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NATURAL AND ANTHROPIC EVENTS AT LA POLLEDRARA DI CECANIBBIO (ITALY, ROME): SOME SIGNIFICANT EXAMPLES

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ABSTRACT: In the site of La Polledrara di Cecanibbio (MIS 9) the analysis of the river-bed morphology, combined to that of the spatial disposition of the accumulated skeletal remains and of their taphonomic modifications, allows to reconstruct the events that have led to the formation and evolution of the deposit.

KEYWORDS: Middle Pleistocene, river-bed, elephant-human interactions

1. INTRODUCTION

The site of La Polledrara di Cecanibbio is located in the Sabatini Volcanic District, at an altitude of 83 m a.s.l., about 22 kilometers from Rome near the via di Boccea. Between 1985 and 2013 the site was subject to regular excavations, funded by the then Soprintendenza Speciale per i Beni Archeologici di Roma today Soprintendenza Speciale Archeologia Belle Arti e Paesaggio di Roma (SSABAP-Rome), which exposed on an area of about 1200 meters square a bed portion of a small water course cut into a bank of compact volcaniclastic deposits (Anzidei et al., 2012; Castorina et al. 2015; Santucci et al., 2016). In the year 2000, with a financial support of MiBACT, about 900 square meters of the site were covered by a prefabricated structure and it became a museum open to the visitors (Fig. 1).

The site is characterized by fluvial deposits that pass to fluvio-palustrine during a phase of high stand of the sea level (Anzidei et al., 2012). The mineralogical composition of the volcanoclastic sediments that have filled the river-bed indicates an origin from several source rocks of the Sabatini Volcanic District (Castorina et al., 2015). The recent dating of 325±2 ka, obtained with the $^{40}Ar/^{39}Ar$ method (Pereira et al., 2017), confirm that the La Polledrara site developed at the beginning of MIS 9, in the final phase of the Transgressive Systems tract of the Ponte Galeria 6 fourth order sequence (Anzidei et al., 2012), and therefore to the Aurelia Formation (Milli & Palombo, 2005; Milli et al., 2011).

Among the 20,000 skeletal remains found, *Palaeoloxodon antiquus* and *Bos primigenius* are the dominant species followed by *Cervus elaphus*; less abundant are the remains of *Sus scrofa*, *Stephanorhinus* cf. *hemitoechus*, *Equus ferus*, *Canis lupus*, *Vulpes vulpes*, *Meles meles*, *Felis silvestris*, *Macaca sylvanus*, *Lepus* sp., murids and arvicolids; the herpetofauna and the avifauna (under study) are also well represented. On the basis of the present species, the isotopic data and the microwear on some elephant molars, it was hypothesized that at the time of deposition of the fossiliferous layers the landscape of La Polledrara was characterized by a dense arboreal cover interspersed with open spaces in conditions of moderately humid and temperate/warm-temperate climate (Palombo et al., 2005). The lack of pollen and plant fossil remains does not enable to confirm this hypothesis.

The anthropic presence (*Homo heidelbergensis*) is testified by hundreds of artifacts on flint and numerous tools on elephant bone. The site had to represent a point of attraction, as a source of food and raw material, for the hunter-gatherers bands who frequented the territory, as is clearly indicated for example by a skeleton of *P. antiquus* in partially preserved anatomical connection, the taphonomic layout of some of its bones and the archaeological artifacts associated with (Santucci et al., 2016).

2. BED MORPHOLOGY AND TAPHONOMY OF BONE REMAINS

The action of the water flow, that took place in particular in the first phase of the river's history, is particularly evident on the surface of the river-bed where two areas are separated by a step of about 80 cm in height, which reduce until disappear towards the center of the watercourse.

Above it, the river bottom appears very irregular, characterized by raised and depressed areas. These irregularities obviously influenced the directions and intensities of the water flows. In this area the faunal remains have been almost all accumulated in the depressed areas, while they are scarce in the elevated portions, more exposed to the hydraulic action. Furthermore, the summit of many of these zones have flat shape and show evident mud-cracks, testifying to their sub-aerial exposure. These evidences would indicate that periodic oscillations of the water table have occurred in this stretch of the channel, perhaps even noticeable and probably linked to seasonal variations in rainfall.

Otherwise, downstream of the step, the river bottom is flat, and the faunal remains are distributed along the

Fig. 1 - Overview on the museum's showcase of the site, seen by SE (SSABAP-Rome archive).

surface of the river-bed with a distribution that reflects the current flow characteristics. For example, in some areas the long and narrow skeletal elements, such as the elephant's tusks, were arranged parallel or transversely to the water flow direction and constituted a barrier that favored the accumulation of other elements.

In some cases, the whirlpools linked to the acceleration phase of the flow around an obstacle produced an undererosion around the skeletal element.

