A BIBLIOGRAPHICAL RARITY – THE FIRST MANUAL OF GEOLOGY IN ROMANIAN LANGUAGE (COBĂLCESCU, 1859)

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Abstract. The Cobălcescu's Elements of Geology (1859) was published in "livre de poche" (Fig. 1), with 116 text pages and 239 text-figures atlas which was not preserved. It was printed with the Romanian transitional alphabet, and it includes four sections (Figs. 2, 3). Cobălcescu interpreted the data following the French author Beudant (1841) in the detailed much comprehensive. The textbook of Cobălcescu includes only 80 pages with 159 paragraphs, out of the four Lessons of Beudant counting 322 pages (without index) and 254 paragraphs. Although drastically reduced, the author succeeded to use in his textbook a large amount of essentialized geological information. Without being included in the text of the manual, all 239 figures were certainly included in the atlas (some illustrations are reproduced in Fig. 4). Back from France in 1862, Cobălcescu wanted to take the book out of public circulation and began to destroy the textbook where ever he could find it, buying it from bookstores and destroying it as a sin of youth.

Key words: Romanian geological history, Beudant, Cobălcescu

HISTORICAL CONTEXT

To the end of the XVIII-th Century, the geological knowledge in various European schools recorded several important approaches: the role of fossils in relative geological dating, stratigraphic subdivisions, the role of orogenesis and the genesis of faults, cryptic chronology and origins of granite (Furon, 1971, p. 699). Beginning with 1775, the success of conferences given by Abraham G. Werner at the Mining Academy in Freiberg and the diversification of applied geological fields lead to the introduction of Earth Sciences in universities and science institutions from various countries (Furon, 1972, p. 399).

The first treatises in Geology were published during the XIX-th Century, such as *Traité de géognosie* (1819), a classic treaty for a long time. It was followed by the excellent treatises *Cours élémentaire d'Histoire Naturelle* (Furon, 1972, p. 401) which included fields such as "Mineralogy" and "Geology" of François-Sulpice Beudant, become a famous title.

In Moldova, at the Royal Academy of Iași (also named as a Lyceum), Gheorghe Asachi organized and taught a course for the first generation of border engineers, between 1813-1818 (Pruteanu, 1966, p. 53). Its curriculum included Geology, Economy and Architecture, next to other fields (Bălan, 2022, p. 752).

The Society of Physicians and Naturalists (SPN), founded in 1833 in Iași, played a crucial role in science, culture and in social life, preparing the modern scientific development. The Society lead to numerous new institutions (e.g. museum, libraries) in Romania, and it contributed to intense exchange of material, journals, and books, creating collaboration networks at national and European levels (Brodel, 2008, p. 13).

Dr. Iacob Cihac, one of the founders of the Society of Physicians and Naturalists in Iași, published in 1837 the first treatise "in Vallachian language" of "*Natural History*", a significant editorial event.

This volume contributed essentially to the spread of knowledge in this field and to the foundation of Romanian scientific terminology (Pruteanu, 1966; Baran, 2008, p. 47). It has three chapters: I – Kingdom of animals, II – Kingdom of plants, III – Kingdom of minerals and an annex about petrifacts (fossils), the third being inspired by the book of I. Reinhard Blum, " *Lehrbuch der Oryktognosie*". Reviewing the Kingdom of minerals chapter, Atanasiu (1941, p. 629) wrote that "Dr. Cihac had the inspiration to choose among the best available models of that time".

Teodor Stamati authored a "Manual of Natural history, synthetized for the Romanian younger generation", published in 1841 and reprinted in 1848 for the freshmen of the Vasilian School (Pruteanu, 1966, p. 120).

BEUDANT'S GEOLOGICAL BOOK, 1841

François-Sulpice Beudant (1787-1850) was the successor of the illustrious crystalographer and mineralogist abbot René Just Haüy (1743-1822). Haüy was the author of the monumental volume "*Traité de minéralogie*" (1801), while Beudant obtained a professorship in Sorbonne and authored several significant works (e.g. „*Traité éleméntaire de minéralogie*", 1824), of including the excellent textbooks "*Minéralogie*" and „*Géologie*" published in 1841, reprinted in no less than 17 editions, the last one printed in 1886[1]. These textbooks were used by many generations of naturalists, as well as those in Botany and Zoology (cf. Lacroix, 1930, p. XLIII).

Beudant is particularly known to Romanian geologists through to his work „*Voyage minéralogique et géologique en Hongrie, pendant l'année 1818*", published in 1822. One of the maps included in this book, entitled " Carte geologique de la Hongrie et de la Transylvanie avec une parte les pays limitrophes", scale 1: 1 000 000, has code numbers and ad hoc colors for separating various terranes, old and new (cf. Galambos, 2009, p. 133-134)[2]. It has today only a historical value, the map representing "the first cartographic approach of the Transylvanian Basin, surrounded by the three Carpathians branches" (Ilie, 1958a, p. 56).

