

Settepolesini di Bondeno (Ferrara - Eastern Po Valley): the first example of mammoth steppe in Italy

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SUMMARY: Reported here is a deposit of the eastern Po Valley (Settepolesini di Bondeno – Ferrara) containing abundant examples of fauna from the Middle Würm, Late Glacial and Holocene (Roman Age). The excavation, carried out by a hydraulic dredge in a water bed, reaches a depth of twenty metres from the field surface. The oldest faunal association portrays, for the first time in Italy, a mammoth steppe, with *Mammuthus primigenius*, *Coelodonta antiquitatis*, *Megaloceros giganteus*, *Bison priscus*, *Alces alces*, etc. The Late Glacial association provides evidence of a steppe dominated by bison. The Holocene layers, containing domestic and wild fauna, testify a prevalently wooded setting. Radiometric datings are presented here, together with environment reconstructions and hypotheses on the accumulation of fossil material.

1. INTRODUCTORY REMARKS AND FAUNAL CONTEXT

In recent years, in the province of Ferrara, extraction of sand from ancient paleoriverbeds has brought to light a deposit of considerable importance due to the presence of large fossil mammals. At Settepolesini di Bondeno (west of Ferrara), the SEI company dig to a depth of

around 20 metres, in the water bed, to remove sand for building trade (Fig. 1). Amidst this sand, materials of different dimensions and type have been brought to the surface, such as gravel, blocks of clay, organic remains and bones.

The first important fossil finding dates back to 1997, when the bucket of the dredge, used to lift the material, was obstructed by what subse-



Fig.1 - Settepolesini di Bondeno sand quarry.

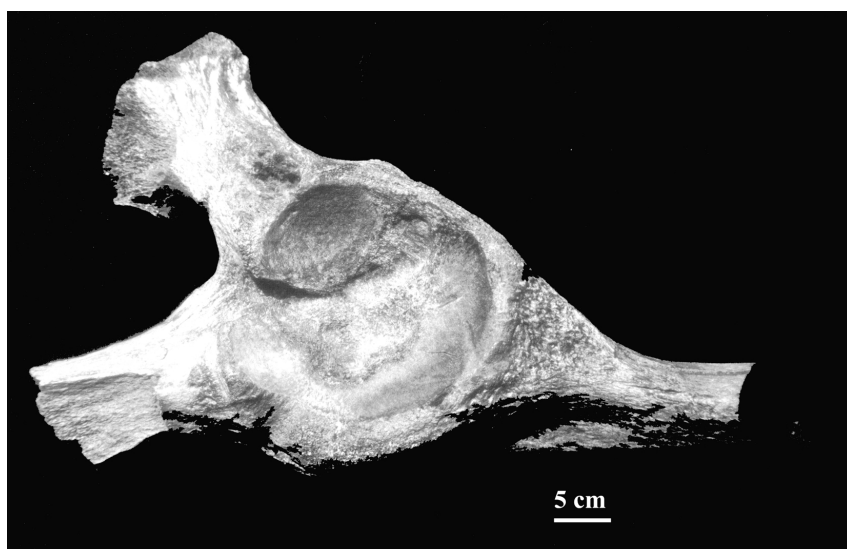


Fig.2 - *Mammuthus primigenius*: left hemipelvis.

quently proved to be the hemipelvis of a mammoth (*Mammuthus primigenius*) (Fig. 2). This was shortly followed by two fragmented skulls of Irish elk (*Megaloceros giganteus*) and the remains of steppe bison (*Bison priscus*). Realizing the significance of these findings, the Bondeno Town Council drew up an agreement with the University of Ferrara in order to study the area and reconstruct its evolution. Thanks to this agreement it is now possible to follow the excavations so that the greatest quantity of fossils are recuperated. In February 2001 the number of bones unearthed was over 360, representing *Mammuthus primigenius*, *Coelodonta antiquitatis*, *Bison priscus*, *Megaloceros giganteus*, *Alces alces*, *Cervus*

elaphus, *Capreolus capreolus*, *Equus ferus*, *Castor fiber*, *Sus scrofa*, *Canis lupus*, *Ursus arctos*, domestic animals and some human remains.