Except for a few exceptions, the faunal remains deposited on the bottom and often also the lithic ones, show extensively striated surfaces, high degree of fluitation of the upper face exposed to the water flow. On the other hand, the lower face of the remains, resting on the

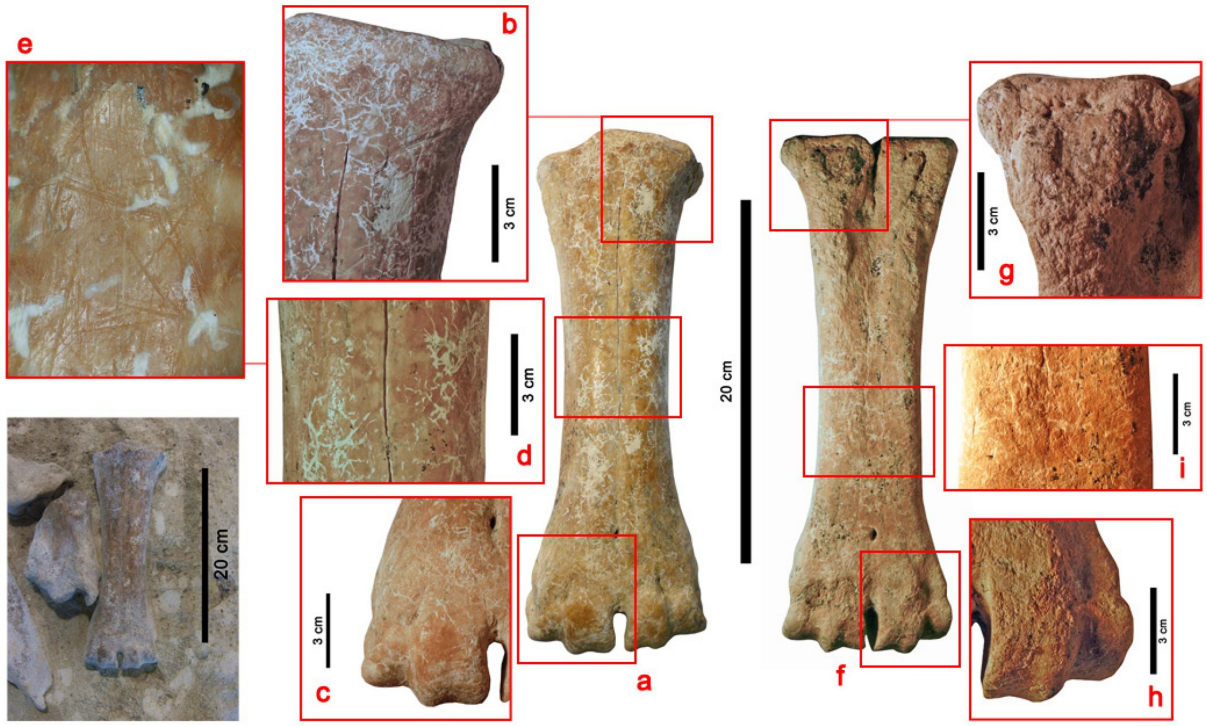

Fig. 2 - Right metacarpus of *Bos primigenius* deposited with the plantar side at the bottom of the bed. The dorsal side (a), the margins of the proximal epiphysis (b) and the surface of the distal condyles (c) are strongly fluitated and abraded, with randomly oriented sediment abrasion scratches (d, e). The plantar side (f, g, h) is poorly fluitated, but intensively eroded, probably due to chemical aggression of the underlying sediment, the erosion has almost completely erased the traces of abrasion which are visible only in some areas (i). On the dorsal side and, less frequently, on the plantar one traces of plant roots are visible. The low degree of alteration from the exposure to atmospheric agents (Behrensmeyer, 1978), especially wet-dry cycles, indicates that this skeletal element has been covered with sediment in a fairly short time (archive SSABAP-Rome).

