

Mesolithic Hunting Strategies in the Dolomites

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1. The analysed area

The area under study is the middle south Alpine region of Italy, which boundaries more or less follow the line of the Adige river to the west, and of the Piave river to the east. The region has a very diverse geomorphology. This ranges, some with local glaciers which rise up to 3,000 m, to the high and vast plateaux, at about 1,000 m, are in a geographical context characterised by important structurally deep valleys. These last cut the landscape in well delimited geological units. The glaciation of the Pleistocene has affected the mountains, plateaux and valleys. Therefore our knowledge of the landscape and of the activities of the human populations in this region is strictly limited and connected to these climatic fluctuations (fig. 1).

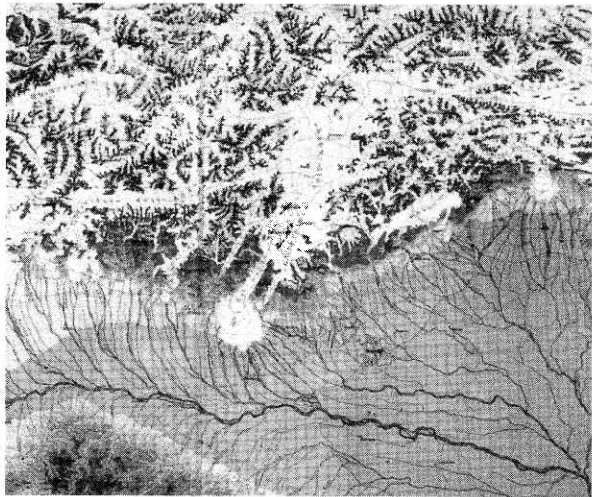


Fig. 1 — The Central and Eastern Alps during the maximum glacial phase of the Last Wurm ipsiglacial, about 20,000 years B.P.

The oldest sites in the region are distributed along the southern fringe of the Alpine chain. Soils with Lower and Middle Palaeolithic and Aurignacian industries are documented in the Verona area, in locations which all escaped the physical effects of the glaciers. Only a few sites have been found in mountain positions at about

1,500 m high and are in particular geographical positions. They are preserved because they were higher than the valley glaciers' fullest range and in areas devoid of local ones. The distribution of these camps is rather scattered and does not allow us to interpret in terms of human activities.

It is only with the last de-glaciation that we can study in greater detail the new biological arrivals in the alpine chain's ecosystem, together with the first human re-occupation of the mountain region.

The sheltered sites distributed along the southern fringe of the Alps, such as Riparo Tagliente, those few located on the plateaux and a couple of sheltered sites inside the chain are dated to the interstadials. Many sites are connected with the last glacial loess and are distributed on the plateaux at altitudes around 500 and 1,500 m (fig. 2). At Riparo Villabruna, one of the sheltered mountain sites, a burial, has been dated to 12040 B.P. (Broglio, in press).

With the climatic amelioration of the Early Holocene and therefore the Mesolithic, we can see the full exploitation of the mountain ranges, up to altitudes of 2,200 m. a.s.l. (fig. 3).

We interpret the progressive influx of human groups and their movement to higher altitudes as a consequence of the rise of the timber-line (during Boreal times, the line was the same as today), which reduced the high mountain prairies' size and shifted them to higher altitudes. This observation allows us to suggest that this phenomenon, represented by more than 200 sparse sites, is connected with the summer exploitation of herds of ungulates (such as ibex and chamois) grazing in the high mountain grasslands.

It is less easy to understand why this economic tradition ended, seen with a decrease in the number of late Mesolithic sites, and probably finishing before the first appearance of ceramics. We think that two factors together played a part: in the rise of the timber-line,



Fig. 2 — The Epigravettian sites of the Wurm Tardiglacial. Shaded area, dense sites distribution on the Mounts Lessini Plateau. ★ : Riparo Tagliente; ■ : Riparo Villabruna; ● : other sites.

