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Karstic sediment, Palaeontology & Archaeology

S.03 - Cave deposits

S.08 - Archaeology and Palaeontology in caves



Speleo-archeology, or the search of historic and prehistoric constructions in the caves of Southern France

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Abstract

The scientific study of the human frequentation clues in caves started with the work of François ROUZAUD (1978), entitled "*La paléospéléologie*". Since that time, other archeologists have continued research, developing a real specialty, the speleo-archeology, defined as the study of human frequentation in caves prior to modern speleology. Clues of human incursions have already been examined by karst scientists or geomorphologists in well-known prestigious caves, which access is regulated. However, many open-access caves have not been yet studied through the point of view of speleo-archeology. Only one example of caves containing anthropogenic constructions is presented here to illustrate speleo-archeological research: the Mas-d'Azil Cave (Ariège), which keeps old traces of a clay mining.

1. Introduction



Figure 1: Location of the caves in the South of France quoted in the text.

In France (Fig. 1), the search for traces and constructions in caves formally began in the 1970s with the work of François ROUZAUD (1948-1999), published in 1978 and entitled: « *La paléospéléologie* ». The study of human traces (footsteps,

hands imprints, etc.), which took place in the caves of the Central Pyrenees, continued to be practiced in the Grands Causses and the Mediterranean garrigues with the investigation of the caves used during the Late Neolithic (GALANT & HALGAND, 2004).

In the early 2010s, the arrival of karstologists in archeological research programs shed additional light. Since a collaboration was imposed in the study of the Chauvet cave, teams of archaeologists have sometimes called on the services of karstologists, in particular to map prehistoric caves of national interest (caves of Bruniquet, Cussac, Isturitz, etc.). Access to these prestigious caves being limited and regulated, it was necessary investing in other caves, open and free in access, to refine our sense of observation. This is what we have been doing in the caves of Southern France in order to develop new investigation methods.

2. The Speleo-archeology: a new discipline?

Speleo-archeology was practiced by few enlightened precursors who laid the foundations of a specific discipline of cave environment. After having stated the advances of archeologists and their followers, the detection of anthropogenic traces will be the subject of a brief presentation.

a) The choice of the word speleo-archeology

The word speleo-archeology contains the root of two key words borrowed from ancient Greek: *spelaiion* which means "cave" and *arkhaiologia* which means "history of antiquity", ended by the suffix -logy or study of. This word is built on

the same bases as the word geoarcheology proposed by the Anglo-Saxons and then gallicized in "géoarchéologie".

If we had to sum up the speleo-archeological activity in one sentence: "recognize in caves what is natural and what is not".

The speleo-archeological approach is a new discipline in the sense that it is based on a good knowledge of karst and cave formation possessed by all good speleologists or karstologists, geomorphologists specialized in karst. Indeed, a perfect knowledge of the "cave without man", that is to say before his passage, allows identifying with certainty what is natural and what is not. Discrimination between natural and man-made forms constitutes the essence of the speleo-archeological approach.

The word "paleospeleology", literally "old speleology", proposed by François Rouzaud in 1978 is limited to the search for traces left by prehistoric man in the remote parts of the caves. He does not apprehend the container, that is to say the cave, but only certain types of traces left by the Upper Paleolithic people during their underground forays into the Central Pyrenees.

The word "paleospeleology", speleology practiced by prehistoric men in the sense of Rouzaud, cannot have the meaning of the word speleo-archeology, which applies to a much larger field of research.

b) A pioneer: François ROUZAUD

François ROUZAUD is a pioneer in the search for anthropogenic traces in cave environments. In 1978, he laid the foundations of a specialty that was struggling to emerge. He was a precursor of this type of archeology, which he practiced mainly in the ancient Midi-Pyrénées region, SW of France. It is only much later, when the cave has been considered a « crime scene » that the methods of observation had changed. These new methods are inspired by the « forensic principle of exchange during contact between two agents and the traces that this contact produces » (MONTELLE, 2012).

In 1997, ROUZAUD proposed an inventory of all human traces (beyond footprints); this inventory « most often takes as a starting point the observations made by the inventor speleologists ». Indeed, ROUZAUD was a speleologist who specialized in the archeology of caves. He built the foundations of « paleospeleology » and specified that the progress of the speleologists should be dictated by the detection of « anomalies, of all kinds, observable on the surface of the soil and walls ».