We will try to find out the way Cobălcescu interpreted the data of Beudant, as Cobălcescu wrote in two endnotes that the sections "About earthquakes" and "Volcanic phenomena" were written following the French author (Cobălcescu, 1859, p. 46-47). However, when comparing the contents and the texts of both textbooks, it is apparent that the work of Cobălcescu was much more detailed and comprehensive.

COBĂLCESCU'S ELEMENTS OF GEOLOGY, 1859

Grigore Cobălcescu was born at the beginning of the third decade of the XIX-th Century and he became a young intellectual during the transitional historical interval between 1830 and 1860, while the Romanian kingdoms "passed a time of great social-political, cultural and moral transformations" (Cazimir, 2006, p. 8).

On 22 September 2021, 190 years passed since the birth of Grigore Cobălcescu and also 162 years since the first Geology textbook in Romanian language was published. The textbook was published for the secondary cycle by the young professor, as proposed and funded by the Ministry of Instruction and Cults (Macarovici, 1942, p. 4).

As an 18 years old graduate, he competes in 1849 for the substitute teacher position opened after the death of Prof. Teodor Stamati (Macarovici, 1942), obtaining the tenure in 1855, at 24. Considering this time frame it can be deducted that writing the textbook was undertaken between 1849-1858, when his professorship pressed him to organize his classes, before becoming a student in Natural sciences in Sorbonne, in 1859.

The textbook was published in "livre de poche" format (18,5 x 12 cm) (Fig. 1), with 116 text pages and 239 text-figures, and it included an atlas with 200 figures (Athanasiu, 1902; Macarovici, 1942; Ilie, 1958; Grădinaru, 2014) which was not preserved (cf. Ionesi, 2007, p. 14)[3]. It was printed with the Romanian transitional alphabet[4], and it includes four sections (Figs. 2, 3b):

The First Book (Chapter I – Introduction; Chapter II – Distribution of matter in Earth's crust; Chapter III – Nature of matter in Earth's crust); The Second Book (Chapter I – Phenomena modifying the Earth's surface, earthquakes, volcanic phenomena; Chapter II – Researching ancient phenomena); Third Book (Chapter I – Genesis of Earth's crust; Chapter II – Earth movements); The Fourth Book (Chapter I – State of Europe during various forming epochs). As Macarovici (1942, p. 4) wrote: "The content is distributed in a classical manner, in 297 paragraphs written highly concisely, highly scientific, offering abstracts of Geology lessons as they were taught in the early highschool cycle".

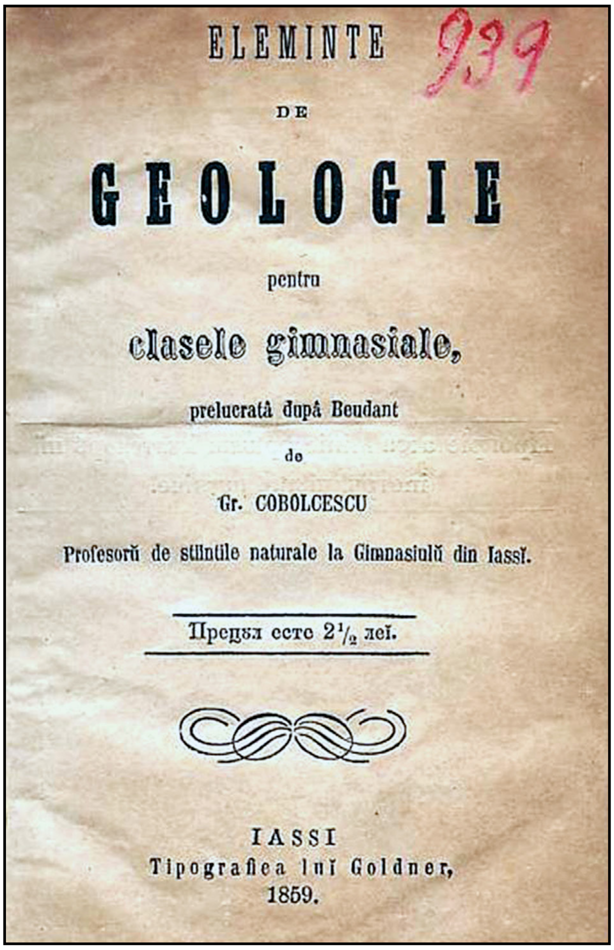
In fact, the four books correspond to the four lessons in Beudant's textbook: I. Phénomènes actuels, II. Application aux phénomènes anciens, III. Composition de la croute terrestre şi IV. Terrains de cristallisation, Composition géologique de la France, Ages relatifs des principales catastophes du globe, État de l'Europe aux diverses époques de formation (Fig. 3a).

