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## NOTARCHIRICO. AN EARLY MIDDLE PLEISTOCENE SITE IN THE VENOSA BASIN

*ABSTRACT: Our knowledge concerning the most ancient phases of the Southern Italy Early Paleolithic has been greatly increased in the last years through the systematic excavations and studies of the early Middle Pleistocene site of Notarchirico (Venosa, Basilicata, Italy).*

*The new geo-stratigraphical (Raynal et al. 1997, Lefèvre et al. 1997), paleontological (Cassoli et al. 1997, Tagliacozzo et al. 1997) and paleoethnological (Piperno 1997) evidences, together with a series of absolute dates obtained by different methods (Piperno et al. 1990, Belluomini, Delitala 1991, Pilleyre et al. 1997, Rhodes, Grün 1997) allowed the reconstruction of a detailed framework of this sequence and its better correlation with the Levels A/B of Loreto, the Acheulian sites of the Atella basin and the other late Middle Pleistocene Acheulian assemblages known from several surface finds in the Venosa basin.*

*One of the main conclusions obtained by the stratigraphical identification and correlation of the Piano Regio (Notarchirico) and the Tufarelle (Loreto) Formations has been that these sedimentary events took part in a relatively short period, largely and continuously influenced by the volcanic activity of Monte Vulture dated K/Ar to a period comprised between 740 and 600 ky.*

*The more important paleoethnological consequence which can be deduced by this conclusion is that the variability observed in the composition and structure of the lithic assemblages from different levels at Notarchirico and Loreto, where techno-complexes with and without hand-axes are both present and alternate along the entire sequence, cannot be explained by a phyletic approach, due to the very short chronological distance reflected within the two sequences. It seems therefore possible to suggest the hypothesis that an even strong variability between lithic assemblages in a limited area as, for example, the Venosa basin, could not necessarily depend on significant cultural changes but do rather reflect some kind of rapid adaptive answers to moderate climatic fluctuations combined with the locally more significant consequences of the volcanic activity of Monte Vulture.*

*The model of the replacement of landscapes modified by the volcanic eruptions by other paleoenvironments where the previous ecological conditions were quickly restored, can also be used to explain the different paleoecology revealed by the faunal association of Notarchirico, characterized by a predominance of Elephas and Cervids, and the one of Loreto, where Pseudodama and Equus predominate.*

*Such a variability could not therefore have been influenced, if not to a limited extent documented also by some palynological indications, by important climatic degradation which did not occur during this short period of time.*

**KEY WORDS:** Middle Pleistocene – Notarchirico – Chronology – Technological diversity

A geological reassessment of the Venosa basin (Lefèvre *et al.* 1997, Raynal *et al.* 1997, Vernet *et al.* 1997) derived from the data acquired on the volcanic complex of Monte Vulture, indicates that its Pleistocene filling consists of three lithostratigraphic units. The basal unit, known as the "Formation of Fonte del Comune" with reversed magnetic polarity, can be attributed to the end of the Lower Pleistocene and is contemporary with the early phases of volcanic activity. This unit is covered by two volcanic-sedimentary units, the "Formation of Piano Regio" and the later "Formation of Tufarelle". Both of these occur within the major phases of volcanic activity and are referable to the early Middle Pleistocene, with a minimum absolute age of about 500 ky.

Absolute dating obtained for the different volcanic units of Monte Vulture (La Volpe, Principe 1989, 1994, Brocchini *et al.* 1994) suggest a short chronological span between about 740 and 600 ky for the two major phases of filling.

The "Notarchirico Complex" probably accumulated during a rapid series of depositional events. The various facies of this complex resulted from the filling of shallow paleochannels produced by low-energy flows, at the top of the "Formation of Piano Regio". Accumulation rates largely depend on the volume of the volcanic products projected from Monte Vulture. In the Notarchirico sequence, the tephra emissions are mostly reworked, with the important exception of a level of alkalin vitric tuff which remains in primary position. This is the so-called "Tephra of Notarchirico", deposited in an environment of stagnant water.

