

THE PREHISTORY OF THE EARLY ATLANTIC PERIOD ALONG THE LIGURIAN AND ADRIATIC COASTS OF NORTHERN ITALY IN A MEDITERRANEAN PERSPECTIVE

PAOLO BIAGI

PREFACE

This article considers the prehistory of northern Italy during the Late Mesolithic and Early Neolithic periods with special regard to the Ligurian and Adriatic coastlines.

Late Mesolithic "Castelnovian" sites are distributed throughout the entire study area. Concentrations are known in the mountain regions where intensive surveys and excavations have been carried out namely the Trieste Karst, the Adige Valley in the Veneto, Trentino and South Tyrol and surrounding areas, the south-central alpine arc in Lombardy, the eastern Ligurian Apennine chain and the nearby Tuscan-Emilian watershed (Bagolini and Biagi 1980; Biagi *et al.* 1989). Isolated finds are also attested in the Po Valley, both to the North and to the South of the river Po. Along the Alpine piedmont the stations are sometimes located on moraines surrounding lakes of glacial origin.

Several traces of Castelnovian occupation come from the caves of the Trieste Karst. Here Late Mesolithic layers are often stratified between "Sauveterrian" Early Mesolithic and Early Neolithic Vlaška or Vasi a Coppa levels (Cannarella and Cremonesi 1967). The Late Mesolithic layers at Grotta Benussi have been dated to 7620 ± 150 BP (R-1044), layer 4; 7230 ± 140 BP (R-1042), layer 3/4; and 7050 ± 60 BP (R-1043), layer 3 (Table 1). Along the northern Adriatic coastline, further to the West, a few Castelnovian surface finds have been collected some kilometres inland (Fig. 1), around the lagoons of Marano and Venice (Broglia *et al.* 1987). No Late Mesolithic site is known South of the Po in the Romagna and Marche regions, where, on the contrary, a number of Early Neolithic Impressed Ware Pottery settlements have recently been discovered (Bagolini *et al.* 1988). The earliest of these is that of Maddalena di Muccia in the Marche, dated to 6580 ± 75 BP (R-643) (Alessio *et al.* 1970). Further to the North the Impressed Ware site of Fornace dei Cappuccini gave a date of

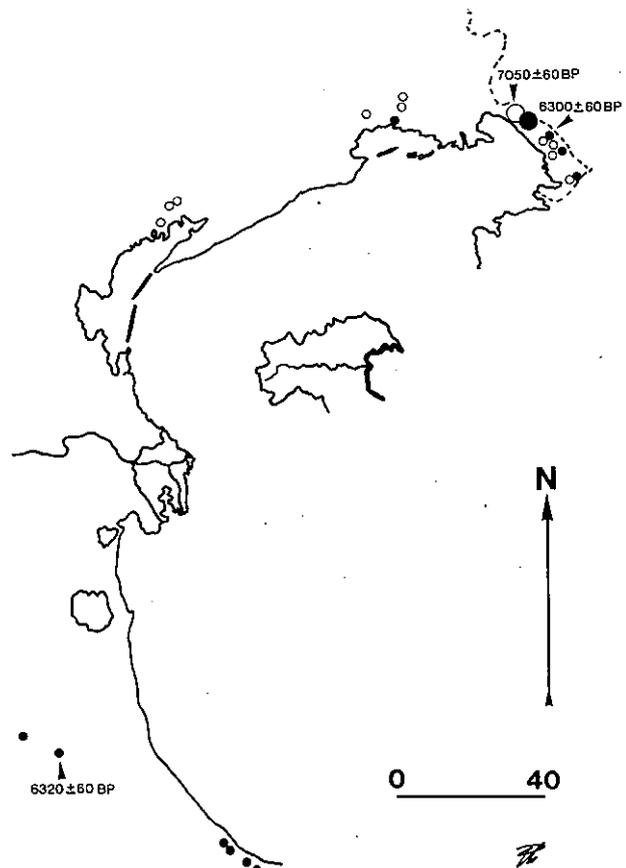


Fig. 1. - Distribution map of the Late Mesolithic and Early Neolithic sites of the North Adriatic coast. The dates are, from left to right, R-1040A, R-1043 and Bln-3372.

6320 ± 60 BP (Bln-3372). Only a few potsherds attributable to vessels of the Dalmatian stream (Chapman and Müller 1990) of this tradition come from the Trieste Karst caves.

A rather different situation is that at the Ligurian coast where no Castelnovian camp has been discovered. Here Late Mesolithic sites lie on middle/high altitude Apennine passes, often very

Table 1 - List of the C14 dates of the study area. Calibrations according to Stuiver and Reimer (1986).