[1] https://mineralogicalrecord.com/new_biobibliography/beudant-francois-sulpice/ (accessed on 31.10.2021). A Mineralogy textbook, twelfth edition (1869) is curated at the Library of the Faculty of Geology-Geography of "A.I. Cuza" University, Iaşi. (Prof. Mihai Brânzilă, pers. comm, Oct. 2021),

[2] https://www.raremaps.com/gallery/detail/41989/carte-geologique-de-la-hongrie-et-de-la-transylvanie-avec-un-beudant

[3] The copy of the Library of the Romanian Academy (no. I 116675) has no recorded atlas, as Macarovici (1942, p. 8) noted.

[4] The transitional alphabet made the transition from the Romanian Cyrillic alphabet to the Latin alphabet. The transitional alphabet was used especially after 1840, when Latin letters were inserted between Cyrillic letters (https://ro.wikipedia.org/wiki/Alfabetul_de_tranzi%C8%9Bie).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ELEMINTE

DE

GEOLOGIE

pentru

clasele gimnasiale,

prelucrată după Beudant

de

Gr. COBOLCESCU

Profesorŭ de stiintile naturale la Gimnasiulŭ din Iassĭ.

Прецул есте 2 1/2 леĭ.

IASSI

Tipografiea luĭ Goldner,

1859.

Fig. 1. Cover of the first Geology textbook in Romanian language (Gr. Cobolcescu, 1859)

Without identifying the source, it is supposed that Cobălcescu used the textbook copy of T. Stamati of 1841, and other works. Cobălcescu included in his Chapter III about the nature of materials that make up the Earth's crust 138 paragraphs, less than half (46,4%) of those of the entire textbook. It is curious that Cobalcescu used the term "crag" (Rom. "stâncă", pl. "stânci"), although Beudant (1841a) used the term "rock" (Rom. "roca", pl. "roci") as commonly used in the geological literature of the time, extended to the end of the XIX-th Century. Such an example is offered by the illustrated Mineralogy manual of Alois Pokorny (1873), translated in Romanian language in 1887 by the former director of the Greek Orthodox Gymnasium in Suceava, Constantin Procopovici (Pokorny, 1887), as was discussed by Mârza and Brustur (1997). It is possible that Cobalcescu used term "crag" on purpose, in the frame of a friendlier language for his students.

