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PALAEOENVIRONMENTAL AND ARCHAEOLOGICAL INTEREST OF LATE GLACIAL COLLUVIAL DEPOSITS IN THE MIDDLE PART OF THE TANARO RIVER VALLEY, PROVINCE OF CUNEO (SOUTHERN PIEDMONT, NW ITALY)

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RIASSUNTO - *Interesse paleoambientale e archeologico di depositi colluviali di età tardiglaciale nella media Val Tanaro (Cuneo)* - Il Quaternario *Italian Journal of Quaternary Sciences*, **9**(2), 1996, 705-710 - Vengono discussi la genesi e il possibile significato paleoclimatico e paleoambientale di un tipo di deposito colluviale distribuito in corrispondenza ai margini di una superficie terrazzata fluviale nel Bacino del Tanaro. Tale deposito, con tessitura siltoso-argillosa, costituisce corpi con geometrie lenticolari di ridotto spessore (max. 80-90 cm) e presenta caratteri tali da giustificare una possibile origine in condizioni climatiche locali diverse dalle attuali e confrontabili con quelle prevalenti nel II Pleniglaciale/Tardiglaciale wurmiani, come definiti nelle sequenze paleoclimatiche alpine e continentali europee. Secondo tale interpretazione paleoclimatica e paleoambientale, infatti, si possono ipotizzare, localmente, alterne modalità di deposizione/erosione da parte del ruscellamento diffuso, sotto il controllo del regime delle precipitazioni atmosferiche. Nel caso preso in esame, gli effetti di seppellimento o dispersione subiti dai manufatti in pietra scheggiata nel sito archeologico BA1 offrono appunto indicazione di differenti processi colluviali, sviluppati fra il Tardiglaciale e oggi, in cui rispettivamente si ricopre e preserva in situ o si rimuove e disperde a valle il materiale clastico più grossolano. Elementi cronologici che possono supportare questa tesi, al momento, vengono offerti dalla stessa tradizione culturale litica trovata in relazione col deposito colluviale. Alla stregua di altri corpi sedimentari (quali ad esempio i *loess* o i *grèzes litées*) il tipo di deposito preso in esame sembra rivestire, almeno localmente, una specifica valenza climatica e può inoltre offrire potenzialmente dati, sia paleoambientali che archeologici, relativi a un intervallo di tempo generalmente assai poco rappresentato nei contesti deposizionali delle pianure.

ABSTRACT - *Palaeoenvironmental and archaeological interest of Late Glacial colluvial deposits in the middle part of the Tanaro River Valley, province of Cuneo (southern Piedmont, NW Italy)* - Il Quaternario *Italian Journal of Quaternary Sciences*, **9**(2), 1996, 705-710 - The genesis and possible palaeoclimatic and palaeoenvironmental significance of a colluvial deposit confined to the top edges of a river terrace, in the middle valley of the Tanaro river, are discussed. This deposit has a silty-clayey texture and a lenticular shape (maximum thickness 80-90 cm). Position and texture suggest that the deposit formed under climatic conditions comparable to those prevailing in the Würm Pleniglacial/Late Glacial, as defined in the European alpine and continental palaeoclimatic sequences. Under such palaeoclimatic conditions, local deposition/erosion episodes controlled by different surface runoffs governed by rainfall variations, can be hypothesised. Buried or disseminated stone artifacts in the examined archaeological site, may be evidence of different colluvial processes, developed between the Late Glacial and the present, during which coarser clastic material was either preserved *in-situ* or transported downhill. A Late Glacial age of the colluvial layers fits the archaeological tradition of the artifacts. Like other sediments such as *loess* and *grèzes litées,* colluvial deposits seem to hold evidence of the local climate, and may therefore offer palaeoenvironmental and archaeological records of a time period that is generally very poorly represented by plain deposits.

Key words: Colluvial deposits, Late Glacial, Tanaro Valley, Piedmont, NW Italy
Parole chiave: Depositi colluviali, Industrie litiche, Val Tanaro, Tardiglaciale

1. INTRODUCTION

Palaeoenvironmental and archaeological data on the most recent episodes of the Last Würm Pleniglacial and Late Glacial as occurred in Piedmont, are still scarce. In fact the karstic caves filled with deposits are very few, and one has to take into account other, less known and less commonly studied settings.