Site name	BP yrs	Cal BC yrs (1 sigma)	Lab n	Period	Site type	Feature
North Adriatic coast						
Benussi	7620 ± 150	6600-6270	R-1044	M	Cave	Layer 4
Benussi	7230 ± 140	6180-5960	R-1042	M	Cave	Layer 3/4
Benussi	7050 ± 60	5991-5824	R-1043	M	Cave	Layer 3
Maddalena di Muccia	6580 ± 75	5562-5434	R-643	N	Open site	Pit
Cappuccini	6320 ± 60	5339-5230	Bln-3372	N	Open site	Pit
Ripabianca	6260 ± 85	5312-5157	R-559	N	Open site	Pit
Ripabianca	6210 ± 75	5256-5085	R-598A	N	Open site	Pit
Ripabianca	6140 ± 70	5223-4978	R-598	N	Open site	Pit
Ligurian coast						
Arene Candide	6980 ± 115	5980-5700	UB-2423	N	Cave	Layer 14
Pollera	6950 ± 100	5950-5690	MC-756	N	Cave	Layer XXX
Arene Candide	6910 ± 110	5890-5660	LJ-4143	N	Cave	Layer 14-13
Arene Candide	6700 ± 145	5700-5480	UB-2424	N	Cave	Layer 14
Stefanin	6610 ± 60	5575-5480	Bln-3276	N	Cave	Layer 2
Pollera	6580 ± 110	5590-5390	MC-757	N	Cave	Layer XXIX
Arene Candide	6520 ± 100	5530-5350	LJ-4144	N	Cave	Layer 15-14
Edera	6510 ± 110	5530-5340	MC-2332	N	Cave	Hearth
Edera	6490 ± 110	5520-5320	MC-2333	N	Cave	Hearth
Nasino	6470 ± 120	5520-5290	R-267	N	Shelter	Layer IXi
Nasino	6420 ± 65	5461-5311	R-313	N	Shelter	Layer VIII
Nasino	6400 ± 105	5460-5250	R-313A	N	Shelter	Layer VIII
Nasino	6280 ± 120	5350-5120	R-265	N	Shelter	Layer IXs
Nasino	6280 ± 70	5317-5217	R-315	N	Shelter	Layer IXs
Aquila	6240 ± 90	5283-5098	Bln-3450	N	Cave	Below layer
Arene Candide	6220 ± 55	5241-5163	R-101	N	Cave	Layer 26-25
Nasino	6140 ± 110	5250-4950	R-263	N	Shelter	Layer VIIIa
Nasino	6015 ± 65	5010-4847	R-316	N	Shelter	Layer IXm
Nasino	5980 ± 85	4979-4797	R-333	N	Shelter	Layer X
Nasino	5955 ± 65	4930-4787	R-316A	N	Shelter	Layer IXm
Continental Italy						
Romagnano III	7850 ± 60	6781-6591	R-1137	M	Shelter	Layer AB2-1
Romagnano III	7800 ± 80	6717-6500	R-1137B	M	Shelter	Layer AB2-1
Bagioletto	7670 ± 120	6620-6420	I-12687	M	Open site	Red earths
Romagnano III	7500 ± 160	6490-6160	R-1137A	M	Shelter	Layer AB2-1
Covoloni Broion	6970 ± 60	5850-5719	R-892	M	Cave	Layer 6
Comunella	6960 ± 130	5980-5680	Birm-830	M	Open site	
Pradestel	6870 ± 50	5769-5654	R-1148	M	Shelter	Layer D3-1
Fienile Rossino	6810 ± 70	5749-5611	Bln-3277	M	Open site	Pit
Crestoso	6790 ± 120	5770-5550	Har-8871	M	Open site	Pit
Vhò	6170 ± 110	5260-4970	I-11445	N	Open site	Pit XVIII
Lugo di Romagna	6170 ± 50	5224-5062	Bln-3370	N	Open site	Beam
Travo	6130 ± 160	5270-4870	I-13798	N	Open site	Pit
Sammardenchia	6120 ± 60	5211-4958	Bln-3373	N	Open site	Pit
Ostiano	6090 ± 100	5210-4900	Bln-2795	N	Open site	Pit III
Romagnano III	6060 ± 50	5061-4918	R-781A	N	Shelter	Layer T4
Fagnigola	6050 ± 90	5097-4857	R-1544A	N	Open site	Pit 1
Gaban	6030 ± 45	5012-4883	Bln-1777	N	Shelter	Layer D2
Chiozza	6000 ± 200	5180-4690	R-458	N	Open site	Pit
Gaban	5990 ± 45	4954-4829	Bln-1778	N	Shelter	Layer D8
Cecima	5930 ± 130	4980-4710	Har-5123	N	Open site	Pit
Vhò	5930 ± 50	4900-4781	Bln-3135	N	Open site	Pit XXXII
Savignano	5880 ± 50	4831-4730	Bln-2976	N	Open site	Pit
Travo	5830 ± 210	4960-4470	I-13779	N	Open site	Pit
Romagnano III	5810 ± 50	4774-4618	R-781	N	Shelter	Layer T4
Fagnigola	5760 ± 160	4820-4440	R-1545A	N	Open site	Pit 4
Gaban	5750 ± 60	4721-4527	Bln-1777A	N	Shelter	Layer D2
Gaban	5650 ± 150	4700-4370	Gif-3766	N	Shelter	Layer D8

