

## LUDOVIC MRAZEC, PROFESSOR AND HEAD OF DEPARTMENT

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**Abstract.** The paper enumerates the main episodes of founding and developing the mineralogical and geological university education in Romania. Facts on how Ludovic Mrazec gained his high academic status and on how he fostered many generations of eminent geologists are described.

*Keywords:* Department of Mineralogy, University of Bucharest, mineralogy, crystallography, courses.

**Résumé.** Le document énumère les principaux épisodes de la création et de développement de l'enseignement universitaire en minéralogie et géologie en Roumanie. Nous décrivons des faits sur la manière dont Ludovic Mrazec a acquis son statut académique élevé et sur la manière dont il a encouragé de nombreuses générations de géologues éminents.

*Mots-clés:* Département de minéralogie, Université de Bucarest, minéralogie, cristallographie, cours.

On June 8, 2017, 150 years since the birth of the renowned founder of Romanian geology were celebrated. Ludovic Mrazec's personality allows multiple evocations, only to illustrate his professional multivalence. This is a brief presentation of the activity of Ludovic Mrazec as a teacher, head of the Department of Mineralogy at the University of Bucharest and founder of the mineralogical, crystallographic and petrological university education in Romania.

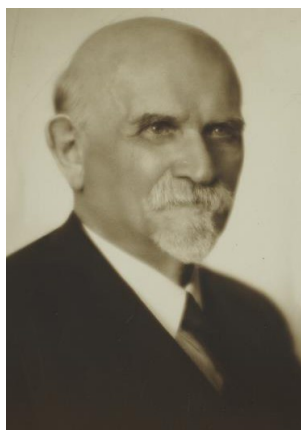


Fig. 1. Ludovic Mrazec (1867–1944), professor and head of the Department of Mineralogy between 1894 and 1937.

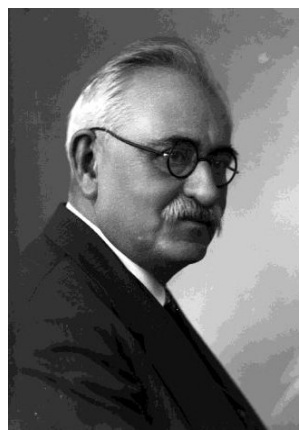


Fig. 2. Louis-Claude Duparc (1866–1932).

The beginnings of Ludovic Mrazec's (fig. 1) scientific and teaching career relate to the personality of Louis-Claude Duparc, professor of mineralogy and chemistry at the University of Geneva (fig. 2), a man with physico-chemical concerns, but with a strong inclination towards geology, who had a profound influence on the young Ludovic Mrazec. Together with Professor Duparc, Ludovic Mrazec wrote the first scientific papers, including an in-depth study of the Ural iron deposits (e.g., the Troitsk iron deposit), thus sealing his approach to the field of earth sciences.

In 1892, at the age of 25, Ludovic Mrazec defended the PhD thesis at the University of Geneva. He was awarded the title of Associate Professor and was appointed – with the approval of the Geneva Canton State Council – assistant at the University Laboratory of Mineralogy for two semesters (fig. 3).