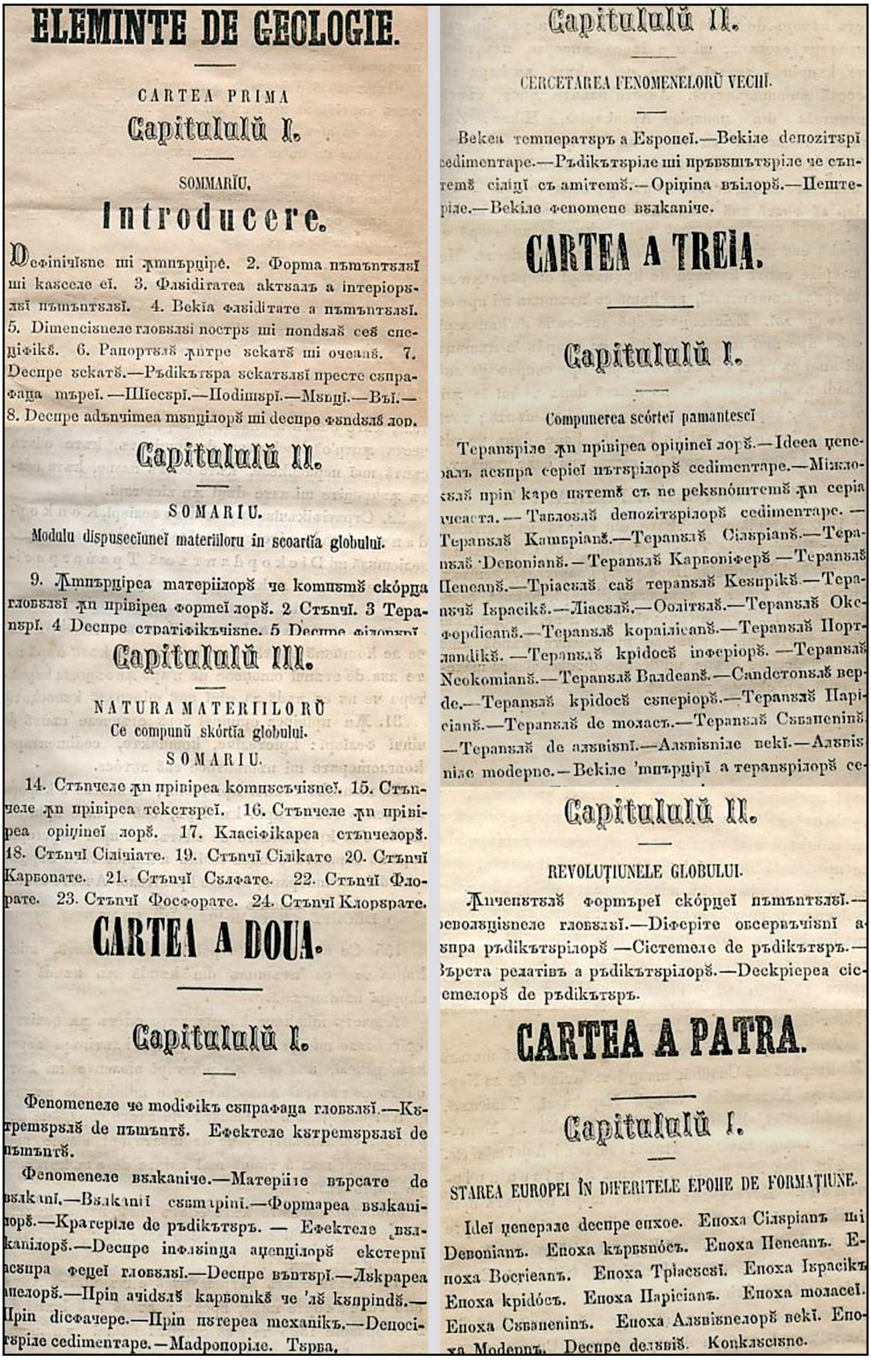
Before summarizing the textbook of Cobălcescu, it must be underlined that between 1850-1862, the textbooks of Mineralogy and Geology of Beudant (1841, 1841a) were re-edited six times in France (1850, 1851, 1854, 1857, 1858, 1861), three times in Germany (1844, 1845, 1848), once in Italy (1846-1847) and once in Poland (1848).

In his paper dedicated to the activity of the Society of Physicians and Naturalists from 1830-1919, Bogdan (1919, p. 14) did not mention the inventory of books of Mineralogy and Geology, unfortunately citing only few treaties of Buffon, Lacépède and Cuvier. However, it is known (Pruteanu, 1966; Brodel, 2008) that Dr. Iacob Cihac was constantly preoccupied since the founding of SPN of acquiring journals and books in these fields, especially in German and French. Therefore, the first inventory of the library shows that, one year after Cobălcescu's election as a vice-president of SPN, in 1868, 1185 volumes and 234 booklets were recorded (Bogdan, 1919, p. 110), so it is clear that one of the French edition, probably the first, was used by Cobălcescu for writing the Geology textbook. After the editing operated by the Romanian author, the textbook of Cobălcescu includes only 80 pages with 159 paragraphs (Fig. 3b), out of the four Lessons of Beudant counting 322 pages (without index) and 254 paragraphs. Although drastically reduced, the author succeeded to use in his textbook a large amount of essentialized geological information.

The geological terminology of the first half of the XIX-th Century used by Cobălcescu was documented by Grădinaru (2014). Two aspects should be emphasized: lacking any geological examples from Romania (e.g. Moldova) and the affinities of Cobălcescu for fossils, a field in which the future Professor and researcher will excel later. Out of 239 text-figures, all reproduced from Beudant, a number of 55 (23%) deal with elements of Physical Geology and ancient fauna (freshwater and marine molluscs, Madreporaria and foraminifers). Out of 184 (77%) figures of fossils, 51 (27%) are from Palaeozoic, 101 (54%) are of Mesozoic and 32 (17,4%) are Tertiary.

Without being included in the text of the manual, all 239 figures were certainly included in the atlas. The atlas was thought to have 200 figures (Athanasiu, 1902; Ilie, 1958; Ionesi, 2007), about 200 figures (Macarovici, 1942) or almost 200 figures (Grădinaru, 2014). Some of the Beudant's illustrations used by Cobălcescu for the atlas are reproduced here in Fig. 4.