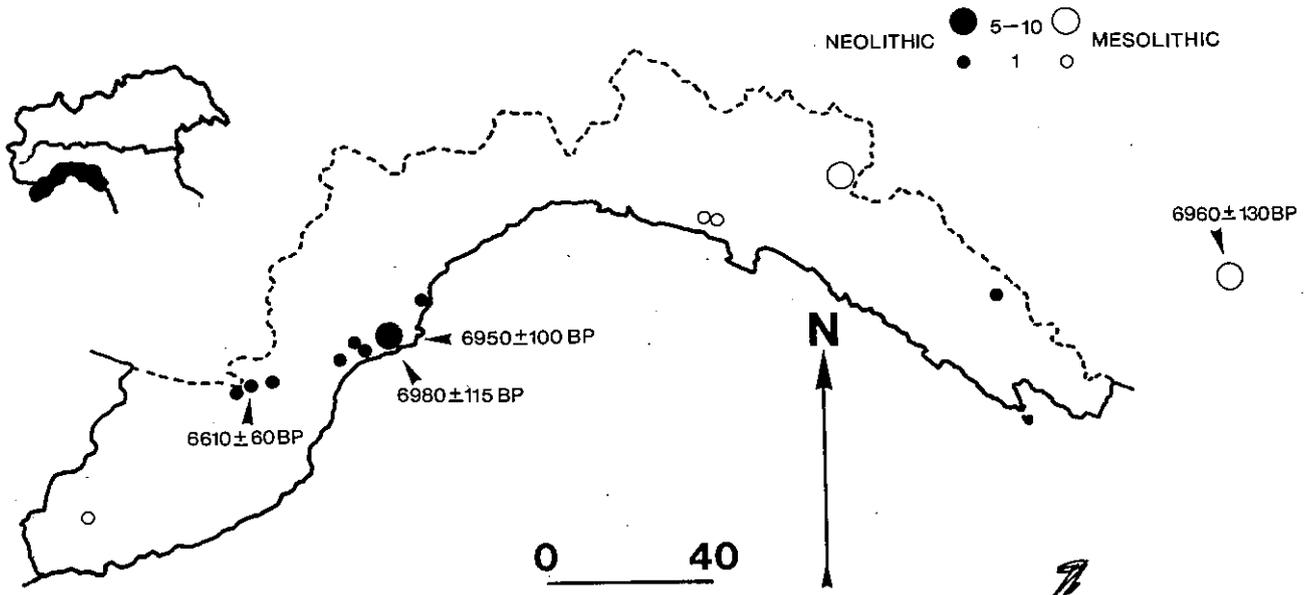


Fig. 2. - Distribution map of the Late Mesolithic and Early Neolithic sites of Liguria. The dates are, from left to right, Bln-3276, UB-2423, MC-756 and Birm-830.

close to jasper or other raw-material outcrops (Biagi and Maggi 1983). None of the caves with Late Palaeolithic and Early Neolithic sequences, as for example the Arene Candide, Arma dell'Aquila and Stefanin, produced traces of Mesolithic occupation (Barker *et al.* 1990; Bietti 1987). In the nearby Tuscan-Emilian Apennines, one of the more recent

Castelnovian sites, Passo della Comunella, has a date of 6960 ± 130 BP (Birm-830); a date almost contemporaneous with those available for the earliest Neolithic of the Arene Candide and Pollera caves, namely 6980 ± 115 BP (UB-2423) and 6950 ± 100 BP (MC-756) (Fig. 2).

There are reasons for supposing that the evidence

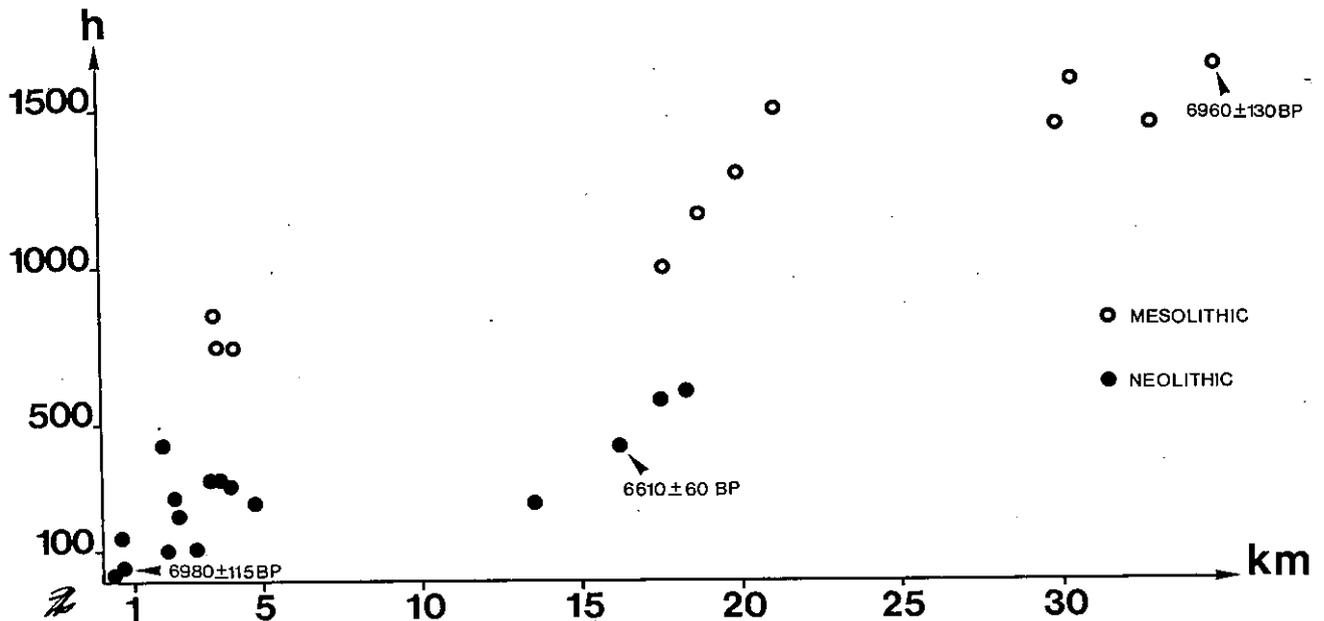


Fig. 3. - Distribution map of the Late Mesolithic and Early Neolithic sites of Liguria in relation to distance from the sea and height above sea-level. The dates are, from left to right, UB-2423, Bln-3276 and Birm-830.

