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THE BAUMANN'S CAVE AT RÜBELAND/HARZ, GERMANY, ONE OF THE CAVES NOTED IN EARLY SCIENCE HISTORY FOR ITS CAVE BEAR AND CAVE HYENA BONE DEPOSITS

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A SHORT HISTORY OF THE BAUMANN'S CAVE

The Baumann's Cave at Rübeland near Elbingerode/Harz is ubiquitous in the early scientific and travel literature (e.g., Kempe 1999; 2000; 2004; Kempe & Reinboth, 2001; Kempe *et al.,* 1999; 2004). It has been open to the public since the end of the 16th century and is the oldest regularly visited and guided show cave.

In Baroque times, the Baumann's Cave represented - even though only 150 m long and small compared its presently known extent (fig. 1) - a singular geological object causing wide-spread curiosity. All reports agree that it was discovered by a miner named "Baumann", who was searching for iron ore in the Bode Valley in the late 15th century. The cave was originally decorated profusely with speleothems and once contained extensive cave bear bone deposits, mined for medical *unicornu fossile*.

The Baumann's Cave was first mentioned in the middle of the 16th century by Agricola, Matthesius and Gesner (with the first two citations not fully verified as yet) (Kempe, 2004; Kempe *et al.,* 2004). Heinrich Eckstorm wrote the first longer account of the cave in 1589 in Latin (published 1620). His report was cited extensively by later authors, even though Eckstorm used local information and did never visit the cave himself. Johannes Letzner - a contemporary of Eckstorm - also wrote a short account about the cave but based on his own visit to the cave in 1599 (or shortly later). Both Eckstorm and Letzner gave descriptions of the first hall only.

In the first half of the 17th century, the Baumann's Cave was mentioned several times in connection with its *unicornu fossile* deposits. Merian published the first longer descriptions in German in 1650 and 1654. The latter text is also accompanied by three copperplates showing the Bode valley with Rübeland and the entrance of the cave, a detailed picture of the entrance, and a picture of the interior of the first section of the cave, including the "Ross" (horse) in the background, a large breakdown block that visitors had to straddle to reach the descent to the deeper parts of the cave. This picture is the first of the interior of any cave ever published (fig. 2).

In 1656, Olearius, an official of the city of Halle, visited the cave accompanied by the young student Von Alvensleben. Olearius left a manuscript in German (published by Bürger, 1929) with a description of the cave and von Alvensleben sketched the ground plan of the cave on two sheets showing sections one and two (fig. 3a,b). These sketch-maps are the first cave maps still preserved world-wide (Stolberg, 1930; Reinboth, 1982; Shaw, 1992; Kempe *et al.,* 2004).

Also, in 1656, Horst published a short note on fossil bones from the Unicorn Cave near Scharzfeld mentioning that similar bones have been taken from the Cave at Elbingerode as well, i.e., from the Baumann's Cave. In this note he suggested that the bones were "similar" to those of "bears, lions, and humans", which is the first anatomically correct interpretation of the unicorn bones (Kempe *et al.,* 2005).

Kircher (1665) mentioned the cave in his famous "*Mundus subterraneus*" also in connection with the fossil bones. In 1666, Lachmund visited the cave and published a short Latin description in his book "*Oryktographia Hildesheimensis*", which appeared 1669. In the same year Praetorius also printed a short account of a cave visit. Towards the end of the century Leibniz visited the cave and wrote about it, its formations and bone deposits. His Latin text was included in the "*Protogaea*", a book published 1749, more than 50 years after his visit.

