

FORERUNNERS OF URBANISM

**A comparative study of settlement organisation in Western Veneto
and South Etruria from the Middle Bronze Age to the end of the
Final Bronze Age.**

by
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Ph.D. Thesis
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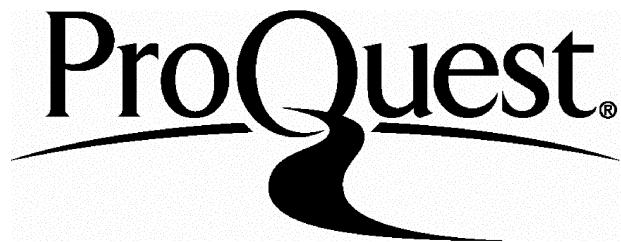
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ABSTRACT

The Ph.D studies the settlement trends of two areas in Italy -Western Veneto and South Etruria- for which there is clear evidence of increasing complexity during the Bronze Age. The developments which took place in both areas are compared to monitor wider social and historical issues, namely the possible factors and causes behind the processes leading to settlement nucleation and the later emergence of urban forms in Italy. The two areas provide an outstanding opportunity for this, because their trajectories appear similar yet diverge in the final stages: Southern Etruria to undertake a leap in complexity which led to the emergence of its Iron Age protourban groups; Western Veneto to face a halt and apparent reversal of trends, and the virtual collapse of the area as a focus for settlement. Both areas have also been the object of field survey campaigns, which have contributed to a better knowledge of the overall settlement distribution of the regions. The approach adopted is a novel one in that it oversteps local and regional boundaries to compare the various trends affecting the two regions, in so far as the data allows it, on the same footing, as a way of assessing the extent of their impact on settlement.

An explanation of the methodology employed is followed by the historical background to the research which underlines some of the problems with the data. After this introduction a series of variables are studied, and their impact in the settlement histories of the two regions is assessed: the environmental conditions, traditional and absolute chronological spans and settlement continuity, economic trends and resources (subsistence and technology), and social involvement. Finally the extent to which each of these variables promoted settlement trends of a pre-urban nature is analysed.

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To my parents

"I could tell you how many steps make up the streets rising like stairways, and the degree of the arcades curves, and what kind of zinc scales cover the roofs; but I already know this would be the same as telling you nothing. The city does not consist of this, but of relationships between the measurement of its space and the events of its past".

"Beware of saying to them that sometimes different cities follow one another on the same site and under the same name, born and dying without knowing one another, without communication among themselves. At times even the names of the inhabitants remain the same and their voices' accent, and also the features of the faces; but the gods who live beneath names and above places have gone off without a word and outsiders have settled in their place".

Italo Calvino (excerpts from *Le città invisibili*)

Chapter 1: AIMS AND METHODOLOGY

The emergence of urban forms has always been a major topic of interest and indeed a popular one. Words as suggestive as civilisation, the Orient, a palace-city, the Mediterranean and the like are conjured up in people's imagination from the mist of the dark beginnings of what is now the most characteristic form of modern human settlement. Until recently, however, not much attention had been paid to the beginnings but rather to the periods of greater splendour: a general tendency towards settlement nucleation in the Mediterranean at the end of the second millennium B.C. was noted and "universal" agents for its existence and grandeur were sought (for a discussion of the trend see Bietti Sestieri 1984: 57). Nevertheless, despite the universal ring and appeal of the topic, it is a naive and simplistic position to see the cities which emerged from this mist in the Mediterranean during the Iron Age as units and reflections of a single reality: urbanism and settlement nucleation are incredibly complex phenomena affected in their very core by the particular characteristics and make up of lands and populations. An initial premise in settlement studies is, thus, that the way in which men and women spread (or gather) across this earth is a direct reflection of more intangible realities such as economic activity or subsistence basis, social parameters of behaviour, the environment, ideologies, and/or different political events. It is only in the understanding of settlement genesis in any specific area that one can hope to find the causes which triggered it in that particular place, time, and form. It is only, too, after having done this, that we will be in a position to detect and understand the common issues, if such there are, which are at the root of the choice for settlement nucleation elsewhere.

1. Aims

To attempt the study of early Italian urbanism is a particularly arduous task. All evidence seems to indicate that the richness of Italian cultural manifestations was already a fact in prehistory. Besides, as it shall be seen later, the history of research in the topic is responsible for many of the problems which the subject currently faces. Whilst the complexity of settlement analysis is not limited to prehistory, it is there, nevertheless, where it appears aggravated by an even lesser knowledge of the factors involved. In tackling the problem of early urbanism in Italy, this has been a major concern: to provide

a real time perspective of the complexity of the developments which fully manifest themselves as urban in the first millennium B.C. so as to investigate the depth of the urban achievement. As the title of this work implies, its purpose is to look and study the period which preceded the full development of urbanism, in an attempt to provide a hitherto lacking background to the crystallisation of early Italian urban forms. We, thus, propose to study settlement dynamics and urban formation in the context of the Late Bronze Age.

The dawn of history, in its disciplinary sense, is marked by the many more or less legendary accounts of and references to the founding of cities by different figures and their followers (Pilemene or Antenore for Padua, Romulus for Rome), by groups of colonists (as in the founding of the towns of Megara, or Syracuse), and by expeditions of people running away from war, hunger or disasters (as were the Lydians under Tyrrhenus, mentioned by Herodotus). The still deeply instilled tendency to regard these accounts as a point of departure for research is, perhaps, to be blamed for centring the attention of researchers in the Iron Age period (e.g. Hencken 1968; Ridgway and Ridgway 1979; Pallottino 1991: 40-43). Thus, by comparison with the Bronze Age, the Iron Age has been the focus of much research concerning settlement nucleation (e.g. among others Di Gennaro 1982; Guidi 1985). In equivalent terms in settlement studies, the period of protourban formation (9th-7th centuries in traditional chronologies) has been the subject of intense attention (the Villanovans of Central Italy are the clearest example), whereas the period preceding it has remained in an obscurity which some have polemically termed as a *Dark Age* (Spivey & Stoddart 1990; James et al. 1991). Fortunately this trend seems to be receding. The reasons for this gap in the research of settlement nucleation are many and very complex, and linked to the historical development of archaeology as a discipline in Italy. A further aspect to be taken into account is the "unfortunate" positioning of the period in the time scale: the Late and Final Bronze Age are periods falling in the traditional frontier line between Prehistory and History, which might have caused a sort of uneasiness and reluctance to tackle it in both prehistorians and historians. The term "protohistory" does not solve the problem either, and the period remains one for which no acceptable methodology has been developed but to which both history and prehistory have made a weak claim (see Chapter 3). For a truly thought-provoking account of the

problem see M. Pallottino, 1989).

The research gathered here is a response to the need for Bronze Age settlement studies to deepen into the nature of the groups and development which characterise it, and which will give rise to the urban phenomenon in Italy. A study of these dimensions for the whole of Italy would be highly desirable, although for obvious reasons it has been necessary to choose two areas of particular interest instead: South Etruria in Central Italy, and Western Veneto in Northeast Italy. But if the area of study has been reduced, there are reasons which prompt an increase in the time range so as to give results the adequate perspective. The period of study encompasses that which spans approximately from 1600 to 900 B.C. in traditional chronology (the Middle Bronze Age to the end of the Final Bronze Age), with special attention being paid to the Late and Final Bronze Age (traditionally dated to 1300-900 B.C.).

The purpose of this piece of research is two-fold: to investigate the causes behind the adoption of nucleated (and eventually urban) forms of settlement, analysing the impact of various factors on settlement nucleation in the areas of interest (the definitions of these terms can be found in Chapter 2). The research fills a gap in that way: that of understanding the different aspects which led to the adoption of new forms of settlement that implied or preceded fundamental changes for the human group. Urbanism, as it later developed, cannot be understood simply as a set of external or functional characteristics affecting the town or city *per se*, the particular settlement. Rather it is a phenomenon that encompasses the whole settlement system, town and countryside (Whitehouse 1977) and the individuals and group that form part of it. It is in direct relation to central economic, social and individual choices which imply radical changes from a rural society.

2. Methodology

As already stated the aim of this piece of research is to deepen the understanding of the nature of the urban phenomenon in Italy. I will now set out the way in which I propose to do so.

The main line of enquiry is a specific, and so far little researched, area: the study of the pre-urban stages in the Bronze Age, and of the developments which would allow urban systems to emerge. Yet, in order to do so it is not enough to consider certain issues in general, nor is it to concentrate on one specific case. That would tell us rather of possible theoretical developments with little relation to actual past human groups, or, in the case of a specific example, of the particular combination of factors that affected one group. Urbanism being the very complex phenomenon that it is, I decided to approach its formative stages by assessing the importance of certain variables - deemed to be relevant - in the process.

Thus, the proposed methodology for the analysis of this complex phenomenon without being too theoretical or too particular, is to make use of data from two areas to establish the general value of each one of a series of variables by contrasting its impact on two different systems. First the variable is considered separately for each area, then the pictures which emerge for each region are compared, and finally, the main issues affecting settlement organisation are highlighted.

