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The Frea IV rockshelter (Selva Val Gardena, BZ)

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ABSTRACT - The paper shortly illustrates the results of the fieldwork which was performed in 1994 at the Mesolithic mountain site of Frea IV, in the Dolomites (Italy). Interdisciplinary data, concerning the pedostratigraphy, radiocarbon dating, charcoal fragments, micro- and macrofaunal remains are presented and briefly discussed, in the context of the Southern Alpine Mesolithic record

Key words: Mesolithic, Dolomites, Plan de Frea, Mountain environment
Parole chiave: Mesolitico, Dolomiti, Plan de Frea, Ambiente montano

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1. SETTING (D.E.A.)

Plan de Frea is a dell situated in the upper part of Gardena valley, near Gardena Pass. It is surrounded by talus cones at the foot of the Sella mountains and Mount Bustaccio, at an altitude of approx. 1900-2100 m. The locality was first marked out by J.M. Moroder e F. Prinoth for the Mesolithic remains in the shelter of one of the many boulder on the plateau, at an altitude of 1930 m. Research was carried out between 1979 and 1982 and three of the four sites that were singled out, were extensively explored (Frea I, II and III), while a survey was carried out on Frea IV in order to define the stratigraphy[1]. The data obtained, which has often been mentioned in short works (ANGELUCCI, 1997a and bibliography hereby mentioned), were only partly published (BROGLIO *et al.*, 1983).

In summer 1994 new fieldwork was conducted with the intent of finishing the Frea IV study[2]. The investigation undertaken with the usual methods of archaeological research thoroughly explored the anthropic deposit, including paleosurfaces and dwelling structures that attest a continuous Mesolithic human occupation. A test trench was also undertaken in order to analyse the lower portion of the sequence.

The interdisciplinary study of the site and its setting in the Mesolithic of the Dolomites, shed light upon some aspects of the mountain peopling and on the strategies of the exploitation of the territory by the first Holocene human groups, along with the data relative to the paleoenvironmental evolution. We would like to illustrate, hereby, the synthetic data of these recent researches (for details see bibliography: ALESSIO *et al.*, 1996; ANGELUCCI, 1997a,b; SILVESTRI, 1995-96).

2. STRATIGRAPHY AND CHRONOLOGY: OUTLINE (D.E.A., M.A., S.I.)

Frea IV is situated on the SE corner of the boulder, where the protrusion forms a shelter of about 20 m^2 surrounded by blocks fallen from the roof. Even though it is restricted, the preserved sequence is distinguished for its variability, which testifies the exceptional microenvironment of the rockshelter. The explored part, which is about 150 cm thick (Fig.1), is divided in six pedostratigraphic units (CS) and is summarily described (Alessio *et al.*, 1996; Angelucci, 1997a).

A reworked layer (CS1) and the present day A horizon (CS2) can be distinguished on the surface. CS3, which is about 50 cm thick, characterizes the main body of the anthropic stratification and is articulated in various units (Fig.1). The upper pedogenized part (unit 3A) was divided into two artificial cuts. The units marked 3B show strongly anthropic units of different characters. These layers are less subject to pedoturbation, which has obliterated the interfaces of the upper units of the sequence, and contain anthropic structures (Alessio *et al.*, 1996:146-147). Unit 3BII is possibly a living floor in a bad state of preservation. Evident structures are found on the living floor 3BIV (Fig.2), which fills up a depression delimited by an artificial cut made in ancient times. At its foot there are two dug-out hearths - one of which has a complex filling - and possibly a post-hole[3]. CS3 lies on a thick succession of deposits coming mainly from the slope, without anthropic deposits, and consisting of various facies (CS4). Two hearths were uncovered in the base portion (CS5). They are partly deformed and cut into US4. The lowest unit to be excavated was US6, a carbonate clastic breccia in silty-clayey matrix.

The Frea IV sequence underwent conventional radiocarbon dating on dry carbon specimens (Fig.3; Alessio *et al.*, 1996).

On the basis of the stratigraphic and radiometric data the following occupational phases were distinguished: F1 (unit 5, 4base): on a pedosedimentary basis, datable from 9000-8000 BC, even though the average older measures of US3BIV suggest the dating as 9000 BC, placing the first sporadic human occupation in the middle Preboreal; F2 (unit 3BIV, 3C): dated around 9000 BC; F3 (US3BIII): dated around the beginning of the IX millennium BC (middle-late Preboreal); F4 (US3BII): dated the first half of the VIII millennium BC, on the Preboreal-Boreal limit; F5 (unit 3BI, 3AII, 3AI): includes units that are not contemporary and have been homogeneously incorporated as a result of pedoturbation; dating is not possible, but it is clear that it is attributable to the Mesolithic period; F6: includes ceramic findings gathered from US3A that attest the presence of man in the post-Mesolithic period. F0 indicates pieces of unknown or unspecified origin.

3. ECOFACTS

3.1. *Charcoals* (A.M.)

Only a few specimens have been determined up till now. In US5 the charcoal fragments mainly belong to *Juniperus* sp. and to the *Pinus sylvestris*/mugo anthracological type. The most common species in US4 are *Larix decidua Mill.*, followed by *Pinus cembra L.* and by a few fragments of *Pinus sylvestris*/mugo. In unit 4, the associations which have been distinguished at a preliminary stage indicate the transition from an open environment to a forest present near the site[4].

3.2. *Macrofaunas* (P.F.C., A.T.)

About 4000 bone remains, of which 3,200 were undetermined microfragments, were discovered during the excavation.

The surfaces of the remains present different states of preservation. Some specimens show well-preserved surfaces and others presenting abrasions that removed the original surface of the bone and yet others that have been damaged as a result of the dissolution of carbonates. The variable state of preservation of the remains coming from the same unit can be due to the length of time they have been buried. The most damaged bones were those that were exposed for longer periods to weathering agents. Many remains were heavily marked by roots. Only one specimen showed rodent gnaw marks.