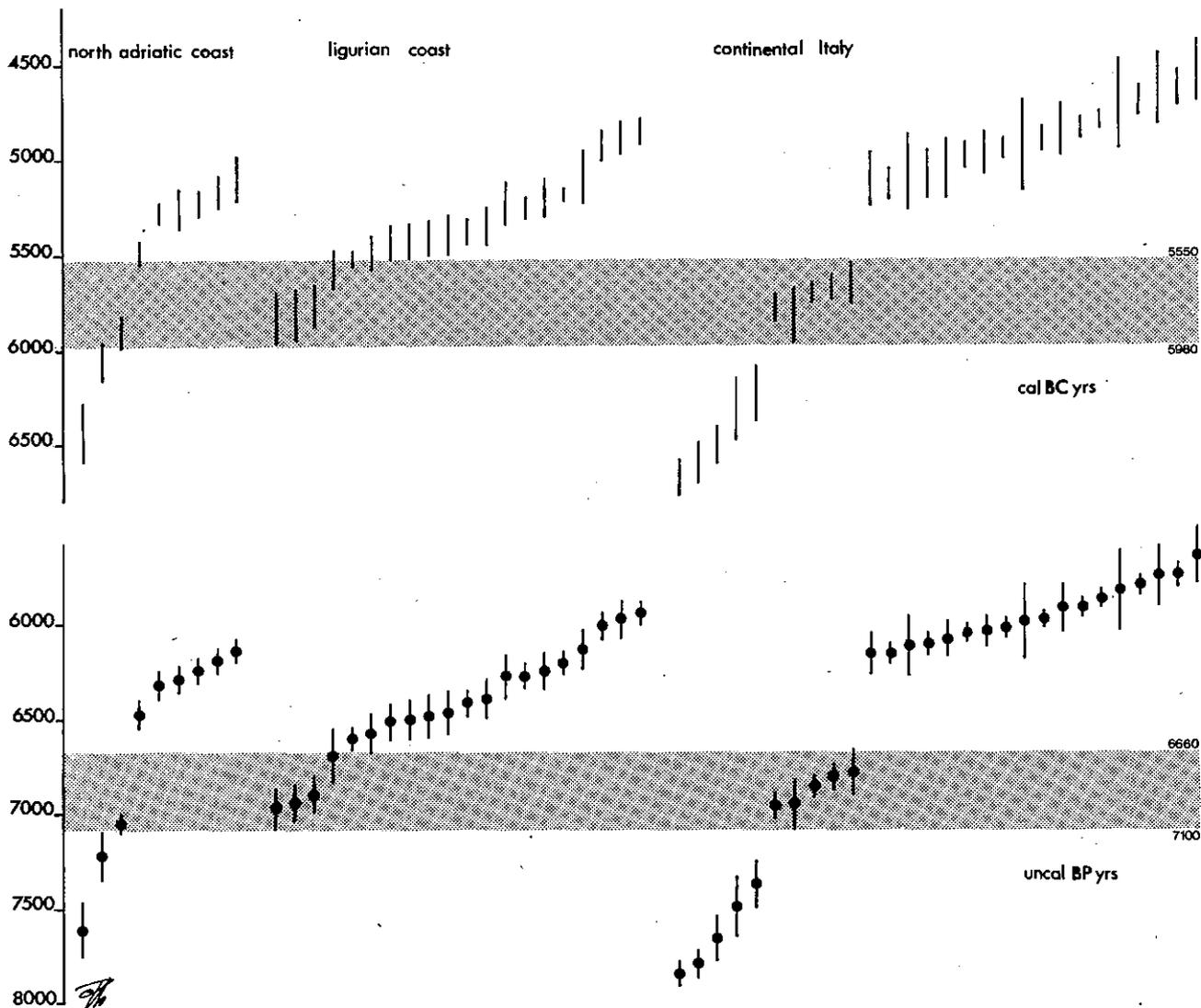


Fig. 4. - Scatterplot of the C14 dates of Table 1.

from sites from the North Adriatic and Ligurian coastlines is strongly affected by disappearance of a number of sites during the post-glacial sea-level rise. As far as we know, the North Adriatic coastline lay 8 to 20 metres below present sea-level around 7000 BP (Bortolami *et al.* 1977). Similar data come from Provence and probably apply to Liguria (Geddes *et al.* 1983). The contemporaneous archaeological evidence for Liguria during the seventh millennium BP consists of a number of caves with Early Neolithic occupation, sometimes opening quite inland along valley bottoms and sides, and of concentrations of middle/high-altitude Castelnovian stations along the Apennine watershed (Fig. 3). The radio-

carbon dates indicate that the two material cultures coexisted at least for a few centuries. As confirmed by more recent data (Bagolini and Biagi 1990), continental Italy was inhabited by Late Mesolithic bands at least until the middle of the seventh millennium BP. The first Neolithic communities settled on the Po Plain around the end of the same millennium as the C14 dates from Vhò and Fiorano demonstrate. The radio-carbon evidence shows a gap of at least 350 C14 years, between the disappearance of the last hunter-gatherers and the arrival of the first farmers (Fig. 4).