In 1859, Grigore Cobălcescu was granted "a scholarship worth 240 golden coins per year to study Natural sciences in Paris" (Pompeiu, 1907, p. 75). Back from France in January 1862 and being convinced that his textbook "was not up to date scientifically" (Macarovici, 1942, p. 9) and that it was outdated "due to the rapid evolution of geological ideas" (Ilie, 1958, p. 67), Cobălcescu began "to destroy the textbook where ever he could find it, buying it from bookstores and destroying it as a sin of youth" (Macarovici, 1942, p. 9). Macarovici (1942) considers that due to the self-critical attitude of Cobălcescu, other published or unpublished works authored by him were destroyed as well (e.g. Highschool textbook of Mineralogy and Geology).



ELEMINTE DE GEOLOGIE.

CARTEA PRIMA

Capitululŭ I.

SOMMARIŬ.

Introducere.

Дефініціѕне ші ꙟпърціре. 2. Форма пъмѫнтѕлѕї ші кавселе еї. 3. Флѕідітатеа актѕалъ а інтеріорѕлѕї пъмѫнтѕлѕї. 4. Векіа флѕідітате а пъмѫнтѕлѕї. 5. Dimencisнеле глобѕлѕї ностръ ші пондѕлѕ сеѕ спеціфікѕ. 6. Рапортѕлѕ ꙟтре ѕскатѕ ші очеанѕ. 7. Деспре ѕскатѕ.—Ръдікътѕра ѕскатѕлѕї престе сѕпрафаца търеї. —Шіесѕрі.—Подішѕрі.—Мѕнці.—Въї.— 8. Деспре адѫнчімеа мѫнцілорѕ ші деспре фѕндѕлѕ лор.

Capitululŭ II.

SOMARIU.

Modulu dispusecĭunei materiiloru in scoartĭa globuluĭ.

9. Ꙟмпърціреа матеріілорѕ че компѕнѕ скóрца глобѕлѕї ꙟн прівіреа формеї лорѕ. 2 Стѫнчї. 3 Терапѕрї. 4 Деспре стратіфікъціѕне. 5 Деспре ...

Capitululŭ III.

NATURA MATERIILORŬ

Ce compunŭ skórtĭa globuluĭ.

SOMARIU.

14. Стѫнчеле ꙟн прівіреа компѕсъціѕнеї. 15. Стѫнчеле ꙟн прівіреа текстѕреї. 16. Стѫнчеле ꙟн прівіреа оріцінеї лорѕ. 17. Класіфікареа стѫнчелорѕ. 18. Стѫнчї Сіліціате. 19. Стѫнчї Сілікате 20. Стѫнчї Карбонате. 21. Стѫнчї Сѕлфате. 22. Стѫнчї Флорате. 23. Стѫнчї Фосфорате. 24. Стѫнчї Клорѕрате.

CARTEA A DOUA.

Capitululŭ I.

Феноменеле че модіфікъ сѕпрафаца глобѕлѕї.—Кѕтремѕрѕлѕ де пъмѫнтѕ. Ефектеле кѕтремѕрѕлѕї де пъмѫнтѕ.

Феноменеле вѕлканіче.—Матеріле върсате де вѕлкані.—Вѕлканії сѕбмаріні.—Формареа вѕлканілорѕ.—Кратеріле де ръдікътѕръ. — Ефектеле вѕлканілорѕ.—Деспре інфлѕінца аценцілорѕ ектерні асѕпра феціеї глобѕлѕї.—Деспре вѫнтѕрі.—Лѕкрареа апелорѕ.—Прін акідѕлѕ карбонікѕ че 'лѕ кѕпріндѕ.—Прін дісфачере.—Прін пѕтереа механікъ.—Депозітѕріле седіментаре.—Мадрепоріле. Тѕрба.

Capitululŭ II.

CERCETAREA FENOMENELORŬ VECHĬ.

Векеа температѕръ а Еѕропеї.—Векіле депозітѕрі седіментаре.—Ръдікътѕріле ші пръвѕшітѕріле че сѫптемѕ сіліці съ амітемѕ.—Оріціна въілорѕ.—Пештеріле.—Векіле феномене вѕлканіче.

CARTEA A TREIA.

Capitululŭ I.

