THE CELESTINE FROM COPĂCENI (TURDA) — GEOLOGICAL REMARKS

In 1887, during his research works on Neogene formations within Transilvanian Basin, the geologist Koch mentioned for the first time the presence of the celestine at Copăceni (Turda). The celestine occur in Dăbăgău Hill, 1 km north from Copăceni village. It represents the most important strontium concentration of Romania.

Ancient and more recent exploration and research mine workings, especially shafts, accompanied by the waste dumps, show the celestine occurrence. During the time, the extracted materials spread over the ground today being visible celestine and gypsum samples.

The geological setting of the celestine marks the presence of a gypsum horizon, covered by a brown-yellowish bituminous limestone layer (2—3 m width). Between these two rocks, there are celestine concentrations, as a variable thickness level (0,15—0,50 m) *(Brana 1967)*. The celestine forms compact masses with fibrous aspect: the fibres are perpendicularly disposed on the deposition horizontal plan, the crystals' endings are perfectly or imperfectly ones. The celestine forms parallel or almost-parallel bands, sometimes separated by non-continuious bituminous limestone layers (of some millimetres to some centimeters width), suggesting a succession in the deposition process. The spatial report between these limestone bands and celestine level involve the carbonaceous rock substitution by the solutions that deposited, descendendly, the celestine. The holes and geodes (from mms to cms), vorered with celestine crystals, seldom barite and strontianite, determine the rock cavernous structure. This structure is specific for a long-time "per descensum" deposition from poor-debit solutions. The color of the compact celestine is nacrous-white, sometimes light gray. The celestine crystals have white and blue-white color.

The celestine appears as crystals also — asociated with calcite, seldom barite, gypsum. These crystals formed in the supergene solvating holes within bituminous limestone. The strontianite ($SrCO_3$) is seldom and form stripes. Sometime there are fine celestine bands in the gypsum base mass. The barite concentrates at 80 cm upon the gypsum horizon *(Imreh 1957 a)*. Within bituminous limestone, there are, seldom, veinlets with chalcedony and secondary sulfides. The sulfides are present in the gypsum horizon also. In the Săndulești outcrop (Valea Lungă), the celestine occur in the same geological condition as in Copăceni area (in the holes within bituminous limestone, upon a gypsum level).

The microscopically examination of the geological samples shows the presence of the colourless short prisms of the celestine idiomorphic

crystals, with two-ways good cleavage, high relief and gray birefringence. A calcite mass includes these celestine crystals.

Zimanyi 1887 and *Imreh 1957b*, studied the celestine crystallography, pointing out new facets for Copăceni [(120) and (100)], for Transilvania [(113), (017) and (018) and also the face I — as a new face for the celestine's crystallography.

The Sr amount in the compact celestine is about 44,79%, calculated as 13 samples — media by Brana. This high Sr concentration justified different stages of the small-scale exploitation during the time, by some local enterprises. In present, the celestine from Copăceni preserves as strategic reserve.

Genetically remarks. The presence of the celestine in sedimentary rocks had generated some different genetically assumptions. *Kraus 1905* and *Andrée 1913* considered that the celestine is singenetically with the environmental limestone (that means simultaneously precipitation from seawaters). In present this hypothesis is totally discredited. The development of the geochemical studies upon the limestone's strontium indicates the epigenetic theory: strontium is a disperse element in limestone *(Imreh—Imreh 1961)*. Especially in the aragonitic organic remains, strontium exists as strontianite ($SrCO_3$). The strontium is present in the gypsum and halogenides horizons also. From this level strontium is solved, transported and deposited in the holes, fissures of the limestone, or at the very contact level between two different geological sequences. The $SrCO_3$ solutions, reacting with the H_2SO_4 generated by the sedimentary iron-sulfur alteration, forms the celestine, $SrSO_4$. This epigenetic pattern of the strontium concentrations from the limestone, is a very realistic process. The structural diagenetic transformations of the aragonite to calcite and of the anhydrite to gypsum, take place with the eliminating of the strontium within the primary minerals.

The high strontium concentrations from Copăceni, placed in a small area, at a certain stratigraphic level, in an active border of the Badenian basin, confirm our suppostion that the strontium and barium are related with rich-strontium hypogene sources, respectively thermal springs (hydrothermally). It follows further isotopic (Sr, S, O) checking of this genetically assumption.

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PRESCURTĂRI ȘI BIBLIOGRAFIE

Andrée 1913 K. Andrée, *Über den Celestin in Mokattamkalk von Aegypten nebst allgemeinen Bemerkungen sedimentare Celestin vorkommen etc.*, in *N. Jb. Min. Geol. U. pal. B.*, XXXVII, 1913.

Brana 1967 V. Brana, *Zăcămintele nemetalifere din România*, București, 1967.

Imreh 1957 a I. Imreh, *Celestina în rocile terțiare din Transilvania* (autoreferat), Univ. „Al. I. Cuza", Iași, 1957.

Imreh 1957 b I. Imreh, *Cristalele de celestină de la Săndulești*, în *Stud. Cerc. Geol.-Geogr.*, VIII, 1—2, 1957.

Imreh—Imreh 1961 I. Imreh, Gabriela Imreh, *Contribuții la studiul genezei celestinei sedimentare*, în *Stud. Cerc. Geol.*, VI, 2, 1961, p. 354—379.

Kraus 1905 E. H. Kraus, *Occurrence and distribution of celestine bearing rocks*, in *The Am. J. of Sci.*, XIX, 1905.

Zimanyi 1887 K. Zimanyi, *Dobogóhegy barit és Celestin Kristlytani viszonay*, in *Mat. Ért.*, Budapest, 1887—1888.