NOTES ON THE HISTORY OF SOME KARSTOLOGICAL TERMS- HYDROTHERMAL KARST, GEYSERMITE, VADOSE ZONE

PRISPEVEK K ZGODOVINI KRAŠKE TERMINOLOGIJE - HIDROTERMALNI KRAS, GEYSERMIT, VADOZNA CONA

PAVEL BOSÁK¹

¹ Institute of Geology, Academy of Sciences of the Czech Republic, Rozvojová 135, CZ-165 02 PRAHA, CZECH REPUBLIC, e-mail: bosak@gli.cas.cz

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Izvleček

Pavel Bosák: Prispevek k zgodovini kraške terminologije - hidrotermalni kras, geysermit, vadozna cona


Ključne besede: kraška terminologija, hidrotermalni kras, geysermit, vadozna cona, speleogeneza, speleohistory.

Abstract

Pavel Bosák: Notes on the history of some karstological terms - hydrothermal karst, geysermite, vadose zone

The author explains unclear priorities of the terms hydrothermal karst, geysermite, and vadose zone. Hydrothermal karst - karst forms, produced by hot water were described already by J. Nöggerath (1845) and J. Desnoyers (1845). In the Czech literature, the term was introduced by E. Michal 1929-1930, and the term thermomineral karstification in 1941. Both terms were used in the description of Zbrašov Aragonite Caves. Geysermite first time appeared in a guide from 1934 (geyser stalagmites) by J. Chromy. The first published description of those forms are in the contribution of W. Czoernig-Czernhausen (1932 - 1933). He described them as »Quellenstalagmiten« (spring stalagmites). Vadose hydrological zone in karst was characterized by F. Pošepny (1893), who use the term vadose also in connection with formation of cavities.

Key words: terminology, hydrothermal karst, geysermite, vadose zone, speleogenesis, speleohistory.
INTRODUCTION

During revision of my reprint library I found some interesting historical problems. I discovered that there are numerous inaccuracies concerning the priorities in utilization of specific karstological terms. Subsequent detailed study of publications from different public and private libraries uncovered some surprising results concerning the first use of terms like hydrothermal karst or geysermite. I discovered that the term vadose zone/speleogenesis was utilized earlier than reported in literature, too.

The principal problem was in false references of year of edition of some publications. It concerned especially the Kunský contribution on erupting stalagmites in journal Naší přírodou, Praha, vol. 4, which was commonly dated to 1940. The correct year of edition was 1941 (only Kašpar in 1949 gave the correct year). The second contribution, in which the year of edition was incorrectly referred to 1941 or 1942 was the contribution of Kašpar and Kunský on geysermites in Rozpravy II. třídy České akademie, Vol. LII, No. 20, where on p. 1 of the reprint the following text was printed: „Submitted to print on December 30, 1941“. The contribution could not been printed in 1941. According to the title page of the whole volume, the contribution was printed only in 1943, as correctly stated Travěnec et al. (1990) in their bibliography of the Hranice karst.

HYDROTHERMAL KARST

It has been traditionally mentioned, in a majority of karstological monographs, that the father of the term - hydrothermal/thermomineral karst - was J. Kunský (1957). This fact was repeatedly referred to without checking the literature.

The first author who used the term thermomineral karst (in Czech - tepliceový kras) was Emanuel Michal (1929-1930) describing the Zbrašov Aragonite Caves. The process of karstification by thermal waters was named thermomineral karstification (in Czech - teplicové krasovění) also by Michal (1941). The use of thermomineral karst/karstification was very common up to the early sixties of the 20th Century (cf. also Kunský 1957; Panoš 1961) before the broad application of an international term of hydrothermal karst/karstification.

E. Michal did not refer to contributions of Kunský and Kašpar (published only in 1943) and Kunský (1941) in his last contribution concerning the Zbrašov Aragonite Caves in 1941. From this fact we can deduce that he did not know those articles, therefore both contributions must have been published later than the Michal´s work. This clearly correlates with the fact that Kašpar and Kunský started their research in the Zbrašov Aragonite Caves only during 1940 (Kunský 1940; p 170). Nevertheless, it has to be stated that both Kunský and Kašpar did not mention Michal´s contributions in their papers, e.g., Kunský (1957) used the term thermomineral karst without reference of earlier Michal´s use (1929-1930 and 1941) in genetically proper context. This is clear evidence of plagiarism in science.