The analyses were carried out on 797 remains and identification, not always possible at the species level, was done for 205 elements. The most abundant remains, with similar percentages, belong to *Cervus elaphus* (37.6%) and to *Capra ibex* (34.6%). There were abundant remains of a small Lagomorph (48, par to 23.4%), probably *Lepus cf. timidus*, and very few remains of wild boar, bear, bird and fish (Fig.4).

Considering the remains of each unit as belonging to different individuals, both red deer and ibex are represented by a minimum number of 11 individuals[5]. If approximately the same amount of deer and ibex were hunted, then the hunting strategy must have been different because the deer are mainly represented by young animals whereas the ibex by adults (Fig.4)[6]. The small sample analyzed does not allow to evaluate possible strategies of carcass processing. Red deer and

ibex are represented by elements of the whole skeleton, but with a prevalence of loose teeth and distal limb bones, such as, phalanges and metapodials (Fig.5). There are no horns/antlers, atlases, axes, scapulae or astragali and in general there are fewer bones of the fore limb than of the hind limb; there are very few specimens of axial skeleton. There are traces of human action on some of the specimens (cut marks and impact marks) proving that these animals were exploited. There are no complete red deer bones and even the phalanges have been intentionally fractured. The only intact bones of ibex are a few short bones of the distal limbs (carpals, tarsals and phalanges), but even some of these are fractured. For the moment, impact marks have been identified on the diaphyses red deer humeri and femurs and on one ibex metacarpus. Striae caused by lithic tools are present on one red deer hyoid bone and humeri and on one ibex hyoid bone and ulna.

In US3BII, the presence of elements that can be articulated is of great interest: a scafocuboid and its cuneiforms of an ibex, or the refitting of red deer bones broken in ancient times (humerus and femur)[7]. The remains of small hares are mainly loose teeth and rarely pieces of the skull and refer to 8 adult individuals.

A fragment of a left fibula of *Sus scrofa* was found in US3BIV. A fibula fragment of *Ursus arctos* came from the same unit; other 3 remains of bears (one V metacarpus, a fragment of tibia diaphysis and probably an upper P4 fragment) came from US3BIII.

In the bone assemblage there are three remains of birds, but only one terminal phalange (claw phalange) from US3BII was attributed to a Galliform of the Tetraonide family, probably a white partridge (*Lagopus mutus*). The only fish remains was one operculum from US3AII, tentatively referred to a Cyprinidae.

The faunal data indicate that the human occupation of the rockshelter was linked to ibex and red deer hunting. The site was used from the beginning of the summer to the end of autumn, as can be proved by the presence of red deer and ibex killed at the age of about two to six months, corresponding to the present months of July-November. The red deer were about one to two years old and were probably hunted in May-June. The faunal assemblage reflects a mixed environment with alpine prairies and wide rocky areas (ibex and hares), but also with bush-forest developments on the fringes and at lower altitudes where herds of red deer lived and where bears and wild boars sought refuge.

3.3. *Micromammals* (G.B.)

Micromammal remains are scarce and amount to 137 distinguishable fragments. The study of these remains does not reveal great differences between the different phases of human occupation of the site.

The Insectivores are well represented (12-22%) by Soricidae, comprising the prevailing Sorex araneus and also *Sorex alpinus*, *Sorex minutus*, *Neomys* sp. and moles. Rodents are abundant (78-88 %), mainly including the *Clethrionomys glareolus*, while the arboreal species are rare and few between, represented by *Sciurus vulgaris*, *Dryomys nitedula* and *Apodemus* sp.(rare). The Microtinae type is scarce; two specimens of *Microtus arvalis* are present in US3BIV (out of a total of three micromammal remains in the unit), while this type is not to be found in the other units; *Microtus nivalis* is frequent in US3BII and US3BI but rare in US3A; the percentage of *Microtus (Pitymys)* sp. becomes more significant further up. The faunal association is probably hindered by the different lithological nature of the two slopes and by the bottom valley richly supplied with running waters on a rather impermeable earth substrata. In trying to give a palecological interpretation of this, it can be supposed that the alpine environment, rich with herbaceous plants, shrubs and trees, changed from a dry habitat to a more humid one. The arboreal species could reveal the presence of a forest environment at a lower altitude. Due to the fact that it is a highland site, the palecological interpretation of the pellets of birds of prey that lived in the rockshelter must be carefully considered, as there is no bibliographical reference.

4. THE LITHIC ASSEMBLAGES (D.E.A.)

The lithic assemblage of Frea IV is not very abundant and we hereby supply the general data (see Silvestri, 1995-96; Angelucci, 1997a); it includes precores, cores, retouched pieces, shatter and unretouched flaking products[8].

Analyses on the unretouched products were carried out on a morphological, typometric and technological basis, creating a specific database. The collection includes about 600 pieces, mainly fragmented (about 60%); the cortical ones or the ones with natural surfaces are scarce in all the phases (about 5%). Considering the material used, there is an increase of bladelets products, from 44% in F2 to more than 66% in F5 towards the higher parts. Among the used lithotypes[9], flint from the Veneto Series prevails (more than 90% of the determined lithologies), whereas the local flint is scarce and hyaline quartz is occasionally found (about 1%). The data referring to the morphology of the materials are the same as those found in other Mesolithic sequences of the region, and particularly at Romagnano III (Bisi *et al.*, 1987). Transversal asymmetrical sections and smooth butts prevail,

especially in the ancient phases (F2 and F3) with rather irregular edges. They usually have flat ventral faces and show parallel unidirectional scars on the dorsal face, matching the data on the cores. The general outline suggests and intense exploitation of cores and other flint substitutes perhaps due to the fact that there were no sources of flint in the environs and that "partly-worked " raw materials were imported to the site.