The study of the two regions has been done by placing them on an equal level of analysis in order to monitor the relevance of the different variables which affect human groups in the movement towards urban forms. The variables chosen for consideration are: material culture and continuity, real time depth of change, environmental relationships, subsistence economy, technology, and social involvement (including inter-group relations, trade and ideological exchange). Some of the issues needing clarification and which have been more discussed in the recent past will also be raised: for instance the importance of local versus external influences, and whether nucleation is to be seen as a free choice for a group or the only possible choice.

As stated above, the two areas chosen for this study are South Etruria and Western Veneto. This particular choice is due to a series of converging circumstances, which make the areas ideal for the study of settlement organisation and nucleation processes. Traditional analysis places them within two different cultural groups and in different cultural traditions, yet contacts between the two regions have long been argued for and

archaeologically identified. Even though they are geographically distinct and separate, their material culture seems to indicate close contact between them at particular periods, so that one could talk of distinct archaeological cultures with fairly parallel lives. When it comes to settlement patterns, both developed forms of nucleated settlement, the forerunners of the urban phenomenon, in the Bronze Age. The areas share many things in common: the approximate timing (from the Middle Bronze Age onwards), the degree of development of the groups, the other social groups with which they came into contact. There is also evidence for contacts between the two areas during the period of study. However, there are also notable differences between them. Most remarkably, the different turn their settlement trajectories took. Etruria moved towards proto-urban centres with the beginning of the Early Iron Age. Veneto reverted to less organised forms of settlement, though some protourban centres emerged, later than in Etruria, in a different landscape.

These two areas seem to be a clear case in which traditional frameworks fall short of explaining the nature of very complex cultural similarities and differences other than by trade or invasion. In fact, an explanation of cultural similarities between the two which takes into account the whole of society and not just specific aspects of the material culture has never been attempted.

The definition of the areas deserves some clarification, though both areas are well delimited in geographic terms. South Etruria spreads along the West Coast of Central Italy, bounded by the Tyrrhenian Sea to the West, the Tiber and Apennines to the East, the Tiber to the South and the Fiora to the North (fig. 1). Western Veneto is bounded by the rivers Po to the South, the Brenta to the North and East, and the Mincio to the West (fig. 2). The limits to the areas set out here are slightly arbitrary and modern in conception, springing from the need to restrict in some way the vast geographic landscape and taking into account the archaeological history of the area.

The boundaries chosen for the areas of study are not always an exact reflection of the geographic boundaries of primitive territories: that was never intended, territories being interesting from an overall point of view. Frontiers are a characteristic of more

rigidly organised landscapes, and there are no indications of formal territory markers at this point in time. It seems more than plausible that social groups had a wider perception of the territory, and that limits were more blurred: Green and Pearlman have convincingly argued that "social systems at all levels of society are more open than they are often considered in archaeology and ethnography" (Green and Pearlman 1985: 7). The study of frontier emergence seems to take significance only in the Etruscan period (Stoddart 1990). Instead what has been sought here is a representation of landscapes, which can be treated homogeneously for research purposes. Homogeneity has been defined in traditional "cultural" terms (areas which render similar material culture assemblages) but also in geographical terms (natural geographic boundaries have been sought). The choice, for instance, of the river Mincio as a boundary is based on the knowledge that a number of sites clearly related to the rest is found between this river and the river Tartaro.

It is worth pointing out that, as a consequence of this approach, the areas defined here as South Etruria and Western Veneto cut through different modern regional and provincial boundaries, and that this will necessarily have an effect on the amount of information - and accessibility to that information - in different areas. As defined here, South Etruria, roughly corresponds with northern Lazio. Western Veneto includes the provinces of Verona, Vicenza, Padova, Rovigo, parts of Trentino Alto-Adige, and a very small strip of land between the Tartaro and the Mincio rivers which belongs to Lombardia.

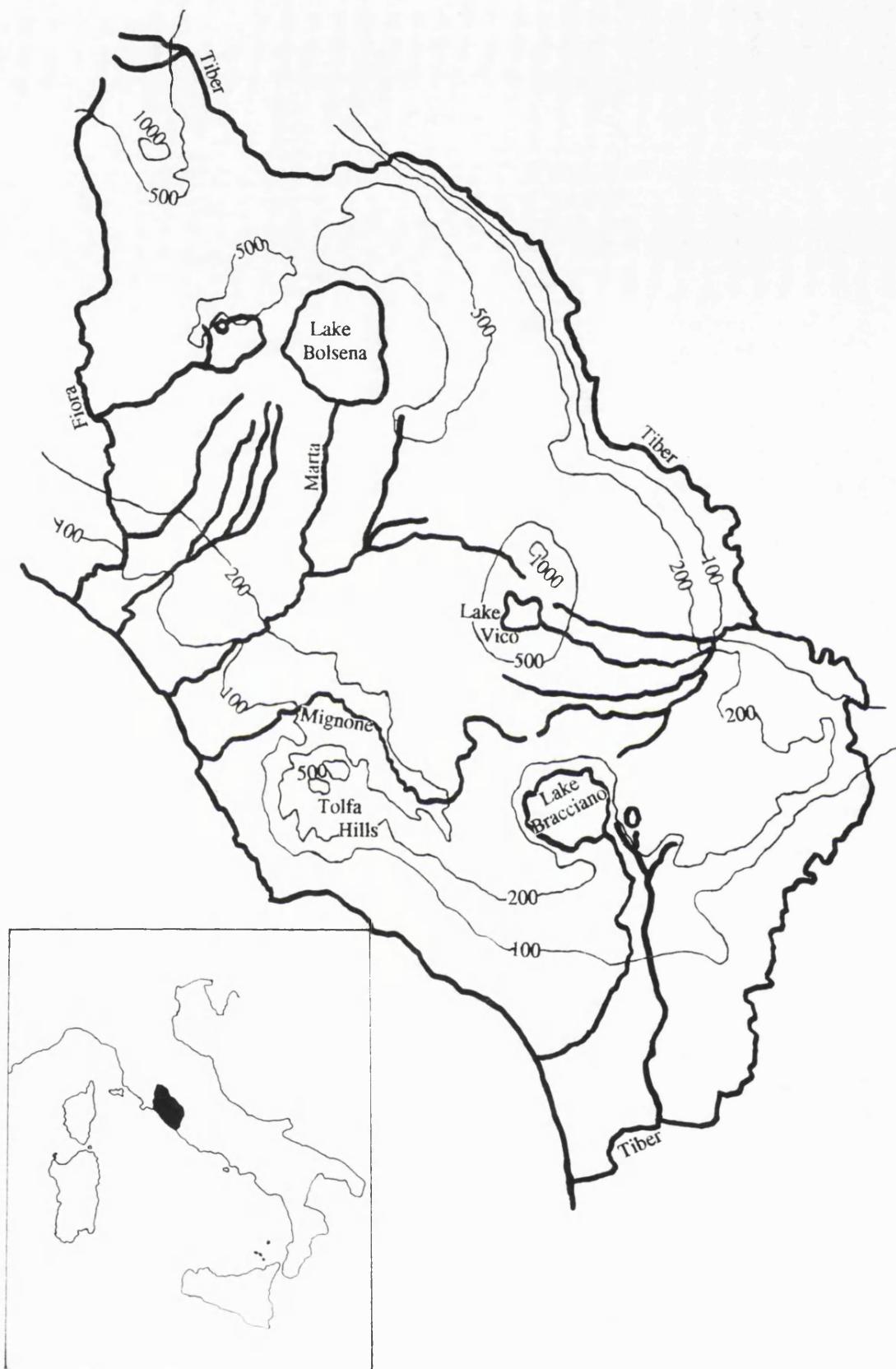


Fig. 1: Location of study areas: South Etruria's physical landscape.

