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- INITIATIVES FOR A MODERN MUSEOGRAPHY

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WORKSHOP 13

**Ca' Belvedere di Monte Poggiolo:
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les premiers habitants en Emilia-Romagna
Ca' Belvedere di Monte Poggiolo:
the first inhabitants in Emilia-Romagna**

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THE STRATIGRAPHY OF THE SITE OF CA' BELVEDERE DI MONTE POGGILO

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GEOLOGY AND MORPHOLOGY

The site of Ca' Belvedere di Monte Poggiolo (Antoniazzi *et al.* 1986, 1988, 1993, 1996a; Peretto 1987, 1989a, 1992a, 1996a, 1996b; Peretto *et al.* 1987; Amore 1996a, 1996b), where a Lower Palaeolithic flake and core industry was discovered in 1983 (Gagnepain *et al.* 1992, 1996a, 1996b; Yokoyama *et al.* 1992; Gagnepain 1996), represents one of the most important sites for the first human population of Europe. The artifacts, thousands of which were collected on the surface and, above all, in primary context in a thick series of sediments, are constituted by siliceous pebbles which were flaked with a great technological repetitiveness in order to produce unretouched flakes which guaranteed a rapid production of cutting edges which could be used in daily activities (Peretto 1996a).

The cupola-like morphology of the Monte Poggiolo hill (214.6 metres above sea-level), on which the Palaeolithic site lies on the eastern slope at about 180 metres above sea-level, dominates the Apennine foothills of central Romagna near Forlì. In this area there is a sedimentary sequence which dates to the Lower Pleistocene (Cremaschi 1983; Antoniazzi *et al.* 1984, 1988, 1993, 1996a, 1996b; Antoniazzi 1987b, 1996; Antoniazzi & Piani 1992) in which the marine *Argille Azzurre* with *Arctica islandica* and *Hyalinea balthica* are overlain in this area by the Monte Poggiolo coastal sediments and towards the north-west by the littoral *Sabbie Gialle* (Monte Vescovado, Castiglione, S. Biagio). The outcropping part of these deposits underwent a pedogenetic process during the Middle Pleistocene, which resulted in the formation of a leached fersiallitic palaeosoil (Palixeralf). Subsequently there was further tectonic activity in the area, as well as erosion and pedogenesis during the most recent phase of the Quaternary.

The data derived from the study of the surface relief, the excavations, the boreholes and the laboratory studies carried out in the Monte Poggiolo area, resulted in the creation of a map and geological sections which show a local geological situation complicated by faults which subdivide the series of deposits into differently dislocated and eroded blocks. Particularly important is the fault which separates the area of Ca' Belvedere, where the sandy gravely deposit outcrops, from that of the hill in which the upper part of the Monte Poggiolo series is present. In this area there are also various smaller faults which could not be mapped, including those which delimit the area of the excavation with respect to its relative lithological context.

In the Monte Poggiolo and Ca' Belvedere area the basal *Argille Azzurre* are referable to a series of infralittoral environments, constantly influenced by freshwater and sometimes characterised by sea bottoms with vegetation (Monegatti *et al.* 1992). These date to the

Matuyama epoch and possibly to the Olduvai episode (Gagnepain *et al.* 1992), and the electron spin resonance dating (ESR) carried out on a fossil shell furnished a date of $1,540,000 \pm 340,000$ years (Yokoyama *et al.* 1992).

The coastal sediments of Monte Poggiolo, 21 metres of which were revealed in borehole 6, have at their base beach and delta sandy gravels covered by 14 metres of silty sandy clay with more or less frequent intercalations of sands or gravels rich in silica (Antoniazzi *et al.* 1992).

The lower part of this series (Antoniazzi *et al.* 1992; Gagnepain 1996), which was also studied in an outcrop near Ca' del Monte, shows a littoral or sub-infralittoral regressive sequence with, from the bottom upwards: 1) beach littoral or sublittoral gravels, small gravels and sands; 2) clayey sediments of low energy lagoon environments with an ostracod fauna represented by a few juvenile forms of freshwater species (Pugliese in Peretto 1989); 3) fluvial gravels in a dark brown sandy matrix, sometimes with pebbles encrusted with oysters. The electron spin resonance dates on two samples of the beach deposit (Gagnepain *et al.* 1996) furnished an age of $1,320,000 \pm 200$ and $1,440,000 \pm 210$ respectively. The magnetostratigraphic study (Gagnepain *et al.* 1992, 1996; Gagnepain 1996) revealed a negative polarity attributable to the Matuyama geomagnetic epoch.

