

THE MINERALOGICAL EDUCATION IN BULGARIA AS EXPOSED IN TEXTBOOKS FROM THE XIX AND FIRST HALF OF THE XX CENTURY

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ABSTRACT

A periodization of the mineralogical knowledge and education in mineralogy has been made as exposed in the textbooks and other books during the XIX and first half of the XX century. Published mainly abroad, in the first (revival) period the natural history works of Dr. I. Seliminski, Dr. P. Beron, Dr. D. Mutev as well as of Dr. N. Planinski can be included. The second period from the late XIX century and the first decades of the XX century is related dominantly to the publishing of textbooks for secondary state schools – among translations, some Bulgarian textbooks can be mentioned as those of M. T. Brakalov, Z. Boyadjiev, I. Mavrov and V. Bogdanov, G. Markov, Ch. Yarumov, B. Mitov, N. Dospevski, A. Toshev, V. Stanchev, G. Bonchev and D. Tzonev, I. Tomov and P. Nedkov, D. Tzonev and K. T. Kuzov. The third (academic) period starts with the university textbooks in mineralogy (1929; 1936) of Acad. Georgi Bonchev and can be traced to the middle of the century with the textbooks of Acad. Strashimir Dimitrov (1939; 1948) and Acad. Ivan Kostov (1948; 1950). Some other publications related to the education of mineralogy in secondary schools and in the university have been reviewed as well including their structure, scientific level and type of illustrations. A conclusion has been made for a relatively higher mineralogical knowledge at the discussed periods compared to the contemporary stage in the beginning of the XXI century because of the lack of secondary school textbooks with geological and mineralogical content.

INTRODUCTION

Mineralogy is supposed to be one of the most ancient sciences not only in the complex of all of the Earth sciences. Natural history knowledge can be considered as a irreversible part of the complete contemporary knowledge. From a practical point of view the development of human civilization can be described as a struggle for the search and processing of natural non-metallic and metallic raw materials. From a historical point of view it is of interest to trace the development of mineralogical knowledge in Bulgaria together with the mineralogical education. In the present study an attempt has been made for describing textbooks as well as other publications related to mineralogy in the XIX and the first half of the XX century.

THE REVIVAL PERIOD

Natural historical and particularly geological-mineralogical knowledge has a definite place in most of the familiar Medieval treatises, for example the so called 'Miscellany of Simeon' and the 'Six Days' by Ioan the Exarch (P. Костов, 1988). The first original Bulgarian works in natural history can be attributed to our educators and scholars Dr. Ivan Seliminski (1799/1800 – 1867) and Dr. Petar Beron (1800 – 1871). The second person has published the famous 'Riben Bukvar' ('The Fish Primer') for the first time in 1824 (Division 7 – Physical stories).

The published mainly abroad during the XIX century (before the Liberation in 1878) in Bulgarian language primers contain certain geoknowledge. Such is the primer by the teacher Hadji Naiden Jovanovich which has been published in Bucharest in

1846 and the 'Primer with Usefull Notions' by Constantin T. and G. M. Vladikin which has been published in Budapest in 1847 (with a division on 'mineral deposits' with description of some minerals) (Галчев, 1981).

The well known scholar Dr. Dimitar Mutev (1818 – 1864) includes in his 'Natural History' which has been published in 1869 in Plovdiv a special third division devoted to minerals. They have been systematized in four classes, being characteristic for the European tradition since the time of Agricola: 1 – earths and stones; 2 – salts; 3 – metals; 4 – inflammable minerals. Among the first class, for example, the following minerals and aggregates (rocks) have been listed: barite, lime earth, lime, gypsum, clays, mica, serpentine, asbestos, lapis lasuli (lasurite), quartz, jasper, diamond and other precious stones. Among the second class he describes alums, natron, salt (halite), Glauber's salt (mirabilite), niter and other salts. In the third class more of the common metals are described including the noble metals and semi-metals. In the last forth class inflammable products have been listed, sulphur, graphite and amber among them. The textbook of Dr. Mutev can be considered as the first competent mineralogical guide for the corresponding epoch published in Bulgaria. During the next 1870 year Dr. Nacho Planinski published a textbook in geology and zoology.

THE SECONDARY SCHOOL PERIOD

After the Liberation from the Otoman yoke in 1878 the educational system in Bulgaria is engaged with ensurance of Bulgarian textbooks for the primary and secondary schools. In some cases translations of foreign textbooks have been used

and in other cases – new adapted textbooks have been published.

In 1882 in the 'Periodic Journal of the Bulgarian Scholarly Society' (predecessor of the Bulgarian Academy of Sciences) is published the original work 'Materials on the Geology and Mineralogy in Bulgaria' by the first Bulgarian mineralogist-geologist professor Georgi Zlatarski (1854 – 1909). About 45 mineral substances (mineral species and varieties) have been described in this article. At the same time Hermengild Skorpil (1858 – 1923) publishes a booklet concerning the mineral wealth of Bulgaria with two editions (1882; 1884). These pioneer reviews make the basis for further studies on minerals in Bulgaria.