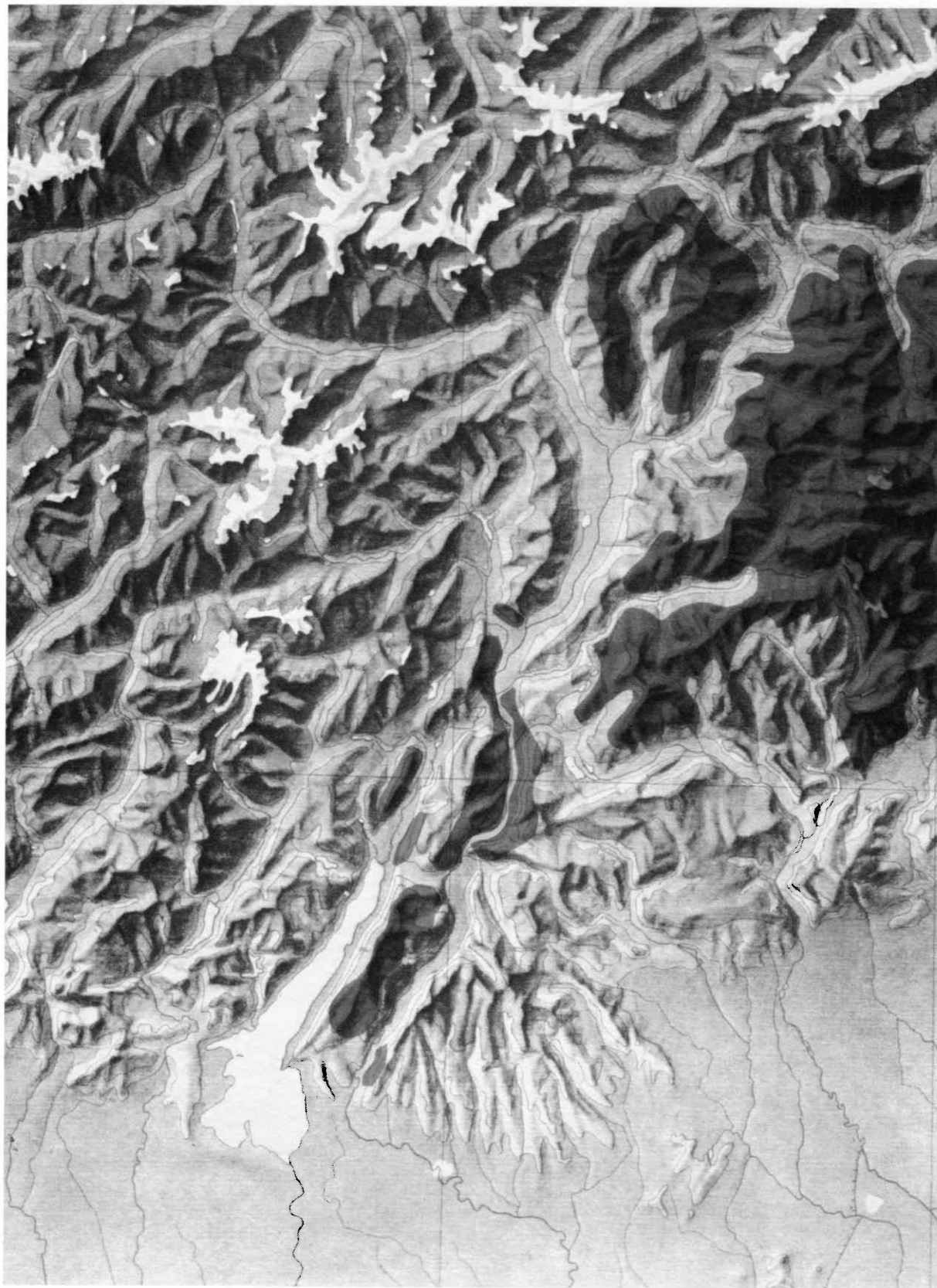


Fig. 3 — Areal distribution of the Mesolithic sites. The straight vertical edge limits the considered area.



Fig. 4 — Location of the Early Neolithic sites.