The middle part of the valley of the Tanaro river, between Ceva and Carrù, displays a flight of terraces, the surface of which is formed by fluvial deposits. These terraces are separated from one another by gentle scarps, which are mantled by a thin cover of colluvial deposits at their foot. Prelim-inary data on the geological setting of this succession is given in Biancotti (1992).

The archaeological site at Bastia, 600 metres to the south of Borgata Minetti, yielded two groups of findings indicative of the prehistoric Man presence in the area.

The oldest lithic artifacts were scattered over the entire relict landsurface at 385 m a.s.l. belonging to the aforementioned terrace succession. These artifacts have been assigned to a Middle Palaeolithic culture, which used only local quartzitic rocks (Mottura, 1994; in press). According to Biancotti (1992), this attribution is also consistent with the age of the deposit as based on features of pedogenetic weathering.

The second archaeological finding (Bastia 1, BA1 in the text) occurs in a very small and well delimited portion of the mentioned surface where Middle Palaeolithic artifacts are present (Fig. 1). This material can easily be distinguished from the first one because of the "leptolithic" appearance of its flaked artifacts, which are made of "exotic" extraregional flints and can be ascribed to a more recent culture.

BA1 artifacts were contained in a thin, limited colluvial body (Fig. 3). Facies and genesis of the colluvial