The new discipline practiced by ROUZAUD implicitly implies a practice of caving. Like him, speleologists are perfectly familiar with the gestures and situations in which their predecessors (the « paleospeleologists ») were confronted. This is also the main theme of his work published in 1978: « *La paléospéléologie. L'homme et le milieu souterrain pyrénéen au Paléolithique supérieur* » (« The paleospeleology. Man and the Pyrenean underground environment in the Upper Paleolithic »). As a pioneer, he advanced alone for years creating this new discipline, whose name will not really be repeated.

In 1989, the methods and relationships that ROUZAUD developed with speleologists were used as good practices during the discovery of an extraordinary cave: the Bruniquel Cave (Tarn-et-Garonne), that appeared several years later as a unique milestone of Neanderthal culture (JAUBERT *et al.*, 2016). The measures taken in favor of conservation made it possible to preserve prehistoric structures, made up of an accumulation of speleothems, in a state of conservation close to the original. At that time, the ¹⁴C dating on charcoal only indicated an age beyond the limit of the method (ROUZAUD *et al.*, 1996). Obviously, F. ROUZAUD was ahead of his time, however he was followed by some disciples in the Grands Causses area.

c) Followers in the Grands Causses

In the 1980s, the archeologist Philippe GALANT set out to study the caves of the Causses, in the south of Massif Central. However, in Prehistory, the fashion is still for outdoor archeology. The confined environment of caves is still considered to be an outdated subject, even an archaism comparable to the excavations of the 19th century, where nothing remains to be discovered...

On the Causse de Blandas, the discovery of the Rouvière Cave (Rogues, Gard), justified rescue excavations in 1989 and 1992. The identified remains and constructions dated from the end of the Neolithic presented unusual character. Alerted, those in charge of the excavation then decided to review a certain number of sites of the same period. Actually, these sites reveal several previously unidentified constructions, and the authors wrote that « *the old studies, too focused on the stratigraphic analysis of the fillings, and without a global geomorphological approach of the caves and their contexts, are the cause of this very reductive vision of underground environment* » (GALANT & HALGAND, 2004). From this moment, the cave, as a site recording traces, became an archeological specificity which methods frankly differ from those used by traditional archeologists, focused on the stratigraphy of sedimentary deposits, and parietal ornaments when existing.

d) Historical speleologists

In France, a few speleologists started research about the uses of caves and decided to inspect the clues left by their occupants. Christophe GAUCHON (1997) is one of them, but deliberately excluded prehistoric periods, which fall outside his competence, he considered as the prerogative of archeologists. GAUCHON's approach was based on observations and documents related to local history. On the field, the search for traces and evidences results from the documentation of observed facts that initially motivated the visit of caves. His book « *Des cavernes et des hommes* » (1997) offers a very innovative perspective, but never crossed that of archeologists, most of whom remaining in a logic of excavations.

e) Evolution of archeological sciences

Since the recognition of prehistoric cave art in 1902, ideas have evolved for the archeologists in charge of the conservation of the decorated caves; the cave is no longer considered only as a deposit of prehistoric objects, it was gradually assimilated into its archeological context. However, it is initially beyond the Atlantic that « geoarcheology » appeared and suggested integrating geoscience specialists into archeological excavation teams. In France, the archeological authorities became aware of such a delay and reacted positively after the discovery of the Chauvet Cave in 1994, which study had to be exemplary. New obligations were imposed to cave researchers, whether they are speleologists or geomorphologists. While the specialty initiated by ROUZAUD struggled to impose its name, the study of the Chauvet Cave begun.

f) First observations in the Chauvet Cave

The Chauvet Cave (Vallon-Pont-d'Arc, Ardèche) is an exceptional cavern; for those in charge of its study, it was important not to repeat the former mistakes made in other caves and to avoid the destructive excavations. From the outset, researchers were asked first to observe while reducing the number of excavations, in order to limit the impact on the cave. Archeologists were looking for the development of new methods that were imposed on them, thus the karstologists of the EDYTEM laboratory in Chambéry were entrusted with the mission of expertise in geomorphology, a discipline supporting the mission of archeologists at the beginning of the 2010s (DELANNOY *et al.*, 2012). They identified an artificial pool made by prehistoric men that was completely unnoticed by

archeologists who did not realize its anthropogenic origin. Their knowledge of cave features and landscapes was decisive in recognizing the mark of Man. Their experience allows them practicing a real specialty, which does not yet have a name, but which in fact belongs to geomorphology. However, despite a long presentation aimed at justifying "The integrative geomorpho-archeological approach" (DELANNOY *et al.*, 2012), no reference was made to the work of ROUZAUD and his disciples of the Grands Causses who have yet practiced the paleospeleology for several years. While this approach was efficient, it was however not new since the study of anthropogenic traces in caves began more than thirty years before.