Some secondary school Bulgarian textbooks with mineralogical and geological-mineralogical content can be mentioned from this period in the late XIX century: by Minko T. Brakalov with three editions (1881; 1889), Zakhari Bojadjev (1889), I. Mavrov and V. Bogdanov with two editions (1889; 1892), N. G. Markov in two parts (1892), Christo Yarumov with four editions (1892; 1894; 1896; 1908), Nikola Dospevski with two editions (1894; 1896) and Andrei Toshev (1897). All these textbooks have been prepared for the lower classes of the secondary schools. Most of them are over 100 pages in volume and have been compiled according to the newest foreign textbooks.

The 'Textbook in Mineralogy' from 1881 by the teacher in the Plovdiv real state secondary school Minko T. Brakalov is the first specialized textbook with such a title in Bulgaria. In Plovdiv have been published also the textbooks by Mavrov and Yarumov, by Dospevski, by Yarumov, in Turnovo – by Boyadjev, as well as by Markov, and in Sofia – by Toshev.

The most voluminous (456 pp.) and ambitious textbook from that period is 'Textbook in Mineralogy and Geology' by Christo Yarumov and Boris Mitov (1896) published in Plovdiv. The textbook which has been probably compiled as model from German sources has the quality of an university course, but not that for the secondary schools. The mineralogical division (more than half the volume within 270 pp.) is structured in two parts: 1 – general mineralogy, including morphological (crystallography), physical and chemical properties of minerals; 2 – 'special mineralogy' or systematic mineralogy, in which the minerals are described in the following sequence of mineral classes: native elements, sulphides, halides, oxides, other ox-salts and minerals of organic origin. The textbook is richly illustrated with crystallographic forms and sketches of mineral aggregates. This textbook has been 40 years the most comprehensive guide in mineralogy in Bulgarian language until the publishing of the official academic edition by G. Bonchev in 1936 (with its second part).

In 1897 professor Georgi Bonchev under the order of the Ministry of People's Education writes an opinion-review on the textbooks of Markov (1892) and Yarumov and Mitov (1896), in which he says: 'Until a few year no textbooks in mineralogy and geology were available for the sixth classes of the secondary schools and a hollow place existed in the school literature, which has been kindly overtaken for the first time by the dear authors of the cited textbooks' (Kостов, 1988). Nevertheless Bonchev criticized the huge volume and poorly placed

material in the textbook of Yarumov and Mitov which as such is difficult for the pupils in secondary schools.

Among foreign authors the translated in Bulgarian as well as in other languages textbook by A. Pokorny and P. Elhichka (1884) has to be mentioned. The translation from Czech language has been made by G. Belchev. The mineral kingdom is described in division B with five groups of minerals being separated: 1 – group of atmospheric minerals with air and water; 2 – group of non-metallic minerals distributed into seven subgroups - salt, lime stones, heavy stones, micas, steatite, clays and hard stones including common stones, quartzites and precious stones; 3 – metallic minerals distributed into five subgroups of pure metals, ores, fire-stones, stones that glisten and variegated stones; 4 – group of inflammable stones with two subgroups including earth resins and coal; 5 – group of rocks subdivided into five subgroups with monomineral, polymineral non-layered, polymineral layered, clastic and clay rock varieties.

In this group of foreign translations can be also included the work by M. Kishpatich about the most important mineral raw materials (1884; in translation from Croatian by V. N. Ikonov from Rousse, who is also the publisher). Of interest is the guide of A. Weissbach (1899) for determination of minerals according to their outer properties in translation from the forth German edition by S. Karavelov (the first edition is from 1866). The minerals are arranged in the following sections: 1 – with metallic luster and distributed according to their colour to red, yellow, white, gray and black; 2 – with semimetallic and common luster and distributed according to their colour to minerals with black, brown, yellow, green or blue streak; 3 – with common luster and non-coloured streak distributed according to their hardness to very soft, soft, semihard, hard and very hard. In a tabular manner are described the following peculiarities of the minerals: name, chemical formula, luster, colour, hardness, crystal system, crystal habit, cleavage, type of the aggregates, fracture, comments for determination with the blowpipe method and associated minerals.

THE ACADEMIC PERIOD

The founder of Bulgarian mineralogy and petrography is academician Georgi Bonchev (1866 – 1955). He has obtained his doctorate in Zagreb, later on, since 1895, he has been elected as an associate professor in the High School (University), since 1905 he has been elected as a full professor and since 1911 - member of the Bulgarian academy of sciences. He has integrated in the University of Sofia a group of young and talented assistants, which have specialized in different towns and countries abroad – Iliya Stoyanov (1875 – 1920), Petar Andreev (1879 – 1912), Naum Nikolov (1889 – 1972), Strashimir Dimitrov (1892 – 1960) and Vassil Arnaudov (1889 – 1946).