The sedimentological and micropalaeontological study of the deposit above the beach and delta sediments demonstrated that the initial regressive phase was followed by a transgressive phase during which, however, the area maintained a littoral environment (Amore *et al.* 1996; Antoniazzi *et al.* 1996b; Antoniazzi 1996). The fossils (foraminifera, molluscs, ostracods and nannofossils) document the presence of a coastal marine environment influenced by continental transport.

THE DEPOSIT WITH THE LITHIC INDUSTRY

In this area lithic artifacts were found on the surface (Bisi *et al.* 1994) in: a) the outcrops of the sediments with an in situ industry (around Ca' Belvedere, at the foot of the slope towards Monte Poggiolo); b) in the residual lenses of the palaeosoils which pedogenised the deposit with the lithic industry; c) in the detritus on the western slope of the hill below the maximum altitude of the levels with the industry (about 200 metres above sea-level).

The stratigraphic excavation, which began in 1984, revealed: a) a sandy gravelly series uphill about 4.3 metres thick, only slightly pedogenised in the upper part, containing the in situ lithic industry; b) the palaeosoil towards the valley, where the Palaeolithic artifacts were found, some residues of the bedrock and the related substrate, with a total thickness of about 3 metres. A past erosion lowered the deposit and brought it to lie in unconformity with the local *Argille Azzurre* (Antoniazzi *et al.* 1984, 1988, 1992, 1993, 1996c; Antoniazzi & Piani 1992; Peretto 1992b; Peretto *et al.* 1987). Further uphill, where the series is not dislocated, the transition from the basal *Argille Azzurre* to the gravels with the industry is, in fact, gradual and characterised by a progressive increase in sand in the deposit. The erosion probably took place during the Würm since the pollen found in the sand which filled the fissures during the phenomenon is referable to an arid steppe environment (Cattani in Antoniazzi *et al.* 1986; Cattani, 1992).

The deposit with the in situ lithic industry, characterised by a stratification which is not very marked and often lenticular, has been moderately deformed by tectonic and gravitational activity over time, and slopes gently towards the west. The excavation levels, which were about 10 cm thick, were therefore often artificial, since the slope of the sediments could not always be followed over a sufficiently large surface area. As a whole, however, it was possible to follow the deposits, which consist of the following from the bottom upwards:

a) an essentially silty sandy series with gravel, enriched with carbonates of an illuvial origin (levels 101 and 102), and residual traces of an overlying palaeosoil which has now been eroded;

- b) a predominantly gravelly sediment (levels 103-107);
- c) a predominantly sandy deposit (levels 108-118);
- d) a final sandy series (levels 119-122) disturbed by past erosion and the flowing of underground water, mainly concentrated along the discontinuities and in the basal sediments;
- e) the erosion surface on the *Argille Azzurre*.

The granulometry of the deposit shows clear variations both vertically and horizontally. The sands are siliceous, except in the upper levels which are enriched with carbonates as a result of the pedogenesis. The gravels, which are constituted by medium and fine pebbles and subordinately by small gravels (coarse pebbles are scarce and normally less than 80 mm) and which are predominantly of discoidal or spherical forms according to Zingg (70.4% of the pebbles), are mainly calcareous and siliceous and, subordinately, arenaceous (Antoniazzi *et al.* 1992; Antoniazzi 1996). There are also sporadic elements of metamorphic quartz, jasper and granitoids etc. Rare altered and brown arenaceous pebbles (pedorelicts) and large spherical nodules of carbonatic and iron manganese concretions document the erosion of the soil present in the ancient river basin.

Mineralogical analyses have been carried out on the fine portion and the clay fraction of samples from the deposit at Ca' Belvedere both from the section and from borehole 1. For comparison some samples have also been analysed from the *Sabbie Gialle* at Monte Vescovado. In the excavation the average percentage composition is as follows: quartz 14, calcite 41, dolomite 4, clay minerals 6, K feldspar 12, Na-Ca feldspar 23. The clay minerals have the following average percentages: smectite 39, illite 36, chlorite 12, kaolinite 4 and serpentine 9. A good correlation was found between these samples and those from borehole 1, both of them being characterised by the presence of serpentine and dolomite. These minerals are, on the other hand, absent in the samples of *Sabbie Gialle* analysed, as is chlorite. These sands are generally characterised by a certain qualitative compositional homogeneity and by quantitative oscillations caused by granulometric variations.

