

Book reviews

The cave minerals (Hill, C. A., Forti, P. 1986. *Cave Minerals of the World*. National Speleological Society, Huntsville, Alabama, USA; X, 238 p.)

The underground world of caves has long attracted people with its mysteriousness and fascinating beauty. Besides the exciting experiences and sporting challenges, however, this world also offers a number of serious scientific problems of the formation and development of karst terrains, origin of cave mineral deposits, life in caves, etc. The new book of C. A. Hill and P. Forti is devoted to cave mineralogy and presents a concise yet encyclopedic summary of the present knowledge about cave minerals and the specific forms of their occurrence.

In the Introduction the authors give some important definitions (of caves, secondary minerals, cave deposits — "speleothems", etc.) specifying the scope of the book and making clearer the descriptive part. In their context, the chief subject of the book are the secondary minerals formed in caves.

A major question in such editions is the arrangement of material. At present, cave minerals are classified according to one of the following three characteristics: 1. morphology of speleothems, 2. genesis, and 3. chemical composition. In their book the authors use a compromise classification system based simultaneously on all three characteristics. The chemical classes of minerals, i. e. carbonates, sulfates, etc., form the most general groups within which the morphological speleothem types, viz. stalactites, helictites, moonmilk, etc., are successively treated with parallel discussion of their genesis. In this way stalactites, for instance, are discussed several times in the sections on carbonates, phosphates, etc. Experience will show if such a classification scheme will prove efficient in practical use.

The book has a historical introduction written by Trevor Shaw which is a captivating story about the development of notions and knowledge about the caves and speleothems through the centuries and millenia starting from the ancient Assyrians, Aristoteles and Pliny till present days. Interesting authentic writings of ancient authors are quoted and reproductions of old pictures illustrate the text.

The main part of the book is a description of minerals and mineral formations. More than 200 mineral species of the classes of carbonates, halides, nitrates, oxides and hydroxides, phosphates, silicates and sulfates are described. In addition, information is given about some ore-associated minerals (their spatial relationship to caves being mostly fortuitous), organic and some other minerals.

The information about the mineral species is given briefly, summarized mostly in tables including the chemical composition, crystal system, some more important properties and forms of occurrence. Carbonate minerals represented by 10 mineral species and 25 types of speleothems are naturally given particular attention. Phosphate cave minerals, 35 species, are the most numerous. Brief but important information about the physico-chemical and geological conditions of deposition of the main cave minerals is given. Some of the major and most interesting deposits of cave minerals and speleothems in various continents and countries are reported.

The minerals of cave clays are omitted from the book because in many cases they do not strictly satisfy the adopted definition of secondary minerals. Undeniably, however, cave clays are typical cave formations of universal occurrence, inseparable constituent of the cave environment. Mineralogically they are still poorly studied.

Four other types of more specific cave deposits are also considered. They include lava formations, mud- and sand formations, mud- and clay vermiculations and organic formations. The list could have been supplemented with the mysterious "mummyo", the mountain balmy substance known from the Himalayas and other higher mountains in Asia.

Some important problems in speleomineralogy are discussed as special topics. They include the calcite-aragonite relationships, the colour and luminescence of speleothems, speleothem structures, dissolution and disintegration, field and laboratory techniques of studying cave minerals. The authors firmly believe and insist that "cave minerals belong in, and should stay in, caves!".

The book of Hill and Forti is superbly illustrated with 136 black-and-white photographs and drawings and 36 colour photographs. The well-selected high-quality photographs taken by various authors from a number of countries are of great informative content and many of them as works of art are real masterpieces.

The book is thoroughly indexed and contains an impressively extensive and valuable list of references on speleomineralogy including over 2300 references. In the text they are referred to jointly at the end of subsections. In addition, an exhaustive glossary of speleomineralogical terms is given.

The fine inner structure and the mechanisms of formation of speleothems are not discussed in detail. They, however, provide a rewarding field of research which may yield important new results by combining refined mineralogical observations with modern physical techniques of examination.

The book of Hill and Forti undoubtedly is a most valuable contribution to speleological literature which will be welcome both by professional mineralogists and by cavers and admirers of the beauty of the underground world of caves.

Translated by I. Vesselinov

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