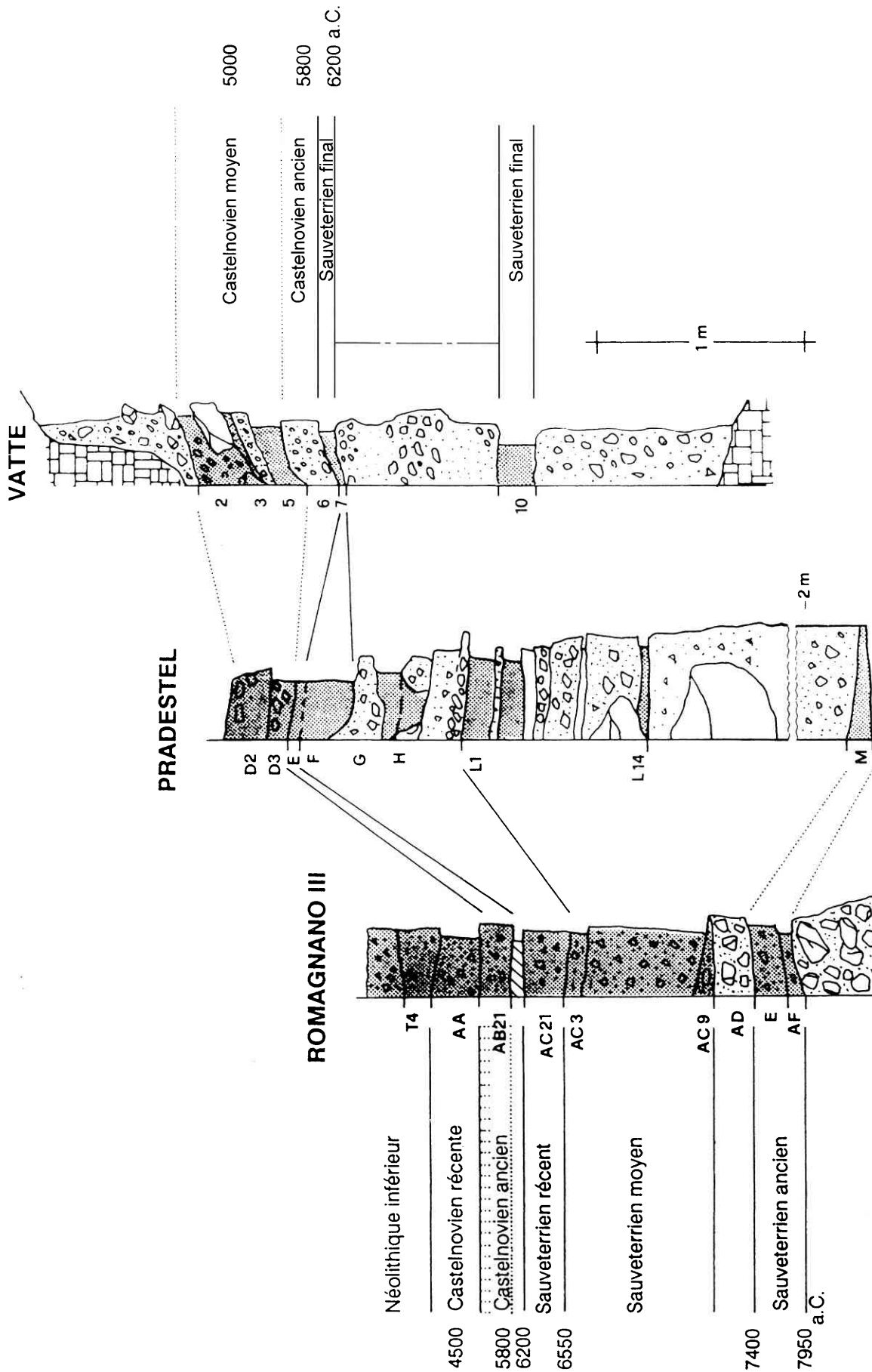


Fig. 5 — Chronostratigraphy and cultural phases of the Mesolithic valley sites in the area of Trento.

which during the Atlantic phase was higher than today and which led to a severe reduction in the prairies, with consequently a lower capacity for supporting large herds; and a modification in the last gatherer-early Neolithic economies, now orientated more towards small game, and the beginning of the first attempts at agriculture, reducing the necessity for long seasonal hunting trips out of the valley system. Even if the economy of the early Neolithic populations of the region is still connected with the hunter-gatherers' subsistence patterns, no one site of this age has been found in a high mountain context (fig. 4). The real neolithisation of the region, with the exploitation of domesticated animals is documented only with the subsequent Neolithic phase of the Square Mouth Pottery.

2. The Mesolithic case studies

The aim of this paper is to consider the Mesolithic case studies. The number of sites is sufficiently large to suggest well defined chronostratigraphies, settlement patterns, strategies and seasonal use.

The chronological and cultural definition is based on the study of a series of sites in rock shelters in the area of Trento. The multistratified sheltered sites in this part of the Adige Valley (Romagnano, Pradestel and Vatte) [fig. 5] allow us to follow in detail the stratigraphic sequence and the development of the assemblages. This series, well documented by radiometric dating (Rome lab.), has been subdivided into four Sauveterrian phases (7950–5800 B.C.) and two Caselnovian phases (5800–4500 B.C.) [Broglio, 1980; Broglio & Kozłowski, 1984; Broglio & Lanzinger, 1985]. These phases are continuous and the tools (*outils communs*) show a certain uniformity, the only new types that differentiate the Castelnovian tradition are Long Blades and Notched Blades. On the contrary, the Armatures are well differentiated in type and frequency and provide a guideline for subdivisions into the aforementioned phases. The good preservation of faunal remains and the palaeoetnological content of the sheltered valley sites have provided the opportunity to describe the environment around the camps, the economy of the human populations (Sala, 1978; Boscato & Sala, 1980; Cattani, 1978), and to support evidence for the mountain camps. This was lacking until now because the physical and chemical nature of the soils did not preserve bone.

3. The locations

It is possible to subdivide the findings in classes of homogeneous location, thanks to the large number of sites already surveyed and investigated.

4. Sheltered valley sites

A heavy concentration of sites are located along the base of the Adige valley. A common ecological background is the ecotonic location between the steep and relatively dry rocky slopes, very often near the sources of fresh water in form of gullies, and the valley infillings. The slopes ran up to high plateaux, still above the timber-line, whereas the valley bottom was developing from a vast Tardiglacial lake to a large marshy area with pools and false channels cut by a very large and slow flowing river in Early Holocene times. The sites are placed under rock roofs, topographically higher than the actual flood plain. They are embedded in slope debris that constitutes the "parent material" of the stratigraphic sequences (Soman, Romagnano, Pradestel and Vatte di Zambana) [fig. 6 and 7].

