

ION POPESCU-VOITEȘTI – THE CARTOGRAPHER

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Abstract. On the occasion of the 80th commemoration of Professor Ion Popescu-Voitești's demise, we can say with certainty that he still remains one of the pillars of the geological sciences in Romania. As one of the pioneers of this science in Romania, his numerous written contributions also include a significant number of illustrations. Among the latter there are more than a thousand published geological sections and logs, countless hand sketches that have likely been irretrievably lost, in addition to a remarkable collection of geology-themed maps, the majority of which are still accurate today. Herein, 13 maps signed by him are discussed, maps that are based on the studies carried out by the geologist throughout his lifetime. This work was put together not only to commemorate the aforementioned eight-decade pole, but also as an homage to the excellence that this skillful cartographer bestowed towards the Romanian scientific research.

Keywords: Popescu-Voitești, cartography, historical geology, Romania.

Introduction

Romania has, but in particular has had many valuable people. When we talk about valuable people, unfortunately there is a progressive tendency to forget those who have brought fundamental contributions to the disciplines and basic sciences that have shaped the prosperity of the country. Concrete examples are ubiquitous, and the field of Romanian geology is not exempt from this trend that culminates in the downfall of exceptionally valuable personalities. One such case is that of geologist Professor Ion Popescu-Voitești. In what follows I will briefly present some of the contributions of this geological scientist, contributions that have brought the Romanian geology into a different, brighter light. Here I refer to the contributions that required exhausting field trips, accumulation of geological data, logic, and last but not least, creativity – the cartographic contributions.

Before anything else, I would like to offer some thoughts on the scientist in question. It is clear that despite the multitude of natural wonders, only a small number of individuals truly understand them. While the majority of natural and fundamental science disciplines hold their own greatness, the geology discipline stands unparalleled. This is probably how Ion Popescu-Voitești saw the approach of

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knowledge, as can be understood from the stories of many geologists who were formed after Popescu-Voitești's lectures, e.g. Corvin-Papiu & Huică (1988):

„Professor Ion Popescu Voitești's life was between the University and the laboratory on the one hand, and the field – the great laboratory of nature, as he liked to present field work to students from the very first moments – on the other.” (– p. 221)

„It is hard to imagine a personality as versatile and complete as that of Professor Voitești. The savant was characterized by his mastery of an astonishing amount of knowledge, which gives the impression of a real geological encyclopedia. Endowed with an unusual memory, passionate about everything that constitutes scientific data, in love with the Romanian lands, Professor Voitești carried out works in the most varied branches of geological sciences, starting with the study of the Long-hills of the Subcarpathians from Muntenia and culminating with the synthesis work on the geological evolution of Romania.

The stratigraphic geology, paleontology, geomorphology and especially the tectonics received brilliant contributions, Professor Voitești being gifted with a remarkable imagination, which allowed him to make dynamic-geological interpretations and paleogeographic reconstructions, which are still valid today.” (– p. 222)

Popescu-Voitești's graphical contributions are represented by an impressive number of sketches that include geological sections and logs, with the help of which he elaborated – either alone or close to other geologists or graphic artists – a generous series of geological maps, or maps with geological thematics concerning the evolution of the Romanian territory. Herein I will present only 13 of these maps – in chronological order – in order to show how the geological mapping studies were carried out in a period when transport across the country was rarely done by car, but rather by train, cart or wagon, or even directly on horseback, or by the side of a mule; a time about which it can be said at first that science did not sufficiently meet with technology. I repeat that I am limiting myself only to some maps, the most aesthetic and complex, because the wealth of Popescu-Voitești's legacy would take up entire volumes.

The beginnings

While teaching at the Normal School of Câmpulung Muscel (1904), at the age of only 28, Popescu-Voitești also carried out the first stratigraphic researches on the Long-hills between the Dâmbovița and Olt rivers (Bombiță, 1980), these researches being part of his doctoral thesis (Huică, 1980). This research was published a little later in the journal *Anuarul Institutului Geologic al României* (Popescu-Voitești, 1908). Here appears the first map that the young scientist drew-up (Fig. 1), in which he outlined – both on the basis of the existing references at the time and on the basis

of his own field and laboratory (biostratigraphic) research – the formations classified back then into Mesozoic (Tithonian, Cenomanian) and Cenozoic (=Tertiary; Eocene, Oligocene, Early Miocene, Sarmatian, Dacian, 'Levantine' and Quaternary). Of course, the metamorphic bedrock of the area is also extended, accompanied by a patch of granite that emerges on the so-called "*crystalline island*" of Albești. All these lithological illustrations are accompanied by major elements of tectonics and structural geology. The faults depicted by Popescu-Voitești are mostly found in the contact zone of the metamorphic with the northern flank of the sedimentary basin, and they were either observed by the author at the surface, or presumed in the underground. The folds are represented by anticlines and synclines, the latter also being related by the author with the salt diapirs in the region. In order to make the map complete, he also added the location of natural gas seepages (*e.g.*, at Albești and west of Suslănești), areas with sulphurous springs (*e.g.*, Călimănești, Căciulata, Bivolari, Bughia, etc.) or salty springs (*e.g.*, Ocnele Mari, Slănic village, the area south of Câmpulung), areas with coal deposits (*e.g.*, on the Văleni-Boteni-Jugur-Poienari-Jidova-Berevoiești-Curtea de Argeș alligment) and with active stone quarries (*e.g.*, Albești limestone near Câmpulung, Mateiașul marble from the locality with the same name, limestone also from the Mateiașul area, and gypsum from the Flămândă ridge near Câmpulung) (Popescu-Voitești, 1908).

The following year, Popescu-Voitești (1909) was assigned as a geologist at the Geological Institute of Romania (Bombiță, 1980; Huică, 1980, 1997; Stanciu, 1936) at the urging of Ludovic Mrazec (Codrea & Fărcaș, 2023). During this period, he served as a teacher of natural sciences at the high schools "Gheorghe Lazăr" and "Matei Basarab" from Bucharest (Huică, 1980, 1997). At the same time, he succeeded in publishing the following series of contributions (Popescu-Voitești, 1909) in his PhD thesis, issued in the journal *Anuarul Institutului Geologic*, which completed and improved the previous work. In this work, the author introduced a second map (Fig. 2) in which he divided the metamorphic schists of the bedrock into three groups, completed the Thitonian with Neocomian, and added the 'Senonian' to the Cretaceous deposits. The Eocene was included within the 'Marls Horizon' (upper) and the 'Conglomerate Horizon' (lower) belonging to the Getic Nummulitic, within the Nummulitic Limestone of the Albești type and within the Nummulitic of the Red Marly Nappe. More on the improvements in this map can be found in Bombiță (1980).