On the basis of different absolute dates, obtained through the thermoluminescence method, and of preliminary ESR dates derived from analysis of the enamel of bovid's and cervid's teeth from the upper level Alpha and the lower level E (Pilleyre *et al.* 1997, Rhodes, Grün 1997) and following the absolute dates proposed by different authors concerning the volcanic activity of Monte Vulture, the "Tephra of Notarchirico" occurring directly on the Acheulian level F, can be dated to  $640 \pm 40$  ky. This "Tephra of Notarchirico" represents at present the only direct fall-out positively identified in an Acheulian site in Southern Italy.

Widely dispersed grey scorias fall-outs document eruptions in plinian regime corresponding to the recent activity of Monte Vulture and characterize the "Formation of Tufarelle". Some fall-outs found below the archaeological levels of Loreto allow the placement of the latter within the upper portion of the "Formation of Tufarelle". This Formation can equally be ascribed to the early Middle Pleistocene and is contemporary to the recent phases of Monte Vulture activity between about 630 and 480 ky.

Tephrostratigraphic correlations and dates agree with the conclusions of the detailed paleontological study carried out to date on the upper levels of the sequence (Alpha and A) and with micromammals identifications (Cassoli *et al.* 1997, Sala 1997).

Striking differences have been often observed between the paleoecological meaning of the faunal associations of Loreto and Notarchirico, reflecting differently characterized paleoenvironments. Level A at Loreto was warm and varied, with wooded areas and wide open land, given the frequency of *Pseudodama* and *Equus*. As far as Notarchirico is concerned, the paleoenvironment in lower levels I-B was more markedly open, with grassy prairies and fewer wooded areas, as indicated by the presence of bison, rhinoceros and *Arvicola cantianus*, while the terminal portion of the sequence (Levels A-Alpha) indicates more humid and forested conditions, due to the frequency of Cervids, above all of *Dama clactoniana*.

Following the result of absolute dating, the differences which can be recorded in the Notarchirico series show, however, that the changes in the composition of the fauna corresponding to different paleoecological conditions, occur in a rather short chronological span; it seems therefore highly probable that they could not depend on more widespread paleoclimatic changes, which in any case are not attested by the few pollen spectra available from the Notarchirico series (Cattani 1996). Similarly, it appears reasonable to assume that even the different faunal association at Loreto is only scarcely due to climatic microvariations and depends, above all, on intense volcanic activity which could be responsible for the formation of more limited and rapidly evolving paleoecological niches.

From a biochronological point of view, it is also possible to suggest a closest chronological position between the faunal associations of Loreto and Notarchirico. This is suggested by the possible presence in level A of Notarchirico of *Cervus elaphus* cfr. *eostephanoceros*, the continued presence throughout the whole series of *Bison schoetensacki* and, among the micromammals, the significant occurrence of *Microtus* aff. *arvalis* in level Alpha. Similar observations about rodents and palynology are still lacking as far as Loreto is concerned.

Following such considerations, it appears reasonable to suggest the hypothesis that a distinct faunal unit could be identified at Notarchirico, to be placed in an intermediate position between that of Isernia and that of Fontana Ranuccio; this unit should include, in its widest meaning, also the faunal assemblage characterizing Loreto's level A.

The site of Loreto received the attention of both prehistoric archaeologists and paleontologists for many years, as it represented the unique important and relevant reference sequence within the Venosa basin. Paleoethnological appreciation of the site was, however, limited by a certain amount of uncertainty regarding its precise chrono-stratigraphical connection with the dynamics of the transformations which involved the whole area of the Vulture (Baïssas 1979, Segre *et al.* 1982, Villa 1985). Yet another obstacle was represented by certain discrepancies arising from the different conclusions of paleontological studies of the materials from level A (Bonifay 1977, Angeletti *et al.* 1978, Caloi, Palombo 1979a, b, Alberdi *et al.* 1988).

