degree in physical chemistry and was authorized to deliver free physical chemistry courses at the University of Iași. Starting from July 2, 1907, he was substitute teacher for the conference on biological chemistry and, in August 4, 1912, he passed the final exam for this conference.

In January 1906, when the celebration of Petru Poni took place, Petru Bogdan participated in all preparations, contributed to the collection of money for the "P. Poni Fund" and collaborated to the tribute volume dedicated to Petru Poni with the study entitled "Dissociation of nitric acid in water mixtures and ether". In March 1906, when the first volume of the "Viata Românească" journal was issued, he reviewed the volume "Homage to Petru Poni from former students"[2].

In 1915, after 14 years of substitute in various departments (Physical Chemistry, Analytical Chemistry, Experimental Physics, Medical Physics, Biological Chemistry, General Mathematics), Petru Bogdan was appointed full professor at the Department of Physical and Analytical Chemistry, where he taught kinetic theory, thermodynamics, electrochemistry, radioactivity.

As an organizer of research in the field of physical chemistry in Iași, he is mentioned by the Swedish scientist Svante Arrhenius, regarding his work about the mobility of potassium ions. He also undertook researches on the molecular constitution of liquids, using thermodynamics and kinetics, as a large number of publications lacked theoretical evidence. Starting with his work on the polymerization of liquids in 1904 and ending with the last study, elaborated in 1943, the structure of liquids proved to be a favorite research topic for the prestigious scientist. Thanks to his deep knowledge in the field of thermodynamics, Petru Bogdan identified the link between the speed of sound propagation in liquids and the heat of vaporization, expressing it in mathematical terms and establishing a

series of relationships that allow the evaluation of the diameter of molecules in liquid phase. He also elaborated studies on the influence of non-electrolytes on the properties of electrolyte solutions, on the characterization of the liquid state and provided explanations to solution phenomena in liquid mixtures. On the same note, it is necessary to highlight the specialized books he published, the reference titles being: “Lessons in Experimental Physics” (1921), “Volume Analysis” (1928), “Introduction to Electrochemistry” (1929), “Radioactivity and the Structure of Matter” (1929), as well as the study entitled “Le développement de la Chimie en Roumanie” (1937). The establishment of the first laboratory and the first specialized library, the first books on physical chemistry, and the training of our first doctors in physical chemistry are all linked to Petru Bogdan’s name.

Between the years 1916 and 1920, thus during the First World War, he worked as director of the “Red Cross” Hospitals in Iași, taking care of their administration. He was mobilized on the front, being part of the 13th Infantry Regiment Iași.

After the war, he taught the Course of Physical Chemistry within the Chair of Physical Chemistry (established in 1913), worked as a substitute teacher in the Chair of Heat and Electricity and, after the death of Professor Stravolca, he also delivered lectures in the Chair of Molecular Physics, Mechanics, Acoustics and Optics.

Professors Horia Hulubei, Radu Cernătescu, Theodor Ionescu, Alexandru Cișman *et al.* defended their doctoral theses under the supervision of Professor Petru Bogdan. Between 1918 and 1925, he was Director of the Electrotechnical Institute. After 1918, Petru Bogdan, delegated by the University Senate, worked as director of the newly established Student Dormitory and, later on, he was member and president of the University Dormitories and Canteens Commission.

Between 1918 and 1925 he worked as director of the Electrotechnical Institute. Also, starting with the year 1918, he has been involved, as delegate of the

University Senate, as director of the newly created Girls Dormitory and member of the Commission for Student Dormitories and Canteens.

Recognized for the efficient results obtained, for his ability to find optimal solutions, for his energy, he was elected dean of the Faculty of Sciences, member of the University Senate and then Rector of the University.

Since 1923, there were hopes that the building of an Institute of Physical and Technological Chemistry will be built in Iași, following the model of those abroad. The first funds intended for the building were allocated between 1928 and 1930, when the chemist Nicolae Costăchescu was the Minister of Education. The Institute was an annex of the old University building. Petru Bogdan took care of raising funds for its construction, which was finalized in 1939.

In 1924, following an invitation from the University of Nancy, four of his students went on scholarships to study in laboratories abroad. The university professors, surprised by their training in the field of physics, and taking note of the scientific works of Professor Petru Bogdan, awarded him the title of Doctor *Honoris Causa* of the University of Nancy.