Almost nothing is known of the late Castelno-

vian of the entire study region. This is due to the disappearance of most open air sites in the Po Valley, a very limited number of excavations carried out at such sites and absence of faunal remains at Alpine stations, with the exception of the Adige Valley rock-shelters and Trieste Karst caves.

THE CHIPPED STONE ASSEMBLAGES

The industrial evolution of the Mesolithic complexes is known thanks to excavations of Adige Valley rock-shelters around Trento (Broglia and Kozłowski 1983) and the sequences of the Trieste Karst caves, but in both these regions the Castelnovian series are incomplete. Sites more recent than the above-mentioned have been excavated in the Lombardy Alpine and Tuscan-Emilian Apennine chains (Baroni *et al.* 1990; Castelletti *et al.* 1976). The Castelnovian station of Fienile Rossino in the Brescian Pre-Alps has a date of 6810 ± 70 BP (Bln-3277). The high altitude (2000 m) Alpine hunting camp of Laghetti del Crestoso gave a date of 6790 ± 120 BP (Har-8871); while the site of Passo della Comunella in the Emilian Apennines, just East of the Ligurian watershed, has a date of 6930 ± 130 BP (Birm-830). Chipped-stone assemblages from these sites are characterized by long and short end scrapers, various types of trapezes (some with a *piquant trièdre* point), notched blades, microburins and pyramidal bladelet cores. In many cases, such as those of Eastern Liguria, the Trieste Karst or the moraines of pede-Alpine lakes, Castelnovian bands exploited local raw material sources. The existence of a complicated long-distance flint network throughout the Po Valley, between the Alps and the Apennines has been indicated by Cremaschi (1978).

Chipped-stone assemblages from Impressed Ware Culture sites of Liguria are of various materials: varieties of flint, dark red and green jasper, hyaline quartz and obsidian of Sardinian origin (Williams Thorpe *et al.* 1979). Tool-types include short end scrapers, straight perforators, truncations, isoscele trapezes with backed or flat, bifacial, truncations and rare microburins (Bagolini and Biagi 1987).

At the North Adriatic Impressed Ware settlement of Fornace dei Cappuccini, the lithic assemblage is characterized by an impressive number of burins, often double, obtained from broken flakes, trunca-

tions, long end scrapers with a steep front, as well as trapezes of "Castelnovian" type, straight awls, sickle blades with oblique sheen and microburins. Flint employed for chipped artefacts comes from the Marche outcrops some 80/100 kms to the South-East. Obsidian tools, representing 8.5% of the total assemblage, come from various South Italian sources (Ammerman pers. comm. 1990).

Flint assemblages of the Vhò and Fiorano Cultures of northern Italy comprise peculiar artefacts such as burins on a side notch. The instruments are commonly obtained from bladelets and consist of straight awls, geometrical tools, bladelets with sinuous sides, sickles with oblique sheen and microburins. The flint comes from a pede-Alpine source, perhaps Mount Baldo in the Veneto. It reached some 150 kms to the South of the river Po to Piedmontese and Emilian sites. No obsidian tool is recorded at sites of these cultures.

THE FAUNAL ASSEMBLAGES

A restricted number of Castelnovian sites has faunal remains. Rock-shelters of the Adige Valley in Trentino, namely Romagnano and Pradestel, show that red and roe deer were the main source of meat, followed by chamois and boar (Boscatto and Sala 1980).

Fowling and fishing were practised on a smaller scale. Late Mesolithic subsistence of the Trieste cave bands was based on hunting red deer, followed by roe deer and boar. Collection of marine molluscs also played an important role at the beginning of the Atlantic period and fishing was also practised (Cremonesi 1978-81). At Arene Candide in Liguria, by the beginning of the seventh millennium BP, subsistence was largely based on domesticated animals: sheep, followed by cow and goat. Wild animals, mainly boar and red deer, represent 35% of the bones (Rowley-Conwy 1987). Wheat and barley seeds, as well as agricultural implements including mullers and saddle-querns, are also recorded (Biagi and Nisbet 1987). Along the North Adriatic coast, the earliest Impressed Ware site, Maddalena di Mucchia in the Marche, has a date of 6580 ± 75 BP (R-643). Its subsistence was based on hunting red deer and boar. This picture changed a few centuries later, as documented by finds at Ripabianca di Monterado in the same region, where the oldest

date is 6260 ± 85 BP (R-599). Here sheep and goats represent 64% of the assemblage (Barker 1975).

Sheep/goat and cattle also seem to predominate over the species in the Early Neolithic Vlaška or Vasi a Coppa Group of the Trieste Karst. Red, roe deer and boar still predominate in the Vhò sites of the Po Plain (Barker 1976) which began to flourish around the end of the seventh millennium BP.