Two fragmented pre-cores and 41 cores were recovered. The majority of these were of local lithic industries; the Scaglia Rossa reddish-brown flint prevails (13 cores), followed by the "Biancone" brown or grey flint (5 pieces). Only 3 out of the 36 distinguishable pieces were produced by local lithic industries[9]. The cores are small and often completely used; only few usable cores feature signs of flaking. The forms are generally simple and not much attention is paid to the manufacturing. The bladelets cores prevail in all the sequence and there are fewer flake cores (Fig.6). The scarce assemblage does not allow to distinguish the variations of the structures of the single phases; the absence of flake cores, the substantial stability of the structure and the higher frequency of bladelets cores and two pre-cores is however surprising if compared to Romagnano III (Broglio & Kozlowski, 1984).

The collection amounts to 127 tools and 231 microlithic tools, analysed according to the Romagnano III typological list (Broglio & Kozlowski, 1984).

It is evident that F5 is much richer and that the other phases are relatively poor. The microliths are more abundant than the tools in all the sequence; they are very abundant in phases 2, 3, and 4 and decrease in F5 even though they still prevail (Fig.7).

The most abundant tools are the retouched flakes that amount to over 30% of the collection; these are followed by the endscrapers (20-24%) and the retouched blades (about 20%). The other classes are scarcely represented and there is no evidence of points and composite tools in the whole collection (Fig.8).

Even though the collection is poor, there are some particular features. Among the endscrapers - mainly found in F5, the only phase where there are some forms on flake - there are short and very short frontal endscrapers, as well as endscrapers on flat supports and flint roof-shaped scrapers. The skrobacz (9 specimens) and the raclette (9 specimens) prevail among the retouched flakes, along with abrupt retouched bowl flakes. There are only 4 burins: 2 simple, lateral, fractured ones, one of which removed from a burin and two short and thick ones, one of which is multiple. Four of the truncated blades feature slightly oblique and concave truncated ends (2 in F4 and 2 in F5).

The retouched blades are abundant in the upper sequence; notched blades prevail (13 specimens, 7 of which present direct notch on one side), but the blades retouched on only one side are also well represented (7 pieces). Only 5 of the pieces were attributed to becs and borer groups, which were only present in F5. These are 4 becs, 2 of which on blade support and 1 fragment of a symmetrical axial borer on blade. There are 3 partly backed knives (2 in distal position, one of which has a notch on the base of the reverse side and the other one in proximal position) and a completely backed knife with a notch at the base of the opposite side. Finally, there are 2 pièces ecaillées.

The triangles are the most represented class of microlithic tools, followed by the double backed points, by the segments and by points on laminar flakes. The other classes are scarce, and unidentifiable fragments are abundant. The classification suggests some structural changes from the ancient phase to the recent ones (Fig. 9): The decrease in points on laminar flakes and the discontinuous decrease in segments, the abrupt decrease in double-backed points in F5; the increase in backed and truncated bladelets, the increase in triangles, which prevail among the microliths in F4 and F5; the presence of trapezes. Therefore, the structure is quite stable in F2 and F3, followed by a first change in F4, where backed and truncated bladelets appear, as well as one trapeze with a consequent decrease mainly in blade points. There is a consistent variation in F5 with a drastic reduction of double-backed points along with the increase in triangles and trapezes.

The collection consists of: 10 truncated points, 3 of which are near the natural distal end, five distal short ones and one on the support axis; 10 backed blade points, 5 with complete, curved backs with distal point; 12 backed points, including 5 with complete back, 3 double pointed, with double symmetrical backs and 3 with arched backs near the point. Most of the segments have straight backs, with a natural opposite edge or with a partially retouched one; there is also a segment with sinusoidal back, one trapeze with total retouch and there are two specimens with bevel ends, one with a natural base and the other with a retouched base. There is a slight increase in the amount of longer forms in the total amount of segments in F5. The backed bladelets with truncated ends all feature one back and an oblique truncation forming an obtuse angle.

As for triangles, the number of isosceles triangles decrease towards the upper part and become almost insignificant (57% in F2, 13% in F5), because of the increase in scalene forms (due to the significant appearance of long scalene triangles with long bases), which are more frequent from F3 onwards, and of long triangles with short base. The double-backed points are abundant from F2 to F4 and decrease in number in F5, where short types are more common. The longer forms generally have two entire converging backs with bipolar retouch. The shorter ones mainly feature two backs, a natural base and tapered end. The trapezoidal forms were found mainly in F5; there are short and very short

forms (3 and 2 pieces, one with a truncated end struck with one blow), and there is also 1 asymmetrical oblique concave trapeze and 1 long asymmetrical trapeze with a simple base. Finally, there are 5 bladelets with total abrupt retouch of the edge and one point. There are also 187 microburins with a majority of simple ones and some backed types; there are various unfinished microlithic tools. The average microburins/microlithic tools ratio is 0.89 ranging from 0.70 (F4) and 1.05 (F3).