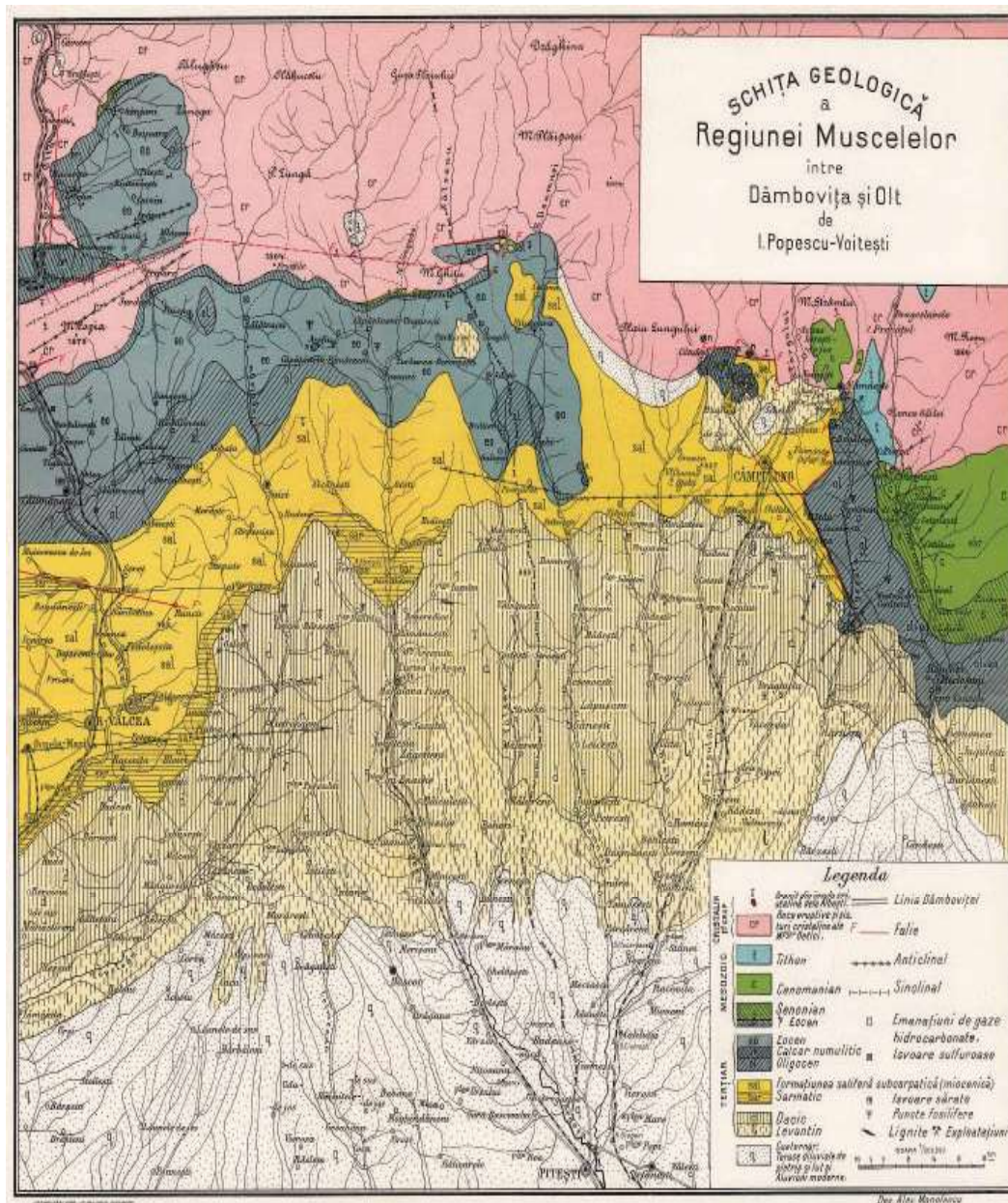


Fig. 1: Geological map of the long-hills region between Dâmbovița and Olt (Popescu-Voitești, 1908).

In the same work, the author introduced a tectonic sketch (Fig. 3) representing the tectonic connections between the Carpathians and the Getic Mountains. The sketch is accompanied by 10 sections, and was developed using his research with Ludovic Mrazec. Here, the author has covered the area of the mountain range along the Olt (to the west), Buzău (to the east) and Trotuș (to the north) rivers.

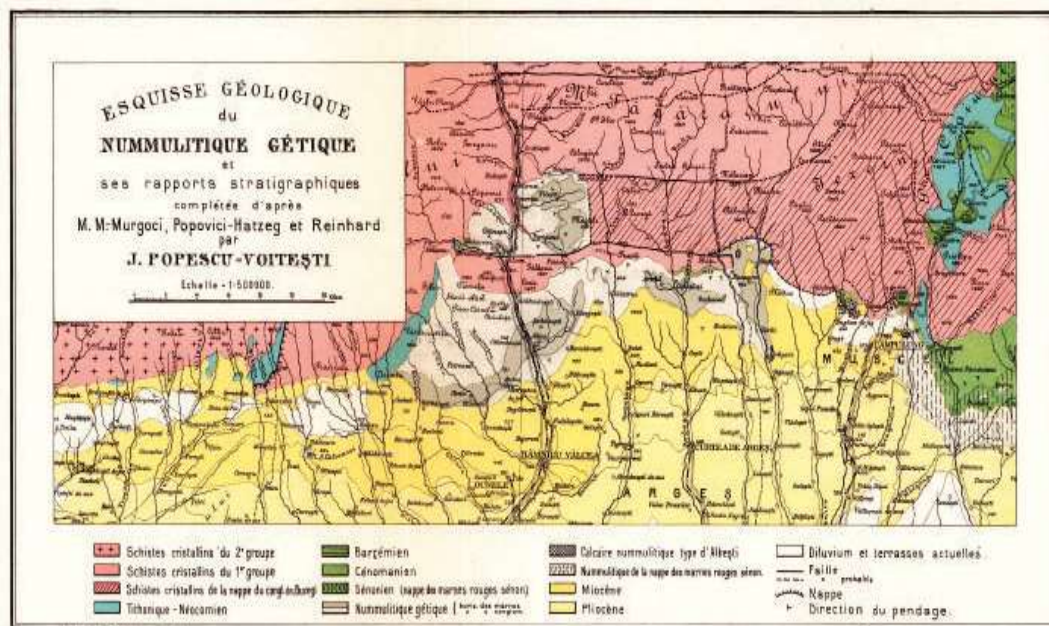


Fig. 2: Geological map of the Getic Nummulitic and its stratigraphic relationships (Popescu-Voitești, 1909).