Compunerea scórteĭ pamantescĭ

Теранѕріле ꙟн прівіреа оріцінеї лорѕ.—Ideea ценералъ асѕпра серіеї пътѕрілорѕ седіментаре.—Міжлоꙋлѕ прін каре пѕтемѕ съ не рекѕнóштемѕ ꙟн серіа ачеаста. — Таблоѕлѕ депозітѕрілорѕ седіментаре. — Теранѕлѕ Камбріанѕ.—Теранѕлѕ Сілѕріанѕ.—Теранѕлѕ Девоніанѕ. — Теранѕлѕ Карбоніферѕ —Теранѕлѕ Пенеанѕ.—Тріасѕлѕ саѕ теранѕлѕ Кеѕпрікѕ.—Теранѕлѕ Ісрасікѕ.—Ліасѕлѕ.—Оолітѕлѕ.—Теранѕлѕ Оксфордіанѕ.—Теранѕлѕ кораліеанѕ.—Теранѕлѕ Портландікѕ. —Теранѕлѕ кридосѕ інферіорѕ. —Теранѕлѕ Неокоміанѕ.—Теранѕлѕ Валдеанѕ.—Сандстонѕлѕ верде.—Теранѕлѕ кридосѕ сѕперіорѕ.—Теранѕлѕ Паріціанѕ.—Теранѕлѕ де моласъ.—Теранѕлѕ Сѕбапенінѕ —Теранѕлѕ де алѕвіѕні.—Алѕвіѕніле векі.—Алѕвіѕніле модерне.—Векіле 'мпърціri а теранѕрілорѕ се-

Capitululŭ II.

REVOLUȚIUNELE GLOBULUI.

Ꙟнчепѕтѕлѕ формъреї скóрцеї пъмѫнтѕлѕї.—Револѕціѕнеле глобѕлѕї.—Діферіте обсервъціѕні асѕпра ръдікътѕрілорѕ —Сістемеле де ръдікътѕръ.—Върста релатівъ а ръдікътѕрілорѕ.—Дескріереа сістемелорѕ де ръдікътѕръ.

CARTEA A PATRA.

Capitululŭ I.

STAREA EUROPEI ÎN DIFERITELE EPOHE DE FORMAȚIUNE.

Ideï ценерале деспре епохе. Епоха Сілѕріанъ ші Девоніанъ. Епоха кързѕнóсъ. Епоха Пенеанъ. Епоха Восrieанъ. Епоха Тріасесї. Епоха Ісрасікъ. Епоха кридóсъ. Епоха Паріціанъ. Епоха моласеї. Епоха Сѕбапенінъ. Епоха Алѕвіѕнелорѕ векі. Епоха Модернъ. Деспре делѕвіѕ. Конклѕсіѕне.

Fig. 2. The contents of the Books I-IV of the Geology textbook, written in the typical language of the time.