The Frea IV sequence has evident typological parallelisms with other Mesolithic industries of the River Adige basin with regard to the general structure and the changes in the various phases. Phases 2 and 3 have a significant stable structure and the differences are linked to the scarce quantities rather than to the real changes in the two phases. Among the microlithic tools, there is a predominance of triangles, segments, double-backed points and lamellar blade points, in particular truncated points. Among the triangles, the isosceles forms are most common. The double-backed points and the segments are mostly represented by long-form types. These parameters enable to attribute the assemblages of F2 and F3 to two different periods of the early Sauveterrian culture, as was confirmed by the dates. In phase 4 there is an increase in truncated and retouched blades along with a decrease in retouched flakes. On the whole triangles increase; the number of isosceles forms decrease and the scalene forms increase, while the number of double-backed points remain stable. Even though there was only one trapeze which was found against the wall or maybe penetrated through, the setting is attributed to the Sauveterrian culture, and in particular to its middle phase; the dating along with the similar industries suggest that it corresponds to unit AC4 of Romagnano III. The tendency in F4 is even stronger in F5, where the lithic assemblage is not homogeneous, as already explained beforehand. Among the microliths there is a considerable increase of triangles and trapezes, while double-backed points strongly decrease. The industry is not homogeneous and it is difficult to place it in context. It could derive from the mixing of two different units, one near the recent Sauveterrian and the other one attributable to Castelnovian.

5. CONSIDERATIONS (all the authors)

The synthetically illustrated data allows for a few considerations as to the meaning, not only of Frea IV, but also of the entire system of sites at Plan de Frea during the Mesolithic. The area was repeatedly occupied during a long chronological period of time, possibly more than 2 millennia. It is in a position where different environments converge and where there are dwelling structures. The Mesolithic groups that frequented Plan de Frea used the raw material available in a wide, ample region, producing objects that fit in with the typological frame of the Adige basin, exploiting the resources of the various ecosystems near the site, where different activities were carried out.

It must, however, be underlined that the paleoenvironmental data show that in the chronological interval of human occupation of the site, the environmental context underwent some changes. The sedimentological and paleobotanical data suggest that the first occupation of the site took place in a yet unstable situation, possibly with alpine prairie vegetation. Furthermore, on the basis of the number of occupations, it is thought that the site could be a so-called persistent place (Schlanger, 1992).

These and other considerations (see Angelucci, 1997a) allow to interpret Plan de Frea as a residential, seasonal site, considering the complex logistics system in which there was a periodical, residential and possibly seasonal mobility, for exploiting at the most, the resources available on the South Alpine territory during the early Holocene.

NOTES

1 - On the basis of these investigations the authors came to the conclusion that the human occupation of Frea IV dates back to a transitional period between the early and recent Mesolithic, due to the presence of an industry with mixed Sauveterrian - Castelnovian features (Broglio *et al.*, 1983).

2 - The 1994 Plan de Frea campaign was organized with under the direction of Prof. A.Broglio, along with the Istituto Culturale Ladino "Micurà de Rü" and the Soprintendenza ai Beni Culturali della Provincia Autonoma di Bolzano. These Institutes financed the fieldwork and part of the analyses on the remains. We would also like to thank the Museum de Gherdeïna and all the persons that took part in the researches.

3 - The first meso- and micromorphological observations proved that units 3BII and 3BIV contain a high amount of anthropic inputs, but the anthropic microfabric was almost completely cancelled by the syn- and post depositional modifications. The thin sections show a complex structure due to animal action and partly to water action in the rockshelter. Discontinuous frost action is responsible for convolutions, capping, dusty coating and elongated microgranular aggregates, partially sorted and separated by plano-lenticular voids. In 3BIV, the skeleton is made up of poligenic stones, unsorted and heterometic, indicating the colluvial origin of the non anthropic sediment. The same natural elements are present in US 4, where there is platy

microstructure soil, linked to discontinuous frost action, alternating with granular microaggregates present in the pores, mainly channels. Dusty coating is also present here.
4 - Unfortunately, the specimens that underwent pollen analyses carried out by K. Oeggl and W. Kofler of Innsbruck University, resulted in a only little amount of pollen which was badly preserved, thus hindering further paleobotanical studies of Frea IV.
5 - When analysing the data, it must be taken into consideration that during the human occupation of the site the bone remains may have been mixed. In at least two cases parts of the skeleton found in different units belonged to the same individual, therefore the minimum number of individuals is only indicative. In one case, two fragments of the same deer tooth (D3 inf.) that had been broken in ancient times but which was reassembled, were each found in two different units: US3BII and US3BIII. In the other case, US3BII (identified as a dwelling surface), yielded various elements referable to one half of the left mandible of a young-adult deer (the third lower erupting molar tooth, part of the mandible symphysus and the first, second and fourth incisors) while the third missing incisor was found in US3BIII.
6 - The following deer were represented: 2 very young individuals under six months old, 1 young, approx. one year old, 4 young-adults of 2-4 years olds and 4 adults of indefinite age; there are no teeth remains belonging to senile individuals. The following ibex were represented: 1 very young individual approx. 6 months old, 1 young individual, proved by the fragments of radius and metatarsus with non-fused epiphysis, 2 young-adults, about 2-3 years old and 7 adult individuals, the majority of which were about 4 to 6 years old, but some 6-8 year olds were also present.
7 - A more accurate study is being carried out by the authors (A.T.) in collaboration with I. Fiore, on the spatial distribution of the bones, the refitting of the fragments, traces of butchering and the places it was carried out. Some observations on these aspects will be anticipated.
8 - Please refer to the bibliography for the analytical data on the lithic assemblages and their drawings.
9 - In order to determine the raw materials, a collection has been set up as a reference, including the lithotypes identified among the artefacts; the provenance of the lithotypes, on a macro-mesoscopic basis, is only indicative as it has not been thoroughly analysed. Three groups were distinguished: a) late Jurassic and Cretaceous flints of the formations of the Veneto sequence, probably recovered in the Veneto prealps or in the Trento area, which were then distinguished as materials possibly pertaining to "Biancone", Scaglia Rossa and to Colindes member; b) flints from Marne del Puez and from the Livinallongo Formation, appearing locally; c) hyaline quartz which is from the Aurine Alps, on the basis of geological and archaeological considerations, (see Broglio & Lunz, 1984).