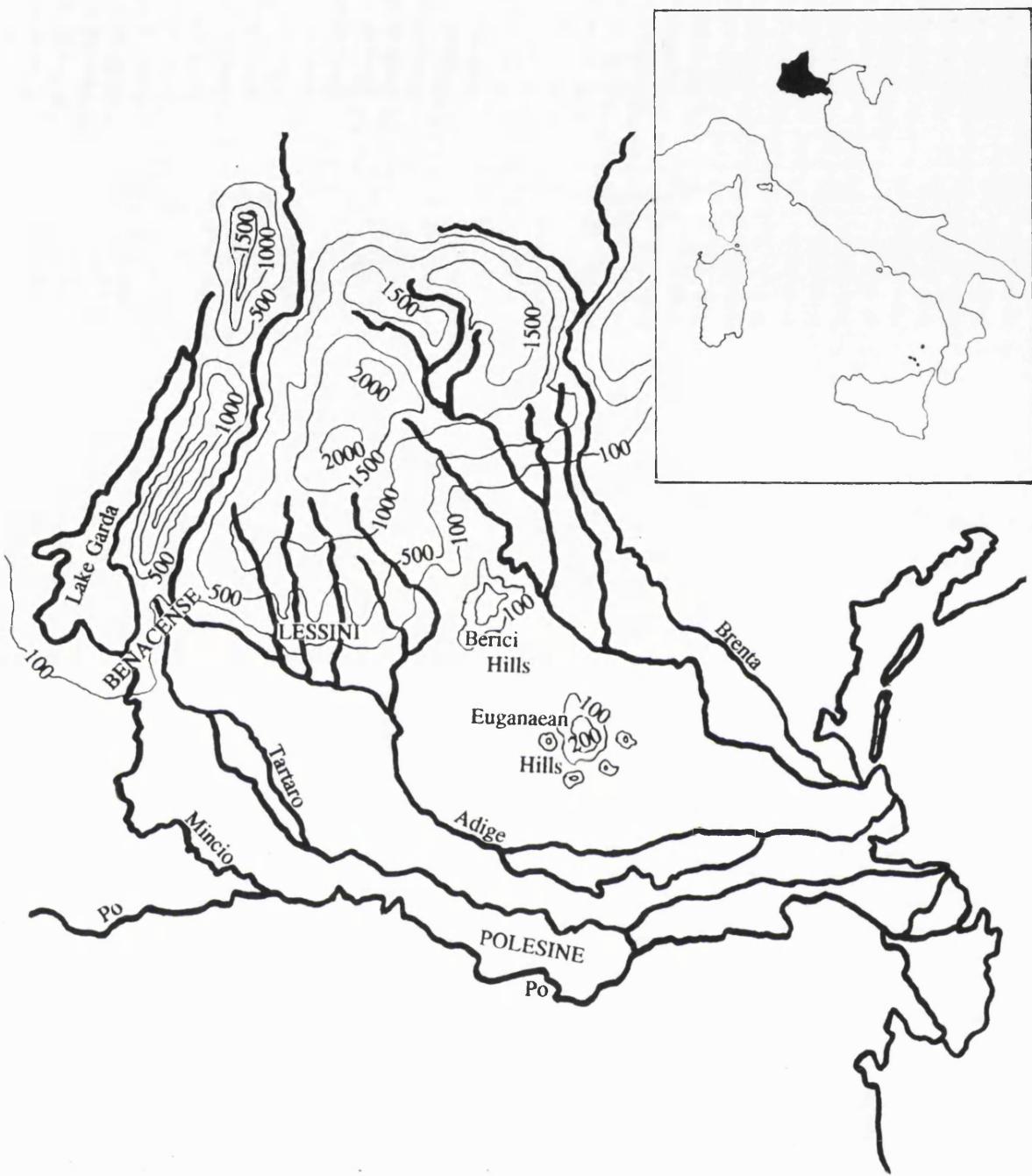


Fig. 2: Location of study areas: Western Veneto's physical landscape.

It was realised from the very beginning that in order to study the run-up to urban attitudes and urban living it was not enough to simply monitor settlement dynamics. Rather it would be more productive to make use of the known settlement dynamics and

put into context all other available evidence (economy, material culture and social identities, trade and exchange, the impact of the environment etc.), thus ensuring that the study was reflective of the interaction between changes to society and settlement, and not exclusively a settlement typology which was then interpreted in social terms. The history of settlement dynamics which constitutes the basis of this research will be now set out. In each of the areas I have accepted those interpretations which incorporate the most recent discoveries.

3. Bronze Age and settlement dynamics

South Etruria

A central issue to the problem of settlement in Etruria is that of settlement continuity, considered in itself (i.e. the span of life of settlements), in relation to cultural continuity (i.e. settlements surviving or not cultural change) and in relation to settlement type (i.e. certain types of settlement being more prone to experience continuity than others). It is in the relation between these three that the problem of settlement dynamics rests: there is strict (actual location) settlement continuity between the first Etruscan centres and the settlements from the first stages of the Early Iron Age. On the other hand, there is no strict continuity between these and the settlements of the Final Bronze Age, which seem to end with the Bronze Age with locational shifts. There is, nevertheless, a very interesting phenomenon of cultural continuity between the Final Bronze Age and the Early Iron Age, the so called Protovillanovans and Villanovans. Continuity between the Late Bronze Age and the Early Iron Age can be observed also in settlement type, which can be said to continue unchanged in everything but size. This indicates that, despite locational changes in settlement, there was continuity among the human groups, and that, therefore, an inquiry into the Bronze Age to shed light on later developments is fully justified. A characteristic tendency towards increasing settlement size and decreased settlement numbers is also observable already from the early stages of the Middle Bronze Age: in the Early Iron Age what was remarkable was the magnitude and speed of the event. Therefore, the phenomenon of progressive settlement concentration which became dominant in the Early Iron Age can be now traced back to the early stages of the Middle Bronze Age though previously it was thought to be a Late Bronze Age process, only in

some cases going back to the late phases of the Middle Bronze Age (Di Gennaro 1979, 1986).

At present the knowledge of settlement dynamics stands as follows (I have based this summary on the studies of F. Di Gennaro 1986 and 1991/92, Bartoloni 1986, and Peroni 1989). The type of settlements in existence at the onset of the Middle Bronze Age were mostly in open locations on hill sides, inland plains, valleys and the coastal plain. Recent research has also shown that at this time a group of settlements emerged on a new type of location: the naturally defended positions on tuff outcrops (Di Gennaro, 1991/92: 200). The majority of early Middle Bronze Age settlements are open settlements, many of which are water oriented along river valleys or around lakes. Those on defended positions amount to a third of the total. The extension of the settlements is difficult to determine, but those on tuff outcrops were 1 to 3 hectares in area, though not all of it might have been occupied initially.

The last phase of the Middle Bronze Age does not show special signs of settlement continuity: about half of the sites disappear, and many more start in this period. The larger settlements in defended positions have better survival rates: almost all of the settlements over 3 hectares or more reach the Final Bronze Age. The majority of late Middle Bronze Age settlements are still short-lived small and/or undefended settlements. As they seem to concentrate around the larger ones it has been suggested that several settlements might have corresponded to the same human group.

By the Late Bronze Age more than half of the settlements are in defended positions, but this time there is no evidence of groupings of smaller settlements around them. Settlement continuity is shown in the 78% survival rate from the previous periods. The number of known Late Bronze Age settlements is much smaller than those of previous periods, though it is likely that this be a consequence of the lack of characteristic traits in the pottery. It is difficult, therefore, to put forward a definitive picture of settlement dynamics at this time. Yet it is clear that settlements in defended positions and with larger areas were becoming the object of preferential location.

With the Final Bronze Age there is a new increase in the number of sites. Those in defended positions make up a 70% of the total. Settlements on the coastal plain, around lakes, and in connection with transhumance routes are abandoned at this time. Conversely, there is a concentration of settlement on heights and in certain areas such as the Fiora valley and the Tolfa mountains, where site densities increase as much as 100% during this period. If settlement numbers decrease, sizes increase: site size is now 4½ hectares on average. By the 10th century B.C. many settlements cease to exist and there is evidence that settlements were regularly spaced (approximately each 10 km.), and had similar sizes. With the end of the Final Bronze Age more settlements become abandoned or change location and settlement sizes increase, arguing for a centralisation of population in certain sites. The settlements on the larger tuff outcrops were those that had better survival rates.

Western Veneto

The story of settlement nucleation in the Veneto area goes back to the last stages of the Early Bronze Age/first phases of the Middle Bronze Age, when settlements were selectively placed in wetland areas, particularly around lakes, depressed interfluvial basins and alluvial plains. These settlements were adapted to the wet environment, and are of the lake-side or lake-village type. The Middle Bronze Age is also characterised by the progressive conquering of higher ground (isolated heights on the plain, the inland area of the Lessini hills and pre-Alps). Settlements of this type are, too, heavily oriented along water sources, characteristically on high plains overlooking the wetlands or on terraces at the meeting point of two rivers. Settlement in the plain follows also a water orientation: in the high plain settlements are overlooking the wetlands (e.g. Tombola, S. Zeno), or over the edge of the terraces overlooking the confluence of rivers (Cop Roman). Some defended settlements (bank and ditch type) also appear at this stage in the mid to lower plain, all of them along fluvial axes, and placed in central positions of control of transit both by water and land. The Middle Bronze Age sees a demographic boom of settlements, with some areas like the old Tartaro course becoming specially relevant.

Settlement during the Late Bronze Age changes orientation slightly, whereas in the

Middle Bronze Age settlements in the hills had been placed in inland locations, towards the Alps, now they occupy also the foothills and the hill sides overlooking the plain. With the beginning of the second part of the Late Bronze Age settlement contracted and its numbers decreased remarkably. Yet, no settlement intensification accompanies the reduction in settlement numbers: it seems instead that a real demographic crisis affects the area, and there is a marked discontinuity of settlement (Margarise 1989-90: 253-262; Peroni 1989: 105-108). The first sites to disappear are those in the inner hills, and connected to transhumance networks. Diffuse settlement concentrates around Garda, on the Lessini (particularly the metal bearing area of Schio-Recoaro), on the Berici hills and the Basso Veronese.