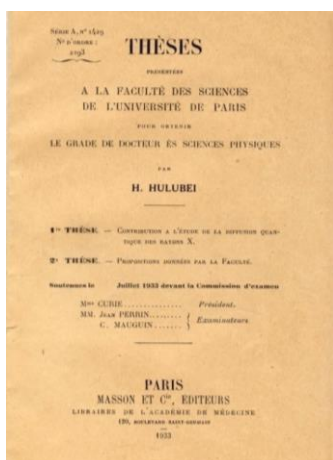


Fig. 3. Horia Hulubei's doctoral thesis (1913)

In 1926, following this honor awarded to Petru Bogdan, the Romanian Academy elected him a full member in the same year [3].

He was a member of the Order of the Star of Romania in rank of Commander (1928), of the Cultural Merit, the rank of Knight 1st Class (1931), member of the Order of the Crown of Romania in Grand Cross degree (1934), member of the Cultural Merit in Officer degree (1934). Professor Petru Bogdan was elected member of important chemical societies, including Société de Chimie Physique, Société de Chimie Industrielle, the Romanian Chemical Society, the Romanian Chemical Society, which all recognized his scientific merits. Many other institutions called on the work power of Petru Bogdan. Among these we

list: the Tram Company, the Iași Electric Plant, the “Oltea Doamna” School, the “Caritatea” Children’s Hospital, etc. Among the works published by Petru Bogdan, special mention should be made of: “Velocity of sound in liquids”, “Guide to volumetric analysis works” (issued in the fall of 1915, being used by students – Radu Cernătescu, Raluca Ripan *et al.* – for only one year, because it was lost during the war); “Contributions to the study of solid and liquid bodies from the point of view of their molecular structure”; “Cathode rays and channel rays”, “Catalysis”, “The role of physics in the development of chemistry” (published in “Adamachi” Magazine). He lithographed the “Experimental Physics Course”, then the “Physical Chemistry Course”.

Petru Bogdan took part in the founding of “Viața Românească” and “Adamachi” magazines.



Fig. 4. The editorial office of “Viața Românească” Magazine (1906) [3]. From left to right:

First row 1: doctor Gh. Kernbach, doctor N. Quinezu  
Upper row 2: G. Ibrăileanu, Costantin Stere, Izabela Sadoveanu, George Diamandy, Mihail Sadoveanu, Constantin Kilimoglu

Although he was not a man of letters, he had an important contribution to the development of “Viața Românească”, where he wrote chronicles and scientific articles, kept the accounts, and was a censor. At the County Directorate of Iași State Archives, there is a copy of a letter sent by Petru Bogdan to G. Ibrăileanu who, tired and depressed, went to Văratec monastery to rest. All this time, Petru Bogdan replaced him at the management of the magazine. On July 26, he wrote to Ibrăileanu: “I am informing you that two sheets of number three are collected for printing and we are waiting for materials. See, if you can, send an article about the painter Grigorescu in No 8.” [5]. Petru Bogdan worked at the magazine until 1924, when its editorial office moved to Bucharest.

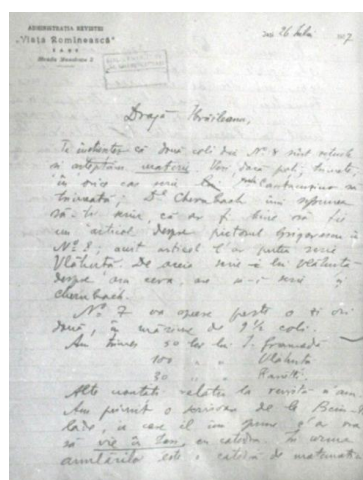


Fig. 5. Letter sent by Petru Bogdan to Garabet Ibrăileanu [5]

The „Poni – Cernătescu” museum hosts in its collection important documents, specialized books, diplomas, photographs and personal objects that belonged to famous teachers, including Professor Petru Bogdan, donated by his daughter, professor Elena Bogdan. Among the objects that belonged to Petru Bogdan, we present the photo of a table clock and an ID card.



Fig. 6. The travel card of Petru Bogdan [6]



Fig. 7. The table clock of professor Petru Bogdan [7]

The academician died on March 28, 1944, being buried at the “Eternitatea” Cemetery in Iași. Since 1991, his memory is permanently honored at the “Poni-Cernătescu” Museum in Iași.

We believe that the presentation of the life and achievements of professor Petru Bogdan, research pioneer in Romanian physical chemistry, characterizes an evocative approach, an obligation of civic and historical essence to the generations to come.

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