SUMMARY - The paper shortly illustrates the results of the fieldwork which was performed in 1994 at the Mesolithic mountain site of Frea IV, in the Dolomites (Italy). Interdisciplinary data, concerning the pedostratigraphy, radiocarbon dating, charcoal fragments, micro- and macrofaunal remains are presented and briefly discussed, in the context of the Southern Alpine Mesolithic record

RIASSUNTO - Plan de Frea, alla testata della val Gardena, è noto per le ricerche condotte negli anni '70 e '80, che comportarono scavi estensivi a Frea I e III, mentre un sondaggio a Frea IV ne fece attribuire la frequentazione al Castelnoviano iniziale. La ripresa delle indagini a Frea IV nel 1994 ha messo in luce una serie plurifase con paleosuperfici antropiche e abbondanti reperti. La serie di riempimento si apre in basso con due focolari sepolti da una coltre di depositi di versante, al cui tetto giace un complesso antropico in parte interessato da modificazioni sin-postdeposizionali e dalla pedogenesi. La serie evidenzia il passaggio da un ambiente instabile a una situazione di biostasia in cui le azioni antropiche sono quasi esclusive; i resti di micromammiferi suggeriscono la transizione da un ambiente aperto a uno più arborato e da condizioni più aride a più umide. Le frequentazione mesolitica copre tutto il Preboreale, estendendosi al Boreale e forse all'Atlantico. Gli insiemi litici, non abbondanti, s'inquadrano pienamente nei complessi del bacino dell'Adige, con due fasi sauveterriane antiche e una media; nell'insieme sommitale, non omogeneo, compaiono elementi castelnoviani in un contesto sauveterriano recente. I manufatti sono prodotti con prevalente selce delle formazioni cretacee della Serie Veneta; scarsa la selce locale e il quarzo ialino. L'analisi tecnologica mostra un intenso sfruttamento della materia prima. I resti faunistici mostrano lo sfruttamento prevalente di cervo, stambecco e lepre alpina in tutte le fasi, con sporadici uccelli ed occasionale pesce, cinghiale e orso. L'età di abbattimento di stambecchi e cervi suggerisce una frequentazione tra estate e autunno. I dati indicano che Frea IV fu frequentato per un prolungato arco di tempo e su base stagionale da cacciatori-raccoglitori mesolitici che si muovevano prevalentemente, ma non solo, nell'ambito del bacino imbrifero dell'Adige. La posizione di convergenza ambientale era connessa a uno sfruttamento ottimale delle risorse dei differenti ambienti montani; da rimarcare la presenza di strutture abitative. Il sistema dei siti mesolitici di Plan de Frea è intepretabile come un insediamento a carattere residenziale stagionale del sistema insediativo Preboreale-Boreale.

REFERENCES

ALESSIO M., ANGELUCCI D.E., BROGLIO A. & IMPROTA S., 1996 - New data for the chronology of the Mesolithic in the Dolomites: the radiocarbon dates from Plan de Frea (Selva Val Gardena, Italy). *Preistoria Alpina* 30:145-154

ANGELUCCI D.E., 1997a - Adattamenti tardi- e postglaciali; gli ultimi cacciatori-raccoglitori del versante meridionale delle Alpi orientali. Tesi di Dottorato di Ricerca, Università di Bologna, Ferrara e Parma, Ferrara

ANGELUCCI D.E., 1997b - Nuovi dati sulla preistoria delle Dolomiti: la campagna di scavo 1994 nei siti mesolitici del Plan de Frea (Selva val Gardena). *Ladinia* 20:19-37

ANGELUCCI D.E., BARTOLOMEI G., BROGLIO A., CASSOLI P.F., IMPROTA S., MASPERO A. & TAGLIACOZZO A., in press - Plan de Frea site 4 (Dolomites): mobility, seasonality and the exploitation of mountain environment during the Mesolithic. Actes del 5ème Congrès Mésolithique, Grenoble, 1995

BAGOLINI B., BROGLIO A. & LUNZ R., 1982 - I siti mesolitici delle Dolomiti. *Ladinia* 6:5-40

BAGOLINI B., BROGLIO A. & LUNZ R., 1984 - Le Mésolithique des Dolomites. *Preistoria Alpina* 19:15-36

BISI F., BROGLIO A., DALMERI G., LANZINGER M. & SARTORELLI A., 1987 - Les bases mésolithiques du Néolithique ancien au sud des Alpes. In: J.K.Kozlowski & S.K.Kozlowski (eds), Chipped stone industries of the early farming cultures in Europe, *Archaeologia Interregionalis* 7:381-422

BROGLIO A., CORAI P. & LUNZ R., 1983 - Risultati preliminari delle prospezioni nei siti mesolitici della Val Gardena e degli scavi al Plan de Frea. *Bullettin d'Etudes Préhistoriques* 15:19-53

BROGLIO A. & LUNZ R., 1984 - Osservazioni preliminari sull'utilizzazione del cristallo di rocca nelle industrie mesolitiche del Bacino dell'Adige. *Preistoria Alpina* 19:201-208

BROGLIO A. & KOZLOWSKI S., 1984 - Tipologia ed evoluzione delle industrie mesolitiche di Romagnano III. *Preistoria Alpina* 19:93-148

SCHLANGER S.H., 1992 - Recognising persistent places in Anasazi settlement systems. In: J.Rossignol & L.Wandsnider (eds), Space, Time and Archaeological Landscapes, p.91-112. Plenum Press, New York

SILVESTRI D., 1995/96 - Gli insiemi mesolitici del Riparo Frea IV (Alta val Gardena). Tesi di Laurea in Scienze Naturali, Università degli Studi di Ferrara, Ferrara