Excavation of the water bed has led to the formation of a lake 35 hectares wide and 20 metres deep; this fact impedes the recuperation of material according to its stratigraphic sequence.

2. DATINGS

Chronological attribution of the finds was achieved by radiocarbon dating. The first samples, analyzed by the Beta Analytic laboratory (Miami, Florida), gave the following results:

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| Mammoth hemipelvis, fragment (Beta-128160) | 34,520 –33,140 BP |
| Irish elk antler, fragment (Beta-128161) | 32,770 –31,350 BP |
| Bison humerus, fragment (Beta-128159) | 13,370 –13,230 BP (Cal.16664-15349 BP) |
| Human teeth (Beta-148560) | Cal.1880 – 1700 BP |
| Human scapula, fragment (Beta-133862) | Cal.1875 – 1700 BP |

3. PALEOECOLOGICAL CONSIDERATIONS

The species found, radiometric datings and sedimentological study of the area make it possible, for the time being, to reconstruct at least three different temporal and biological contexts.

3.1 Middle Würm (ca. 35,000 – 33,000 years ago) (Schreiner 1992)

The findings of mammoth and Irish elk, ascribed by the radiocarbon datings to this period, together with woolly rhinoceros, steppe bison and elk, denote that particular environmental context defined by Guthrie (1985, 1990) as “mammoth steppe”, documented for the first time in Italy. This was a cold steppe which extended from the Atlantic coast of Europe as far as Alaska, across Beringia (the present-day Bering Strait and Aleutine Islands). The lowering of the sea level during the glacial period had brought to light the Upper Adriatic, forming an extensive plain, and favouring faunal exchanges between the Italian peninsula and eastern Europe. Animals of varying dimensions arrived via this route and spread throughout the Po Valley: large animals like the elk, Irish elk and steppe bison, as well as smaller species such as the whistling hare (*Ochotona pusilla*), still present today in the Asian steppes, wild sicista (*Sicista betulina*) and root vole (*Microtus oeconomus*), all animals still found in the damp woods of north-eastern Europe and northern Asia.

3.2 Late Glacial (ca. 13,000 years ago)

The remains of steppe bison (*Bison priscus*) are attributed to this period. On the basis of data on the deposits of the nearby Apennine and the upper Veneto-Lombardy plain, it has been inferred that the faunal association of large mammals also comprised elk (*Alces alces*), horse (*Equus ferus*), Irish elk (*Megaloceros giganteus*), red deer (*Cervus elaphus*), and beaver (*Castor fiber*), present in the deposit but not dated.

The existence of a prevalently steppe setting

with riparian wooded areas can thus be deduced. The temperature must have had higher average values than the preceding period, though it is likely that the marked drought heavily conditioned biodiversity, which is somewhat impoverished at this time throughout Italy (Bertolini *et al.* 1996).

3.3 Roman age

The sub-fossil material of the deposit is ascribed to this period; it is represented by red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*), wild boar (*Sus scrofa*), domestic animals and human remains.

The type of fauna, alongside the documentation available in literature, allows us to infer a temperate climate environment which favoured the spread of forest settings.

4. FINAL CONSIDERATIONS

It is probable that various neotectonic liftings, caused by the structural high known as the Ferrarese Ridge which crossed the area of Settepolesini di Bondeno, led to repeated deviations of the main watercourses, creating extinct branches or reduction of current.

The fresh appearance of all the fossil remains unearthed, together with the finding of whole bones without any anthropic alterations or signs of animal gnawing, permit a taphonomic hypothesis to be advanced: i.e. carcasses of drowned animals were carried downstream until they reached a shallow point, where they sank to the river-bed and decomposed, and their skeletons became covered by sediment.

The multidisciplinary commitment on the part of the University of Ferrara in the study of this area shall permit the proposed hypotheses to be verified, outlining an ever more detailed picture to be drawn of how the Po Valley setting has evolved over the last 35000 years.

5. BIBLIOGRAPHY

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