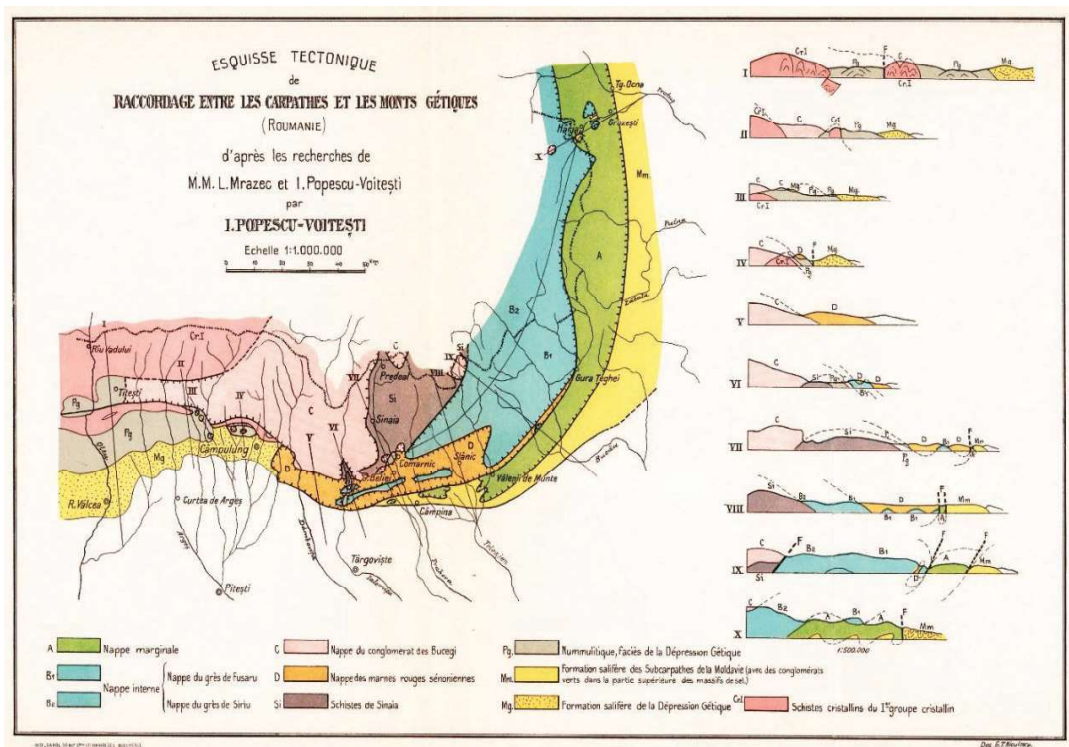


Fig. 3: Tectonic sketch of the connection between the 'Carpathians' (actually Eastern Carpathians) and the 'Getic Mountains' (actually the central-eastern part of the Southern Carpathians) (Popescu-Voitești, 1909).

The sketch contains the main tectonic belts and their distribution within the Eastern and Southern Carpathians, representing their thrusting in relation to the 'crystalline'. Incidentally, this collaboration between Mrazec and Popescu-Voitești was only the beginning of a long partnership in which the two geologists began to unravel the tectonic evolution of the Eastern and Southern Carpathians.

From regional to national scale

In a subsequent research, Mrazec & Popescu-Voitești (1914) studied the tectonic relationships between the sedimentary basins around the Eastern and Southern Carpathians, and the orogene. Using data from literature, as well as their own data and observations from the field, they were able to produce a new, more complex tectonic cartographic composition, which includes three categories of tectonic data, as shown in Figure 4.

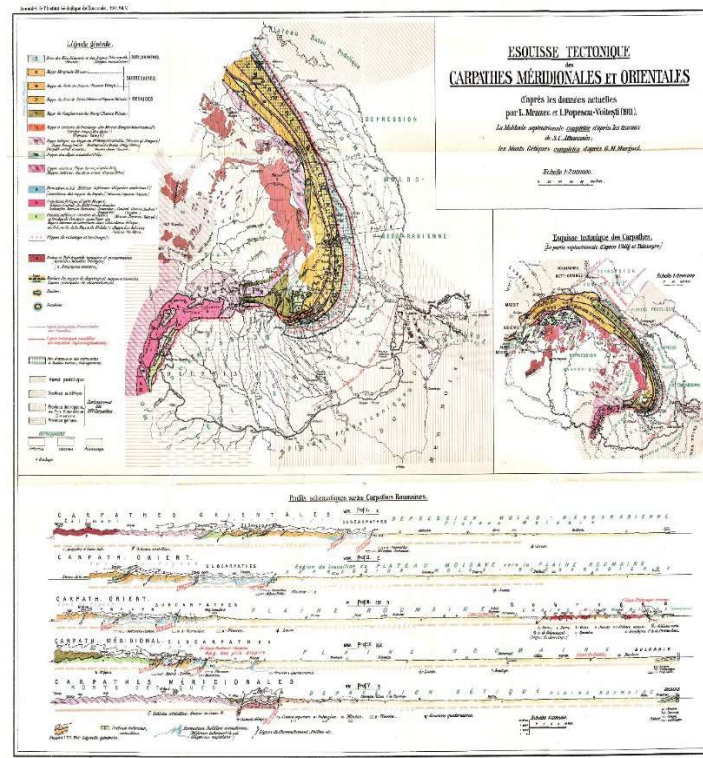


Fig. 4: Tectonic sketch of the Southern and Eastern Carpathians, with the tectonic sketch of the Carpathians, and schematic sections through the Romanian Carpathians (Mrazec & Popescu-Voitești, 1914).

In the main part of the composition, Mrazec and Popescu-Voitești have succeeded in drawing the first tectonic map of Romania where the Carpathian area and the 'Vorland' are outlined with the main units and structural elements, many of

the important fractures affecting the 'Vorland' (e.g., Peceneaga-Camena and Trotuș faults) being visible (Stănoiu, 1997). What is fascinating about this map, in relation to the map legend, is the way the authors have bracketed the authorship attribution for the names of the nappes, a fact not found in maps today, but which would still be useful to remember who is credited for these names. The second part of this graphic composition is represented by the generalised tectonic outline of the Carpathians, where the eastern part is extended to the north-west and then to the west, up to the contact with the Alps, thus placing the Carpathians in the Alpine system. This part was made using data from Uhlig (1903) and those collected by Mrazec together with Teisseyre over several years since the beginning of the 20th century. The last part of the composition presents five schematic sections across the Romanian Carpathians, the authors having already presented the tectonic thrusting of the nappes, including the contours of their non-eroded structures.

It is certain that the relationship between mentor (Mrazec) and disciple (Popescu-Voitești) was a great one, the disciple becoming a supporter of the thrusting tectonics theory, a fact represented by himself even through a caricature illustration (Fig. 5) otherwise reminded by his younger colleagues, such as Băncilă (1988):

„... at one time he produced a successful caricature-profile, in which the Carpathian nappes were represented by the bodies of men at different ages (as the nappes were considered) thrown outwards in order and struggling to find a more comfortable position.” (– p. 229)



Fig. 5: The Carpathian nappes and their origin. Pen drawing by Prof. I.P.-Voitești. On the left Prof. Voitești, on the right L. Mrazec (from Stanciu, 1936).

Detailing the unknown

A following detailed map published by the geologist (Popescu-Voitești, 1915) is an elaborated sketch of the Ogretin – Mierla (present-day Poiana Mierlei) region in Prahova County, a map that connects the present-day Ciocrac and Rotarea localities in a southwest-northeast direction (Fig. 6). Here, he covers the Oligocene sectors of the 'Marginal Nappe', the Badenian, Meotian and Dacian, placing particular emphasis on the outline of the fossiliferous 'Dacitic Tufa' and the autochthonous formation that emerges on the surface with salt formations. This map is not lacking in regional tectonic features or in the occurrence of sulphurous and salt springs. The study of this area began in 1912 following the discovery of fossils of 'Tortonian' (= Badenian) molluscs. The author realised that this part of the Miocene was not recorded in this area of the Carpathians, but knew – from literature and even from his own work – that the deposits here are considered Upper Oligocene – Lower Miocene. Thus, he was able to reconstruct the region around the correct specific formations.