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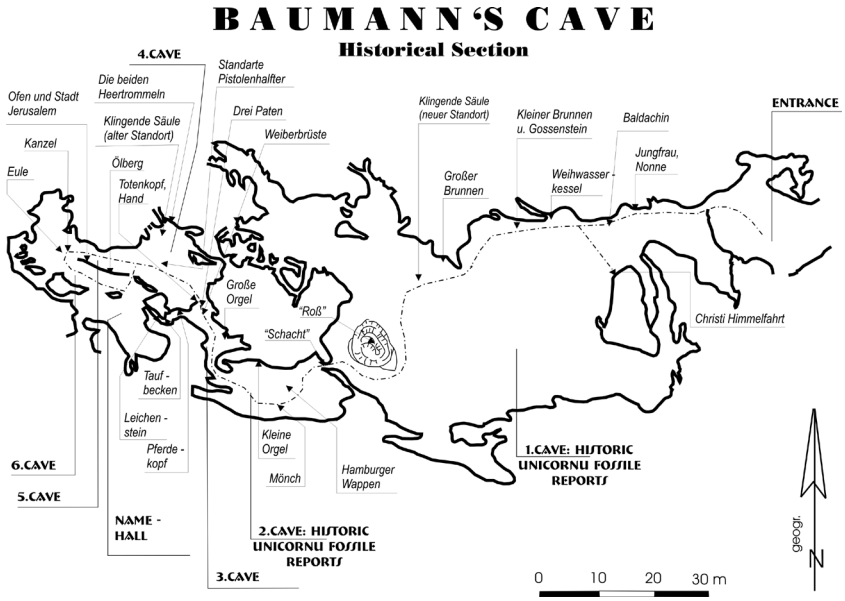

Figure 1. Map of the historical section of the Baumann's Cave and its division into six „caves". The locations and historic names of the flowstone figures presented in guided tours are indicated as far as they have been identified. Historically fossil bones have been dug in the first and second section; today, bones are visible only in a corner of the second cave (altered after Kempe *et al.,* 1999).

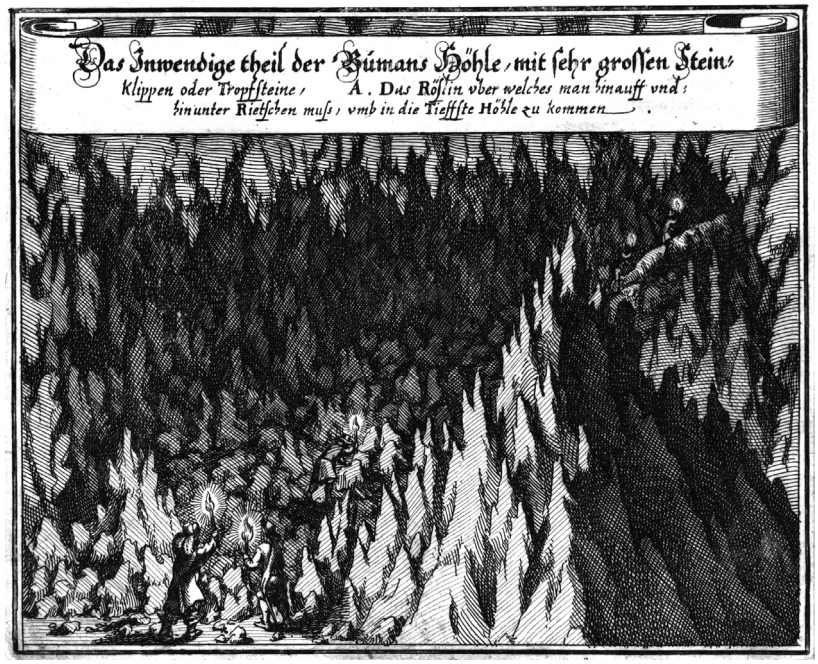

Figure 2. Merian etching of 1654 showing the interior of the Baumann's Cave with the titel: "Der Inwendige theil der Bumans Höhle, mit sehr grossen Stein-Klippen oder Tropfsteine, A Das Röslin uber welches man hinauff und hinunter Rietschen muss, umb in die Tieffste Höhle zu kommen". (The inner part of the Baumann's Cave with very large stone cliffs and flowstones. A: the Horse, across which one has to slide to get to the deepest cave). This figure is the oldest figure depicting the interior of a natural cave published world-wide. The view is into the first section of the historic cave (today named "Goethe Saal") from the southwest with the northeast wall removed so that one can look into the cave. The three persons in the foreground have just entered the cave, the two "cavers" in the background "ride up" across the big breakdown block named "Ross (Horse)" to get to the continuation of the cave (today "Saal des Hamburger Wappens"). The etching was drawn by Conrad Buno by personal instruction of Duke August der Jüngere and published in the Merian "*Topographia Braunschweig-Lüneburg*". (Original: collection Kempe).