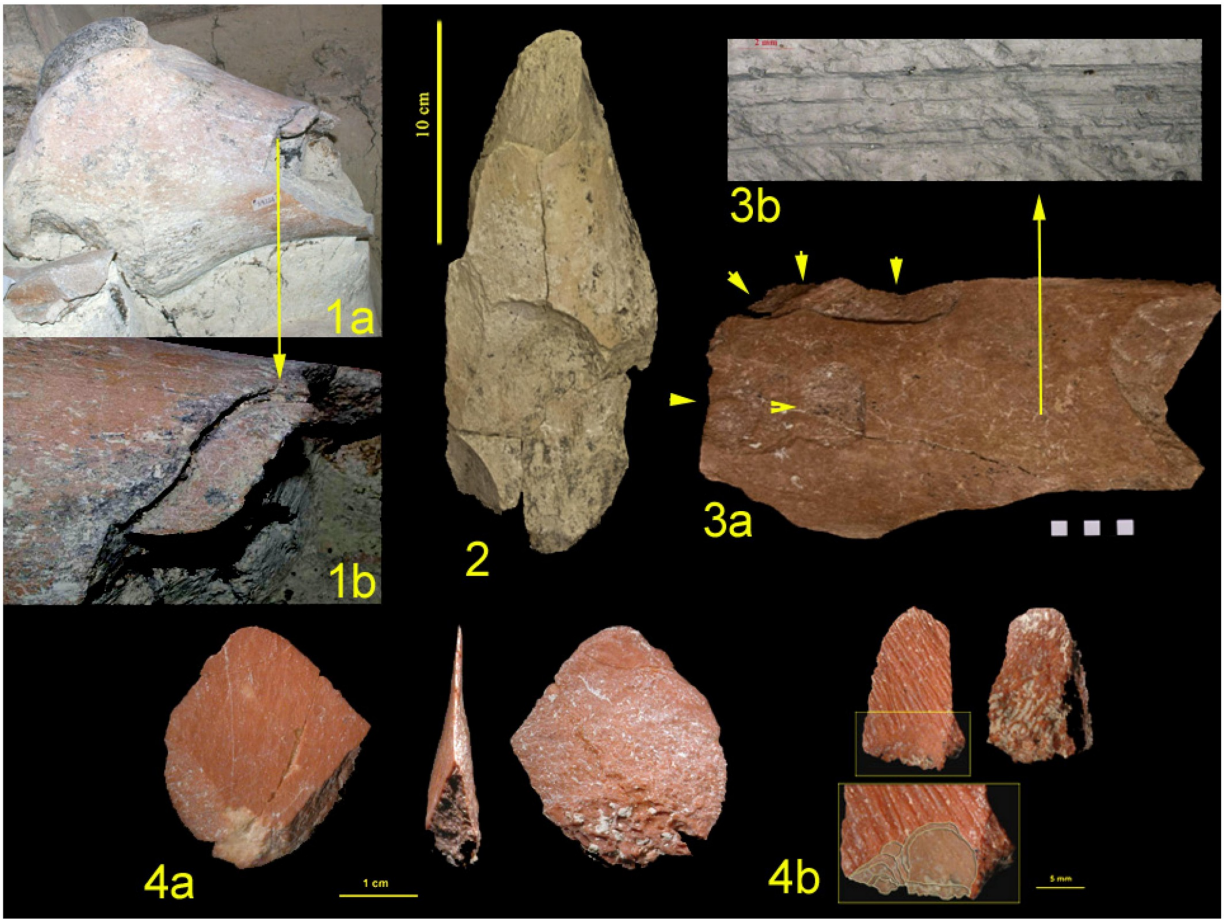

Fig. 3 - Anthropogenic modifications in bones. 1 (a) femur with percussion flake still connected and (b) detail. 2 bone tools made from an elephant diaphysis. 3 (a) diaphysis of an elephant's long bone with concentration of percussion scars and of overlapped scars (yellow arrows), (b) detail at the microscope of striae from lithic tool. 4 (a-b) conchoidal flakes on a very large mammal long bone diaphysis, resulting from intentional bone fracturing, this kind of flake usually is not due to bone fracturing for marrow extraction, but rather may be the consequence of bone tool manufacturing.

bottom of the bed, is not transported instead it is very often strongly eroded (Fig. 2). Furthermore, on the remains deposited on the bottom, impact or trampling fractures are clearly evident, as well as the marks of intentional anthropogenic fracture for bone marrow extraction are well testified. Finally, there is a marked differential conservation of the anatomical elements depending on the strength of their bony tissue: the resistant portions of elements of large animals, mainly represented by adult individuals, are more represented on the bottom, while the elements of young or small animals, or the skeletal portions with more abundant spongy tissue or with thinner compact tissue, are rare. On the bottom, elements in anatomical connection are never recognized, while they are well represented in the successive marshy phase, together with skeletal parts of small animals.

These taphonomic characteristics indicate that during the fluvial phase the remains were transported by a muddy current and that, once deposited on the bottom, generally they did not significantly shift from their primary position and remained exposed to the water flow for a prolonged period of time.

On the other hand, the remains deposited in the subsequent filling and swamping phase of the channel show show no or poor degree of fluitation, but in any case they are always intensively striated, where their surface has been able to record this alteration. This indicates that, after their transport within a muddy flow and their subsequent deposition, they were almost immediately covered by sediment.

The formation of large accumulations of sediment caused the death of three elephants trapped in the mud (Anzidei et al., 2012). One of these is of particular interest. In an area near the right bank, the skeleton of a pachyderm, certainly dead because trapped in the mud, is in close spatial relationship with more than 600 stone artifacts that indicate the scavenging of the carcass (Santucci et al., 2016). Anthropic exploitation (Fig. 3) is also documented by remains with traces of impact and cutting from lithic tools, by percussion chips and bone tools with traces of use. Some diaphyses of elephant's

long bone show fracture patterns and a quantity, localization, concentration and overlapping of scars to interventions aimed to shape the raw material rather than to butchering activities.

In conclusion, it seems undoubted that in La Polledrara the main agents of accumulation of the bones were the flow of water inside a river-bed and the mud of the subsequent marsh phase, but it is also undeniable that the river and the marsh have attracted the human groups of hunter-gatherers who frequented the territory, because of the formidable possibilities of exploitation of animal carcasses, both for food and for the recovery of hard animal raw materials to produce artifacts.

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