Demographic recession continues in the Final Bronze Age, and affects the Garda area, the Lessini, the Berici hills, and the Basso Veronese. Settlements concentrate along the Po di Adria, and on the high plain. There is a slight recovery in landscape occupation in the 10th century, with a return to hill sites and the birth of new settlements in a new area (the high plain around Gazzo and Padova). However, towards the end of the period, settlement contracts once more and occupation of the hills, the inner mountain area and the mid to lower plain practically ceases. Urban forms develop in the higher plain later than in Etruria.

The two pictures for settlement dynamics and nucleation in the Bronze Age seem very different and yet share things in common. So far no comparison has been made between the two areas (and indeed between any two areas of Italy for that matter) in an attempt to set the problems under study within a wider framework of perception¹. It is very interesting to map out the similarities and the differences in the process, with a view to seeing what is "normal", and even if a norm exists at all: we are with this plunging deep into the core of the urbanistic problem, of its reasons for being and for a society adopting such a deep change in organisation. It is not possible to interpret a phenomenon

¹ The only exception is an unpublished paper by A. Cardarelli on "Settlement organisation and demography in the Po Plain and South Etruria during the Bronze Age; two different patterns of development", delivered at the Conference "The identity of Bronze Age Europe", British Museum, 27-29 October 1994. The paper mainly dealt with the Terremare area, and the comparison of population estimates which should be considered highly hypothetical.

only by looking at it in isolation from events elsewhere: to understand something we need not only to know what it is like, but also to understand why it is that way, in which other ways it could have been and was not, and the reasons behind the specific choice or result.

"...The study of the single region, whilst certainly the most profitable and economical approach for much of settlement analysis, cannot be the exclusive form of investigation" (Barker 1985: 9). Studies have now reached a level that will permit an analysis of both areas to be carried out according to the same parameters.

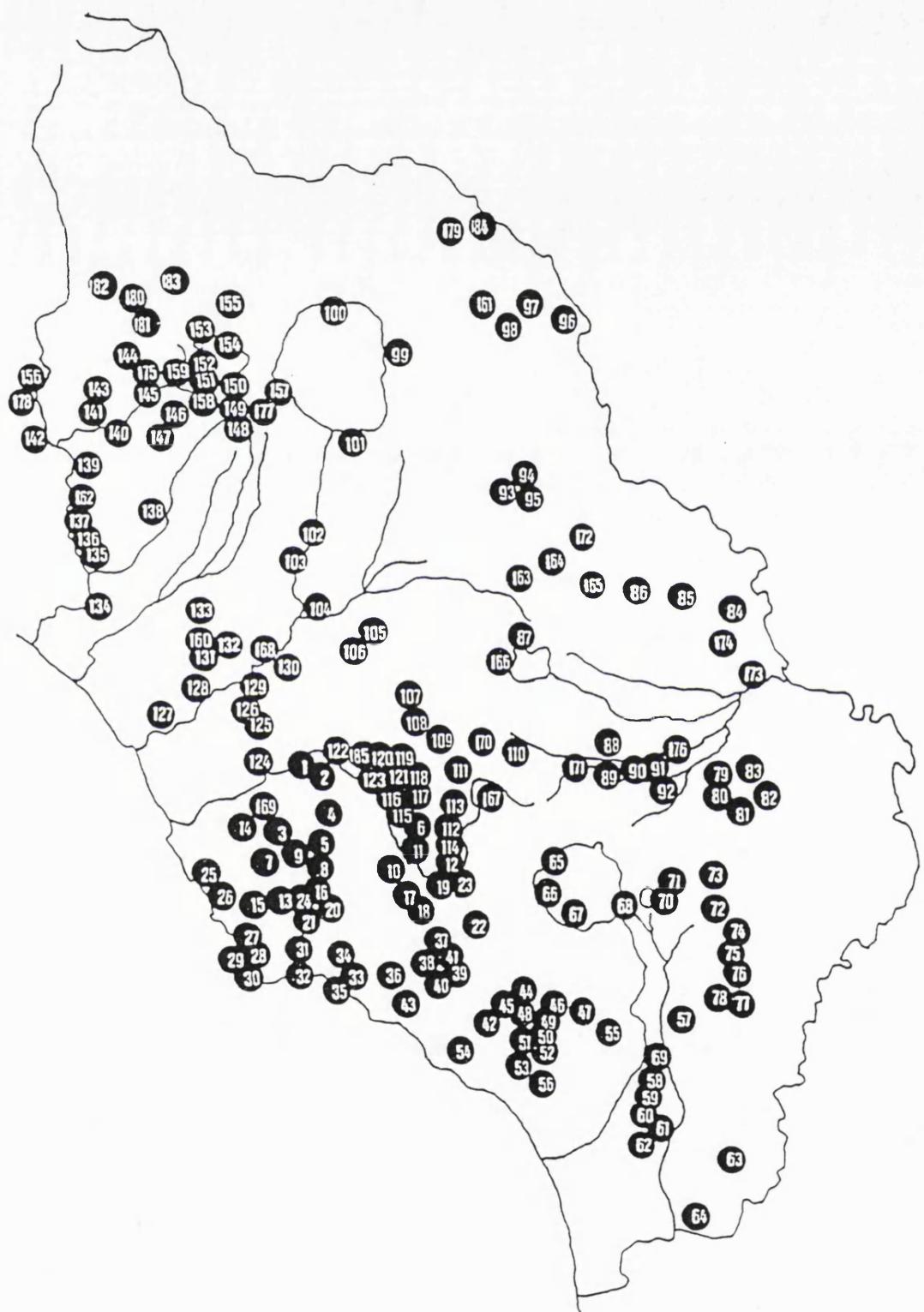


Fig. 3: Sites in South Etruria

SOUTH ETRURIAN SITES (numerically arranged)

1	Bufalareccia RM	54	Vaccina RM
2	Cerreta RM	55	Le Colonnacce RM
3	Monte Rovello RM	56	Palidoro RM
4	Coste del Marano RM	57	Fontanile della Breccia RM
5	La Tolfa RM	58	Riserva dei Grottoni RM
6	Castellina orientale di Poggio S. Pietro RM	59	Casotto RM
7	Elceto RM	60	Fosso della Bottaccia RM
8	Sughera RM	61	Monte Roncione RM
9	Monte Urbano RM	62	Fosso Pantano RM
10	Rota RM	63	Acquafrredda RM
11	Castellina del Cerasolo RM	64	Chiavichetta RM
12	Gatta Pelosa RM	65	Vicarello sub RM
13	Codata della Macine RM	66	Vigna Grande sub RM
14	Monte Sassetto RM	67	Vigna di Valle sub RM
15	Campanile S. Giovanni RM	68	Longarina di Malveto RM
16	Giovita RM	69	Galeria RM
17	Monte Radicata RM	70	Lago Martignano (riva est) RM
18	Capannone RM	71	Monte Sant'Angelo RM
19	Mercareccia RM	72	Valle Cencella RM
20	Tufarelle RM	73	Vignale VT
21	Cicugnola RM	74	Terre di Bettona RM
22	La Caldara RM	75	Formello RM
23	Monterano RM	76	Prato la Corte RM
24	La Tolfaccia RM	77	Veio, appendice orientale RM
25	Valdaliga RM	78	Veio porta NW RM
26	Mattonara RM	79	Vignacce RM
27	Malpasso RM	80	Tre Querce RM
28	Castellina del Marangone RM	81	Monte la Rosa RM
29	Foce del Marangone RM	82	Monte li Santi RM
30	Chiaruccia RM	83	Narce VT
31	Poggio Castelsecco RM	84	Grotta Porciosa VT
32	Selciatta a Mare RM	85	Punta Matteo VT
33	Caolino del Fosso Eri RM	86	Torre Aliano VT
34	Monte Pozzo di Ferro RM	87	Monte Venere - Nocicchiola VT
35	Grottini di Santa Severa RM	88	Monte Tufo VT
36	Pian Sultano RM	89	Ferriera VT
37	Monte delle Fate RM	90	Solfarate VT
38	Sassone RM	91	Il Pizzo VT
39	Cerqua Petrosa RM	92	Porciano VT
40	Norcino di Montetosto RM	93	Monte Piombone VT
41	Monte Santo RM	94	San Silvestro VT
42	Monte Abbadone RM	95	Casale dei Gesuiti VT
43	Monte Bischero RM	96	Massetto VT
44	Fornace di Cери RM	97	Poggio di Sermugnano VT
45	Cери - Pian Cerese RM	98	Santo Stefano VT
46	Riserva delle Pertuce RM	99	Capriola VT
47	Quarto della Caduta RM	100	Ragnatoro VT
48	Il Pigno RM	101	Fondaccio VT
49	Torre del Pascolaro RM	102	Pian di Mola - Acqua Forte VT
50	Casale Campanella RM	103	Colle di San Pietro VT
51	Castel Campanile RM	104	Rocca Respampani VT
52	Pizzo Prete RM	105	Piano del Casalone VT
53	Cecio RM	106	Norchia VT