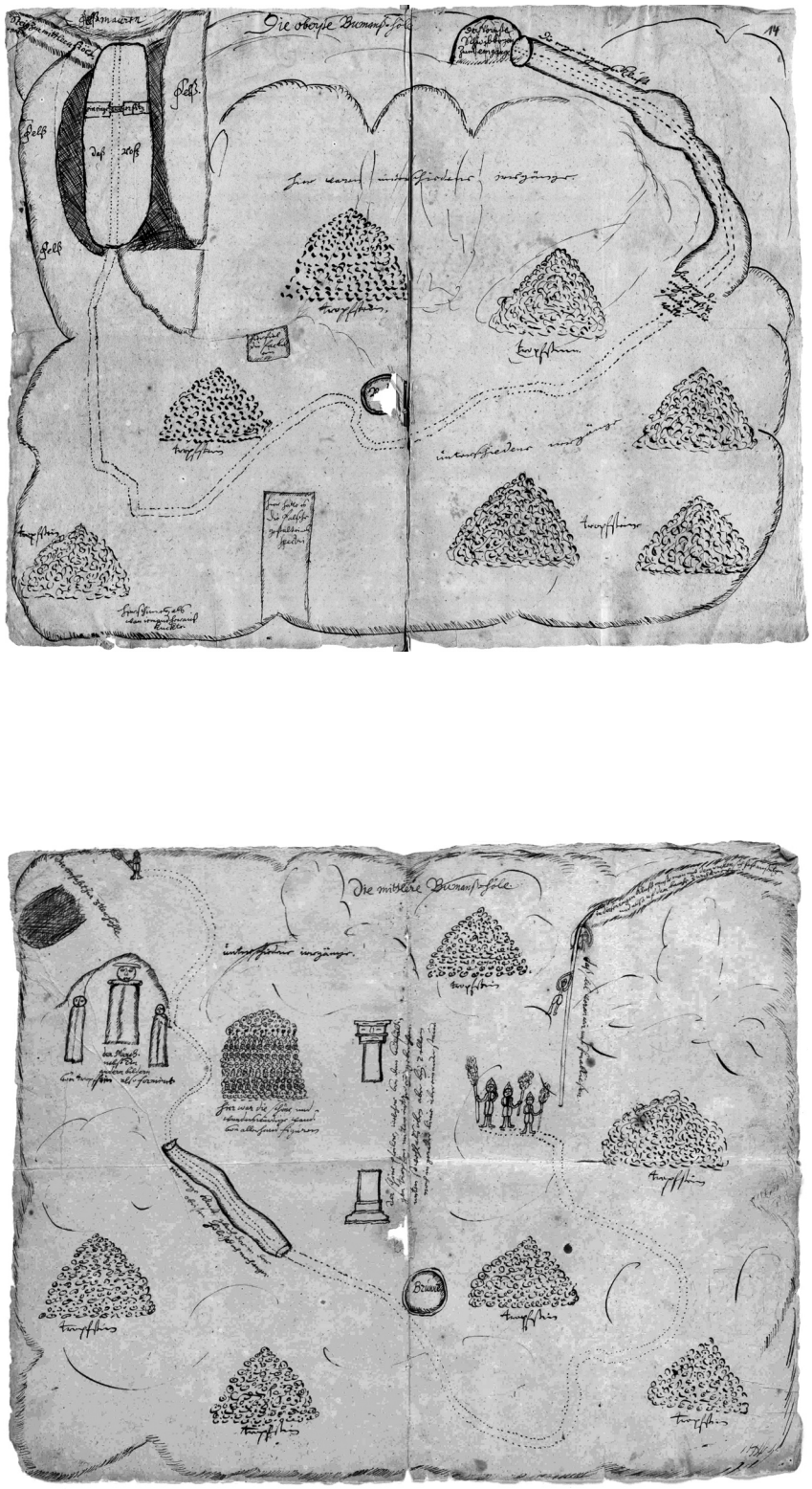

Figure 3 a,b. The student von Alvensleben drew this sketch after a visit of the Baumann's Cave together with the superintendent Olearius, 1665. The maps are kept today in the state archive in Magdeburg. They are the first preserved maps of a natural cave world-wide. For the translations of the texts see Kempe *et al.,* 2004. (Printed by permit of the Landeshauptarchiv Sachen-Anhalt).