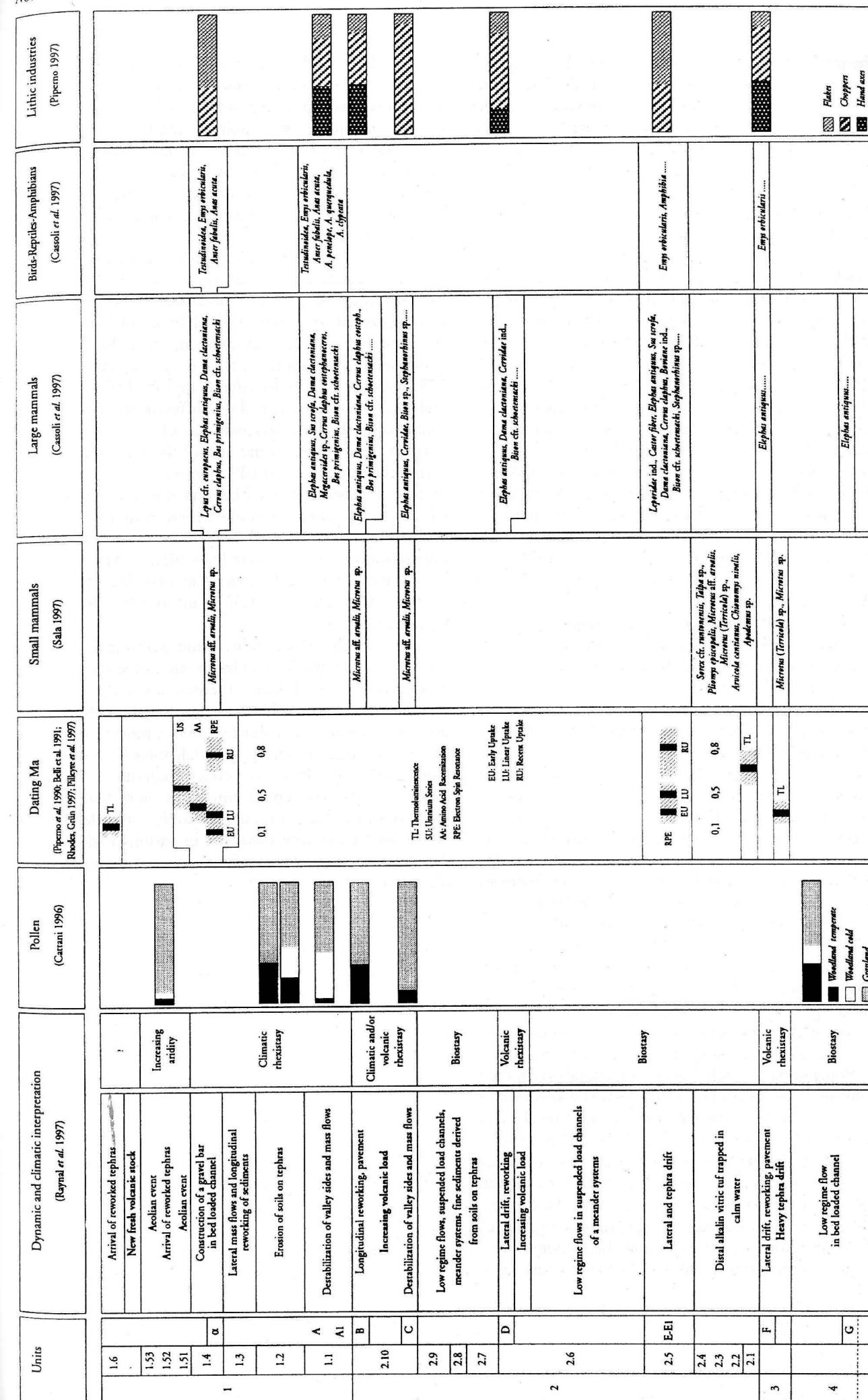


FIGURE 1. Synoptic table of the geological, chronostratigraphical, paleontological, paleobotanical, and archaeological evidence from Notarchirico (from Piperno 1997).