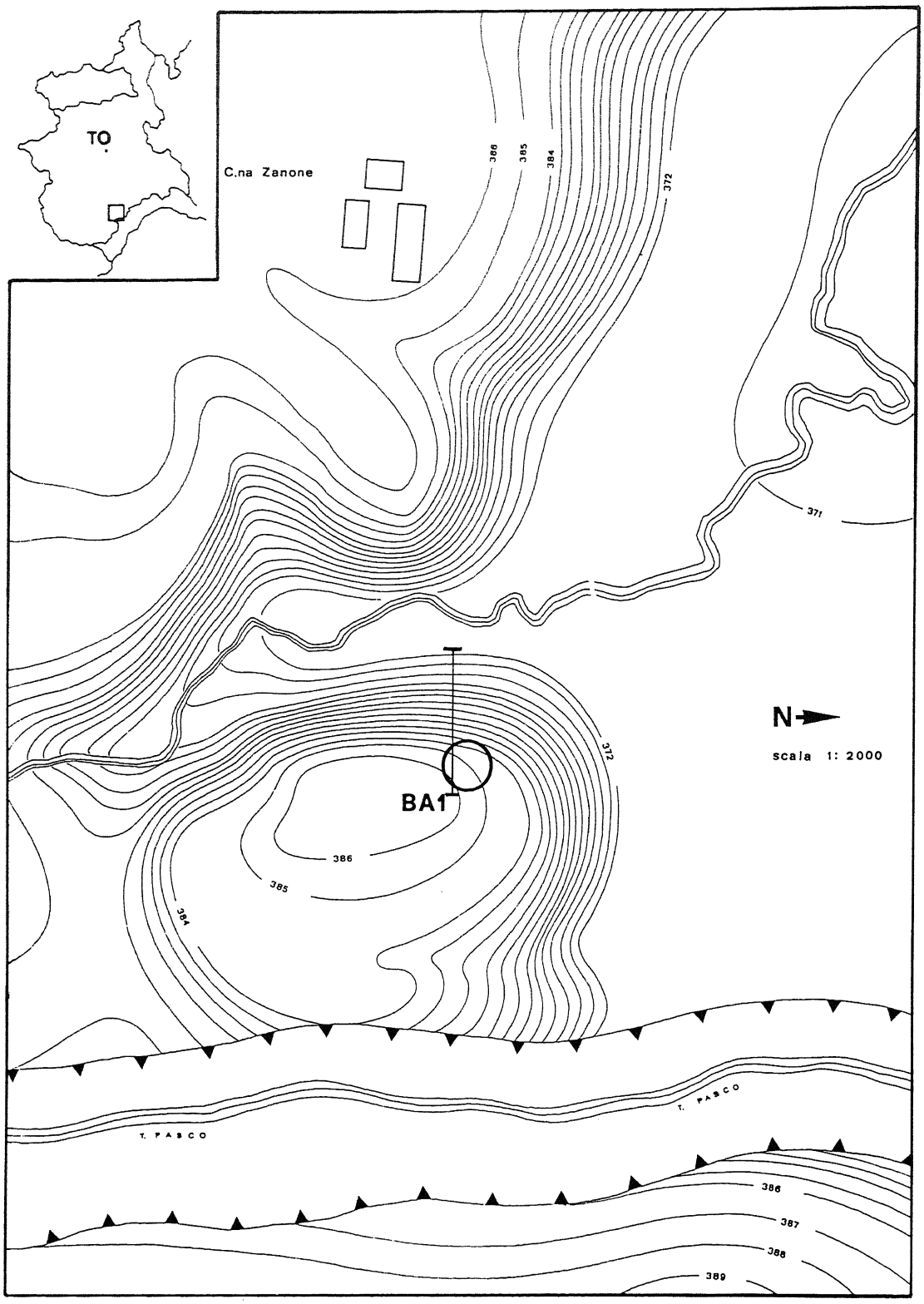

Fig. 1 - Topographic map of the studied area with location of BA1 site and of the cross section of Fig. 3.
Carta topografica dell'area in esame, con le ubicazioni del sito BA1 e della traccia del profilo di Fig. 3.

body and its peculiar preservation in the site original morphology (see next chapter), support the palaeoenvironmental hypotheses made in this paper.

2. GEOLOGICAL OUTLINE

The colluvial body shown as **c** in Figure 3, is formed

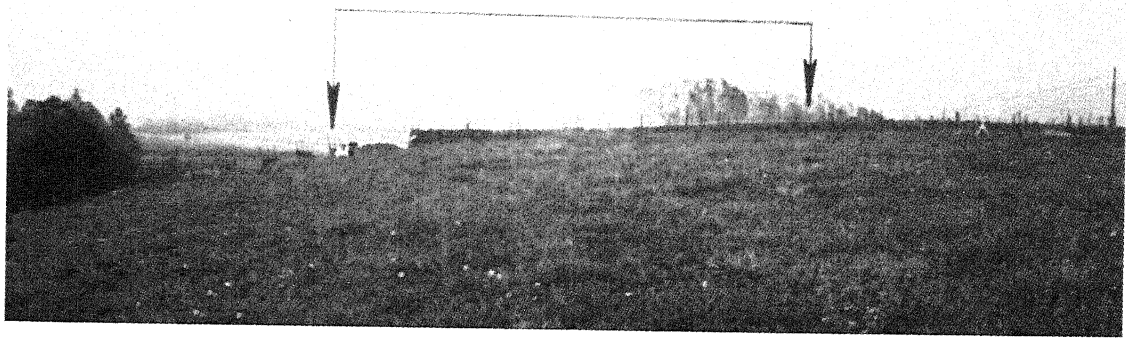

Fig. 2 - General view of the terrace surface and of the gently sloping scarp on which the lithic artifacts were found.
Vista d'insieme del lembo della superficie terrazzata, con la fascia superiore di scarpata entro cui sono distribuiti i manufatti di superficie del sito BA1.

by a silty-clayey deposit with a shallow lenticular shape, 90 cm thick at the most, which covers the gentler upper part of a river-cut scarp. The texture of the deposit is uniform (clasts of a size larger than silt grain-size are lacking); a mild pedogenetic weathering is revealed by a brown-yellow 10YR 6/8 grey-mottled colour and no evidence of aggregations or concretions occurrence.

This colluvial deposit lies, with an abrupt contact, over a fluvial succession formed of gravel and silt deposits (**a** and **b** in Fig. 3). These ones show a more marked weathering than **c**, as a distinct prismatic aggregation, a brown 7.5YR 4/4 colour, clay patinas and abundant iron and manganese oxides indicate.

Silty-gravel colluvial deposits — **d** in Figure 3 — form a lenticular body at the foot of the slope. The plough zone (**e** in Fig. 3) contains sporadic clasts imported by man.

These indications suggest that the silty-clayey sediments **c** are the product of the selective reworking of the fluvial term **b**, whereas the deposits at the foot of the scarp (**d**) derive from the reworking of all the lithotypes outcropping in the studied area.

The proposed series of episodes that gave rise to the slope is shown in Figure 5. Episode 3 (mainly depositional) suggests the presence of very sluggish rills; episodes 2 and 4 (mainly erosional) are indicative of much stronger surface runoff.