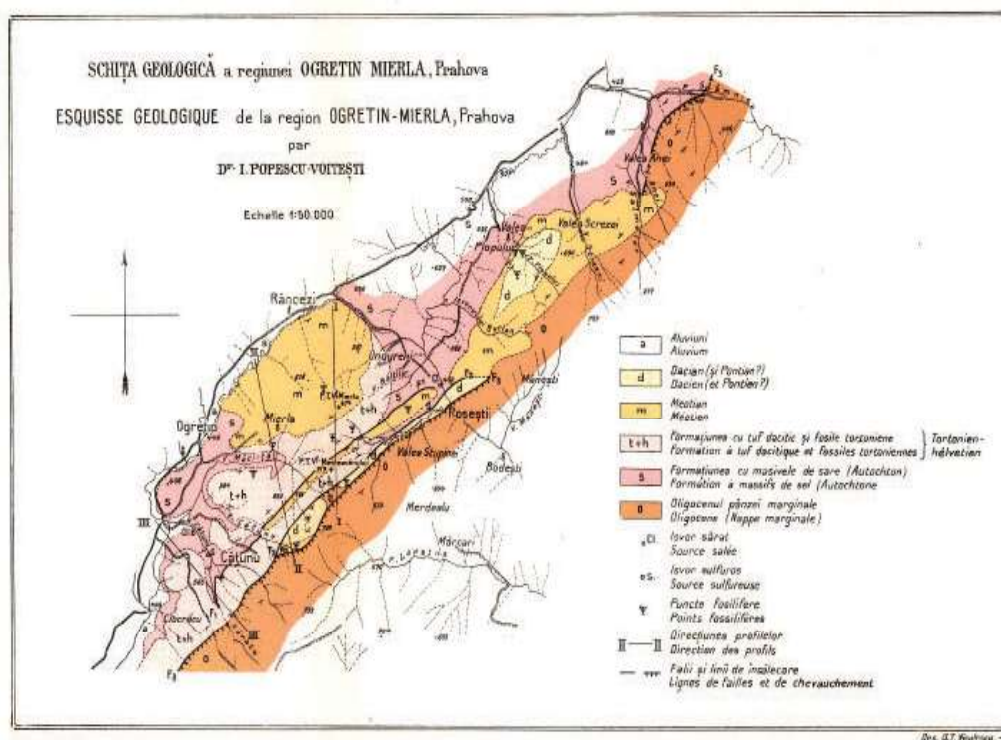


Fig. 6: Geological map of the Ogretin-Mierla region, Prahova County (Popescu-Voitești, 1915).

Another research of the geologist focuses on the geological description of the Brezoi Basin region (Popescu-Voitești, 1918), which at that time was poorly known. Popescu-Voitești also compiled a geological and tectonic sketch of the basin (Fig. 7), the map including the area situated south of the line between the locality of Siliștea (now Păscoaia) to the west, and Titești to the east. Among the geological contributions are: the division of the three groups of the metamorphic bedrock, the contact breccia between the metamorphic rocks and the surrounding sedimentary ones, the establishment of the geological ages for the stratigraphic sequences, the presence of some 'Senonian' tectonic 'klippe' structures with *Hippurites*, and even the presence of a gold-bearing vein at Stan's Valley. Tectonically, it shows: a faulting between Căndoaia Peak - Vasilatu Valley - Albioara Peak, the Brezoiului fault, and the Bucegi Nappe Crystalline thrusting over the Cozia Crystalline.

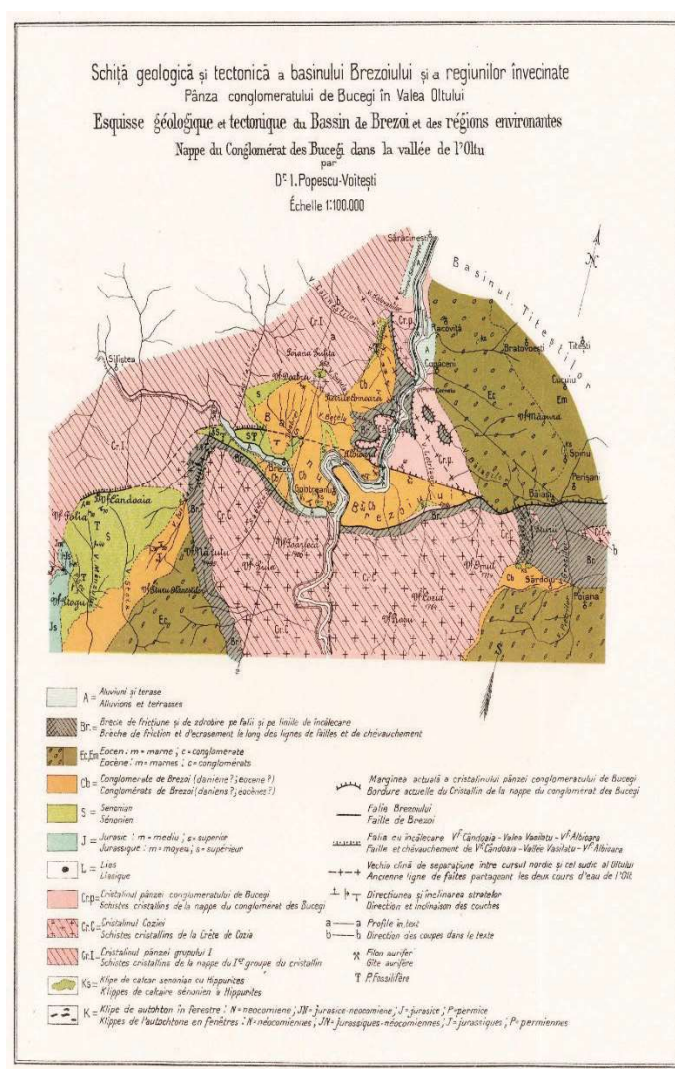


Fig. 7: Geological and tectonic sketch of the Brezoi Basin and its neighbouring regions. The Bucegi Conglomerate Nappe in the Olt Valley (Popescu-Voitești, 1918).

From the Great Union of Romania and beyond

Probably the best known of Popescu-Voitești's maps is the one representing the Geological Map of the Greater Romania (*i.e.*, Romania after the Great Union from 1918, when the former Romania composed by Moldavia and Vallachia united with Transylvania; *e.g.*, Fig. 8), a map that was published after the geologist became a Professor at the University from Cluj in 1919 (Băncilă, 1988), therefore immediately after the Great Union of Romania. The map was published in three editions of a book (Popescu-Voitești, 1921, 1924a, 1929a). In this map, the geology of Romania is accompanied by the geology of the Republic of Moldova, and small parts of present-day Bulgaria, Serbia, Hungary and Ukraine, of course, under the geographical names of the respective times. What is noteworthy about the map is the first representation of Transylvania region in Romanian, and the wealth of data synthesised at this scale, much of which remains valid today. Thus, the map contains two divided legends, one for sedimentary rocks with ages ranging from Paleozoic to Quaternary, and a second legend for magmatic and metamorphic rocks.