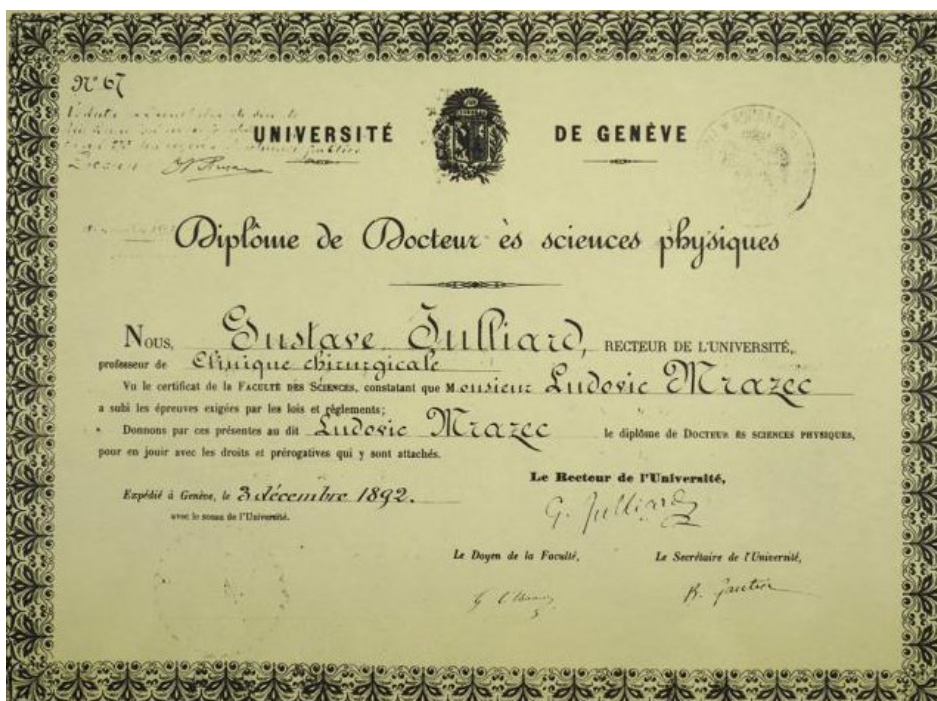


Fig. 3. The PhD diploma awarded to Ludovic Mrazec by the University of Geneva in 1892.



Fig. 4 Constantin Istrati (1866–1932), chemist, medical doctor and member of the Romanian Academy since 1899.



Fig. 5 The title page of the Methodical Course of Chemistry and Mineralogy by C. Istrati and G. G. Longinescu, 1908.

He returned to the country in 1893 and was appointed assistant in the Geology Laboratory of the Faculty of Sciences at the University of Bucharest. Here he worked in the chemistry laboratory led by the professor and academician Constantin Istrati (fig. 4), a scientist who was no stranger to certain mineralogical topics (fig. 5). Those were, after all, times when mineralogy was only regarded as a chemistry of the Earth's crust.

The introduction of crystallography and the taking over of the French traditions of Haüy, Delafosse and Bravais, as well as integrating mineral chemistry and crystallography, represented another special merit of Ludovic Mrazec. Although this was a time only slightly outrunning the advent of X-ray diffraction, crystallography still did not find followers among Romanian scientists. The division of the Department of Geology at the University of Bucharest in 1894 and the creation of the Department of Crystallography, Mineralogy and Petrography, offered young Ludovic Mrazec the prospect of dedicating himself to the field in which he specialized along with Louis-Claude Duparc. As we all recognize today, Ludovic Mrazec has successfully capitalized on this opportunity.

The division of the Department of Geology was requested by Constantin Istrati, at that time, General Inspector of Higher Education. Until then, mineralogy was taught, along with general geology, by Gregoriu Ștefănescu. It is understandable that both the quality of training and the personality of Ludovic Mrazec made a strong impression on Constantin Istrati.

Even Mrazec would recognize later that Duparc – his mentor – and Constantin Istrati were among the scientists who contributed essentially to the establishment of this department that has survived to this day.

In order to take over the leadership of the newly established department, Ludovic Mrazec took on December 1, 1894, an exam for the position of temporary professor at the University of Iași – he got an average mark of 9.13 –, which might appear somewhat surprising, if not pedantic, especially since one can only imagine that there were only few personalities with the same scientific scope. The appointment of the new professor was made by Take Ionescu who was the Minister of Public Instruction and Cults.

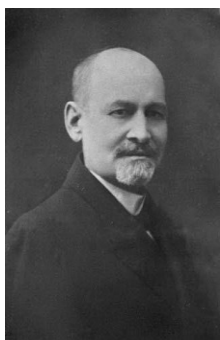
The Laboratory of Crystallography, Mineralogy and Petrography did not exist physically at the time of Ludovic Mrazec's appointment, as there were no dedicated establishments and no specialists employed.

The first lectures on mineralogy, under the new aegis, took place at the University Palace in Bucharest (fig. 6), whereas the practical works were held in the basement of the building, under the Senate room, in the inorganic chemistry laboratory led by Professor Alexe Marin.



Fig. 6. University Palace of Bucharest, by architect Alexandru Orăscu (photo taken after 1874).

The mineral collections were hosted by the Natural History Museum established by Prince Alexandru Ioan Cuza in 1864, in the Porumbacu House on Polonă Street, in Bucharest. The library of the department, founded mainly on the donations made by Ludovic Mrazec, was not in any way arranged or systematized.



The budgetary provisions for the academic year 1894–1895 allowed the new laboratory to be developed. Based on credentials by Ludovic Mrazec, the employment on the position of lecturer, of Gheorghe Munteanu-Murgoci, a graduate in physico-chemical sciences, became possible (fig. 7).

For almost 30 years, the Mineralogical Laboratory did not have any proper headquarters. It was hosted in private, inappropriate houses away from the University's classrooms (fig. 8, 9).

Fig. 7. Gheorghe Munteanu-Murgoci (1872–1925), the first Romanian docent in mineralogy.



Fig. 8. The Cariadi House, in Lahovary Street, the first integrated headquarters of the Mineralogical Laboratory, in 1897.