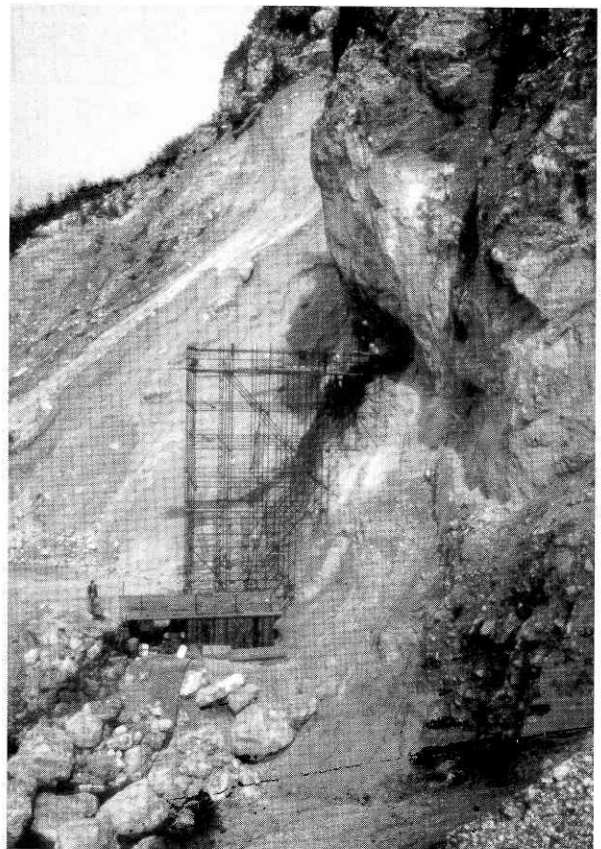


Fig. 6 — The site of Riparo Pradestel. Today the shelter is hanging over an exploited scree slope.



Fig. 7 — The valley sheltered site of Riparo Soman, at the very southern limit of the Adige valley.

The hunting remains reflect the ecotonic position of these sites: the ungulates reveal the progressive development in the environment towards the milder conditions of the Early Holocene: in the lower deposits of Pre-boreal times the *Capra ibex* largely predominates among the herbivores and reflects an environment still barely forested, with climatic conditions colder and drier than today. During the Boreal, the environment becomes more forested and humid; *Cervus elaphus* predominates, *Capreolus* reaches the same frequency as Ibex. The transition to the Atlantic phase is already developed in the Castelnovian phase; Ibex declines with a rapid increase in the frequency of *Capreolus*; deer are well represented together with Boar remains.

The presence of fish-bones, fresh-water molluscs and tortoises reflect an economy in which the water resources were well exploited (fig. 8). Unfortunately most of these sites were fully exposed on the stone scree slope during the activities of exploitation. The preservation, therefore, of the living floors in most cases is limited only to the inner part of the deposits,



Fig. 8 — The alluvial plain of the Adige Valley. Until historical times it was locally waterlogged by lacustrine and palustrine areas.

directly adjoining the rock walls. In a few sites (Soman, Romagnano and Gaban) it is possible to see a very intense period of visitation, with no sedimentological discontinuities in the human layers, in others (Vatte and Pradestel) there are clear gaps with sterile scree present in the sequence.

5. Mountain rock shelter sites

They represent a settlement pattern very similar, in a certain way, to those of the valley bottom. The distribution of the sites is further north than those on the valley bottom and they are situated at between 1,900 and 2,200 m a.s.l. Until recently they were found only in the Dolomitic region. No one site is directly attributed to the high rock walls of the Dolomitic cliffs very probably because of the high rock fall activity on the scree slopes that surround the peaks. The sites, on the contrary, are found under the small overhang of large blocks that have collapsed from the adjoining rock walls and are now placed in smooth rock formations, often in the form of lone standing huge blocks (Plan de Frea, Riparo di Tramans, Alpe di Cisles, Mondeval de Sora, Cionstoan) or vast rock fall deposits, for example the sites near Passo di Sella (Città dei Sassi) [fig. 9].

This class of site, was up to the present, limited to the Dolomitic area, where the geomorphological phenomenon of block landslides is common, probably partially connected with glacial rafting.

At Plan de Frea in Val Gardena, the site had been reoccupied for a long period, settled both by people with Sauveterrian and later with



Fig. 9 — The high mountain sheltered site of Plan de Frea. Around the bloc it has been found a large and structured site and other three zones of lithics distribution.

Castelnovian technological traditions. The lithic collections are very abundant with implements from all classes and strong evidence of flint knapping. It has been possible to distinguish structures such as fireplaces and stones used to support posts probably connected to a tent, which leant against the rock wall.

6. Peri-lacustrine mountain sites

They have been widely surveyed especially in the areas with a siliceous geological background where the lakes are much more numerous than in the areas of limestone bedrock. They are scattered around the shores of small glacial lakes or their remains are found in peat bogs. These camps are concentrated along the Lagorai Chain, where there are particularly well preserved lakes located in over deepened hollows, separated from the main valley by glacial steps of hanging troughs.

Camps have been found around almost all these lakes. Located between 1,900 and 2,200 m a.s.l., they are usually surrounded by more than one find-spot in the same lacustrine area. Although many sites have been surveyed, only a few have been adequately excavated. Among them are Lago delle Buse 2, aged at 8220 ± 110 B.P.; the well known Lago di Colbricon 1 at 8370 ± 1340 B.P. (fig. 10 and 11).

The lithics are usually very rich and often reflect the spatial organisation of the camp. In the case of Colbricon 1 (Bagolini, 1972; Bagolini & Dalmeri, 1987), it has been possible to distinguish areas differently structured, on the basis of the spatial distribution of the lithics. The site is confined between two rocky outcrops, the



Fig. 10 — The area of Lago delle Buse in the Lagorai Chain. Three sites have been excavated along the grassy area nearby the shoreline.