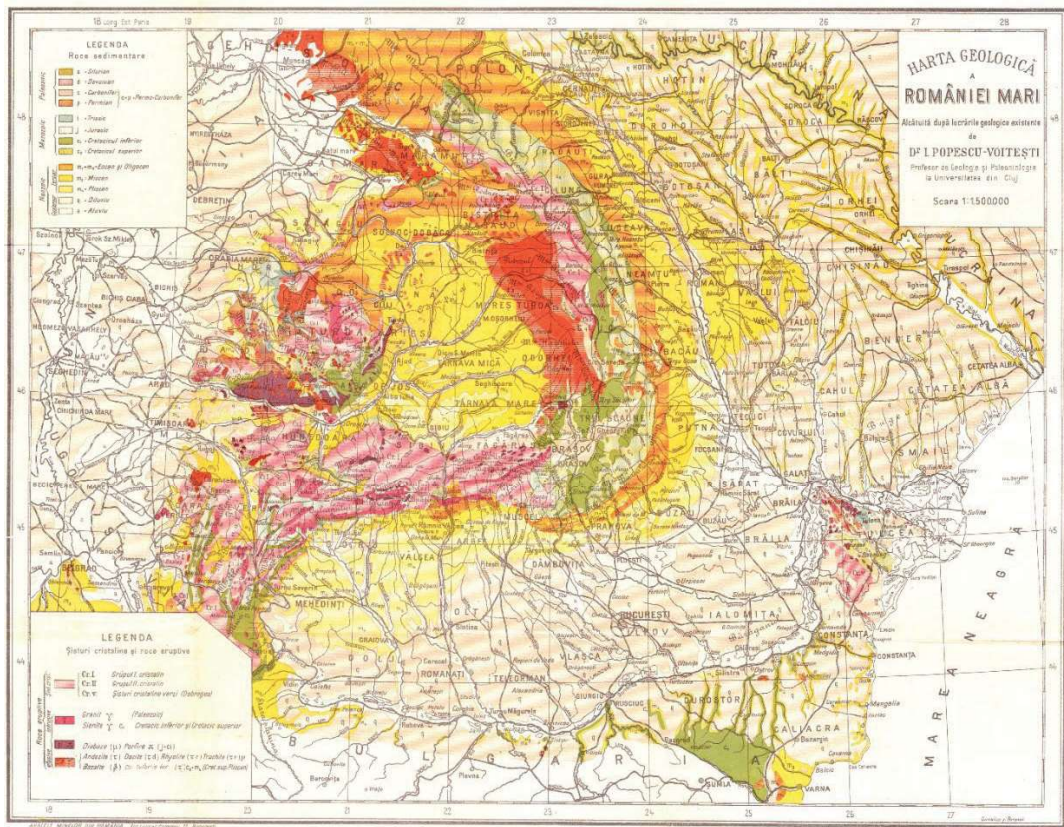


Fig. 8: Geological map of the Greater Romania, based on existing geological works (Popescu-Voitești, 1924a).

All these depictions are well represented for the knowledge from a century ago, especially in the context that the map was produced in order to popularize and promote the science of geology in Romania on a general level. What is intriguing about this map, however, is that Popescu-Voitești could not have made it based on his own research because it would have been impossible for him to study Transylvania in such a short period of time (*i.e.*, 1919 – 1921 period). It is clear that Antal (Anton) Koch (1843-1927) (Codrea *et al.*, 2011a, b, 2023) developed the first line of geological study in Cluj and that he was no longer there at the time when the Romanian geologist appeared at the university chair, as is evidenced by the Cluj university yearbook (Pușcariu, 1921). However, in the period 1919 – 1920 there were still employees of Austro-Hungarian origin from the previous university. At the Department of Geology and Palaeontology remained: chief of works Sigismund Szentpéteri, chief-laborant Iosif Pázsi and the 'servants' Petru Szovati, Iosif Fülöp and Francisc Pázsi (Pușcariu, 1921), being replaced by Romanian staff in the next years (Călugăreanu, 1923). I mention this because the political – we can say nationalist – influence of that period in Transylvania is very evident, and the possibility that this influence affected the scientific writings is very high. Thus, I believe that for political reasons Popescu-Voitești could neither cite nor mention, let alone thank for the bibliographical support he had for the elaboration of the works regarding Transylvania and the surrounding regions of Romania during that period, implicitly for the map in question.

A fact is that a similar scale, slightly more complex map issued immediately, in 1926, in the Physiographic and Statistical Atlas of Romania published by the Geological Institute of Romania (Mrazec *et al.*, 1926), after the work of the Institute's geologists, under Mrazec's direction, but drawn up by Jekelius and Atanasiu. From what appears from Ion Atanasiu's memoir of titles and works (Atanasiu, 1936), can be deduced that Mrazec had no contribution to this map, the authors of the map being only Jekelius and himself. Also, although the 1926 map represents the complete Greater Romania, the authors do not mention on the cover that they were also inspired by the works of Popescu-Voitești, but that they did the work according to the following: „*Transylvania and Banat, in part after the earlier work of Hungarian geologists. Bulgaria, Czechoslovakia, Yugoslavia, Poland, Ukraine and Hungary, according to the geological maps of these countries.*” However, all of these come in a context where neither of the two authors (Atanasiu and Jekelius) could do the same work as Popescu-Voitești (who did had support at the University of Cluj), since they were not proficient in Hungarian as can be understood from Bleahu (2010):

„*The Geological Institute initiated the editing of the "Geological Bibliography of Romania", publishing the first volume in 1926. Unfortunately, it was incomplete, as the authors were not sufficiently familiar with the Hungarian language and in general with Austro-Hungarian publications, in which almost all the works on Transylvania and Bucovina appeared until 1920. When the problem arose of producing a supplement to the Bibliography, to complete it with omitted and newly appeared works, the task was given to Dr. Jekelius, who was best suited to do*

it. He carried it out brilliantly, and the First Supplement to the Geological Bibliography of Romania, which appeared in 1929, is a model of how such a work should be done.” (– p. 18)

Ironically, the second edition of the map appeared in 1929 (Mrazec *et al.*, 1929), the authors of this edition being now Mrazec, Jekelius and Popescu-Voitești (*vide* Stelea, 2011).

As head of the Chair of Geology and Palaeontology at the University of Cluj, Popescu-Voitești was now the organizer of geological education in Transylvania (Huică, 1997). His activities included the elaboration of lectures for students, but sometimes also teaching in other areas of the country (*i.e.*, at the Polytechnic School of Timișoara). On one such occasion, he developed a course on petroleum geology (Popescu-Voitești, 1924b), on the occasion of which he also published a map (Fig. 9). The map is not necessarily a special one, except for the fact that it showed the oil fields, areas with oil marks and with natural gas, known up to that time in the Carpathian areas of Romania. However, this map shows another complexity, namely that it is hand-drawn, geologically simplistic but hydrographically complex. This is because it could make it easier for young students to understand where the hydrocarbon deposits are located, by explaining their location in relation to rivers and streams.

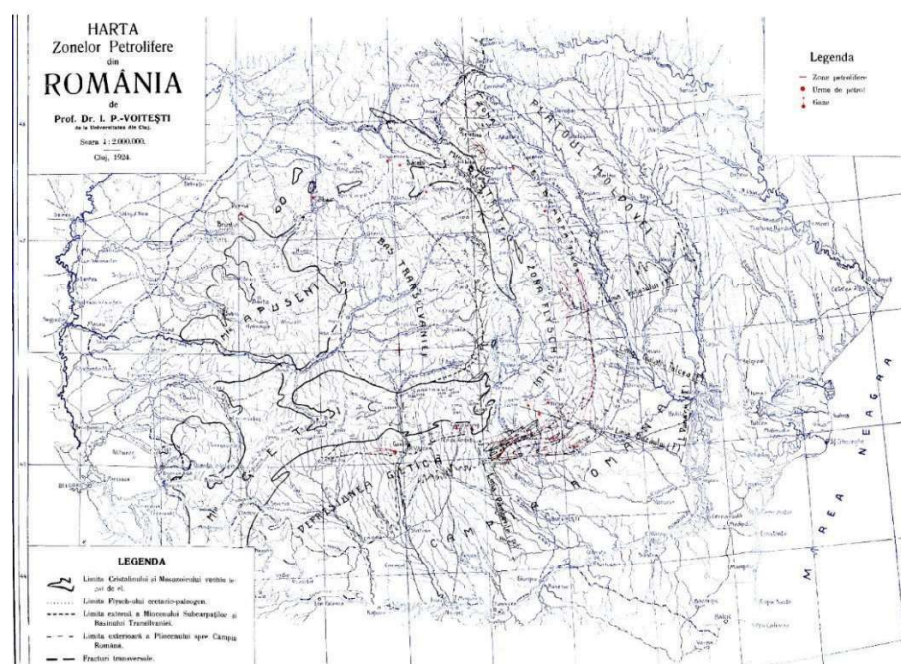


Fig. 9: Map of the Oil Fields from Romania (Popescu-Voitești, 1924b).