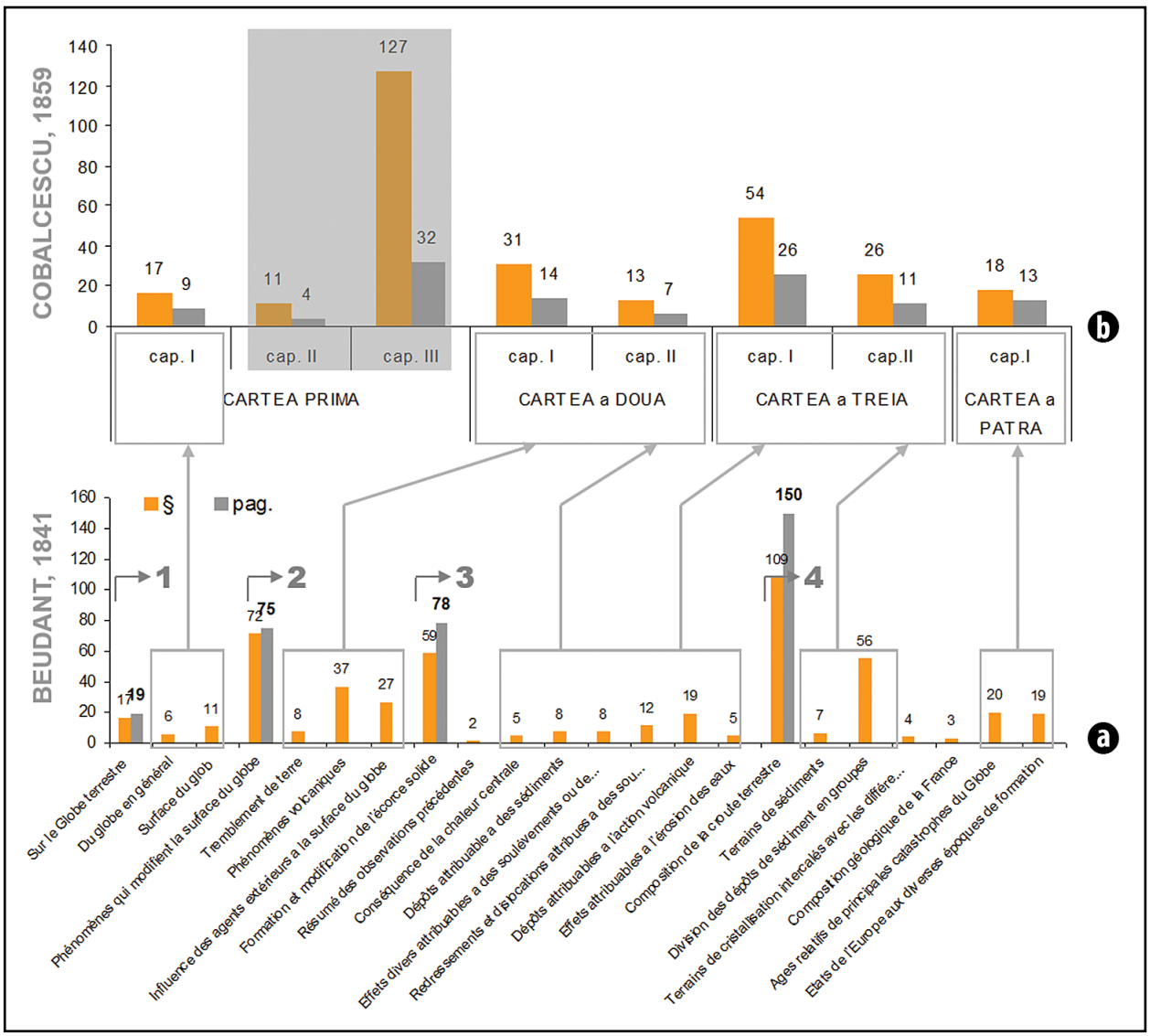


Fig. 3. Structure, page numbers (grey) and paragraph numbers (orange) of Lessons 1-4 of Beudant's textbook (**a**) and of Cobălcescu's textbook (**b**). The light grey rectangle marks Chapters II and III writrten by Cobălcescu from other sources.

Athanasiu (1902) and Ilie (1958) think that still there are only three to five copies of this manual. A copy is curated at the Library of the Romanian Academy, while a second belongs to the personal library of the author. In the near future, this second copy will be donated to the Central University Library "Mihai Eminescu" from Iași, where it should rightfully belong.

NOTEBOOK OF GEOLOGY, 1863

As a highschool Teacher at the Mihăileană Academy between 1851 – 1867, Grigore Cobălcescu activated in Natural sciences, teaching Mineralogy and Geology to students in the third form (Procopiu, 1907, p. 78, 126). For these students he asked the Chair for approval to send them once a week to the SPN museum for "getting familiar with rocks and fossils studied in the Geology course" (Procopiu, 1907, p. 86). A happy circumstance made that a handwritten notebook of Geology, kept by a student in the third form, to record some of the talks of Professor Cobălcescu, detailed by Grădinaru (2014, p. 98-104). In this way it can be understood that the structure of the textbook published in 1859 is kept in the talks, while the terms were updated by new terms as "sedimentary lands" of different ages (e.g. Paleozoic or Primary Realm, Tertiary Realm and Quaternary Realm) and numerous examples from Romania (e.g. morphology of rivers from Moldova, geothermal waters of Mehadia-Herculane, Transylvanian trachytes, marble from Făgăraș Mountains, Silurian and Permian formations of the Dniester river, Carboniferous plants from Banat, etc.).