107 La Casetta VT
 108 Pontone Colonna VT
 109 Pontone VT
 110 Monte Sant'Elia VT
 111 Veiano VT
 112 Castellina di San Nicola VT
 113 Castellina di Valle Campane VT
 114 Castellina delle Pallarete VT
 115 Pontone Cavaliere VT
 116 Castellina della Pampanare-Sant'Andrea VT
 117 Monte Casella-Reale RM
 118 Cupellaro VT
 119 San Giovenale VT
 120 Portone VT
 121 Pontesilli RM
 122 Luni VT
 123 Pontone delle Pallotte RM
 124 Pisciarello VT
 125 Cavone VT
 126 Castellina della Cività VT
 127 Montarana VT
 128 Orti di San Martino VT
 129 Larga Callare VT
 130 Castellaccio dell'Ancarano VT
 131 Ferleta VT
 132 Omo Morto VT
 133 Lestre della Roccaccia VT
 134 Pontecchio VT
 135 Ponterotto di Vulci VT
 136 Cavalupo di Vulci VT
 137 Torre Cognola VT
 138 Le Rogge VT
 139 Grotta Misa - Le Colle VT
 140 Osteriaccia del Punton di Villa VT
 141 La Selva-2 VT
 142 Ponte S. Pietro VT
 143 Crostoletto di Lamone VT
 144 Sorgenti della Nova VT
 145 Castellaro di Prato Fabulino VT
 146 Santa Lucia VT
 147 Cantinaccia di Montedonato VT
 148 Monte Cellere VT
 149 Valle del Bovo VT
 150 Monte Saliette VT
 151 Poggio del Mulino VT
 152 Poggio Pilato VT
 153 Mezzano VT
 154 Il Montione VT
 155 Poggio Evangelista VT
 156 Poggio Buco VT
 157 Bisenzio VT
 158 Casone VT
 159 Farnese VT
 160 Castellina della Roccaccia VT
 161 Cività di Bagnoregio VT
 162 Le Bagnare VT
 163 La Palanzana - Monte Pizzo VT
 164 Monte Cimino VT
 165 Vallerano VT
 166 Monte Fogliano VT
 167 Torre d'Ischia VT
 168 Torrionaccio VT
 169 Uliveto di Cencelle VT
 170 S. Giuliano VT
 171 Sutri VT
 172 Fosso del Mandrione VT
 173 Alveo di Baccano RM
 174 Fosso delle Rote VT
 175 Poggio Starnina VT
 176 Torre della Stroppa VT
 177 Valderico alla Mandriola VT
 178 Scarceta GR
 179 Rocca Ripesena TR
 180 Pitigliano GR
 181 Marmone del Pantano GR
 182 Sovana GR
 183 I Colli GR
 184 Orvieto TR
 185 Pontone della Noce VT

SOUTH ETRURIAN SITES (alphabetically arranged)

Acquafredda RM (63)
Alveo di Baccano RM (173)
Bisenzio VT (157)
Bufalareccia RM (1)
Campanile S. Giovanni RM (15)
Cantinaccia di Montedonato VT (147)
Caolino del Fosso Eri RM (33)
Capannone RM (18)
Capriola VT (99)
Casale Campanella RM (50)
Casale dei Gesuiti VT (95)
Casone VT (158)
Casotto RM (59)
Castel Campanile RM (51)
Castellaccio dell'Ancarano VT (130)
Castellaro di Prato Fabulino VT (145)
Castellina del Cerasolo RM (11)
Castellina del Marangone RM (28)
Castellina della Roccaccia VT (160)
Castellina della Cività VT (126)
Castellina delle Pallarete VT (114)
Castellina della Pampanare-Sant'Andrea VT (116)
Castellina di San Nicola VT (112)
Castellina di Valle Campane VT (113)
Cavalupo di Vulci VT (136)
Castellina orientale di Poggio S. Pietro RM (6)
Cavone VT (125)
Cecio RM (53)
Ceri - Pian Cerese RM (45)
Cerqua Petrosa RM (39)
Cerreta RM (2)
Chiaruccia RM (30)
Chiavichetta RM (64)
Cicugnola RM (21)
Cività di Bagnoregio VT (161)
Codata della Macine RM (13)
Colle di San Pietro VT (103)
Coste del Marano RM (4)
Crostoletto di Lamone VT (143)
Cupellaro VT (118)
Elceto RM (7)
Farnese VT (159)
Ferleta VT (131)
Ferriera VT (89)
Foce del Marangone RM (29)
Fondaccio VT (101)
Fontanile della Breccia RM (57)
Formello RM (75)
Fornace di Ceri RM (44)
Fosso del Mandrione VT (172)
Fosso della Bottaccia RM (60)
Fosso delle Rote VT (174)
Fosso Pantano RM (62)
Galeria RM (69)
Gatta Pelosa RM (12)
Giovita RM (16)
Grotta Misa - Le Colle VT (139)
Grotta Porciosa VT (84)
Grottini di Santa Severa RM (35)
I Colli GR (183)
Il Montione VT (154)
Il Pigno RM (48)
Il Pizzo VT (91)
La Caldara RM (22)
La Casetta VT (107)
La Palanzana - Monte Pizzo VT (163)
La Selva-2 VT (141)
La Tolfa RM (5)
La Tolfaccia RM (24)
Lago Martignano (riva est) RM (70)
Larga Callare VT (129)
Le Bagnare VT (162)
Le Colonnacce RM (55)
Le Rogge VT (138)
Lestre della Roccaccia VT (133)
Longarina di Malveto RM (68)
Luni VT (122)
Malpasso RM (27)
Marmone del Pantano GR (181)
Masseto VT (96)
Mattonara RM (26)
Mercareccia RM (19)
Mezzano VT (153)
Montarana VT (127)
Monte Abbadone RM (42)
Monte Bischero RM (43)
Monte Casella-Reale RM (117)
Monte Cellere VT (148)
Monte Cimino VT (164)
Monte delle Fate RM (37)
Monte Fogliano VT (166)
Monte la Rosa RM (81)
Monte li Santi RM (82)
Monte Piombone VT (93)
Monte Pozzo di Ferro RM (34)
Monte Radicata RM (17)
Monte Roncione RM (61)
Monte Rovello RM (3)
Monte Saliette VT (150)
Monte Sant'Angelo RM (71)
Monte Sant'Elia VT (110)
Monte Santo RM (41)
Monte Sassetto RM (14)
Monte Tufo VT (88)
Monte Urbano RM (9)
Monte Venere - Nocicchiola VT (87)

Monterano RM (23)
 Narce VT (83)
 Norchia VT (106)
 Norcino di Montetosto RM (40)
 Omo Morto VT (132)
 Orti di San Martino VT (128)
 Orvieto TR (184)
 Osteriaccia del Punton di Villa VT (140)
 Palidoro RM (56)
 Pian di Mola - Acqua Forte VT (102)
 Pian Sultano RM (36)
 Piano del Casalone VT (105)
 Pisciarello VT (124)
 Pitigliano GR (180)
 Pizzo Prete RM (52)
 Poggio Buco VT (156)
 Poggio Castelsecco RM (31)
 Poggio del Mulino VT (151)
 Poggio di Sermugnano VT (97)
 Poggio Evangelista VT (155)
 Poggio Pilato VT (152)
 Poggio Starnina VT (175)
 Ponte S. Pietro VT (142)
 Pontecchio VT (134)
 Ponterotto di Vulci VT (135)
 Pontesilli RM (121)
 Pontone VT (109)
 Pontone Cavaliere VT (115)
 Pontone Colonna VT (108)
 Pontone della Noce VT (185)
 Pontone delle Pallotte RM (123)
 Porciano VT (92)
 Portone VT (120)
 Prato la Corte RM (76)
 Punta Matteo VT (85)
 Quarto della Caduta RM (47)
 Ragnatoro VT (100)
 Riserva dei Grottoni RM (58)
 Riserva delle Pertuce RM (46)
 Rocca Ripesena TR (179)
 Rocca Respampani VT (104)
 Rota RM (10)
 San Giovenale VT (119)
 San Giuliano VT (170)
 San Silvestro VT (94)
 Santa Lucia VT (146)
 Santo Stefano VT (98)
 Sassone RM (38)
 Scarceta GR (178)
 Selciatta a Mare RM (32)
 Solfarate VT (90)
 Sorgenti della Nova VT (144)
 Sovana GR (182)
 Sughera RM (8)
 Sutri VT (171)
 Terre di Bettone RM (74)
 Torre Aliano VT (86)
 Torre Cognola VT (137)
 Torre del Pascolaro RM (49)
 Torre della Stroppa VT (176)
 Torre d'Ischia VT (167)
 Torrionaccio VT (168)
 Tre Querce RM (80)
 Tufarelle RM (20)
 Uliveto di Cencelle VT (169)
 Vaccina RM (54)
 Valdaliga RM (25)
 Valderico alla Mandriola VT (177)
 Valle Cencella RM (72)
 Valle del Bovo VT (149)
 Vallerano VT (165)
 Veiano VT (111)
 Veio, apendice orientale RM (77)
 Veio porta NW RM (78)
 Vicarello sub RM (65)
 Vigna di Valle sub RM (67)
 Vigna Grande sub RM (66)
 Vignacce RM (79)
 Vignale VT (73)