Fig. 11 — The area of Colbricon. Around the upper lake are recognised 9 different sites. (See also fig. 17).

artefacts are distributed along a sort of aisle with a central fireplace visible and characterised by the predominance of large tools; at the edges of the camp two areas with a predominance of *microburins* and *armatures* could be interpreted as work-shops (fig. 12).

In the case of the Lago delle Buse 1 and 3 at 1,960 m, charcoal and post holes suggest the

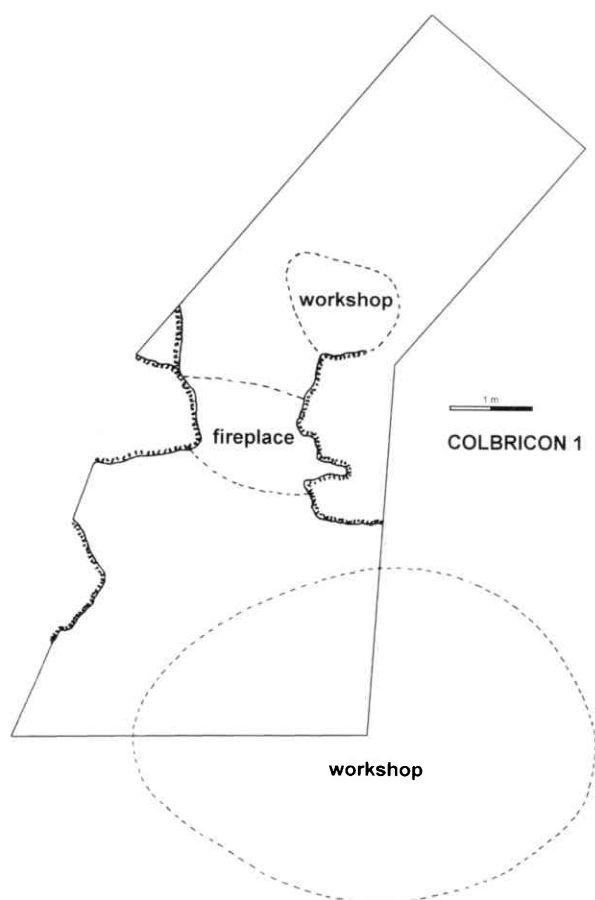


Fig. 12 — Colbricon Site 1. In the workshops the *armatures* and *microburins* predominate over the large tools.

presence of a tent or hut adjoining a glacial boulder, not sufficiently high to act as a shelter (only 1 m) but sufficient to be an ergonomic area naturally sheltered from wind action (fig. 13).



Fig. 13 — The Lago delle Buse. The Site 1 adjoining a modest erratic bloc.

7. Camps on the crests or in well exposed morphological terraces

This last type of site is placed on very sharp crests and passes between adjoining valleys or terrace edges. The common topographical feature is the location on a high position useful for controlling the surrounding lower areas. Among them, the clearest examples are the sites along the *Auf der Schneide* crest at the edge of the high plateau of the Alpe di Siusi (fig. 14 and 15).



Fig. 14 — The *Auf der Schneide* Crest in the Dolomitic district. Many sparse find spots are distributed along the crest.

Here only two find spots have been excavated but, as yet, more than fifteen other spots have been surveyed. Another example is located near to the previously mentioned perilacustrine site of Colbricon 1. Sites 6 and 8 are placed along the crest that separates the hollow of the Colbricon Lake from the Val Bonetta Valley. The



Fig. 15 — *Auf der Schneide* — Site XV. The site is topographically dominant over a large landscape.

scarp between the crest and the valley exposes a steep slope about 250 m high. The number of implements found on these sites varies substantially from single and poor find-spots up to 15,000 artefacts (Colbricon 8). In this latter case, because of the low sedimentation rate of the thin podzolic cover (maximum deepness of the soil profile before bed-rock is no more than 40 cm) no stratigraphic evidence can be used. The spatial cluster of artefacts in beds of different depth and with diverse barycenters, nevertheless points to an accumulation of deposits from human visitations at different times to almost the same location. In these sites not all the classes of instruments are equally represented, usually the *armatures* prevail over the large tools, the waste material is of hypermicrolithic size, and the number of *microburins* is usually very high. The structural features are very poor, lacking clear evidence of fireplaces or post holes.

8. The structure of the industries

As previously mentioned, the lithic assemblages of the stratified sequences in the Adige valley sites can all be attributed to the evolution of a common technocomplex. Due to the fine chronological subdivisions and the large number of ^{14}C dates, the typological homogeneity of these attributed industries can be extended to the mountain finds, which have rarely been dated. In spite of this widespread and homogeneous technocomplex, the structure of the assemblages seems to show differences that we think reflect the prevailing activities performed at the camps. The clearest example is the case of the workshops in which the so-called *microburins* largely predominate over *armatures* produced with this kind of technique. Another example that can give functional information is the case of the assemblages very rich in broken and/or whole *armatures*. This could be evidence for activities orientated towards the production of arrow tips, in a context where probably hunting prevailed.