In this place we have to state that J. Chromy correctly explained the speleogenetical sequence of processes in the Zbrašov Aragonite Caves already in 1913, i.e., the invasion of thermal water into already formed cavities (p. 7: „collapses of wall and ceiling rocks corroded by carbonic acid smoothed those erosive effects“).
František Pošepný (1893, 1902) has been considered the father of the concept of the hydrothermal karst by Dublyanski (1990). Nevertheless, F. Pošepný never used this term, although he explained the principles of hydrothermal speleogenesis in a complex and fantastic way, at least 60 years earlier than this concept was widely accepted. He was not the first who described effects of such kind of karstification. On page 49 (second ed., 1902) he mentioned the contribution of J. Nöggerath from 1845 with description of „several vertical channels of nearly circular section and 20 to 30 centimeters diameter, some of which contained thermal water and emitted steam“. Channels were 4 m deep and developed in Devonian limestones at Burtscheid, near Aachen (FRG; unfortunately it was not possible to find this contribution). Shaw (1992, p. 150) reports the first evidence on dissolution of limestones by warm thermal waters given in the idea of J. Desnoyers (1845, p. 81) on „exhalation of gas and acid vapours“.

GEYSERMITE

It has been commonly accepted in a majority of karstological textbooks and monographs, that the term of geysermite (geyser stalagmite) was used by J. Chromý (1927), and Kašpar and Kunský (1941 or 1942; correctly 1943) for the first time. This statement has been accepted by individual authors without the check of reality. Hill and Forti stated (1986, pp. 41-42) that the term of geysermite was „first reported from Aragonite Cave and Zbrasov Cave, Czechoslovakia (Chromý 1927 and Kašpar and Kunský 1942)“. In 1997 on p. 76 they wrote that geysermite „first reported from Zbrasov Cave, Czech Republic (Chromy 1927, Kašpar and Kunský 1941)“.

Kašpar and Kunský (1943, p. 4) stated that geysermites were „discovered by J. Chromý r. 1913“ and noted, that „…from this place [from the Zbrašov Aragonite Caves, note of PB] they were briefly described by W. Czoernig (2) under the name of Quellstalagmite“.

Kašpar (1949; p. 5) ascribed the first use of the term of geyser stalagmite to Kašpar and Kunský (1941, correctly 1943) „…hollow stalagmites …were named the geyser stalagmites (11)…“ (reference of Kašpar and Kunský dated to 1941 represents this number in bibliography) although he had to know that this term had used substantially earlier J. Chromý, and E. Michal and J. Kunský (both in 1941).

In other place, Kašpar (1949, p. 6) wrote that: „For the first time they [geysermites, note of PB] were correctly evaluated by J. Chromý (4)“ (paper of J. Chromý from 1927 is listed under No. 4 in bibliography). This wrong statement was later accepted by Kunský (1957) and subsequently by others as paper of Kunský in English has been frequently cited.

Kunský (1957, p. 328) contended, that „J. Chromý gave a complete description of these phenomena [geyser stalagmites, note of PB] in his first works“ listing contributions of J. Chromý from 1927 and 1934 in references. The first author who did not agree with such statements was V. Panoš (1961), who noted on p. 297: „They [geysermites, note of PB] were described for the first time from here [i.e., from the Zbrašov Aragonite Caves, note of PB] by J. Chromý (1934) and J. Kunský (1940)“.

The detailed analysis of all published data showed without any doubt that J. Chromý did not utilize this term in any papers before 1934. Therefore, he could not use the term in 1927. In his contribution in 1934 (p. 23) he wrote: „The crystalline forms similar to hollow stalagmites represent also special feature here [in the Zbrašov Aragonite Caves; note PB]. Those stalagmites do not
represent any forms created by dropping of water. They were formed by warm mineral springs gushing from cave bottom. Higher and higher rims formed around springs from limestone abundantly contained in springs. Cones similar to hollow stalagmites originated during ages. The mineral water erupted from their centres. They were geysers on a small scale. The term geyser-like deposits was later used by Chomý (1935; p. 4) in one newspaper contribution. In 1936, Chromý described: „geyser-like deposits in a form of large hollow stalagmites“ (p. 1), i.e., similar to his original contribution of 1934.

Kunský (1940; p. 170) described geysermites (geyser speleothems) using the same sentences as Chromý in 1934: “we found here so-called geyser speleothems, lithified witnesses [of eruptions of mineral waters-note PB]. They are not real speleothems, as they did not originate by dripping, but from erupting water. They are cones 1 decimetre to 1 metre high, with a vertical crater hollow along the whole height. Their origin is the same as those around geysers... Around springs, mineral water enriched in carbon dioxide erupted and deposited dissolved limestone, which was firstly mixed with a cave loam and later deposited clean. Thick layers of limestone - sinter - deposited firstly from springs, which are intersected by crater chimneys through which water erupted in numerous places.”