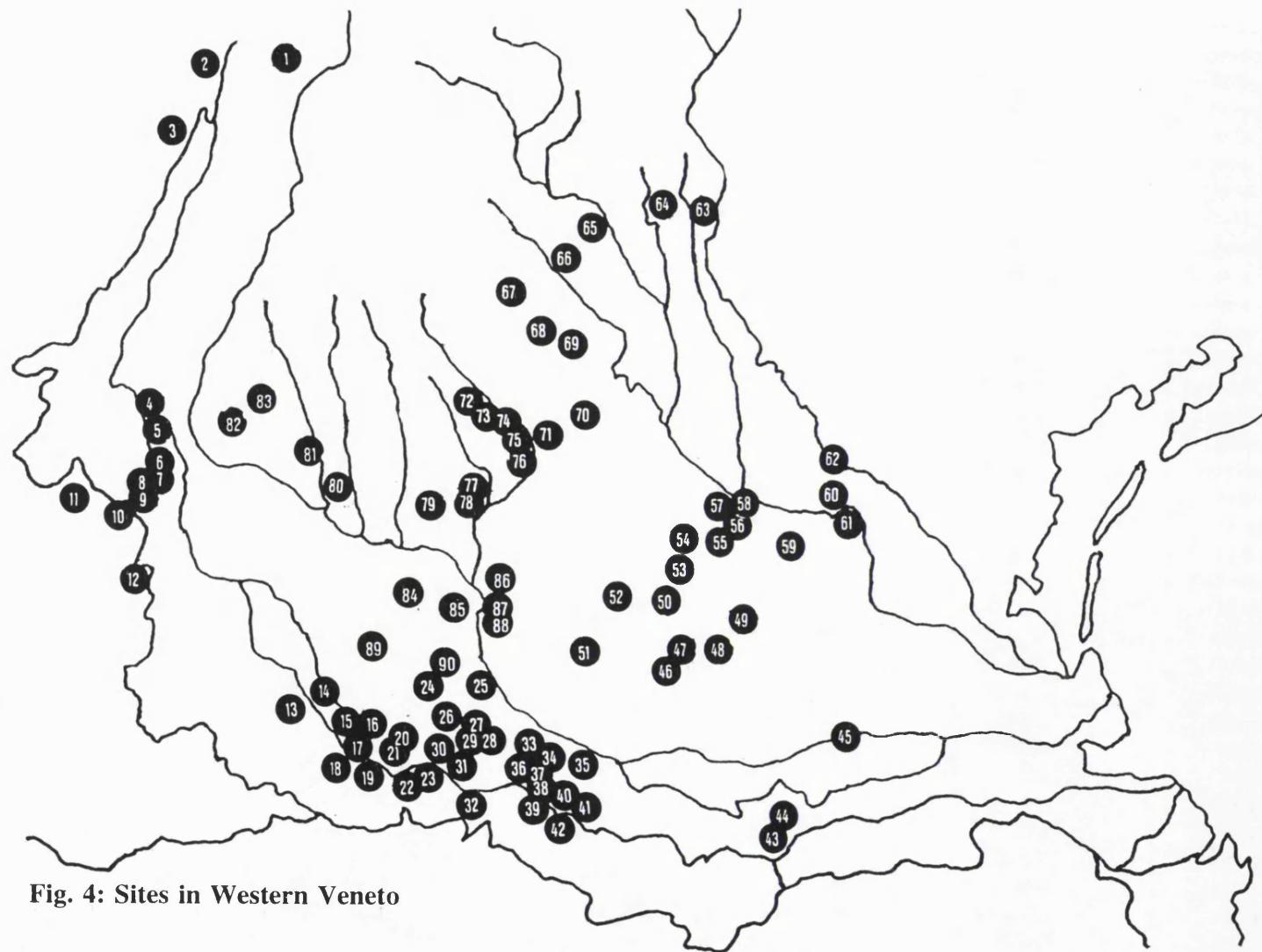


Fig. 4: Sites in Western Veneto

WESTERN VENETO SITES (numerically arranged)

1	Vigolo Vattaro TN	51	Montagnana Borgo San Zeno PD
2	Fiavè TN	52	Bosco di Noventa VI
3	Ledro TN	53	Monte Rovarola PD
4	Paerno VR	54	Monte Rosso PD
5	Cisano VR	55	Monte Tondo VI
6	Lazise-La Quercia VR	56	Monte Alto VI
7	Villa Bagatta VR	57	Fimon-Fondo Tomellero VI
8	Bor di Pacengo VR	58	Castelon del Brosimo VI
9	Porto di Pacengo VR	59	Monte della Croce VI
10	Peschiera Bacino Maria VR	60	Creola PD
10	Peschiera Boccatura VR	61	Padova -ex Storione PD
10	Peschiera Mulino dell'Otello VR	62	Ponterotto PD
10	Peschiera Palafitta centrale VR	63	San Giorgio di Angarano VI
11	Lavagnone BS	64	Monte Corgnon VI
12	Isolone del Mincio MN	65	Piovene Castel Manduca VI
13	Demorta MN	66	Monte Summano VI
14	Mulino VR	67	Magrè VI
15	Coazze VR	68	Castelgomberto VI
16	Gazzo Veronese VR	69	Costabissara Pignare VI
17	Cop Roman VR	70	Altavilla Vicentina VI
18	Finilone VR	71	Montecchio Maggiore VI
19	La Vallona MN	72	Monte Madarosa VI
20	Quartieri dei Maccacari VR	73	Monte Parnese VI
21	Maccacari VR	74	Monte Cavalrina VI
22	Mazzagatta MN	75	Monte Lago-Monte Bello VI
23	Ara di Spin MN	76	Montebello-Lotto Maran VI
24	San Zeno di Cerea VR	77	Monte Zoppega VR
25	Terranegra VR	78	Monte Rocchetta VR
26	Tombola di Cerea VR	79	Monte Casteggioni VR
27	Aselogna VR	80	Monte Pipaldolo VR
28	Perteghelle VR	81	Marzana VR
29	Morandine VR	82	San Giorgio di Valpollicella VR
30	Corte Bellintane VR	83	Monte Castellon di Marano VR
31	Castello del Tartaro VR	84	Feniletto VR
32	Mariconda di Merlara RO	85	Fornace di Oppeano VR
33	Corte Lazise VR	86	Desmontà di Veronella VR
34	Venezia Nuova VR	87	Beccacivetta di Coriano VR
35	Stanghelletti VR	88	Coriano VR
36	Fondo Paviani VR	89	Castello di Bovolone VR
37	Stanghelle VR	90	Cavalzara VR
38	Canàr San Pietro RO		
39	Canova RO		
40	Fabbrica dei Soci VR		
41	Parona VR		
42	Marola RO		
43	Villamarzana RO		
44	Frattesina di Fratta RO		
45	Saline RO		
46	Prà d'Este PD		
47	Este PD		
48	Marendole PD		
49	Arquà Petrarca VI		
50	Lozzo Atestino-Vignalon PD		

WESTERN VENETO SITES (alphabetically arranged)

Altavilla Vicentina VI (70)
Ara di Spin MN (23)
Arquà Petrarca VI (49)
Aselogna VR (27)
Beccacivetta di Coriano VR (87)
Bor di Pacengo VR (8)
Bosco di Noventa VI (52)
Canàr San Pietro RO (38)
Canova RO (39)
Castelgomberto VI (68)
Castello del Tartaro VR (31)
Castello di Bovolone VR (89)
Castelon del Brosimo VI (58)
Cavalzara VR (90)
Cisano VR (5)
Coazze VR (15)
Cop Roman VR (17)
Coriano VR (88)
Corte Bellintane VR (30)
Corte Lazise VR (33)
Costabissara Pignare VI (69)
Creola PD (60)
Demorta MN (13)
Desmontà di Veronella VR (86)
Este PD (47)
Fabbrica dei Soci VR (40)
Feniletto VR (84)
Fiavè TN (2)
Fimon-Fondo Tomellero VI (57)
Finilone VR (18)
Fondo Paviani VR (36)
Fornace di Oppeano VR (85)
Frattesina di Fratta RO (44)
Gazzo Veronese VR (16)
Isolone del Mincio MN (12)
La Vallona MN (19)
Lavagnone BS (11)
Lazise-La Quercia VR (6)
Ledro TN (3)
Lozzo Atestino-Vignalon PD (50)
Maccacari VR (21)
Magrè VI (67)
Marendole PD (48)
Mariconda di Merlara RO (32)
Marola RO (42)
Marzana VR (81)
Mazzagatta MN (22)
Montagnana Borgo San Zeno PD (51)
Monte Alto VI (56)
Monte Casteggioni VR (79)
Monte Castellon di Marano VR (83)
Monte Cavalrina VI (74)
Monte Corgnon VI (64)
Monte della Croce VI (59)
Monte Lago-Monte Bello VI (75)
Monte Madarosa VI (72)
Monte Parnese VI (73)
Monte Pipaldolo VR (80)
Monte Rocchetta VR (78)
Monte Rosso PD (54)
Monte Rovarola PD (53)
Monte Summano VI (66)
Monte Tondo VI (55)
Monte Zoppega VR (77)
Montebello-Lotto Maran VI (76)
Montecchio Maggiore VI (71)
Morandine VR (29)
Mulino VR (14)
Padova -ex Storione PD (61)
Paerno VR (4)
Parona VR (41)
Perteghelle VR (28)
Peschiera Bacino Maria VR (10)
Peschiera Boccatura VR (10)
Peschiera Mulino dell'Otello VR (10)
Peschiera Palafitta centrale VR (10)
Piovene Castel Manduca VI (65)
Ponterotto PD (62)
Porto di Pacengo VR (9)
Prà d'Este PD (46)
Quartieri dei Maccacari VR (20)
Saline RO (45)
San Giorgio di Angarano VI (63)
San Giorgio di Valpollicella VR (82)
San Zeno di Cerea VR (24)
Stanghelle VR (37)
Stanghelletti VR (35)
Terranegra VR (25)
Tombola di Cerea VR (26)
Venezia Nuova VR (34)
Vigolo Vattaro TN (1)
Villa Bagatta VR (7)
Villamarzana RO (43)

Chapter 2: TERMINOLOGY

"Let us avoid the ancient belief in the magic power of words, which can make us turn names into real things (...). It is possible to persuade oneself that having named a concept, therefore, it actually exists and can be dealt with accordingly" (Piggott 1972: 948-949).