Two features discriminate the colluvial deposit **c**:

– a fine (silty-clayey) grain size, which is clearly different from that of the original sediment (deeply weathered silt **b**, with large concretions);

– its distribution at the top of the scarp and its absence at the foot of the slope, which indicate a persistently low rainfall, probably lower than 40 mm/storm (a value regarded as a critical threshold; Wainwright, 1994).

We suggest that such climatic conditions gave rise to reworking and selective removal of the finest fraction (**b**) of outcropping deposits and to its early deposition onto the flatter upper part of the scarp. The coarse lithic

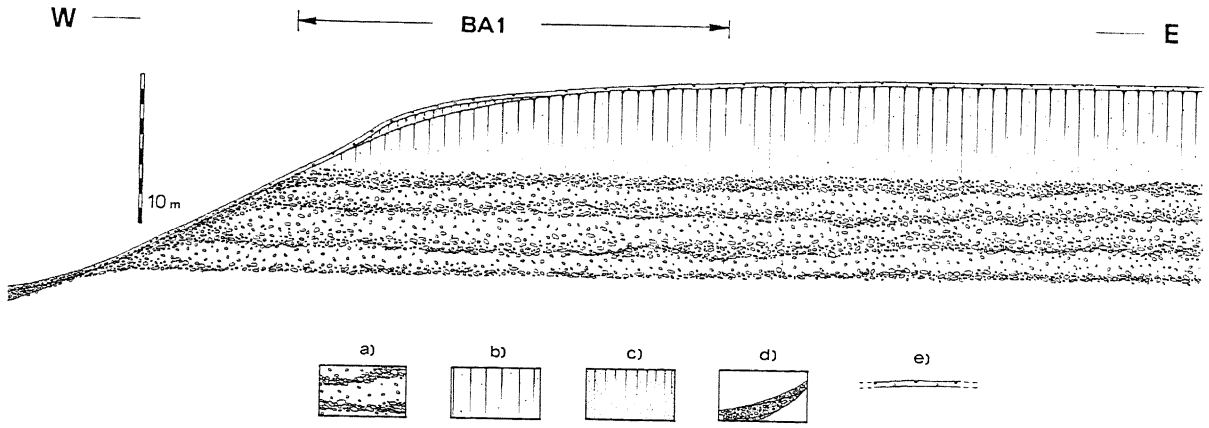

Fig. 3 - Geological section of BA1 site: **a**) fluvial gravel deposits; **b**) fluvial silt deposits; **c**) colluvial silty-clayey deposits; **d**) colluvial silty-gravel deposits; **e**) plough zone .

*Profilo geologico dell'area in esame. Legenda: **a**) depositi fluviali ghiaiosi; **b**) depositi fluviali siltosi; **c**) depositi colluviali siltoso-argillosi; **d**) depositi colluviali siltoso-ghiaiosi; **e**) livello superficiale di rimaneggiato agricolo.*

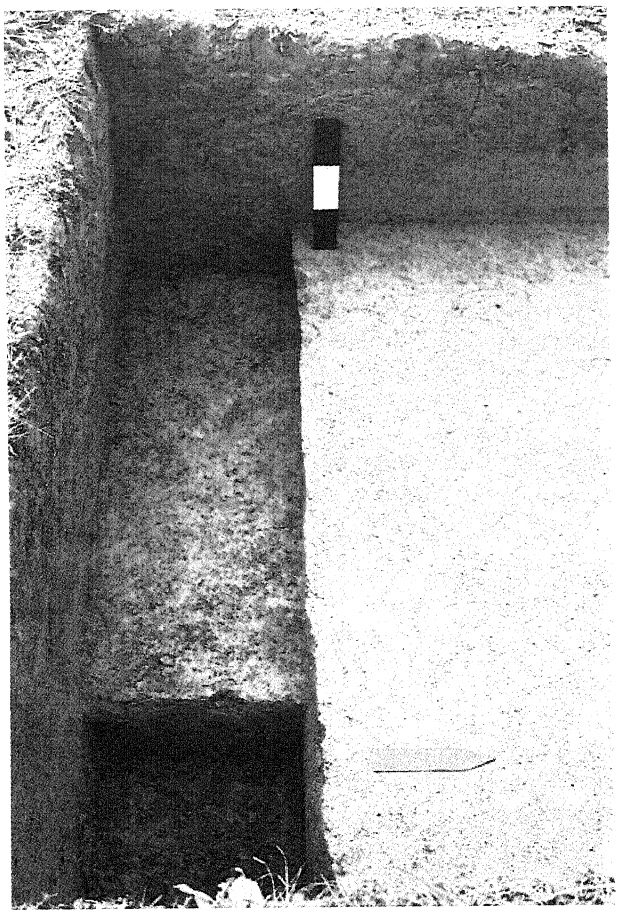

Fig. 4 - Mottled appearance of silty-clayey sediment **c** in the upper portion of the scarp.