The first description of geysermites can be found in a contribution of W. Czoernig-Czernhausen (1932-1933, p 115). He considered their origin to be by uprising of carbonate saturated waters rich in carbon dioxide from the cave bottom. Carbonate could be deposited by rapid degassing of CO₂ (p. 116). The forms he described as - Quellstalagmiten - spring stalagmites. In principle, he correctly explained the genesis by uprising (Aufquellen, p. 115) of mineral waters. Nevertheless, he used probably a wrong or not completely correct term. From the explanation of Czoernig-Czernhausen it cannot be deduced that spring stalagmites in the Zbrašov Caves “originated by capillary rise of water” as written by Kašpar and Kunský (1943, p. 4), because the German word Aufquellen means uprise and not capillary action. The term of spring stalagmite was used also by Chromý in his very late contribution (1941, p. 511, explanation to figure): “Those hollow stalagmites (spring stalagmites) were originated by mineral water gushing from the cave bottom”, although he commonly used geysermite in his earlier contributions. The fact serves as evidence that Chromý himself explains the Czoernig-Czernhausen model in another sense than Kašpar and Kunský (1943) who stated that „Our forms [geysermites, note of PB] have nothing common with spring stalagmites“.

In the sense of valid explanation of the genesis of the form, E. Michal (1941-thermominal nozzles and geysers, pp. 146-147) and J. Kunský (1940; p. 170 and 1941; p. 791 - erupting or geyser stalagmites) independently used the term geyser speleothem in the scientific contribution (in the Czech language there exists a cumulative term for cave decoration - krápník - which means both stalagmite and stalactite, and which has no equivalent in English, therefore term speleothem is used). Nevertheless, Chromý earlier used more correct term - geyser stalagmite.

The remarkable fact is that Kašpar and Kunský (1943) did not mention important contributions of E. Michal. Similarly, in references Kunský (1957) listed only article of E. Michal from 1941 although he mentioned his research in Zbrašov area between 1929 a 1941 (he did not refer any contribution of E. Michal in the text, except of historical review on p. 350!), and instead of complete bibliography he listed only selected bibliography, which is highly unusual in original scientific paper.
Who was the “father” of the geyser stalagmite is only speculation. We have only two possibilities: (1) J. Chromý used it as equivalent of real geysers, which resulted from his lively imagination (adopted also during description of cave spaces and decoration) and from interest to increase the number or visitors (successful marketing operation), and (2) J. Chromý adopted the term, which could have been used by E. Michal as a reflection of the visit of W. Czoernig-Czernhausen as E. Michal had already studied caves during his visit (the first Michal’s contribution on Zbrašov was printed in 1929) and had very close relations with J. Chromý’s family. The term, together with the adequate explanation of genesis, was only later utilized by Kašpar and/or Kunský, without any author participation. Kunský’s description of 1940 is a pure plagiarism of the original description by Chromý in 1934.

VADOSE ZONE

It has been traditionally repeated that the term of vadose origin of caves was firstly used by William Morris Davis (1930). This opinion is not completely correct. František Pošepný in his book „Genesis of Ore Deposits“ (1893, 1902) described in detail results of vadose speleogenesis and he commonly used terms like „vadose circulation“ and „vadose zone“ (pp. 18 and following). In the second edition (1902) he specified on pages 19 and 20: „Peculiar conditions are created by occurrence of relatively soluble rocks, such as rock-salt, gypsum, limestone and dolomite, in which, by the penetration of meteoritic waters and the circulation of the ground-water, connected cavities are formed, constituting complete chanels for the vadose circulation“. In following parts he described in a completely modern way phases of speleogenesis, including speleogenesis induced by human impact (underground mining of rock salt in salt diapir at Ocna Mures-Máros Ujvár, Transylvanie, Romania; cf. Pošepný 1867).

F. Pošepný also defined „karst rocks“ for the first time in the way which is accepted recently. It seems that principles of modern karstology were presented by F. Pošepný in a more modern view and long before E.A. Martel, J. Cvijić and others, to whose attention his conclusions escaped (Shaw 1992, p. 163). His really pioneering study has to be rediscovered for modern karst science.

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*The name of Pošepný is not properly given in literature. Shaw (1992, p. 143, 163) gave his name in a Hungarian form as Ferencz. Pošepný’s principal work “Genesis of Ore Deposits” gave his name in a German form as Franz. In reality his name was František.
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**Povzetek**

V krasoslovni literaturi je celo vrsta nejasnosti o prvih zapisih nekaterih strokovnih terminov, kot so npr. hidrotermalni kras, geysermit ali vadozna cona.


*Vadozna speleogeneza* - na splošno se trdi, da je termin vadozni v zvezi s kraškim okoljem in speleogenezo prvi uporabil W. M. Davis (1930). Vendar je vadozno hidrološko cono v krasu označil že F. Pošepný (1893), ki je uporabil termin »vadozni« tudi v zvezi z nastankom kraških jam.