Another hand-drawn map made by the professor is that of Oltenia (Popescu-Voitești, 1925), only that this time it is a complex geological map (Fig. 10) made by him using the data known-to-date. He published this map in a journal from a beloved

area where he spent his youth and his highschool years, in order of respect. The complexity of the map is easy to see, with the geological ages being defined by specific textures, all of which are also explained in the journal, so that the untrained people can easily understand them.

In a comemorative volume on which he had to collaborate ten years after the Great Union, the professor (Popescu-Voitești, 1929) gave a synthetic sketch of the Transylvanian Basin and the structure of the Carpathians (Fig. 11), in which he presented firstly his personal conceptions on the structure of the overlapping nappes and the number of these nappes in the crystalline-Mesozoic area of the orogen (Popescu-Voitești, 1936). With this sketch he succeeded in illustrating much better the outlines of the units in the eastern and southern Carpathians, including the link between these structures – still insufficiently known at a time when global tectonics was not yet a theory – and the western area.

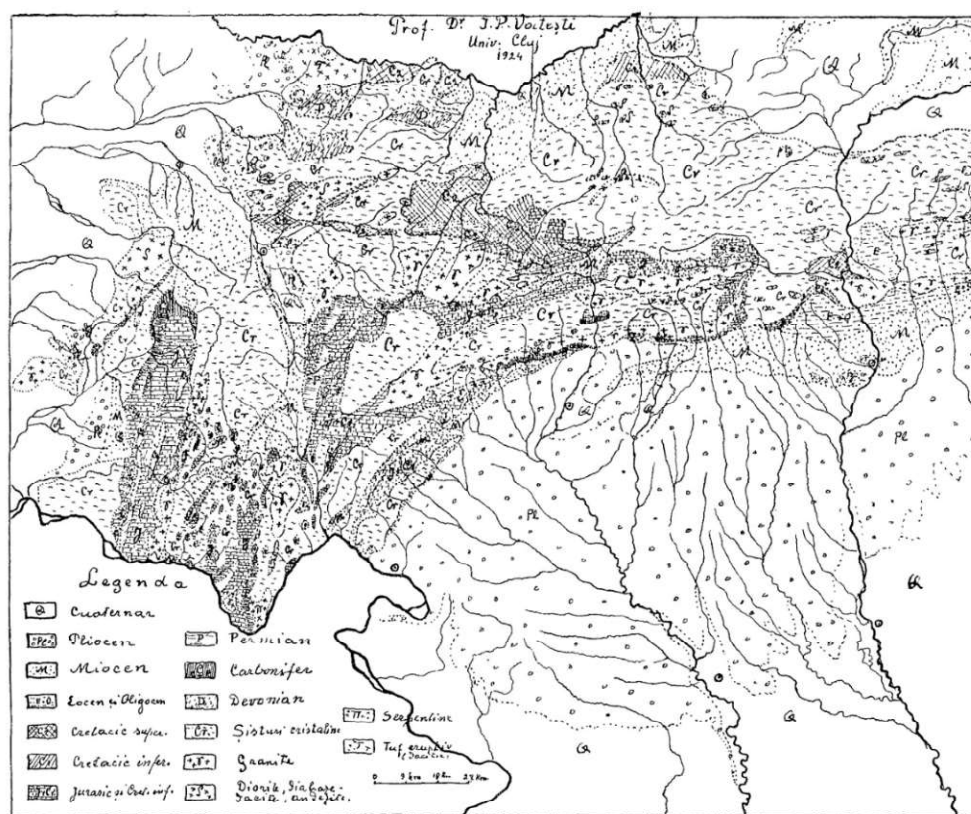


Fig. 10: Geological map of Oltenia (Popescu-Voitești, 1925).

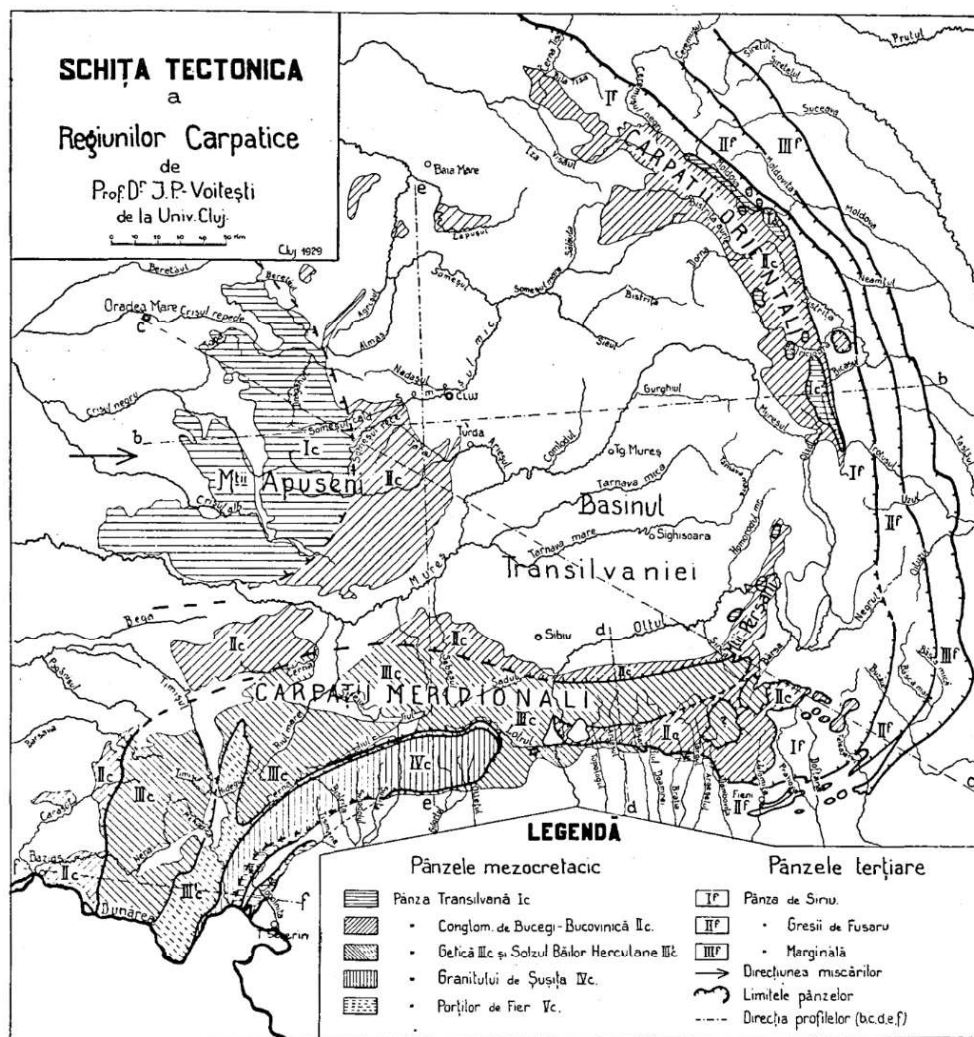


Fig. 11: Tectonic sketch of the Carpathian regions (Popescu-Voitești, 1929).