Fig. 9. The house of the former "Maria and Zoe Slătineanu" Asylum, in Regele Alexandru Street, headquarters of the Mineralogical Laboratory from 1908.

The relocation of the Laboratory into the eastern wing of the newly built University, in 1927, was not likely to solve all the organizational issues. The laboratory facilities were completed in 1930 and only in pursuit of the persistent intervention of Ludovic Mrazec (fig. 10).

The architect's plans did not please the new tenants of the enclosure. A disappointing detail was that the classrooms were separated by the chemistry and diffractometry laboratories. Too much attention given to the teacher's pretense, too little attention given towards the functionality of the research spaces.



For example, the wing of the offices and laboratories was connected with the classrooms through a narrow corridor, designed to prevent the teachers from intersecting with the students on the hallway (fig. 11).



Fig. 10. The eastern wing of the University of Bucharest, the new headquarters of the Mineralogy Laboratory from 1927.

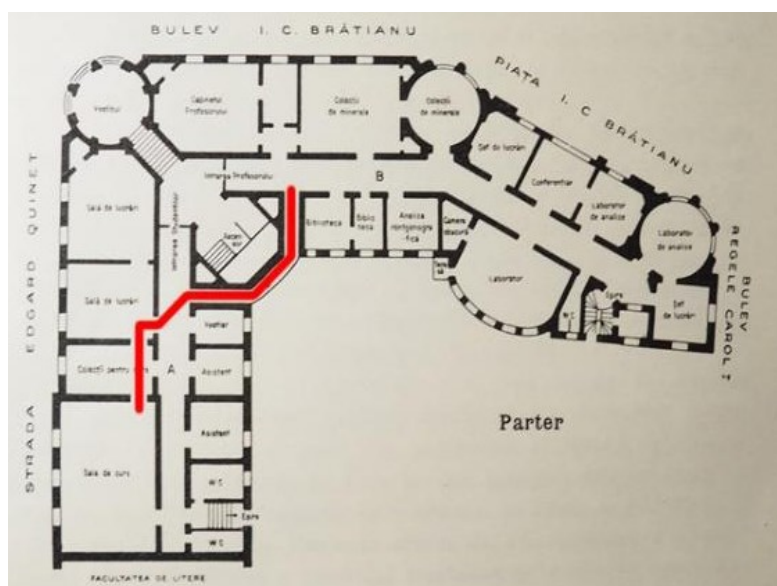


Fig. 11. Teacher's route between the offices and the laboratories of the Department of Mineralogy and the classrooms.

Between 1894 and 1937, Ludovic Mrazec taught the “Crystallography, Mineralogy and Petrography” course at the Faculty of Natural Sciences and Sciences (University of Bucharest), the Faculty of Pharmacy and the Faculty of Industrial Chemistry (Polytechnic Institute), trying and otherwise succeeding to address very diverse categories of students and professional concerns.

As a professor, Ludovic Mrazec was extremely active, sustaining 75 course hours and 600 hours of practical work per year, all highly inspiring and scientifically dense. The themes of these courses were filtered and compiled by a keen mind, capable of rebuilding the links between various geological processes. A special personal charm, suggestive gestures, an imposing stature, all contributed to an impressive presence in the classrooms (fig. 12 a, b).

After retiring from the Geological Institute of Romania, Ludovic Mrazec dedicated himself to education. He skillfully used the prestige he enjoyed among industrialists to create and develop the “Professor Ludovic Mrazec” University Fund. With the help of this fund he extended the library and he published the first two volumes of the Mineralogical Laboratory Bulletin as well as the Course of Minerals and Rocks.

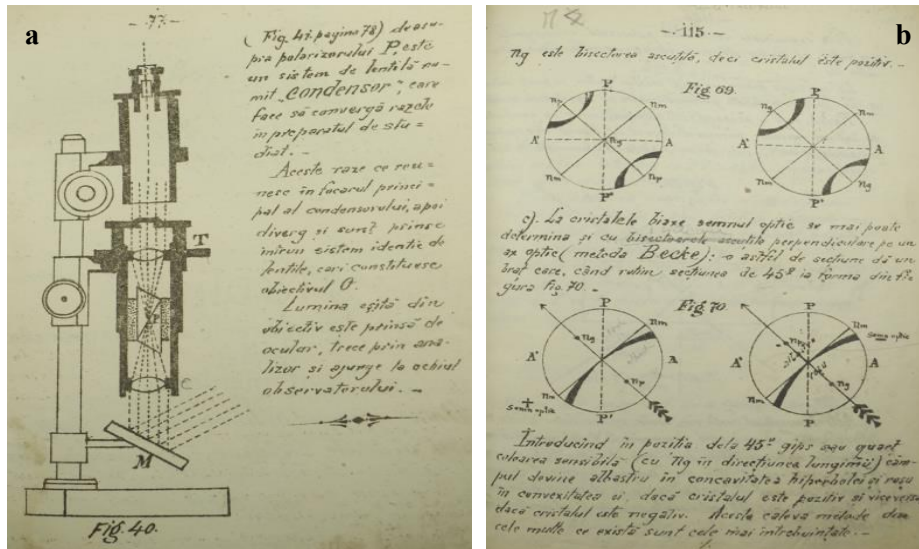


Fig. 12 a, b. Illustrations from the courses drafted by Ludovic Mrazec.