In 1895 Bonchev as an associated professor in the High School published as linotype 'Key for Determination of the More Important Rock-forming Minerals', and in 1899 'Determinative Crystallography (Crystallonomy)'. The second work appeared as an university textbook in 1921 (University Library, N12). The two parts of his lectures in mineralogy have been published a bit later as two textbooks, correspondingly

'General Mineralogy' (1929) with 374 pages (University Library, N85) and 'Special Mineralogy' (1936) with 368 pages (University Library, N175). He published also two textbooks in petrography, the first one in 1928 for agronomists, foresters, geographers and technicians (University Library, N77), and the second one in 1938 for students in natural history (University Library, N188). Among the university aids one can point out also to the 'Guide for Determination of Minerals' by Fuchs-Brauns (1932) translated by N. Nikolov and S. Dimitrov from the seventh German edition (University Library, N112).

In 1923 in the 'Annual of the Sofia University' has been published the large article 'The Minerals in Bulgaria' (in a volume of 212 pages), which is the first major and fundamental review in regional mineralogy after the work of Zlatarski. During these 2-3 decades Bonchev has written a lot of articles on the mineralogy of different mountains or regions. His extraordinary capacity for work, talent of observation and precision of descriptions, as well as the knowledge of the science of his day placed him among the best European professors in the field of natural history sciences. He has also contributed for popularizing mineralogical science. Among his popular science articles a specific place has been occupied by the series 'Precious stones' in a few numbers of the 'Estestvoznanie' ('Natural History') journal in 1912 with over 100 pages of total volume. As a matter of fact this is the first guide on precious minerals and thus he can be declared as the founder of gemmology in Bulgaria (P. Костов, 1992).

Bonchev writes in the preface of his university textbook in mineralogy as a pathetic pedagogue: 'Because mineralogy is studied in the first semesters, the matter has to be taught in an accessible for everyone manner. That is why it will start with the common, the visible and gradually will transfer towards the more unknown matter, and the study and determination of mineral species being the final aim'. In his 'General Mineralogy' the following main subdivisions have been included: outer peculiarities of minerals (including crystallography); physical properties of minerals; chemical properties of minerals; genesis of minerals; mineral deposits; systematics and nomenclature of minerals.

In 'Special Mineralogy' 450 mineral species and varieties have been reviewed arranged in classes according to Dana's (USA) classification, but the author knew and has used in his work the monographs and the reference books of the most famous European mineralogists as Naumann-Zirkel, Tschermak, Bauer, Hintze, Dufrenoy, Lapparent, Beudant, Bombici, Descloiseau, Pisani and others: 1 – native elements; 2 – sulphides, selenides, tellurides, antimonides; 3 – sulphosalts; 4 – halides; 5 – oxides; 6 – oxisalts (with groups and numerous subdivisions for the silicates and other minerals); 7 – organic salts; 8 – hydrocarbons.

During the first decades of the XX century the publishing of textbooks for the secondary schools continues. Professor Dr. G. Bonchev and D. Tzonev (teacher in the 1st Sofia secondary school for girls) have published in 1909 'Textbook in Natural History. Mineralogy and Geology', which is addressed for the third class and has been approved by the Ministry of Education. The text has been illustrated with 100 figures (among them a lot of prints from photos) and two coloured tables.

A 'Methodical Textbook in Chemistry and Mineralogy' has been published in 1906 in Turnovo by V. Stanchev. The last edition of the textbook of Yarumov has been published in Plovdiv in 1908. Ivan Tomov and Pavel Nedkov are authors of 'Geology and Mineralogy' (1909) for the third class of the boys and girls secondary schools. D. Tzonev published 'Natural History. Mineralogy and Geology on Pure Genetic Basis for the Secondary Schools' (1911), with its second edition with Ch. Kantardjiev as a co-author (1927). 'Mineralogy and Petrography' (1926) is the title of the textbook by Kyril Kuzev, who published later on also a 'Mineralogy' (1946) for the sixth mining class in the State technical secondary school 'Christo Botev' in Sofia.

The pocket field guide for determination of minerals intended for pupils and amateurs by Zhivko Lambrev (1937) and the translation from Russian language of one of the classic works 'Entertaining Mineralogy' by academician A. E. Fersman can be pointed out in this period among the scientific popular literature.

From academician Georgi Bonchev the educational relay-race has passed to professor Strashimir Dimitrov (later academician) who published as lithoprint in 1939 his lectures in mineralogy (being read during the winter 1938-1939 semester), and in 1948 as a textbook in mineralogy.

In 1950 appears the first part 'Mineralogy (Special Part)' by professor Ivan Kostov (later academician), which is going to be included within the next editions in one of the best monographic textbooks 'Mineralogy', translated in English and Russian languages (the latest Bulgarian edition is from 1993). He also published in 1948 an university appliance for students 'Crystallographic Tables', a predecessor of the later textbook 'Crystallography', which has been also translated abroad and undergone several editions (the latest Bulgarian edition is from 1978).

CONCLUSION

The review of the textbooks and related scholar aids in mineralogy for the secondary schools and universities in the end of the XIX century and the first half of the XX century displays a concern and wishfulness for educating the population in the best European traditions. This tendency is in contrast with the contemporary situation at the end of the XX century and the beginning of the XXI century when neither geology, neither mineralogy are studied in secondary schools with the exception of a few specialized technical schools. The described three educational periods (revival, secondary school and academic) are in a logical sequence of the social-political and concrete educational situation in Bulgaria.

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