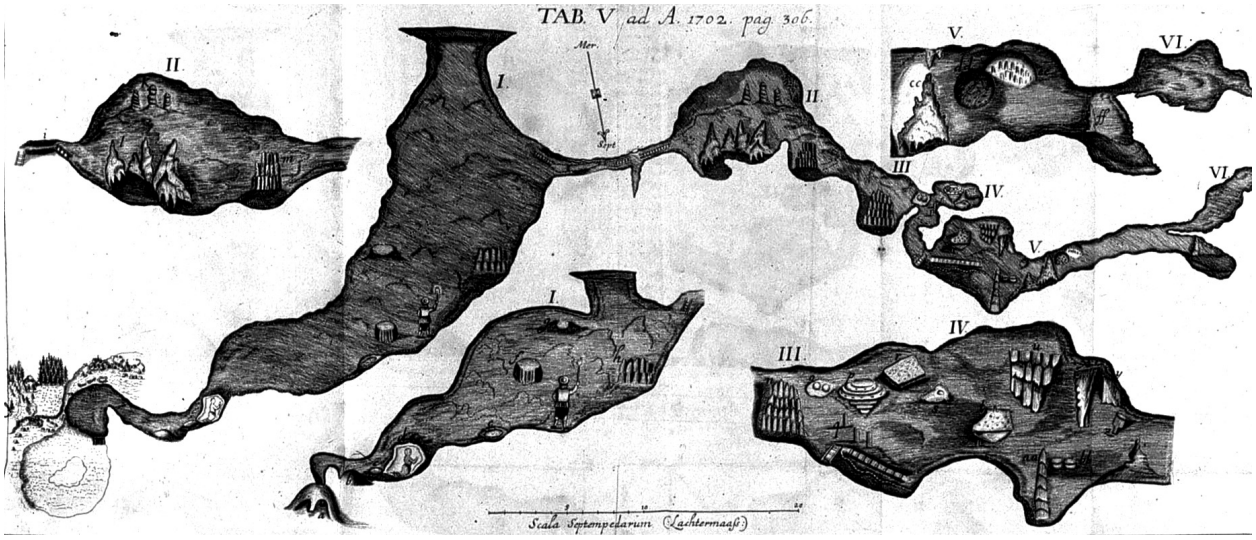

Figure 4. This map of the Baumann's Cave was published as a copper etching by v. d. Hard in the "*Acta eruditorum*", 1702. The map is oriented to the south and has already a north arrow and a scale (in Harzer Lachter; 1 HL = ca. 2 m). There is a plan view and four longitudinal sections of certain parts of the cave. The letters refer to the individual flowstone formations shown to the visitor (For details see Kempe *et al.,* 2004. (Original: collection Kempe).