CONSIDERATIONS

The origin of the Neolithic in northern Italy has some obscure aspects which the research of the last twenty years has not yet clarified. They are:

- 1) The more recent Castelnavian camps are known from pede-Alpine, Alpine and Apennine finds. They are dated to the first centuries of the seventh millennium BP. A gap of several hundred years is perceptible in the stratigraphies of the Adige Valley rock-shelters between the end of the Castelnavian and the appearance of the first pottery making communities.
- 2) The Ligurian caves which show evidence of long occupation throughout the Late Palaeolithic and the Early Neolithic, were not settled during the Preboreal, Boreal and Early Atlantic climatic periods. This is clear from reexamination of the material and the C14 datings of the Arene Candide, Arma dell'Aquila and Stefanin caves.
- 3) The Ligurian Impressed Ware Culture has C14 dates earlier than those of the North Adriatic settlements of the same culture. The oldest date, from Arene Candide (UB-2423), is some 400 years earlier than that from Maddalena di Muccia in the Marche (R-643).
- 4) In Liguria, a few Mesolithic Castelnavian camps lie some 3.5/4 kms from the present coastline, at altitudes around 700/800 metres above sea-level. These sites have not yet been carbon dated. Further to the East, the Castelnavian station of Passo della Comunella has a date almost identical (Birm-830) to that known for the earliest Impressed Ware layers of the Arene Candide and Pollera caves (UB-2423 and MC-756) (Figs. 2 and 3). This suggests that the two traditions coexisted, perhaps along the shore now under water.
- 5) Both Late Mesolithic and Early Neolithic sites were undoubtedly covered by the post-glacial sea-

level rise. But, while in Liguria the strip between the post-glacial coastline and the present one is rather narrow, at least 20/25 kms of flat land, reasonably fertile and suitable for habitation, have been submerged along the North Adriatic coastline since 9000 BP (Shackleton and Van Andel 1985). This indicates that the settlement pattern of the archaeological record, as represented by cave sites in Liguria and the Trieste Karst, is likelihood defective.

6) Even though the Castelnavian technological background is said to have been of fundamental importance for the Early Neolithic tool-kit of the North Italian flint assemblages, clear differences are recognizable between regional complexes. For instance, the flat-retouch technique only appears in the *fleches tranciantes* of the Ligurian Impressed Ware Culture. A wide variety of new types, including long straight awls, sickles with sheen, bladelets with sinuous profiles, and various types of burins (including the side-notch ones), make their appearance (Fig. 5). Raw materials employed by the Early Neolithic communities are more varied and sources seem to have been accurately selected, at least during the Vhò and Fiorano Cultures. Obsidian began to arrive during the Impressed Ware period, although limited to the coastal region (Barker *et al.* 1987).

7) Even though only a few dates are available for the North Adriatic sites (Fig. 1), the northernmost settlements of the Impressed Ware Culture in Romagna seem to be more or less contemporaneous to the Vlaška or Vasi a Coppa cave sites of the Trieste area. This strengthens recent suggestions of an early spread of the Danilo Culture in Dalmatia (Chapman 1988) and a late arrival of the Impressed Ware Culture North of the Marche.

The above-mentioned points imply that the neolithisation of the North Italian coastline was an involved process. Lack of archaeological evidence in the North Adriatic region and continental Italy during the key centuries between the end of the Mesolithic and appearance of the first villages is clear from the scatterplot of Fig. 4. It shows that C14 dates from later Castelnavian sites of continental Italy clearly overlap the oldest so far available for the North Italian Neolithic; that is those provided by the Impressed Ware sites of the Ligurian coast. In this latter region a "full" stage of neolithisation is already attested by domestic animals, which largely prevail over wild ones at Arene Candide, as well as by agricultural implements, pottery with impressed