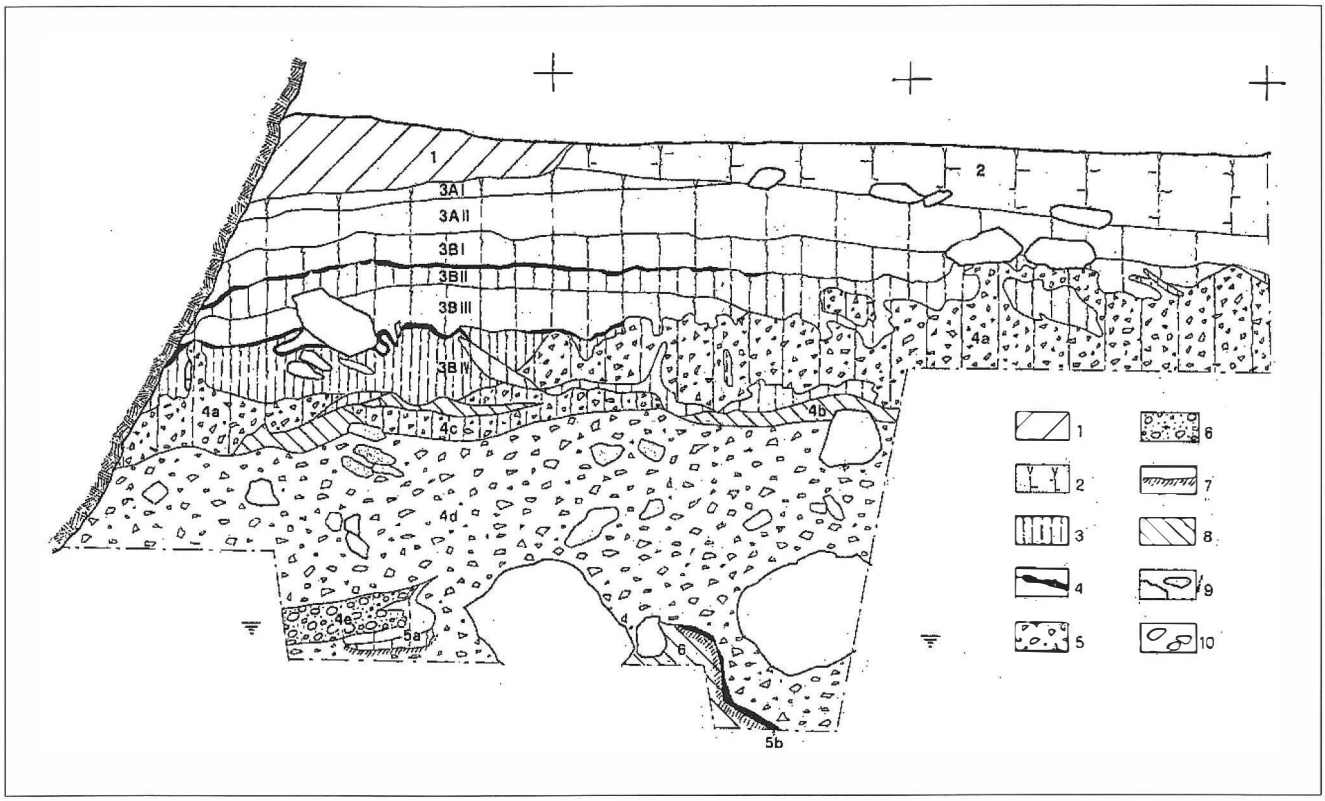

Fig. 1 - Frea IV. E-W section of the 1994 excavation. 1) reworked; 2) soil; 3) anthropic units; 4) carbon levels; 5) angular gravel; 6) rounded gravel; 7) soil reddened by combustion; 8) silt; 9) calcareous stones; 10) non-calcareous stones. The numbers refer to the excavation units; the external grid represents the metric squares (elab. F. Nalin)

