Acta Mineralogica–Petrographica, Szeged, XLI, Supplementum B, 2000

MINERALOGICAL OBSERVATIONS ON DECAY OF HISTORICAL MONUMENTS FROM TRANSYLVANIA

HANCHEVICI, M.S. & HANCHEVICI, T. (Babeş–Bolyai University, Cluj-Napoca, Romania)

This paper is part of a larger work dedicated to study the monuments from Transylvania. In this part we try to present some observations on the processes of decay on monuments from Cluj and Braşov and the newly formed minerals which appear.

A video recording presents categories of deterioration and associated minerals present on some monuments from Cluj-Napoca. The second part is dedicated to the monuments from Braşov.

Generally, deterioration begins with the appearance of a net of cracks on the surface. It continues with exfoliation that can reach 1 cm. The undercover material is dusty, irregular and it can be very easily attacked by other factors. The rich vegetation makes the alteration process faster as it keeps humidity high and increases the quantity of CO_2. Deterioration is intense on the W and NW sides of monuments. All the processes lead to the appearance of minerals like gypsum, aragonite and wollastonite. Statues and sculptures not exposed directly to precipitation water are well preserved despite their age. Results presented here lead to the conclusion that the studied limestones are more suitable for ornamentation inside buildings and in protected areas.

In the Braşov region we have studied the following monuments: Weaver's Tower (Braşov), City Walls (Braşov) and Fortress Prejmer (Braşov District). These monuments are built of sandstone, bricks and limestone.

Pollution information is structured in two parts: air pollution and soil pollution. Restoration of Fortress Prejmer was documented two times: July 1998 and March–April 1999. X-ray analysis was also made on samples from these three monuments.

Many X-ray analyses were made to detect newly formed minerals which appear due to processes of dissolution, solvation and precipitation affecting the rocks. The samples were from different materials such as limestone, bricks and black crust. Among the minerals we found aragonite, albite, tobermorite and afwillite.

We can conclude that air pollution plays an important role in the deterioration process. Also, precipitation of soluble minerals and the freeze–unfreeze cycle lead to major exfoliation. Sulfates and sulfites from cement produce gypsum and anhydrite and the growth of the crystals leads to the exfoliation of cement.

References

ANASTASIU, N. & JIPA, D. (1983). Sedimentary textures and structures. Ed Tehnică, Bucureşti (in Romanian).

IANOVICI, V., STIOPOL, V. & CONSTANTINESCU, E. (1979). Mineralogy. E.D.P., Bucureşti (in Romanian).

MAXIM, A., LUCCA, V., MARINCAŞ, V., CLICHICI, O., ŞURARU, N., DUŞA, A., FLOREI, N., ŞURARU, M., IONESCU, G., MOŢIU, A., GHIURCĂ, V., NICORICI, E., BALUŢA, C. & GHERGARI, L. (1960). Coarse-grained limestone in the environs of Cluj. Studia U.B.B. II/1. (in Romanian)