Using a cross plot to summarise these two indexes, it is possible to observe the following groupings (fig. 16).

All the assemblages found in the sites located on crests are placed in one homogeneous group. Here *armatures* completely dominate, by 70%, over the other classes of larger instruments. A high frequency of *microburins* is also often noticeable. We have interpreted these data

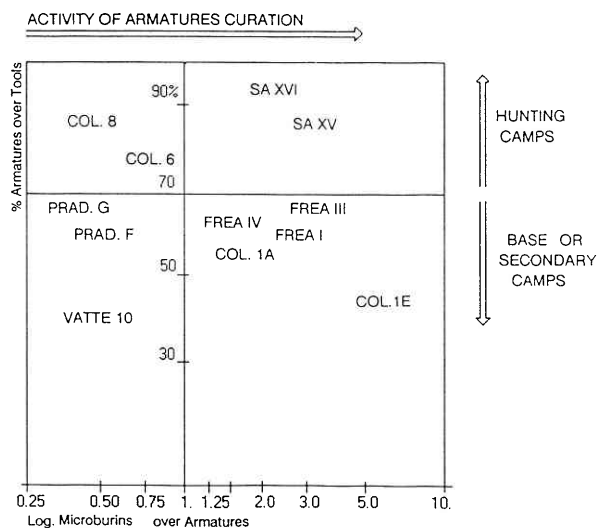


Fig. 16 — "Functional Scatterplot".

as reflecting discarded items connected with hunting activities, such as the preparation and curation of points fixed to the tips of the arrows. These sites, therefore, because of their very exposed position and the structure of the assemblages, could be the result of activities performed in a hunting camp.

A different pattern seems to occur in the assemblages of the valley bottom sites and the mountain camps near lakes or in rock shelters. In these industries all tool classes (burins, end scrapers, knives, etc.), and *armatures* types (backed points, double backed points, triangles, trapezes, etc.) are represented.

In the case of the Lago delle Buse 1 and 2, longitudinal strata connected with cutting and scraping activities on fresh bone and meat have been identified (Lemorini, in press). A first interpretation of such a situation, seems to point to multi-functional activities connected with food procurement from hunting practices (*armatures*), together with slaughtering and maintenance tasks (tools of larger size on flakes and blades).

The ratio of *microburins* over *armatures* could also be significant in reflecting several activities performed at camp sites. A high number of *microburins* over *armatures* could reflect *armature* curation within intra-site spatial organisation of these camps. Such an example is represented in the mountain site of Colbricon 1 in which, as already mentioned, a specialised workshop area has been found in the context of a larger camp (Bagolini, 1972; Lanzinger, 1986; Bagolini & Dalmeri, 1987). Another example of this

situation can be seen at the crest sites of Seiser Alm XV and XVI in the Dolomites, where the high percentage of *microburins* is connected to the predominance of the *armatures* over the larger tools. The functional interpretation of this structure allows us to hypothesise that whilst staying in the stalking stands the hunters were using the time for preparing or repairing arrows tips.

It is interesting to note that the crest camps of Colbricon 9 and 8, which show the same high *armature* index, differ from the sites previously described because of a clearly recorded lack of *microburins*. The difference is probably connected with the proximity of the secondary camps upon the lake shores (less than 15 min walk). Thus, the vicinity of the base camp seems to be reflected in a reduction in the rate of *armature* preparation. This could mean that hunters were equipped with weapons already prepared in their base camp workshops (the workshops of Colbricon 1?) [fig. 17]. On the basis of their typologies, many of the nine camps clustered around the Colbricon lakes show strict similarities, but it is clear that we can only presume synchronous links between them. The aim of these observations is to tentatively hint at the possibility of recognising a quite sophisticated inter-site organisation in the seasonal exploitation of the mountain environment by the Mesolithic hunters.

To summarise it is interesting to note that these statistical observations fit very well the functional interpretations that are proposed on

the basis of the geomorphological context in which these camps are located.

On the basis of these observations, it is possible to sketch a logistical system that encompasses all the previously described aspects. We, therefore, interpret the valley bottom sites as base camps; the mountain sites in rock shelters and around the lakes as secondary camps, settled repeatedly for long periods of time (days, weeks, months; it is impossible to establish) and the well exposed hunting camps or stalking stands connected with the ultimate goal of exploiting the mountains by humans the game.

9. Hunting strategies

The reconstruction and interpretation of the hunting strategies performed in this Mesolithic context is challenging even if still very hypothetical.

The distribution along the crests of camps with hunting associations, allows us to think about locations for the interception of wild herds. If this model is generally good for the examples of Seiser Alm and Colbricon, current research seems to give more information and explains even better this hypothesis.

The case study is at Val di Dona, in the heart of the Dolomites at an altitude of 2,200 m. The high and suspended valley is on one side linked with a large and lower valley by means of a river which has eroded a gully of volcanic sediments. The gully continues along the bed of the valley with an elongated terrace to the north, and with a steep slope to the south (fig. 18).