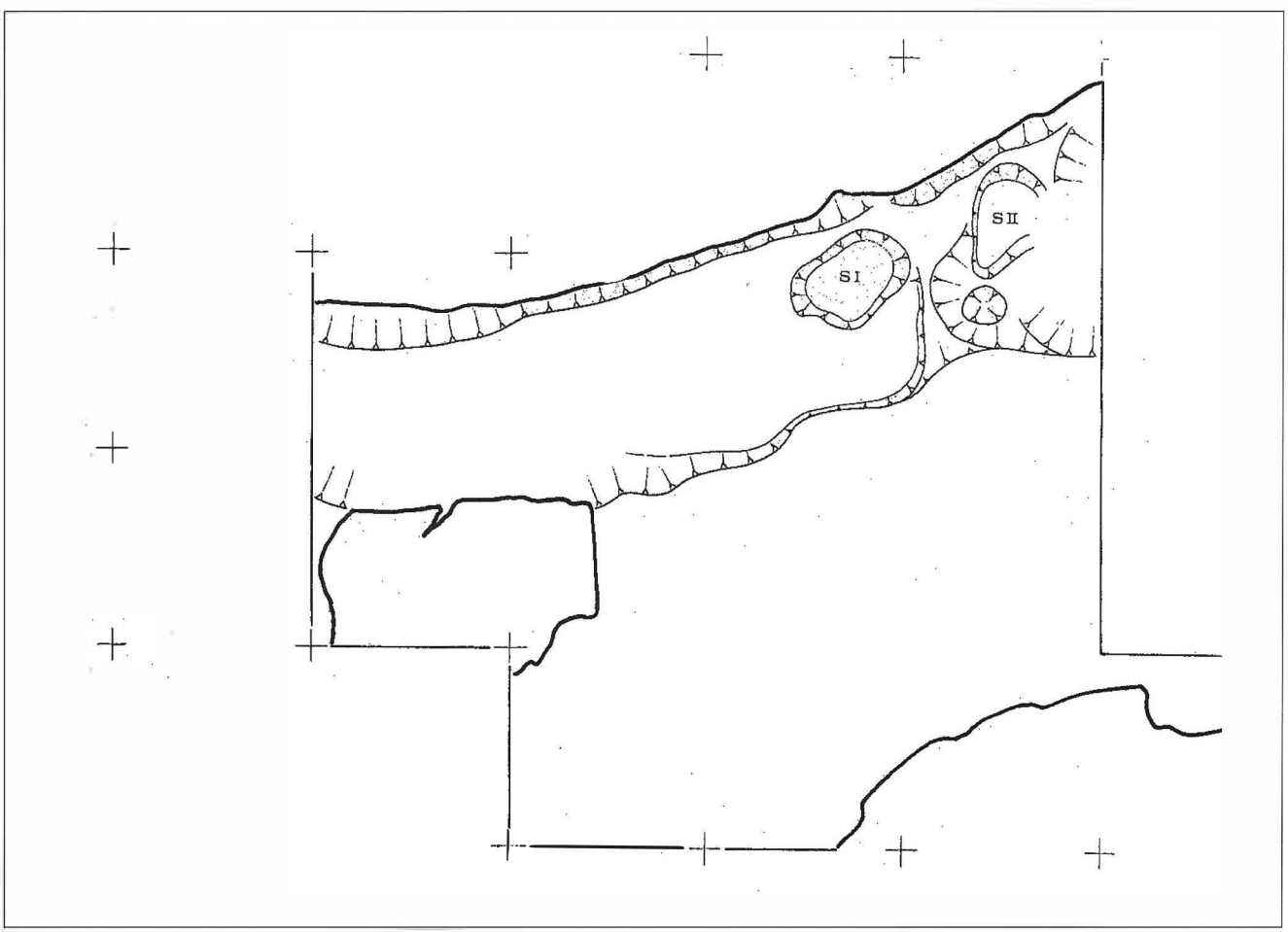

Fig. 2 - Schematic planimetry of the paleosurface of US3BIV; the external grid represents the metric squares (elab. F. Nalin)

ref. lab.	unit	square	rel.*	value°	average^	range 1^	range 2^
R-2714	3BII	41g, 31, 32	IV	8688 ± 90 BP	7693 BC 7656 BC 7643 BC	7903-7547 BC	7962-7502 BC
R-2565	3BIII	11, 21f	IV	9558 ± 90 BP	8847 BC 8807 BC 8619 BC	8958-8478 BC	9016-8359 BC
R-2715	3BIV	42b, 41g	IV	9663 ± 392 BP	8962 BC	9560-8265 BC	10420-7949 BC
R-2713	3BIV	21d-g, 31g-h-i	III	9883 ± 68 BP	9052 BC	9241-9042 BC	9572-9014 BC
R-2566	5b	str. IV	III	9377 ± 198 BP	8413 BC	8903-8097 BC	9031-8023 BC

Fig. 3 - Radiometric dates from Frea IV. *) reliability of the specimen (see WATERBOLK, 1971 - Working with radiocarbon dates. *Proceedings Prehistoric Society* 37:15-33); °) value in years C14 BP non-calibrated; ^) value in years BC calibrated by rev. Calib 3.0 (STUIVER & REIMER, 1993 - Extended 14C data base and revised CALIB 3.0 14C age calibration program. *Radiocarbon* 35:215- 230)

Stratigraphic units	3BIV	3BIII	3BII	3BI	3AII	Total	
Species	**Number of remains**					**N°**	**%**
Pisces					1	**1**	**0,49**
Aves		1	1		1	**3**	**1,46**
Lepus cfr. *timidus*	6	12	17	6	7	**48**	**23,41**
Ursus arctos	1	3				**4**	**1,95**
Sus scrofa	1					**1**	**0,49**
Cervus elaphus	11	14	30	15	7	**77**	**37,56**
Capra ibex	4	11	34	13	9	**71**	**34,63**
Total determined	23	41	82	34	25	**205**	
Total undetermined	176	105	167	64	80	**592**	
Total	199	146	249	98	105	**797**	

Species	**Minimum number of Individuals**					**MNI**	**%**
Pisces					1	**1**	**2,70**
Aves		1	1		1	**3**	**8,11**
Lepus cfr. *timidus*	1	2	2	2	1	**8**	**21,62**
Ursus arctos	1	1				**2**	**5,41**
Sus scrofa	1					**1**	**2,70**
Cervus elaphus	1	3	3	2	2	**11**	**29,73**
Capra ibex	1	2	4	2	2	**11**	**29,73**
Total	5	9	10	6	7	**37**	

Age	**yy**	**y**	**y-a**	**a**	**sen**	**Total**
Cervus elaphus	2	1	4	4		**11**
Capra ibex	1	1	2	7		**11**

Fig.4 - Frea IV. Number of remains and of individuals of vertebrates in the different units and the relative age of the deer and ibex. yy) very young; y) young; y-a) young-adults; a) adults; s) senile