The fresh lithic artifacts, which are sometimes moderately patinated and often encrusted with carbonates and sometimes iron and manganese, were found in nearly the whole of the series explored by the excavation (levels 101-118). In the upper part of the deposit only level 106 was found to be nearly sterile. The presence of artifacts is also lower towards the bottom from level 112 onwards. The artifacts normally have sharp edges and no traces of postdepositional transport (evidence of weathering or pseudoretouch). This is also documented by the numerous refits of flakes and cores which sometimes recomposed the whole pebble in its entirety; often the refitting pieces were found in the same level or in different levels but only a few centimetres apart, and in small areas usually of the order of a few tens of square centimetres. There was no significant dispersion of the artifacts after they had been manufactured (Peretto 1989a, 1992a, 1992b, 1996 a, 1996c).

The sedimentary facies revealed by the excavation section fits well with the model of a river with braided channels, characterised by quite variable sedimentation and flow rates and multiple channels which frequently changed position, and in which quite steep slopes and heavy flow permitted the transport of large quantities of coarse material, especially sandy gravels (Ricci Lucchi 1980). Today rivers of this type, which are mostly torrents, still descend to the coast from the Apennines, in other words in analogous situations to the Pleistocene one at Monte Poggiolo.

In the deposit there are mainly facies of longitudinal sand banks formed by the accumulation of sediments which developed between the currents in the river (Antoniazzi 1996). In the upper gravelly part of the sediment, apart from the surface levels which have been modified by pedogenesis, there are sediments which are characteristic of the central sector of the longitudinal banks, and which are mainly characterised by a lack of stratification and coarse parallel

laminations. In the series there are also various truncated sequences with a decreasing granulometry and energy, and erosion surfaces at the base corresponding with the bottom of the river channel in full flow with its related pebble pavement. The situation is complicated by the effect of the partial erosion, during periods of reduced flows, followed by renewed marginal sedimentation as well as by the effects of the migration of the banks. In this section of the series the presence of forms with parallel or low angle laminations and pockets of silty sand with concave laminations is rare, while these are characteristic of the upper part of the banks and abandoned channels.

In the lower part of the deposit, which is the most sandy and the most distal of the system, frontal facies of banks tend to become predominant; they are characterised by a reduction of the clasts and by a greater sorting. The sedimentation is more complex, articulated and lenticular with the juxtaposition of decidedly sandy levels and levels with a greater gravel content. Once again there are truncated low energy cycles and their related pebble pavements. The repetition of sequences with depositional energy decreasing towards the top, and therefore with a decreasing granulometry, is frequent. Forms attributable to the summit facies of banks or the bottom of channels with a concave crossed stratification are more common than in the upper part of the deposit. Once again there are complex situations which are probably due to both phenomena of marginal erosion of the banks and to the subsequent renewal of sedimentation, as well as to the evolution of the deposit itself. Rare but not infrequent are the traces of pelitic deposition attributable to facies of abandoned channels, of which the only evidence is represented by eroded silty and sometimes clayey lenses with inclusions of smaller dimensions.

What has briefly been described here is confirmed by the palaeoenvironmental reconstruction, proposed as a working hypothesis (Antoniazzi *et al.* 1992; Gagnepain 1996), of the site being located in a river bed with braided channels. The good state of preservation of the Palaeolithic artifacts can therefore be explained by a situation characterised by frequent changes in the position of the braided channels, by the more or less temporary occlusions of the channels and by the rapid forms of deposition of new sediments. This was a coastal environment, in which a sandy beach became locally gravelly near the mouth of a river rich in pebbles, during a marine regression which, given the temperate cold climate (Cattani 1992; Cattani *et al.* 1989; Monegatti *et al.* 1992), was probably related to phenomena of glacial eustatism. The influence of the nearby sea is very clear, and in fact the excavation revealed the presence of some unweathered fragments of *Ostrea* sp., as well as terrestrial forms of pulmonate gastropods.

The palaeomagnetic studies date the Palaeolithic site to the Matuyama epoch of reversed polarity (Gagnepain *et al.* 1992, 1996a, 1996b; Gagnepain 1996) while the radiometric dates (Yokoyama *et al.* 1992; Gagnepain *et al.* 1996b) carried out using the electron spin resonance method (ESR), furnished an age of the order of 1.1-0.9 million years (in levels 111, 115 and 118 respectively: $1,190,000 \pm 138,000$; $1,125,000 \pm 138,000$; $879,000 \pm 128,000$).

Of the fersiallitic palaeosoil (Antoniazzi *et al.* 1992b) present in the western part of the excavation, only part of the B horizon remains underneath the agricultural soil (Ap); having formed at the expense of the sandy gravelly deposit, it contains the lithic industry in all levels. Lower down (C horizon) the pedogenesis decreases progressively and the sediment shows analogous facies to those present in the western sector.

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