The years of retirement allowed Ludovic Mrazec to fulfill a great desire of his life: writing and printing the Course of Mineralogy. Two editions of the second part of the Course of Minerals and Rocks, were lithographed from hand written manuscripts, in 1924 and 1936. The minutely-drawn figures were printed with wood-based engraved lead molds. After numerous modifications and additions, the course was printed in 1942. The second tome of the course was printed after his death (fig. 13 a, b).

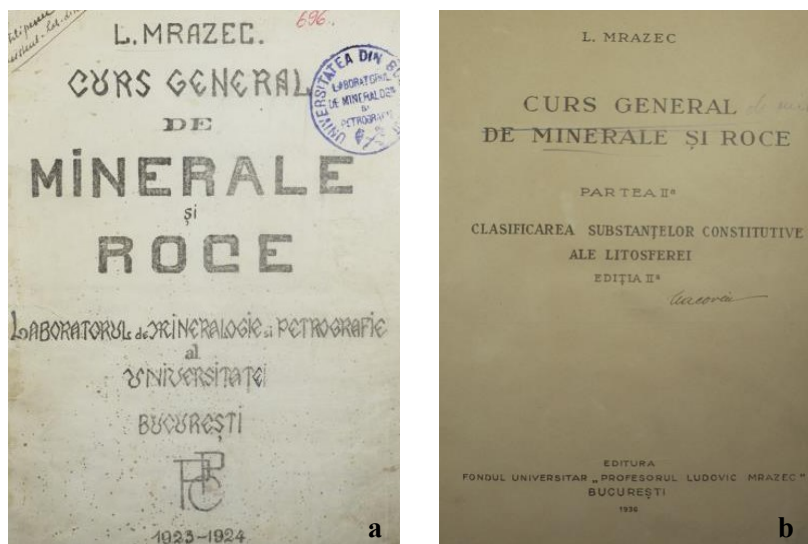


Fig. 13 a, b. The title pages of the Course of Minerals and Rocks, 1924 and 1936 editions, by Ludovic Mrazec.

The guiding principles of the course have been extensively exposed in this paper's foreword: *"A natural science by excellence, mineralogy studies the well-defined conditions of mineral formation in the earth's crust. Naturally, the essential approach of the course was a mineralogenetic one, the whole work being similar to a physico-chemical study of the crust."* The content of the course is relevant to the synoptic character of Ludovic Mrazec's vision on geosciences:

#### I. THE PHYSICS OF MINERALS

- A. Geometric crystallography
- B. The detailed structure of crystals and its determination
- C. Optical properties of crystals
- D. Thermal properties
- E. Electricity, magnetism and minerals
- F. Cohesion, elasticity and plasticity
- G. Hardness
- H. Specific gravity

#### II. THE CHEMISTRY OF MINERALS AND ROCKS

- A. The chemistry of Earth
- B. Radioactivity. Radiochemistry
- C. Cristal chemistry
- D. Analysis of minerals and rocks

#### III. THE FORMATION OF MINERALS AND ROCKS

- A. Magmatic minerals and rocks
- B. Sedimentary minerals and rocks
- C. Metamorphic minerals and rocks
- D. Alteration of minerals and rocks. Soils
- E. The synthesis of minerals and rocks
- F. Minerals and rocks from the point of view of the national and world economy

Ludovic Mrazec was not only a founder of institutions, but also an institutor of generations. It might be sufficient to see some of the names of scholars who sustained their PhD at the University of Bucharest during the period when Ludovic Mrazec was head of the department:

- I. Ionescu Bujor – The granite of Șușița
- Șt. Cantuniari – The granite of Turcoaia and Iacob-Deal
- D. Roman – The igneous massif of Greci
- Al. Codarcea – Geological and petrological study of Ocna de Fier – Bocșa Montană region
- Gh. Paliuc – Geological and petrological study of Parîng Massif and of Cimpei Mountains
- Gh. Manolescu – Geological and petrological studies in the eastern part of Vulcan Mountains
- N. Gherasi – Geological and petrological studies Godeanu and Țarcu Mountains.