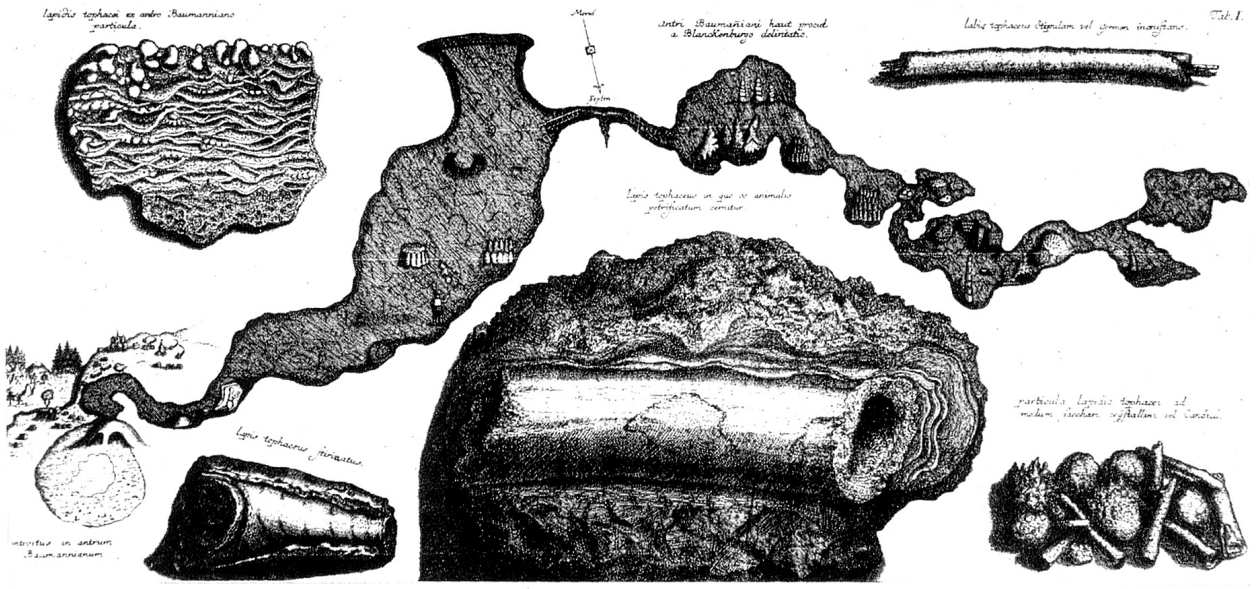

Abb. 59 *Lageplan und Aufriß der Baumannshöhle* · Kupferstich; 21,5 × 47 cm · aus: Leibniz, Protogaea, 1749, Tab. I

Figure 5. The map of the Baumann's Cave re-printed in Leibniz "*Protogaea*", published 1749. (After the translation of the "*Protogaea*" by Engelhardt, 1949).

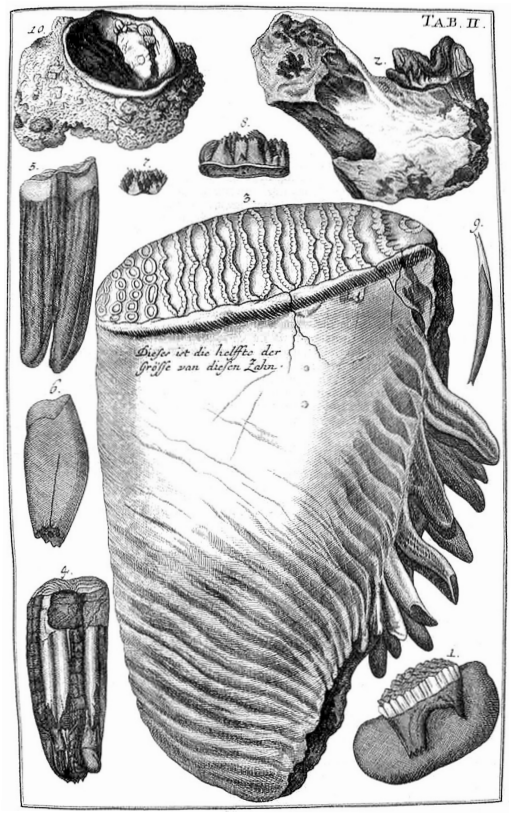

Figure 6. The copperplate No. 2 from KUNDMANN's curiosity opus, published in 1737, depicting fossil bones. The ones in the right corners were the bones he had, as a young person, collected himself in the Baumann's Cave, second section; they are depicted at a scale 1:1. (Original: Universitäts- and Landesbibliothek, Darmstadt).

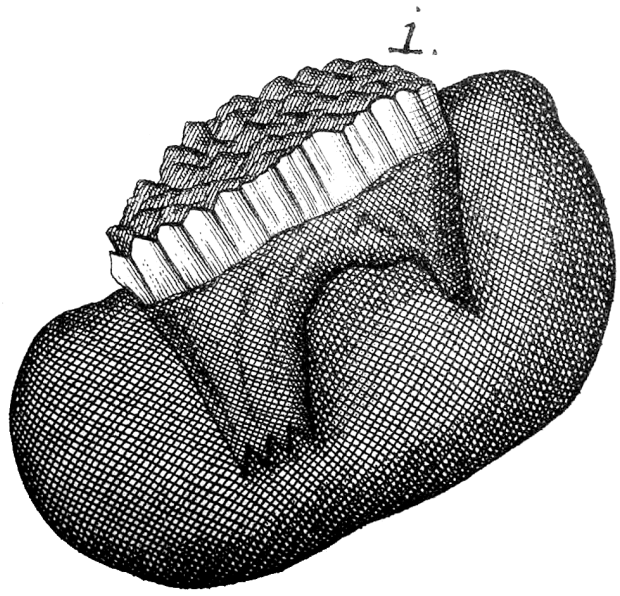

Figure 7. Etching of an abraded molar, most probably of a cave bear. It was identified as a tooth of a horse by KUNDMANN (1737: Taf. 2, item 1). (Original: Universitäts- and Landesbibliothek, Darmstadt).