Before he became director of the Geological Institute of Romania, in 1930 he drew a geological map for an area near Cluj, more precisely on Dej town. The map (Fig. 12) refers to the geology of Ocna Dejului where there is still an active salt mining up to this day. Unfortunately, there is no certainty that this map would have been published, the single copy probably being found in the geological office of the salt mine. However, it is noteworthy that the geologist scholar marked a '*probable limit of the massif*' of the underground salt, in the region, a limit which has so far has been taken into account by the geologists from the quarry, and has not been exceeded.

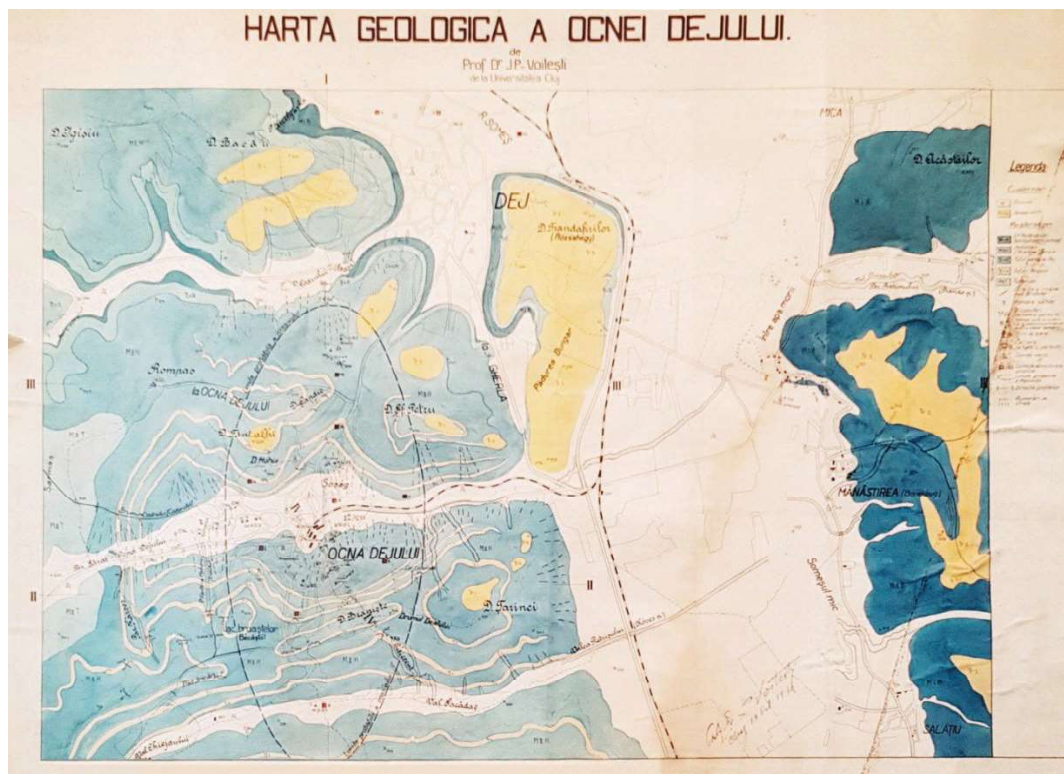


Fig. 12: Geological map of Ocna Dejului (Popescu-Voitești, 1930).

Being known as an enthusiast of the emergence of salt on the territory of the country, and of the way in which it manages to appear on the Earth's surface, Popescu-Voitești conceived - again for students from Cluj and Timișoara - a lecture on the genesis of salt deposits during 1929-1930. He published the lecture concerning the salt (Popescu-Voitești, 1934) in the same journal as the one in which he published the previous lecture (Popescu-Voitești, 1924b) about petroleum, succeeding this time in elaborating a sketch of Romania including the salt massifs and the areas with saline manifestations (saline springs and lakes).

Another sketch he made with respect for his place of origin is the map showing the geological sketch of Gorj (Fig. 14) published in the *"Tudor Vladimirescu" High School Yearbook* in Târgu Jiu (Popescu-Voitești, 1934). About this work, the author says (Popescu-Voitești, 1936) that it is the first work published after almost half a century, which includes all the new geological data about the area. Obviously, this data is mostly his own, specifically collected by the geologist in question. As he has already proved his habit, this map has also been hand-drawn, with carefully made textures in an effort not to disturb the monochrome appearance of the map. Two legends are again present, one dedicated to the Miocene-Quaternary sedimentary areas and one dedicated to the 'Crystalline' part of the mountain region. Unlike other maps elaborated up to that time, it is clear that the author has put a lot

of effort in doing this map, which is something that I personally have never seen before.

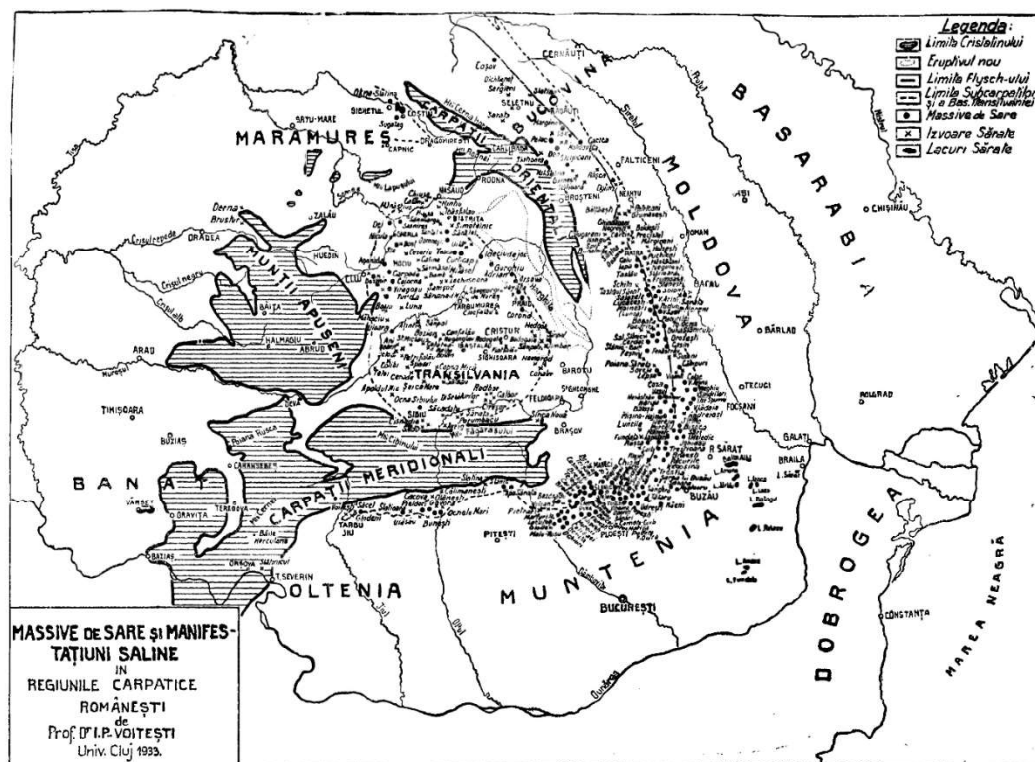


Fig. 13: Salt massifs and saline manifestations in the Romanian Carpathian regions (Popescu-Voitești, 1934).