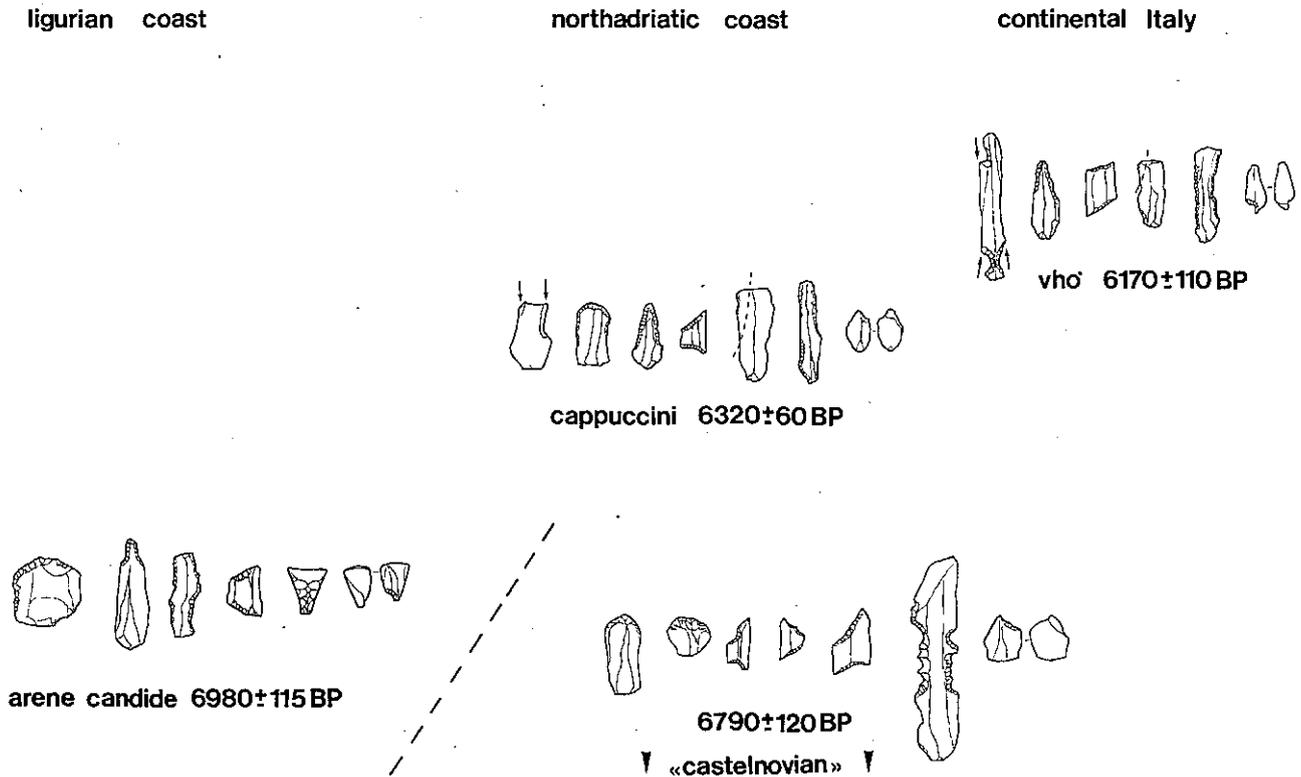


Fig. 5. - Flint instruments from Late Mesolithic and Early Neolithic sites of the study area in chronological order.

decoration and greenstone axes/adzes. Lewthwaite (1989) has recently argued that Liguria acted as barrier instead of a filter in the spread of the Neolithic innovation. This is not improbable if one considers that the Ligurian group of the Impressed Ware Culture, which has parallels only at a few sites in southern France (Biagi and Nisbet 1986), did not cross the Alpine watershed until a late stage in its development (Bagolini and Biagi 1972-74). Here fishing seems to have been irrelevant to the Neolithic diet even though we may have to regard Arene Candide as a cave with activities complementary to those practised at coastal sites now submerged. Marine resources certainly were of major importance in the Trieste Karst by the middle of the same millennium BP, but the sparse data available shed little light on our knowledge about the existence of fishing communities along the North Italian shores around the beginning of the Atlantic climatic period (Lewthwaite 1985).

Some data offered here reinforce an impression of a western origin for the Impressed Ware Culture

of the Ligurian coast, the earliest Neolithic tradition of the study area. Radiocarbon evidence, as well as presence of domesticates (mainly caprines and cattle), strong similarities between Ligurian pottery decoration and that of the Peiro Signado *facies* of southern France (Grimal 1982) as well as occurrence of trapezes of the so-called *fleche tranciant* type, support this view.

A few centuries later an eastern stream of the same culture reached the Adriatic coast of northern Italy and spread further inland, as far as central Emilia. This strongly influenced the technological aspects in the Po Plain and Adige Valley Neolithic as documented by pottery decorations in Fiorano, Vhò and Gaban Cultures (Bagolini and Cremonesi 1987).

*Dipartimento di Scienze Storico-Archeologiche
e Orientalistiche - Università di Venezia*

This article is published with the aid of a 60% MPI grant.
All drawings are by the Author