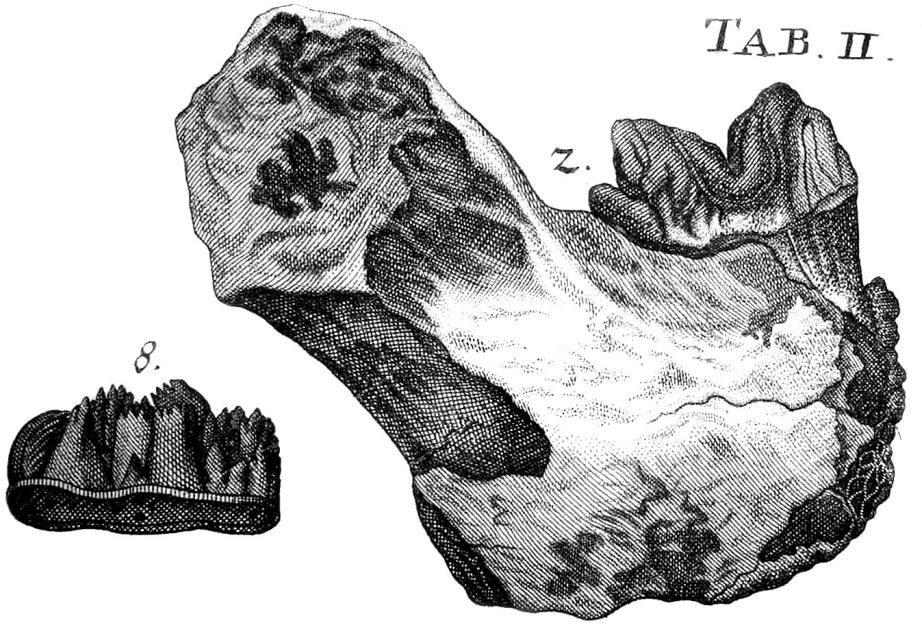

Figure 8. Etching of the last molar in a left lower jaw of the cave hyena. It was identified as the jaw of a calf by KUNDMANN (1737: Taf. 2, item 2). (Original: Universitäts- and Landesbibliothek, Darmstadt).

In the early 18th century three more reports of the cave were published, those of Behrens (1703), Hellwig (1702) and Von Der Hardt (1702). Behrens' account does not relate much more information about the cave than the Eckstorm-text, and Hellwig copied the Olearius-report, but Von Der Hardt published the first map and longitudinal sections of the cave based on a rough survey (fig. 4). His Latin report appeared in the "*Acta Eruditorum*", the most influential scientific magazine of the time. It contained for the first time a detailed description of all the formations (cross-referenced with the map) usually shown to the visitors by guides (Reinboth, 1986; Kempe *et al.,* 2004). It also established the division of the cave into five (later enlarged to six) sections, a practice followed by all the later authors. A copy of this map was reproduced by Leibniz (1749) (fig. 5) and Linné (1779).

In 1708, Johann Christian Kundmann (1684-1751) visited the cave and retrieved several pieces of bone. Kundmann was a physician and a collector of - among other things - natural curiosities. His visit is described and the bones are depicted in the catalogue of his cabinet of natural curiosities: "*Naturae et Artis item in Re Medica, oder Seltenheiten der Natur und Kunst des Kundmannischen Naturalien-Kabinets wie auch in der Arzeney-Wissenschafft*" published in 1737 (fig. 6). Kundmann, however, was not able to correctly determine which animals these bones belong to. One of the pictures shows (most probably) a cave bear tooth (fig. 7), while the other depicts a fragment of the lower jaw of a hyena (fig. 8). This picture is most probably the earliest of a cave hyena bone. Cuvier (first in 1805) correctly attributed it to a large hyena. Goldfuss also referred to the Kundmann picture when discussing fossil hyena bones in 1810 and when he established the cave hyena as a separate species in 1823 as *Hyäna spelaea* (now *Crocuta crocuta spelaea).*

The last one to describe the bones from the Baumann's Cave without clearly recognizing which animal they belonged to was the physician Johann Friedrich Zückert (1763) (Kempe, 1999; 2000; Kempe *et al.,* 1999). Shortly after the extinct bear species was established as *Ursus spelaeus* by Rosenmüller, 1794. The steps which led to this benchmark in early Paleontology have been illustrated in detail by Kempe *et al.* (2005).

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