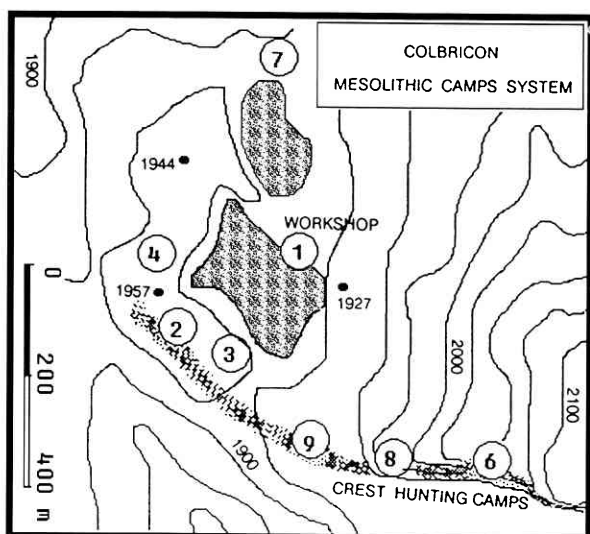


Fig. 17 — Hypothesis on the functional intrasite relations among the Colbricon Camps.

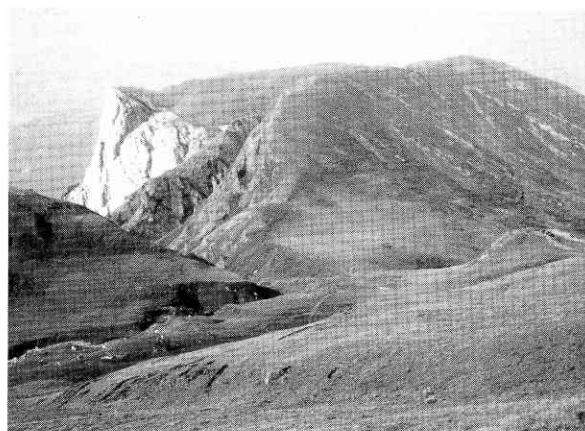


Fig. 18 — Val di Dona. Gully and lateral capture of the Rio Udai.

Many findspots show the strategic value of this location. One set of sites has been found just behind a hill that blocks the entrance of the main valley into the area of the stream catchment. The archaeological situation shows a scatter distribution of artefacts all along the terrace (about 200 m), without any particular concentration. This has been tested with a systematic survey every 10 m². Only behind this scatter, hidden by a small hill, is there some concentration of lithics. Our interpretation, only hypothetical, is that along the terrace there were stalking stands, waiting for daily small scale movement of Ibexes or Roe deers (for the chamois it still happens today). Despite the impossibility of demonstrating this idea, we like the idea of the presence of beaters employed to force the animals into the gorge and to prevent them doubling back and escaping. Once in the gully, the only escape route was along the gully itself or even better straight across the steep slope directly in the shooting range of the stalkers. A few large tools, among those a large and very worn burin, suggest that the butchering activities were performed in the same area. The small site, 50 m behind, could represent perhaps a secondary camp or something less strategic (rest and consumption of the food) connected to the hunting event (fig. 19).

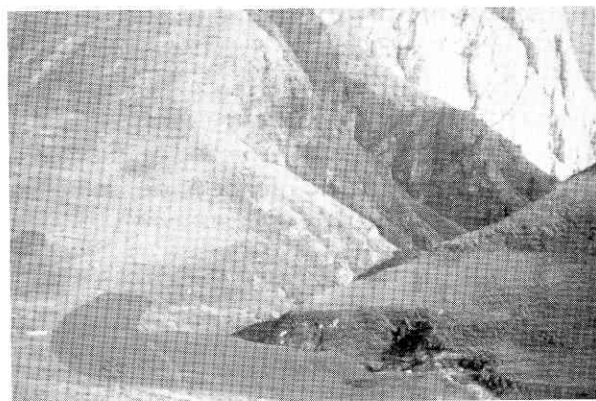


Fig. 19 — Val di Dona. In shadow the area of distribution of the artefacts.

10. The seasonal treks and territories

Even if, we cannot support an interpretation of seasonality based on the faunal remains from the valley sites (mortality curves based on teeth growth) the division of sites between the valley base and the mountain camps seems very logically to be the result of a seasonal intra-site

system in which the high mountain camps were occupied and perhaps re-occupied during the warm season, and at least when there was no snow cove.

Following this hypothesis, with the analysis of the raw material abandoned in the camps, we can test the possibility of recognising differentiations in the use of the territory by Mesolithic bands. The lithic assemblages of the region are made mainly of mesozoic flint, very diversified in colours and with an homogeneous distribution throughout the southern fringe of the Alps (the geological Sudalpine district). In the area of chert outcrops, all the types (with a predominance of the red types) are found in the assemblages of the Adige valley sites.

In the Dolomites, out of the area of the flint bearing formations, the flint assemblages are as diverse as the Adige valley sites, but rock crystal from the northern outcrops of the Metamorphic basement and a very local type of green chert, less suitable for knapping, have also been used. The frequency of chert and rock crystal artefacts is at its maximum in the Dolomitic area and spreads down, lowering in rate, until it reaches the Adige Valley. Here only a very precious double microlithic point has been found at the Riparo Gaban.