REFERENCES

- ALESSIO M., BELLA F., IMPROTA S., BELLUOMINI G., CORTESI C. and TURI R. 1970. *University of Rome Carbon-14 dates VIII*. Radiocarbon 12: 599-616.
- BAGOLINI B. and BIAGI P. 1972-74. *La cultura della Ceramica Impressa nel Neolitico inferiore della regione padana*. *Bullettino di Paleontologia Italiana* 81: 81-112.
- BAGOLINI B. and BIAGI P. 1980. *The Mesolithic and Early Neolithic settlement of Northern Italy*. In Kozłowski J.K. and Machnik J. (eds.) *Problèmes de la Neolithisation dans certaines régions de l'Europe*: 9-26. Krakow, University Press.
- BAGOLINI B. and BIAGI P. 1990. *The Radiocarbon Chronology of the Neolithic and Copper Age of Northern Italy*. *Oxford Journal of Archaeology* 9 (1): 1-23.
- BAGOLINI B. and CREMONESI G. 1987. *Il processo di neolitizzazione in Italia*. *Atti della XXVI Riunione Scientifica dell'IIPP*: 21-30.
- BAGOLINI B., DELLUCA O., FERRARI A., PESSINA A. and WILKENS B. 1988. *Insedimenti neolitici ed eneolitici di Miramare (Rimini)*. *Preistoria Alpina* 24 (in press).
- BARKER G., 1975. *Prehistoric territories and economies in Central Italy*. In Higgs E.S. (ed.) *Palaeoeconomy*: 111-176. Cambridge, University Press.
- BARKER G. 1976. *Early Neolithic economy at Vhò*. *Preistoria Alpina* 12: 61-70.
- BARKER G., BIAGI P., CASTELLETTI L., CREMASCHI M. and NISBET R. 1987. *Sussistenza, economia ed ambiente nel Neolitico dell'Italia settentrionale*. *Atti della XXVI Riunione Scientifica dell'IIPP*: 103-118.
- BARKER G., BIAGI P., CLARK G., MAGGI R. and NISBET R. 1990. *From hunting to herding in the Val Pennavaira (Liguria - northern Italy)*. In BIAGI P. (ed.) *The Neolithisation of the Alpine Region*. *Monografie di Natura Bresciana* 13: 99-121.
- BARONI C., BIAGI P., NISBET R. and SCAIFE R.G. 1990. *Laghetto del Crestoso: a high altitude Castelnuovian camp in its environmental setting (Brescia - northern Italy)*. In BIAGI P. (ed.) *The Neolithisation of the Alpine Region*. *Monografie di Natura Bresciana* 13: 43-51.
- BIAGI P. and MAGGI R. 1983. *Aspects of the Mesolithic Age in Liguria*. *Preistoria Alpina* 19: 159-168.
- BIAGI P., MAGGI R. and NISBET R. 1989. *Liguria: 11,000-9000 BP*. In BONSALL C. (ed.) *The Mesolithic in Europe*: 533-540. Edinburgh, J. Donald.
- BIAGI P. and NISBET R. 1986. *Popolazione e territorio in Liguria tra il XII e il IV millennio b.c.* In ARSLAN E. (ed.) *Scritti in ricordo di Graziella Massari Taballo e Umberto Tocchetti Pollini*: 19-27. Milano, ET.
- BIAGI P. and NISBET R. 1987. *Ursprung der Landwirtschaft in Norditalien*. *Zeitschrift für Archäologie* 21 (1): 11-24.
- BIETTI A. 1987. *Some remarks on the new radiocarbon dates from the Arene Candide Cave (Savona-Italy)*. *Human Evolution* 2: 185-190.
- BORTOLAMI G.C., FONTES J. CH., MARKGRAF V. and SALIEGE J.F. 1977. *Land, sea and climate in the northern Adriatic region during Late Pleistocene and Holocene*. *Palaeogeography, Palaeoclimatology and Palaeoecology* 21: 139-155.
- BOSCATO P. and SALA B. 1980. *Dati paleontologici, paleoecologici e cronologici di tre depositi epipaleolitici in Valle dell'Adige (Trento)*. *Preistoria Alpina* 16: 45-61.
- BROGLIO A. and KOZŁOWSKI S.K., 1983. *Tipologia ed evoluzione delle industrie mesolitiche di Romagnano III*. *Preistoria Alpina* 19: 93-148.
- BROGLIO A., FAVERO V. and MASALE S. 1987. *Ritrovamenti mesolitici attorno alla Laguna di Venezia*. *Istituto Veneto di Scienze Lettere ed Arti, Rapporti e Studi* 10: 195-231.
- CANNARELLA D. and CREMONESI G. 1967. *Gli scavi nella Grotta Azzurra di Samatorza nel Carso Triestino*. *Rivista di Scienze Preistoriche* 22 (2): 281-330.
- CASTELLETTI L., CREMASCHI M. and NOTINI P. 1976. *L'insediamento mesolitico di Lama Lite sull'Appennino Tosco-emiliano*. *Preistoria Alpina* 12: 7-32.
- CHAPMAN J. 1988. *Ceramic production and social differentiation: the Dalmatian Neolithic and the Western Mediterranean*. *Journal of Mediterranean Archaeology* 1 (2): 3-25.
- CHAPMAN J. and MÜLLER J. 1990. *Early farmers in the Mediterranean basin: The Dalmatian evidence*. *Antiquity* 64 (242): 127-134.
- CREMASCHI M. 1978. *The source of the flint artifacts for the central Po Plain and Apennine sites, between the 7th and the 2nd millennium b.c.* *Staringia* 6: 139-142.
- CREMONESI G. 1978-81. *Caratteristiche economico-industriali del Mesolitico del Carso*. *Atti della Società per la Preistoria e Protostoria del Friuli Venezia Giulia* 4: 173-186.

GEDDES D.S., GUILAINE J. and MONACO A. 1983. *Early Neolithic occupation on the submerged continental plateau of Roussillon (France)*. In MASTERS P.M. and FLEMING N.C. (eds.) *Quaternary Coastlines and Marine Archaeology*: 175-187. London, Academic Press.

GRIMAL J. 1982. *Le Néolithique ancien de la plaine de l'Hérault*. In *Le Néolithique Ancien Méditerranéen*: 253-259. Archeologie en Languedoc.

LEWTHWAITE J. 1985. *The lacuna in the lagoon: an interdisciplinary research frontier in the west mediterranean Holocene palaeoecology and prehistory*. Cahiers Ligures de Préhistoire et de Protohistoire 2: 243-264.

LEWTHWAITE J. 1989. *Isolating the residuals: the Mesolithic basis of man-animal relationships in the Mediterranean islands*. In BONSALL C. (ed.) *The Mesolithic in Europe*: 541-556. Edinburgh, J. Donald.

ROWLEY-CONWY P. 1987. *Faunal remains from Arene Candide. Preliminary report on the Neolithic and later material from the 1940-42 and 1948-50 excavations*. Archeologia in Liguria 3 (1): 126-128.

SHACKLETON J.C. and VAL ANDEL T.H. 1985. *Late Palaeolithic and Mesolithic coastlines of the Western Mediterranean*. Cahiers Ligure de Préhistoire et de Protohistoire 2: 7-19.

STUIVER M. and REIMER P.J. 1986. *A computer program for radiocarbon age calibration*. Radiocarbon 28 (2B): 1022-1030.

WILLIAMS THORPE O., WARREN S. and BARFIELD L.H. 1979. *The sources and distribution of archaeological obsidian in Northern Italy*. Preistoria Alpina 15: 73-92.