Aspetto screziato dei depositi colluviali siltoso-argillosi ***c*** *conservati nel tratto superiore della scarpata.*

fragments resting on there (namely, BA1 stone artifacts left by Man) could not be removed by the sluggish flow and were thus buried by the finer sediments.

Alternatively or additionally, a similar result might be achieved as the effect of meltwaters runoff. Scarce rainfall and low temperature would have favoured the preservation of snow cover until later spring.

Both hypotheses are consistent with the prevailing cold and dry climate of the Last Würm Pleniglacial and Late Glacial. Also the chronological time interval for the stone industry, which was buried by deposit **c**, is in good agreement with some stages of this glacial period (probably the Dryas I and II), when a colluvial fine-grained sedimentation prevailed in the studied area.

3. ARCHAEOLOGICAL DATA

The archaeological BA1 collection consists of more than 200 culturally identical artifacts, most of which collected on the ground surface and a minor amount taken from the reworked topsoil layers during excavations. Only two artifacts were found *in-situ* in a preserved layer of colluvial sediments **c**, below plough zone and over the deeply pedogenized sediments **b**. Among a few worked blanks collected so far, the most characteristic are: i) two backed fragments of microgravettes, ii) a backed fragment (a point?), which has inversely been retouched at the distal end, iii) a laminar curved back, iv) a pair of narrow truncated bladelets, v) a short and a long carinate endscrapers, vi) two burins with a stroke in a fracture, vii) a burin stroke in a truncated flake (pseudo-Noailles type), viii) some encoches with a deep, well-marked notch, and ix) a pair of microburins. All cores are of the prismatic or pyramidal type deriving from bladelets or microbladelets production. The association of such lithic

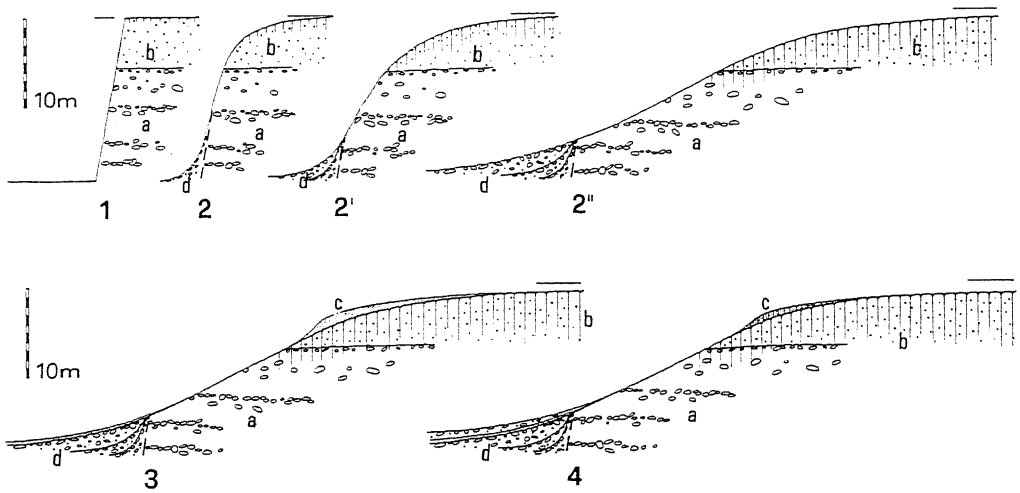

Fig. 5 - Proposed evolutionary sequence of the slope: 1. Deposition of a fluvial succession of gravel and silt (**a** and **b**): its initial pedogenesis (vertical hatching) was followed by cutting of the river scarp and an earlier Man occupation of the terrace (Middle Palaeolithic stone industry). 2. Re-modelling of the scarp by rills reworking **a** and **b** deposits with consequent deposition of colluvium **d** and the shaping-up of a gentle slope, whose upper part is almost flat. 3. Deposition of colluvial deposit **c**. Towards the end of the period, a second human occupation occurred on the flat upper portion of the scarp (Upper Palaeolithic stone industry). 4. Reshaping of the scarp by a more violent runoff, with reworking of **a**, **b** and **c**, and deposition of the youngest colluvial deposits **d**.