The interpretation of the stone industries from the same level was founded on a rather generic attribution of this facies to the "Tayacian", initially put forward by Blanc (1953) and subsequently maintained (Simone 1980, Barral, Simone 1983, 1984) until its reconsideration following a detailed study carried out in recent years (Crovetto 1991, 1993, 1994).

Therefore, because of its uniqueness, Loreto failed to fall within a definite framework, especially for those who always refused the validity of long-distance comparisons between the Middle Pleistocene techno-complexes unless, on a stricter regional scale, the exact progression of the prehistoric sequences could be better understood (Piperno 1982, 1984). In this regard, all the available evidence within the Venosa basin prior to the research at Notarchirico (Belli *et al.* 1991, Piperno 1996), although quite consistent, could be only typologically attributed to the final phases of the Middle Pleistocene, while its eventual correlation with levels A and B of Loreto was still doubtful.

The series exposed in the nearby basin of Atella (Borzatti von Löwenstern, Vianello 1990, Borzatti von Löwenstern *et al.* 1990) demonstrate the existence of Acheulian complexes within a chronological bracket roughly corresponding to the one suggested for Notarchirico. However, at this stage of the work, they do not allow us to document, in one site or between different sites, either the alternation between industries with or without hand axes, or, what is far more relevant, the chronological dimension which separates such techno-complexes in the Vulture area.

The extensive evidence from Notarchirico shows at this regard a continuous alternating superimposition of levels with hand axes (from bottom to top, Levels F, D, A, A1, B) or without this tool (E1, E, C, Alpha), starting with the most ancient one (Level F) with hand axes, just below the alkalin vitric tuff dated 640 ky.

As already stated, one of the main conclusions that can be drawn from the most recent geological studies of this area, is the comparatively short duration of the sedimentary cycles which brought about the filling of the basin.

In other words, the sequence of the industries at Notarchirico, together with that of Loreto, must necessarily be interpreted within a perspective which rules out any connection with their chronological distance. Similarities and differences in the structure and in the typological composition of the various assemblages as well as divergent elements at a technological level actually derive from other factors. Some of these might have had a natural origin such as for instance, the selection of materials (i.e. medium to small flakes) which took place in the various levels as a consequence of post-depositional events. Other factors, such as either the limited extension of some excavated areas or the insufficient studies carried out until now on the techno-complexes of different levels of Notarchirico, reduce the value and significance of the sample examined. Finally, other choices in interpreting the various interrelationships between these industries must of course also

be considered, as for example the use of different sources of supply for certain raw materials. Nevertheless, such a variability has especially to be connected with peculiar functional situations, such as adaptive reactions to environmental or, more likely, to micro-environmental changes resulting from eventual coincidence and concurrence between very limited climatic changes and the locally more meaningful effects of the eruptive activity of Monte Vulture.

Despite the fact that several hypotheses have been put forward (Leakey 1971, Chavaillon *et al.* 1979) to explain the alternation of techno-complexes differently characterized at a typological level in long lasting stratigraphic series such as Olduvai, Melka Kunturé or, to quote an Italian example, Valle Giumentina (Radmilli 1965, 1982), it must be admitted that it appears difficult today to understand what motivated the different strategies which characterize the lithic assemblages of various sites of the African Lower Pleistocene and of the European Middle Pleistocene. It seems equally impossible, in the majority of cases, to ascertain well beyond the residual evidence which can be observed in most lithic complexes, if such dichotomy actually corresponds to a substantial diversification of the Lower Paleolithic industries which would allow them to be placed in two or more parallel phyla corresponding to "Acheulian" and "not-Acheulian" separate traditions.

The brief chronology which emerges from the study of the evolution of the Venosa basin and of the sequences of Notarchirico and Loreto, throws some light on this problem. It seems possible to assume that the technological diversity within such a short sequence mostly depend on lifestyle changes induced by quick microenvironmental modifications produced by volcanic activity.

In other words, tephra emissions more than climate variations or cultural diversity probably partly determined the tool-kit variability observed in various early Middle Pleistocene assemblages of this area of Southern Italy (*Figure 1*).

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