It is relevant at this point to deal with some of the terminology and concepts central to the objective of my research. To clarify the specific meaning given to the terms used is important, since they have often had long histories of development and use and equally long debates have taken place about the specific issues they refer to. Consequently, over the years, the terms have acquired particular nuances.

The terms to be clarified refer specifically to the main forms of settlement organisation as they existed in prehistory. Though different from area to area, three general types of settlement can be distinguished in later European prehistory: the farmstead or isolated family unit; the village, made up of a conglomerate of various families mainly engaged in food production; the town/city, a conglomerate larger than the village in which the population engages in a diversity of tasks (Wells 1984: 16). The background changes of the movement from the second to the third in two areas of Italy is the subject of my research.

Perhaps the most obvious of all the terms needing definition is that of **urbanism/urbanisation** itself, the process of urban formation, and auxiliary words such as proto-urban. I do not wish to reproduce here the whole general debate over what makes a site into an urban site (for some ideas see Childe 1936, Redman 1978 and Whitehouse 1977). Since Childe first coined the expression "urban revolution" there have been many attempts at establishing which quantitative and qualitative markers should be found before a group acquires the urban label. Generically, evidence can be grouped in two main strands (see Redman 1978 for a detailed analysis of Childe's ten characteristics of a city): first the quantitative considerations (e.g. settlement size, estimated population numbers, presence of substantial buildings, markers of long-distance trade, etc); secondly

some qualitative conditions (e.g. development of tight forms of social control, landscape organisation, concentration of surplus, varied economic activity with a considerable amount of technological development, etc). However, agreement over these is no more than on a very general basis; which specific conditions/combination of conditions are a must, and in which degrees they should appear remains very much a matter of debate.

In this work I have treated the definition of the word **urbanism** in very generic terms, that is, without seeking rigid boundaries as to estimated population numbers, site sizes and densities etc. Within European prehistory the definition of urbanism has seen a trend to perhaps stress the more intangible aspects of the phenomenon (see for instance Wells 1984 for an interpretation of urbanisation North of the Alps which emphasizes the role of trade, industry and of commercial entrepreneurial activity in the development of the first towns and cities in Central Europe in the 1st millennium). My own position is within this current and largely in agreement with the views expressed by Whitehouse (1977: 7-8). To my mind, to employ rigid definition boundaries in prehistory is but to project our own constructs onto the past. Such approaches, determined to draw borderlines in terms of population numbers or site sizes, which are then crossed by societies in their evolutionary race towards development, do not fit well with the reality of the processes under study. From our modern perspective it is not always easy to realise that prehistoric societies of a pre-urban nature often did not have a model to go by. This is true also of the process of urban emergence in Italy even if it could be argued that by then there were groups in the East Mediterranean which had acquired urban status. It is my view that urbanisation in prehistory, and certainly in Italy during the 2nd and early 1st millennium, was a non-existing possibility which later came into being as the result of a series of events and circumstances which took place within non-urban human groups during this period: it was not a 7th century import.

Urbanism itself was a concept in the make during the period, and as such, to try to bound it within narrow limits is not an appropriate solution. It is also possible that some of the events which eventually facilitated its development (I purposely do not use the word adoption), were not, in fact, part of the final outcome: subsistence intensification, for instance, was a developmental factor of metal production/exchange in Etruria which

in its turn was important for nucleation, though subsistence intensification was not a causal factor of nucleation (see Chapters 7 and 9). It is in this context - the historical process which resulted in the definition of urban forms in some areas of Italy during the Second Iron Age - that my areas of research can be seen as forerunners of urbanism. I also believe that some of the characteristics that emerged as determinant from my study of the background to urbanism in Italy (see Chapter 9) can be later observed North of the Alps.

But going back to the definition of urbanism itself, the convergence of the following factors has been deemed enough in my work to qualify urban status. First large population numbers (in the hundreds), and larger and denser sites, though these requirements on their own are not enough. There are examples in Italy since the Neolithic of large conglomerates of population where there is no trait of urban achievement (some of the largest *villaggi trincerati* of the Tavoliere such as Passo di Corvo with population estimated in the hundreds are good examples, *vid. Brown 1991*).

Other characteristics considered of primary importance in my work are the development of forms of social control, of territorial hierarchies and relationships of dependence between sites, particularly the development of **town/countryside economic patterns**. By this I am not referring to forms of centre-periphery (for a definition see the essays gathered in Champion 1989 (ed.) *Centre and Periphery*), but rather to the establishment of supply exchange systems between sites which involved commodities moving from the larger sites to smaller communities engaged in primary production which in turn supplied the larger centres with subsistence goods. In my research, the development of such patterns is not as yet documented during the period of study (Stoddart 1989: 95 for Etruria; see Chapter 7 for Veneto). It is also in the context of the development of exchange and dependency systems between sites as part of the urban phenomenon that I regard the move away from primary to secondary (or from subsistence to technological activities) in a considerable sector of the population an important indicator of such development, and it is within this development that I will make use of the expression **socio-economic binomial** (see Chapter 7 for instance). The expression refers to the balance in a group's economy between predominantly economic

considerations such as investment in primary (subsistence) activities, and predominantly social considerations such as the development of secondary (technology) activities and trade. Finally, vital to the definition of urbanism is, to my mind, the development of locational identities (call it local/national awareness), linked to increasing landscape stabilisation, growth of forms of land possession and a sense of *us vs. the others* which is displayed through material culture (for modern ethnographic examples of assertions of tribal identity through material culture see Hodder 1982, for the development of geographical boundaries see Cherry 1987: 152-159; Green and Pearlman (eds.) 1985).

Other indices of urbanism (e.g. the development of writing, of monumental and ritual buildings, etc) I consider more as the optional consequences of the above mentioned deeper running changes.

According to this general definition of urbanism, in my areas of study no settlement meets urban status until roughly the 7th century (Etruria) or later (Veneto). Before that, the phenomenon affecting settlement dynamics and landscape organisation can be best defined by the expression **settlement nucleation**, an expression which also deserves some clarification.

In this work I will be making use of the word nucleation in a sense akin to that of an expression used by authors such as Di Gennaro or Peroni, as that of "*una progressiva concentrazione dell'insediamento*" (Di Gennaro 1991/92: 199; Peroni and Di Gennaro 1986: 193; Peroni 1989: 140). The expression, however, begs two important questions, namely:

- a) where and how is the borderline drawn between an unnnucleated and a nucleated site in this process of progressive concentration of settlement (i.e. when is a settlement concentrated enough to be defined as nucleated?).
- b) how is this borderline identified in archaeological terms?.

The answers to these two questions, as I view them, are:

- a) As with urbanism, it is difficult to try to define in retrospect a phenomenon which to all indications did not follow a unilinear pattern of development (many sites

were abandoned and later reoccupied). If nucleation as such was a phenomenon which affected groups in different ways and with different patterns, the boundaries within which the process is defined must *per force* be relatively wide. As with urbanism too, I will set out the characteristics which define the process in its more generic terms, since I consider the process of nucleation or concentration of settlement to be a phenomenon more deeply determined by settlement and landscape configuration and relationships than by individual settlement characteristics. This last statement is not, on the other hand, a denial of the fact that the latter (the individual settlement characteristics) tend to be taken as the obvious archaeological expression of the former (settlement and landscape configuration). The decision to view the process of settlement nucleation in more general terms is also motivated by the type of data available; archaeological data as it has been obtained is not sufficiently precise to indicate specific number or density of sites in a regional context. I will expand these considerations in my answer to question b).