Possibile ricostruzione degli episodi di evoluzione del versante: (1) Dopo la deposizione di una successione fluviale ghiaiosa e siltosa (termini ***a*** *e* ***b****) e l'inizio della pedogenesi che la interessa (tratteggio verticale), avviene l'incisione della scarpata fluviale e una prima*

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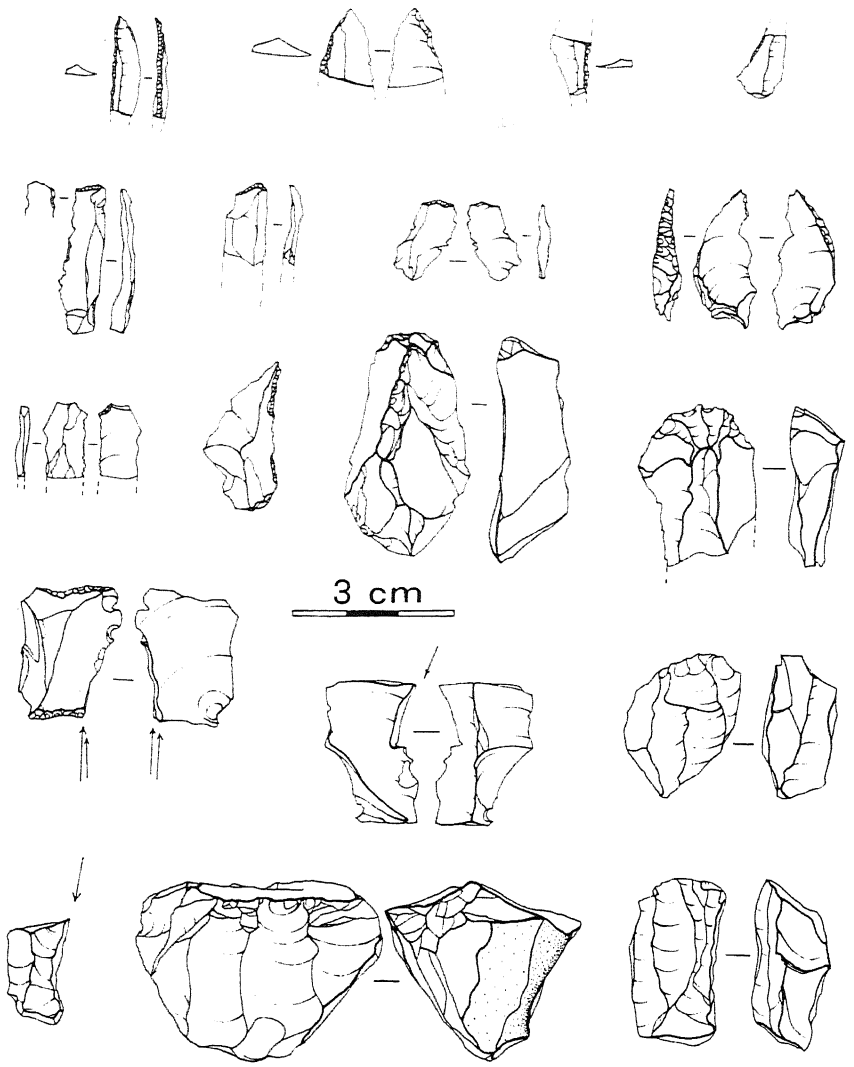

Fig. 6 - BA1 lithic artifacts probably of the "recent" Epigravettian culture.
Industria litica del sito BA1 di probabile tradizione epigravettiana recente.

artifacts (Fig. 6) — which also indicates a relative microlithic tendency — is a common feature of the late Upper Palaeolithic industries in Northeastern Italy, Liguria and Provence, although, on the basis of some lithotechnical features, the whole assemblage may be closer to a "recent" Epigravettian tradition (*sensu* Broglio, 1994). In Northern Italy, this culture developed between the end of the Last Würm Pleniglacial and the end of the Late Glacial (15,000 - 10,000 years B.P.).