Particularly interesting is the case of the Lagorai mountain sites. The geology of this elongated mountain crest, about 30 km long, is volcanic, therefore all the raw material exploited during the Mesolithic period of the area had been imported from outside. A different distribution of the raw material has been noticed: the sites placed to the west have a composition very similar to that of the Adige valley (all the classes of colours) whereas the eastern camps are enriched by grey coloured flint. It is worthwhile to note that no one piece in rock crystal has been found in the eastern sector.

This distribution of raw material could allow us to reconstruct, hypothetically, large "areas of influence" of different human groups (fig. 20). A first area could link together in a seasonal system the Adige valley sites with the Dolomitic district and the adjoining territories of the western part of the Catena del Lagorai up to the area of Lago delle Buse, that can actually be reached in two days walking from the base camps in the area of Trento. A different cluster seems to be represented by the eastern sites where the grey chert predominates: all the territories around the Colbricon lakes were probably in the range of

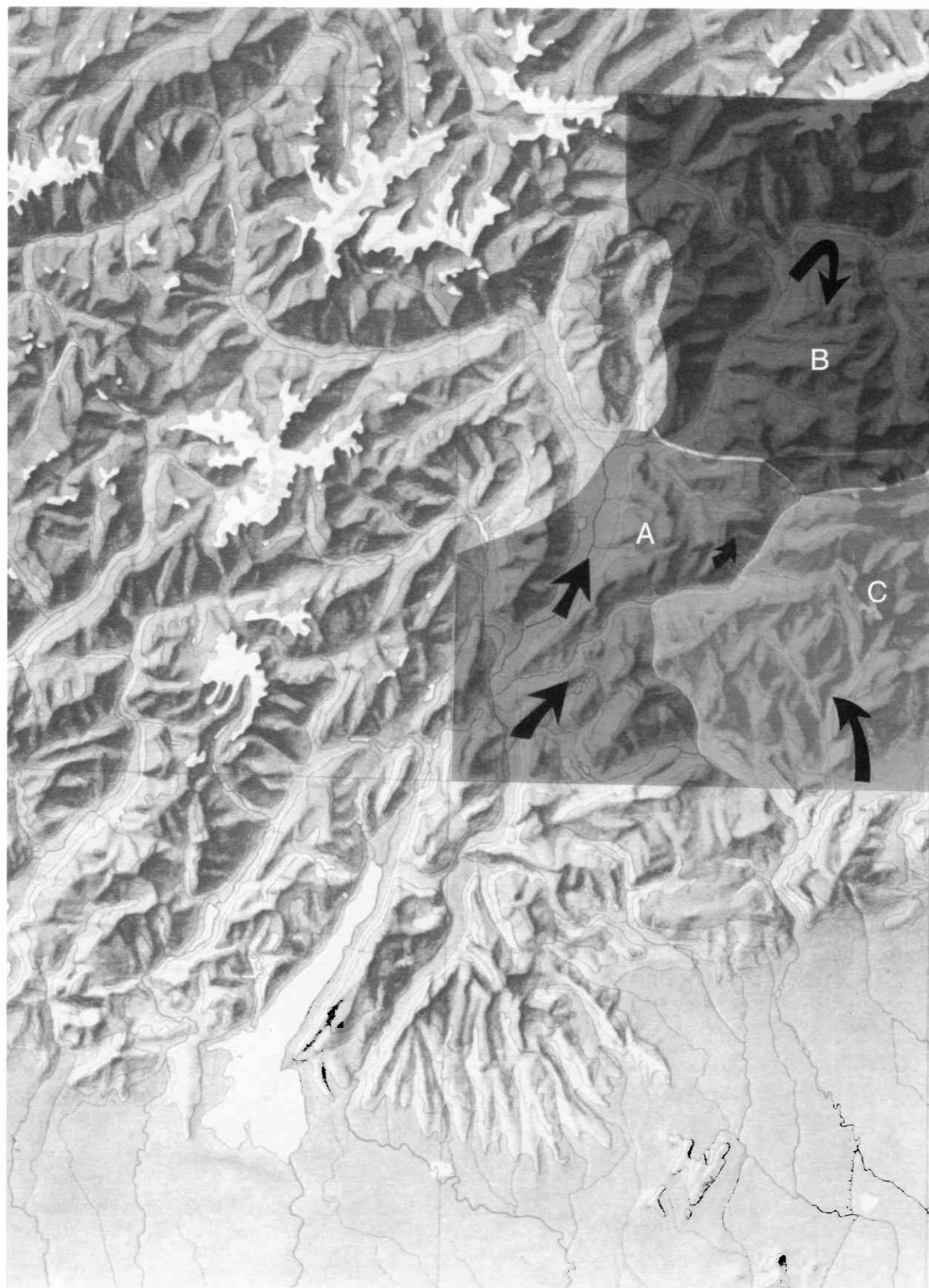


Fig. 20 — Main influence areas of raw material. **A:** mesozoic red flint of the Adige Valley; **B:** mesozoic grey flint; **C:** red flint, Dolomitic triassic chert and rock crystal.

groups that did not settle in the Adige Valley but somewhere else in the eastern district. It is noticeable that other sites in the same area, but of Epigravettian tradition, share the same raw materials as those of the Mesolithic.

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