		Capra ibex						*Cervus elaphus*					
Anatomical elements		3BIV	3BIII	3BII	3BI	3AII	**Total**	3BIV	3BIII	3BII	3BI	3AII	**Total**
Horn/antler													
Skull				3		1	**4**			1			**1**
Maxilla													
Upper teeth				2	1		**3**			1	5	2	**8**
Mandible			1	3		1	**5**			1			**1**
Lower teeth		1	3	1	2	1	**8**	2	3	7	2	1	**15**
Teeth				1			**1**	1	2	6	1	2	**12**
Atlas													
Axis													
Vertebrae													
Ribs-Sternum				2	1		**3**						
Scapula													
	prox.												
Humerus	diaphysis									1	2		**3**
	dist.												
	prox.												
Radius	diaphysis												
	dist.			1			**1**						
	prox.				1	1	**2**						
Ulna	diaphysis												
	dist.												
Carpal				2	1		**3**						
	prox.			2			**2**	1					**1**
Metacarpus	diaphysis										1		**1**
	dist.												
Vestigial Metac.				1			**1**			1			**1**
Pelvis					1	1	**2**						
prox.													
Femur	diaphysis				2		**2**			3	1		**4**
	dist.												
Patella													
	prox.												
Tibia	diaphysis		1	1			**2**		1	1		1	**3**
	dist.	1					**1**	1					**1**
Calcaneus			1				**1**						
Astragalus													
Tarsal-Malleolus		1	1	4			**6**						
	prox.		1		1		**2**		1				**1**
Metatarsus	diaphysis											1	**1**
	dist.		1	1			**2**						
Vestigial Metat.													
Metapodial.				2			**2**	3		2			**5**
1st Phalanx	intact				1		**1**						
	fragm.			1		2	**3**	1		1	1		**3**
2nd Phalanx	intact				1	1	**2**						
	fragm.			1	1		**2**	1	3	1	1		**6**
3rd Phalanx	intact			1		1	**2**						
	fragm.			1			**1**			1			**1**
Vestigial Phalanges									2	3	1		**6**
Sesamoids		1	2	4			**7**	1	2				**3**
Total		**4**	**11**	**34**	**13**	**9**	**71**	**11**	**14**	**30**	**15**	**7**	**77**

Fig. 5 - Frea IV. Anatomical elements of deer and ibex in the different units

Cores	F2	F3	F4	F5	F 0	Total	%
- subconical blade, 1 p.p. (I)						**0**	**-**
- carenate bladelets, 1 p.p. (II)				1		**1**	**2.4**
- subconical bladelets e burins. (III)	2	1	1	3	1	**8**	**19.5**
of which burin-shaped (n9)	(2)	(0)	(1)	(3)	(1)		**-**
- bladelets, 2 p.p. (IV)	3	1	2	2	4	**12**	**29.2**
- oval bladelets and flakes (V)	3	1	1	6	3	**14**	**34.1**
- flakes (VI)							**-**
- struck detachments (VII)			1	1		**2**	**4.9**
- undetermined fragments (VIII)	1			1	2	**3**	**7.3**
unclassified cores	1					**1**	**2.4**
	10	**3**	**5**	**13**	**10**	**41**	

Fig. 6 - Frea IV. Typological class of the core collection

	F2		F3		F4		F5		F0		Total	
	n	%	n	%	n	%	n	%	n	%	**n**	**%**
tools	18	28.5	18	31.6	20	27.0	52	41.6	19	44.2	**127**	**35.1**
microlithic tools	45	71.5	39	68.4	54	73.0	73	58.4	24	55.8	**235**	**64.9**
Total	**63**		**57**		**74**		**125**		**43**		**362**	

Fig. 7 - Frea IV. Distribution of the retouched pieces in the occupation phases.

	F2		F3		F4		F5		F0		Total	
	n	%	n	%	n	%	n	%	n	%	**n**	**%**
A	4	22.2	3	23.1	4	20.0	11	23.9	4	28.6	**26**	**23.5**
B	8	44.4	8	61.5	5	25.0	12	26.1	2	14.3	**35**	**31.5**
C	1	5.6	-		1	5.0	2	4.3	-		**4**	**3.6**
D	1	5.6	-		3	15.0	2	4.3	1	7.1	**7**	**6.3**
E	-		1	7.7	6	30.0	10	21.7	5	35.7	**22**	**19.8**
F	-		-		-		4	8.7	1	7.1	**5**	**4.5**
G	1	5.6	-		-		3	6.5	1	7.1	**5**	**4.5**
H	-		-		-		-		-		**-**	
I	-		1	7.7	-		1	2.2	-		**2**	**1.8**
K	-		-		-		-		-		**-**	
L.	3	16.7	-		1	5.0	1	2.2	-		**5**	**4.5**
Tot. A-L	18	100	13	100	20	100	46	100	14	100	**111**	**100**
M	-		5		-		6		5		**16**	
Total	**18**		**18**		**20**		**52**		**19**		**127**	

Fig. 8 - Frea IV. Absolute and relative quantities of the tool classes (symbols after Broglio & Kozlowski, 1984)

	F2		F3		F4		F5		F0		Total	
n	%	n	%	n	%	n	%	n	%	**n**	**%**	
N	5	17.3	5	16.7	3	7.3	6	9.4	1	4.3	**20**	**10.7**
O	2	6.8	4	13.3	3	7.3	3	4.6	1	4.3	**13**	**7.0**
P	7	24.2	3	10.0	7	17.1	10	15.7	2	8.7	**29**	**15.5**
Q	-		-		2	4.9	4	6.3	1	4.3	**7**	**3.7**
R	7	24.2	6	20.0	13	31.7	23	35.9	13	56.6	**62**	**33.1**
S	8	27.5	11	36.7	12	29.3	8	12.5	3	13.1	**42**	**22.5**
T	-		-		1	2.4	5	7.8	2	8.7	**8**	**4.3**
U	-		1	3.3	-		5	7.8	-		**6**	**3.2**
V	-		-		-		-		-		**-**	
tot N-V	29	100	30	100	41	100	64	100	23	100	**187**	**100**
W	12		10		11		9		2		**44**	
Total	**41**		**40**		**52**		**73**		**25**		**231**	

Fig. 9 - Frea IV. Absolute and relative quantities of the microlithic tools classes (symbols after Broglio & Kozlowski, 1984)