A further item, stratigraphically belonging to sediments **c**, is the a specimen of a jugal tooth of *Equus* sp. found within BA1 artifacts. Because *Equus* remains are more numerous in deposits assigned to the colder periods of the Würm Pleniglacial (see other papers in this volume), this finding is in agreement with the inferred climatic scenario and the association of stone artifacts.

Archaeological and faunal data thus indicate that the sediments are the product of a peculiar cold climate like the one prvailing during the most recent part of the Last Glacial.

4. FINAL REMARKS

Timing and origin of colluvial deposits in the Tanaro valley allowed for the preservation of a surface yielding evidences of the Upper Palaeolithic Man presence, until the recent disruption by farming techniques, as the restricted scattering of artifacts on the sloping surface at BA1 site also indicates.

These colluvial deposits (**c**) — a type of deposit which may be present elsewhere in similar morphological conditions — may yield palaeoenvironmental data such as pollen, fauna, etc. and can allow a better preservation of archaeological sites (*e.g.*, game lookouts overlooking the valley floor, such it may be assumed to be BA1 site). At present, situations like the one presented in this work, can be investigated by means of simple techniques (shallow hand drillings) as it was done at the aforementioned site.

For the first time, evidences provided by archeological findings and geomorphological data concur in pointing out the environmental and climatic conditions of the Last Glacial Maximum and Late Glacial as occurred in the southern Piedmont basin.

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cont.da / *cont. from* p. 708 *frequentazione antropica della superficie del terrazzo (industria litica di tradizione Paleolitico Medio). (2) Si verifica un rimodellamento della scarpata da parte delle acque ruscellanti, con rielaborazione dei termini **a** e **b** a formare i depositi **d**, e l'acquisizione di una più modesta inclinazione, soprattutto nel tratto superiore. (3) Inizia la deposizione dei sedimenti colluviali **c** e, verso la fine di questa, una seconda frequentazione antropica (industria litica in BA1 di tradizione Paleolitico Superiore) interessa il tratto superiore della scarpata, meno acclive. (4) Con la ripresa di un ruscellamento più energico avvengono l'ulteriore rimodellamento della scarpata, con rielaborazione dei termini **a**, **b** e **c**, e la sedimentazione degli ultimi depositi colluviali **d**.*

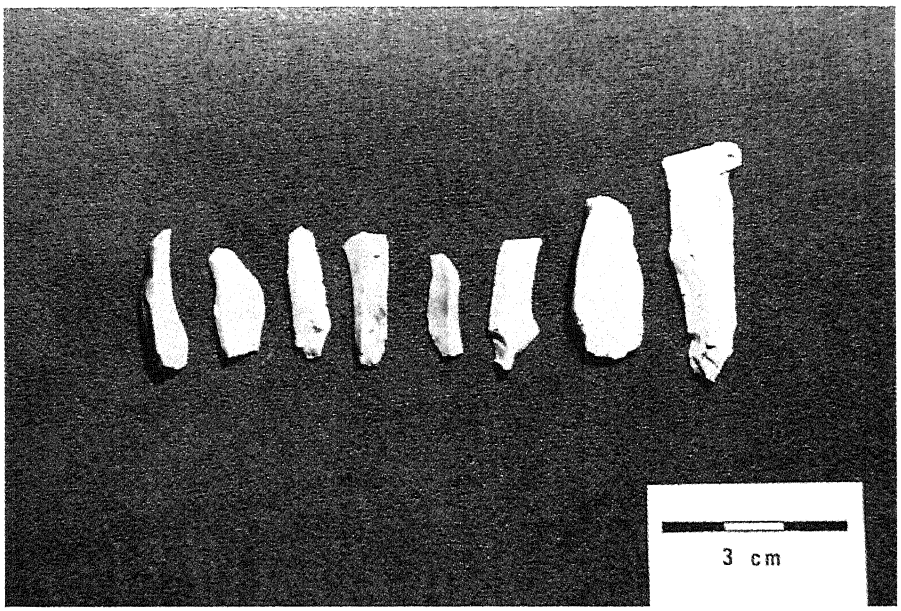

Fig. 7 - Laminar flint artifacts from BA1.

Manufatti lamellari non ritoccati del sito BA1.

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