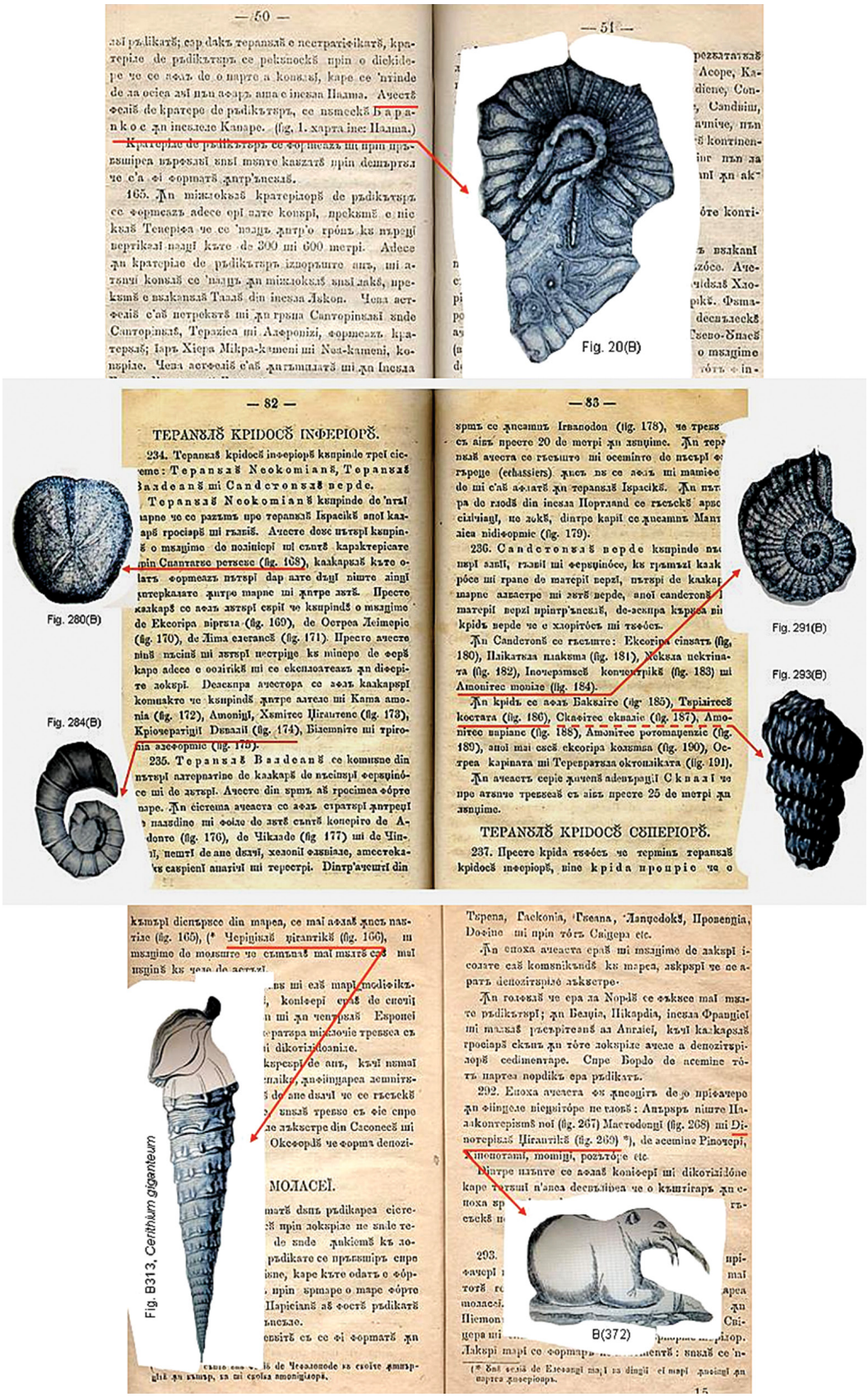


Fig. 4. Examples of illustrations from Beudant's textbook (up: barrancos from La Palma island; middle: Lower Cretaceous echinoids and ammonites; lower: *Cerithium giganteum* from the Eocene of Paris and *Deinotherium giganteum* from the European molasse), cited by Cobălcescu between brackets, from Fig. 1 to Fig. 239. The notes Fig. 20(B), B313, B(372) correspond to text-figures of Beudant (1841a).

COBĂLCESCU – GEOLOGY PROFESSOR AT IAȘI UNIVERSITY

The Department of Geology was founded at 16 October 1863 at Iași University, at the same time with the tenure-track of Professor Grigore Cobălcescu. Cobălcescu was tenured in 1864, teaching the Geology course which included Crystallography, Mineralogy, Petrography, Physical Geology, Palae-ontology and Stratigraphy, next to field trips for direct observations and for collecting rocks and fossils (Ionesi, 1981). Cobălcescu was refining his course each year, for keeping it updated scientifically. Without any indoctrination, he would enthusiastically quash ideas taught even a year earlier (cf. Macarovici, 1942, p. 6).

The three decades of university activity and geological research represent the Cobălcescu Phase (1863-1892), based on "the beginning of higher education and laying the foundations of modern Romanian palaeontological and geological sciences" (Turculeț, 2007, p. 122; Erhan and Apostoae, 2010).

FINAL REMARKS

Although the first Romanian geological textbook disappeared at the hands of its own author, as well as the "Highschool textbook of Mineralogy and Geology" (Athanasiu, 1902), they became a model for later secondary schools and highschool textbooks by Popescu-Voiteşti (1921, 1924), Simionescu (1927), Băncilă (1935, 1960) etc.

In contrast with today's situation, at the beginning of the XX-th Century, Romania was first to teach Mineralogy and Geology in secondary schools and highschools (Athanasiu, 1904). Today, Geology has the most unfortunate position, as it is "repudiated as a studied field in Romanian schools" (Grigorescu, 2014, p. 48). Moreover, it is unacceptable for an educated person not to know that "understanding Planet Earth is an essential element of the modern culture, a planet that we step upon and a planet offering the foundation of our existence" (cf. Acad. G. Murgeanu, in Lăzărescu, 1980).

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