3. The detection of old visits: the example of the Mas-d'Azil Cave

a) Classification of anthropogenic traces

There are several ways of classifying the traces left by human frequentation; ROUZAUD (1978) proposed a classification into three large groups.

The first group contains traces of progression left by men (prints of feet or hands, slips, broken speleothems); the second checks the traces corresponding to the end of the penetration (bodily prints, charcoals and torch-wipes, broken speleothems). A third group gathers the traces of construction in underground sites (hearths, soil, blackening, cave art).

According to MONTELLE (2012), there is another group of traces, those that escape us and « that we cannot yet identify, for lack of not having thought of them ».

However, a good knowledge of caves and some specialization can reduce the limits of undetectable tracks. We tried to push these limits by carefully observing the caves from all points of view: karstological, speleological, and archeological.

b) Between doubts and certainties

When entering a cave known to be prehistoric, we are trying to search by any tangible means signs of human frequentation. Sometimes it is possible to immediately recognize traces of the prehistoric passages; but the numerous visits through history could have erase any trace. It is then necessary to seek and in particular to analyze, then to decipher the underground landscapes in order to distinguish what is natural from what is not.

Unfortunately, this analysis is not accessible to everyone; but it will be more spontaneous for those who study caves and know well their speleogenesis. An archeologist claimed, evoking Easter Island: « If you understand geology, you understand culture ». The quote can be transposed to caves and karstology.

Despite a good knowledge of cave formation, it can happen that a single visit in a cave is not sufficient. Indeed, sometimes it takes only a second to identify a first decisive clue that will allow « pulling the thread » and resolving a situation. Thus, a minor clue can lead to the discovery of a major archeological interest. There is a brief moment when you completely change your mind from perplexity to

certainty. When the first clue appears, it brings intense emotion. Speleo-archeological research is part of a police investigation, and it is carried out using the same methods. Only one example will illustrate our methodology and shed light on a discipline that has remained obscure for a large number of archeologists who are not so familiar with cave environment.

c) Speleo-archeology in the Mas-d'Azil Cave

Caves remained regularly open to men during successive prehistoric periods. Indeed, one can find their traces as well from Paleolithic, Neolithic, and even historical periods. Of course, revealing these traces requires a trained eye and special conditions.



Figure 2: Large pebble in place used to break the calcite flowstone in the Mas-d'Azil Cave (Ariège). Scale: 20 cm. Photo D. Cailhol.

A practical case occurred in the Mas-d'Azil Cave (Ariège) in 2017, when Marc JARRY, researcher at INRAP (French institute of preventive archeology), brought together six karstologists to identify signs of biocorrosion linked to the presence of bats. He was aware of his « blindness », however since only the result counts for him, he knows that others could see. The concentration of karstologists in the cave was an opportunity to gain a new vision of it. Thus, the detection of hidden clues in the underground landscape was at the origin of the discovery of an old clay quarry, which had never been identified previously, despite its front of about 20 m in length.

The first clue was tenuous and based on the observation of the slope of a clay deposit, almost vertical. Indeed, any rock can be characterized by a natural slope which can extend from vertical (hard rocks like limestone) to a subhorizontal slope (loose rocks like sand). Here, since the clay was not affected by natural subsidence, another explanation was necessary.

Once the first clue discovered, it was easy "getting to the bottom of things" and discovering a large pebble, still in place (Fig. 2). It has been used for a methodical cutting of

the calcite flowstone. This flowstone originally covered the coveted clay deposit. Nearby were standing enigmatic small, rolled clay balls, about 2.5 cm in size and flattened by pressure onto the soft clay. Strokes printed in the clay were observable on surfaces which miraculously remained intact. All material remained sealed by an old patina. Further on, overhanging calcite flowstone have preserved a hollowed-out area that showed traces of a pick (tool): it was a clay quarry mined by sapping, a type of mining also known in the Cave of Vitalis (Hérault).

5. Conclusion

We have seen that archeologists practicing caving played a determining role in the identification of human traces in caves. Pioneers, like François ROUZAUD, and followers like Philippe GALANT, took an innovative look beyond classical excavation methods, by carefully observing the volumes that contain human traces. The awareness of the destructive action of archeological excavations was understood in the Chauvet Cave, where officials recommended a non-destructive archeological approach carried out with

specialists from other disciplines (geoarcheology). In caves, the constructions can be obvious or very discreet; they are only accessible, that is to say visible, by those who know the caves and their speleogenesis. Karstologists, from speleology circles, have a real skill, they are able to distinguish what is natural from what is not.

Thus, a team of specialists of underground environment and experts in speleogenesis, trained in speleo-archeology, are able to detect anthropogenic constructions more easily.

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