Concluding remarks

By presenting these maps, I intended to let the readers of this paper know that there have been personalities who have dedicated their lives to doing what they loved, and I will limit myself to just one person out of all those whom we can take as examples. It is certain that the geological scientist excelled in pioneering the Romanian geological school, and even if I would have liked to add more information about his graphic creations, I will limit myself to the words of Ion Stănoiu (1997):

„Presenting the geological activity carried out by Ion Popescu Voitești would require entire tomes....” (– p. 260)

Thus, on this occasion I will leave the opportunity to discover other creations of the geologist at the disposal of those who wish to do so. More about any of the works mentioned here, including other

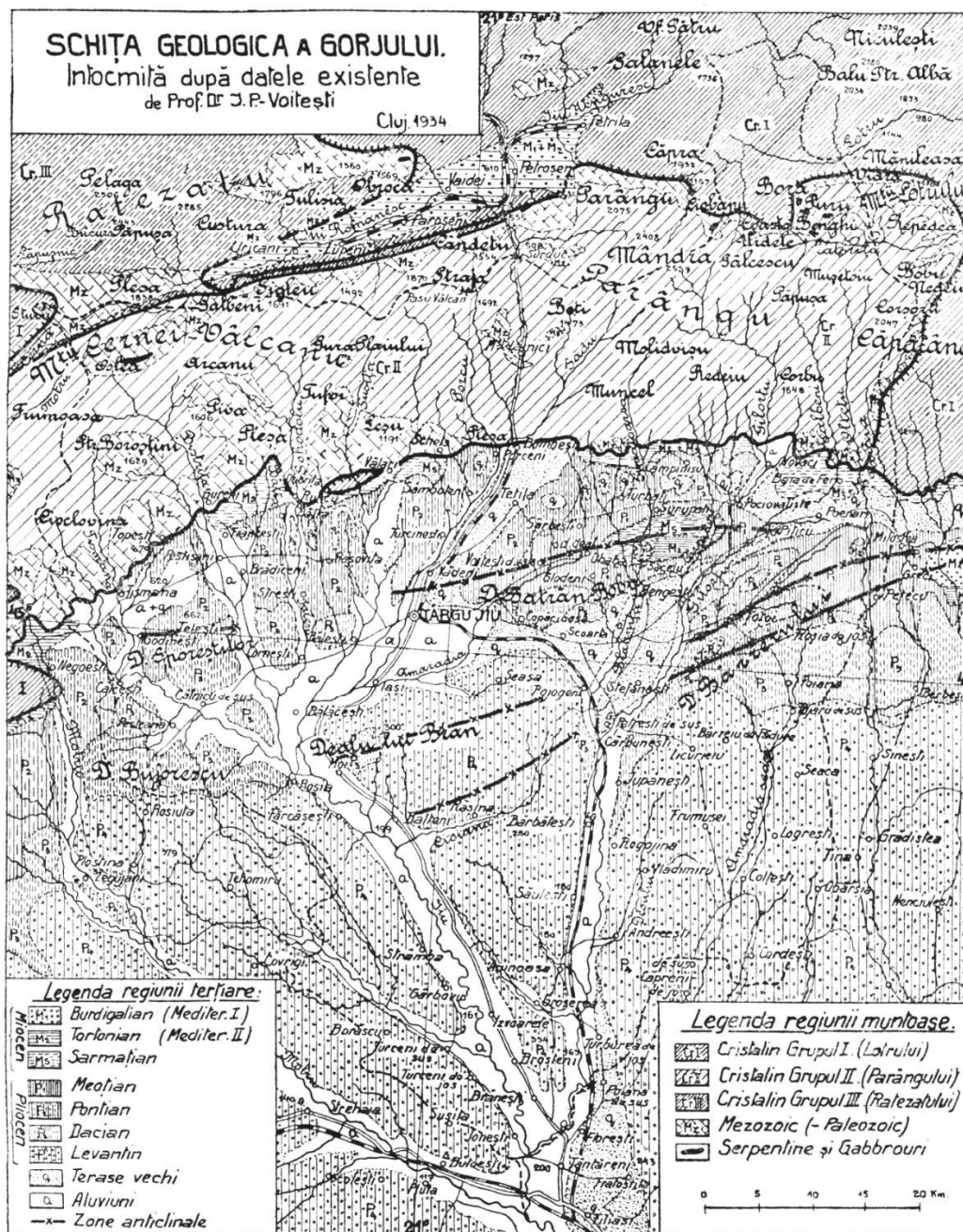


Fig. 14: Geological sketch of Gorj, based on existing data (Popescu-Voitești, 1935).

bibliographical data belonging to the eminent geologist Prof. Dr. Ion Popescu-Voitești can be found in his memoir of titles and works (Popescu-Voitești, 1936). Of course, the list of works does not stop here, as they are mentioned by him in some of his subsequent works, as well as in more recent ones by others. Moreover, the current

literature on the scientist is quite extensive, he is sometimes remembered on the occasion of other anniversaries or commemorations, and the prism through which we can see how he was – a disciple, a professional geologist, a mentor, a teacher or even family person – can take us to a whole other world.

Discussing what else we can learn from what his successors have mentioned, I would like to recall one story of Ilie Huică (1988) who related how he saved from destruction in the autumn of 1962, a series of manuscripts and maps of Voitești:

„In the backyard of the house, Elena Voitești showed me four full sacks, which she asked me to carry to the back of the garden and set them on fire. I asked what was in the bags and when she replied that there were manuscripts of the professor, I was astonished. Looking in the bags, I saw specialized books, photographs, maps, records, etc., etc. I told Elena Voitești that this would be an unforgivable mistake and asked her to leave the four bags to me.” (– p. 214)

The materials – apparently – were distributed at the University of Cluj, at the Faculty of Geology in Bucharest, at the Institute of Geology and Geophysics in Bucharest, – and those with and about Gorj – at the memorial house in Voitești. Hopefully, at a moment in time, they will surface and be available for study.

Acknowledgements. I kindly thank Prof. Vlad Codrea for his support in reviewing this manuscript, for the suggestions he made, and for the scan of Ocna Dejului map. Many thanks also go to Geologist Engineer Dorin Potrocozan from Ocna Dejului salt mine for making the map available to us. I thank Dr. Monica Ghenciu from the Geological Institute of Romania for offering the scanned map compilation from 1914, and to Dr. Liana Săsăran from Babeș-Bolyai University for offering me a copy of Stanciu's book from 1936.

Funding. This work was supported by a grant of the Ministry of Research, Innovation and Digitization, CNCS - UEFISCDI, project number PN-III-P4-PCE-2021-0351, within PNCDI III.

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