The characteristics, then, which I consider essential to justify the definition of a group or a settlement as nucleated (or in the process of nucleating) are basically two. On the one hand substantial settlement occupation. By this I mean relative settlement stability and the signs of communities being larger than the family unit (understood in its widest sense as the extended family). If some sort of estimate must be given, this requirement would put population numbers in the order of several tens of individuals at any one time. The other vital point to be taken into account is the spatial distribution of these individuals, which must be within well defined geographical boundaries: nucleation implies the enlargement of human communities *and* the restriction of the inhabited space. This is not meant in the sense of smaller settlement sizes - the case is for quite the opposite in societies with growing populations - but rather in the sense of a concentration of settlement, of site occupation. Nucleated sites are of a monocentric nature (i.e. they are the only settlement site used by the group). This is in direct opposition to a polycentric arrangement whereby a group will make use of several sites, either by rotating between them or by splitting sectors of its population between them at different times, normally to perform different economic activities. The development of monocentric communities is in its turn linked to the growth of exploitation territories and settlement hierarchies.

b) There is a series of issues which affect the archaeological identification of nucleated sites and which need to be addressed here, not least because they have not always been highlighted prior to interpretations of settlement dynamics. It appears from settlement studies that from the beginning of their Middle Bronze Ages both areas experienced a process of increasing settlement stabilisation and concentration (see Chapters 1 and 5 for an outline of the process in time and for references). However there are some problems with the way in which the process itself has been documented. First of all, the study of settlement dynamics is above all a regional undertaking. As such, the main research tool in the acquisition of data for the interpretative models put forward for both areas is field survey. Chronological settlement maps and patterns of settlement continuity have been defined from field survey, and, though in many cases it is the only possible source of regional information, it has also been responsible for possible distortions to the perception of true settlement dynamics. For instance, the under representation of Late Bronze Age sites is a direct consequence of the differences in percentage representation of pottery parts in any assemblage and the fact that the almost exclusive chronological indicators for this period are handles. It is therefore unclear up to what point the dearth of Late Bronze Age sites corresponds to deficient research or to actual settlement contraction.

Of the characteristics needing to be established to justify the definition of a settlement as nucleated I have specified large populations, and noticeable settlement concentration. Archaeologically, these characteristics tend to be determined from settlement sizes and site densities. Problems arise once more in trying to establish settlement size at any time. In Veneto, the bank and ditch settlement type facilitates the calculation of good estimates of settlement sizes and, possibly, population numbers. In Etruria, though estimated sizes have been calculated for the defended sites on tuff outcrops (e.g. Di Gennaro 1986; Peroni and Di Gennaro 1986), it is nevertheless by no means certain that occupation of the whole plateau took place from the beginning of a site's history. For some of the major excavated sites this has in fact been proved not to be the case (e.g. see Di Gennaro's comments on the occupation of Luni and San Giovenale in the Late Bronze Age as opposed to the Final Bronze Age, in Di Gennaro 1986: 29). Despite initial optimism, it has started to be realised that accurate estimates

for both site sizes and site numbers and their density in the landscape are not yet possible (Di Gennaro 1988: 63 and 1991/92: 197).

Yet the existence of monocentric as opposed to polycentric settlement systems can hopefully be more easily established. Barker has convincingly argued that the existence during the Middle Bronze Age of montane sites in the Apennines and of a series of coastal sites spaced at regular intervals and which could have acted as summer and winter pastures respectively are indications of a system in which groups made use of several sites during the year (Barker 1981: 156). Di Gennaro has also seen an indication of polycentric communities during the last part of the Middle Bronze Age in the fact that smaller settlements concentrate around those on the larger tuff outcrops (Di Gennaro 1991/92: 198). In Western Veneto patterns of upland and lowland exploitation and transhumance also exist during the Middle Bronze Age, which affect mainly the settlements in the hill and pre-alpine areas (De Guio in Fogolari *et al.* 1987: 98-99). All these polycentric groups I do not regard as nucleated.

It is worth it, finally, to briefly set out the outline of settlement nucleation for each area, according to the definition given. The process of settlement concentration in Etruria seems to have started in the Middle Bronze Age, with the birth of a series of sites which would then grow into nucleated settlements in later periods. Settlement dynamics for the end of the Bronze Age show the selection of isolated heights and particularly the larger ones in place of smaller ones (Peroni and Di Gennaro 1986: 193; Di Gennaro 1991/92: 200) related to larger communities. By the Final Bronze Age a series of larger defended settlements of supposedly similar sizes and territories are placed at regular intervals (Di Gennaro 1991/92: 198), showing a series of nucleated groups.

In Western Veneto nucleation as I define it here took a slightly different course. Settlement spacing at regular intervals is observable, as in Etruria, only in the Final Bronze Age (see Chapter 8, fig. 18). Before that, the population, site densities and the restricted geographical boundaries of a considerable number of sites (e.g. Castello del Tartaro, Canova, Fabbrica dei Soci, Fondo Paviani, all of which are embanked sites) (De Guio in Fogolari *et al* 1987: 98-99) provide evidence for already nucleated communities

from the end of the Middle Bronze Age. The demographic collapse which affected the area from the Late Bronze Age did not affect the nature of sites as nucleated groups (as shown by nucleated sites such as Fabbrica dei Soci or Fondo Paviani).

To conclude, I have defined here the main concepts as I understand them and use them in my research. I am aware that these definitions are both arguable and perhaps not measurable, but that could just confirm, in Calvino's words, *"the hypothesis that each man bears in his mind a city made up of differences, a city without figures and without form, and that the individual cities fill it up."* (Italo Calvino, Le città invisibili)

Chapter 3: THE HISTORICAL PERSPECTIVE

"A historical approach offers a special vantage point from which the changing relations between archaeological interpretation and its social and cultural milieu can be examined. The time perspective (...) permits the researcher to identify subjective factors by observing how and under what circumstances interpretations of the archaeological record have changed, (...) it almost certainly increases the chances of gaining more rounded insights into what has happened in the past" (B. Trigger 1989: 4).

Archaeology, as currently defined in textbooks, is the study of human behaviour in the past from its material remains (e.g. Renfrew and Bahn 1991: 485). From personal experience, however, archaeologists are well aware that there is a gap between the "material remains" and the behaviour which produced it, a gap which does not extend only in time but more seriously, in our understanding of societies and situations which no longer exist. This gap is filled by *an interpretation*.

Every archaeological study implies interpretation, and every archaeological interpretation implies a more or less basic or elaborate framework from which the problem is viewed and approached. In archaeology, as in most human undertakings, knowledge is cumulative, and builds upon previous knowledge either to confirm it and accept it as a premise or, alternatively, to refute it and reject it. The problems, the concepts, the interests of archaeological research at any given time, depend upon others formulated in the past. An understanding of how the basic framework of research in archaeology has developed is an absolutely necessary first stage which cannot be overlooked or underestimated. In attempting to isolate, study and solve a problem, a primary concern must be to establish why the problem is such, why does it exist, in all its extent: what is intrinsic to it and what is the result from defective or limiting study frameworks used in the past and associated with it ever since. There is a double side to this historical perspective. In the first instance, there is a whole series of more general trends, what we could call the intellectual climate of the discipline at any given time. Then, there is the specific development of the problem through time, and the different solutions and interpretations given to it. We shall be looking at both.

1. The development of archaeology in Italy

The birth of antiquarianism

The beginnings of that predecessor of archaeology we call antiquarianism go back to the Renaissance, and have their roots in the rediscovery of Greek and Roman civilisations which the Renaissance brought about. As a taste for the Classical world and its artistic and cultural achievements developed, an interest grew in collecting the many objects which could be still easily found. Florence and Rome were the first two places where collectors started work, in the last decades of the fifteenth century, first on behalf of the Papacy, but soon also for the nobility and other influential people (Daniel 1975: 17). Private excavations were conducted to furnish the villas and houses of prominent people, and material rapidly found its way to foreign customers. The impulse behind every excavation was, as the well-known story of the discovery of Pompeii reveals, to find fine objects of Classical art to nurture the collections then growing all over Europe.

No attempts at classification were made, and the excavations conducted at the time did little to record or collect other evidence than the objects themselves. Interest in pre-Roman and prehistoric material was limited to the richer finds, which were, anyway, almost invariably ascribed to later periods. Interest in the collection of artefacts and works of art was not restricted to Italians, and became particularly strong in countries like France and Britain: Italy, as a matter of fact, was to suffer the consequences.

The habit of art collecting seems to have been in decline in Italy by the eighteenth century (Daniel 1975: 17). By that time much of the Roman material was dispersed in collections all over Europe. Earlier material remained largely ignored. Nevertheless, the results of more than two centuries of antiquarian activity would be found later on in archaeology as this developed: a stress on and attachment to the search for artistically important objects, with artefacts acquiring disproportionate importance in any excavation, the growth of a lucrative profession - that of *clandestini* or *tombaroli*, illegal excavators and tomb robbers -, together with a neglect of earlier periods, settlements and everyday life objects, and the general sense of aggrandisement and prioritary value attached to the Roman past, a sense which stills weighs heavily on research.

In contrast to Northern and Western Europe, where antiquarianism led to increased interest in the history of preclassical periods and the interpretation of their artefacts, antiquarianism in Italy led to a notable impoverishment of the information and to an even greater interest in the omnipresent Rome. The influence of what for Greece has been called *The Powerful Past* (Kotsakis 1991: 65), made itself felt in Italy too, and the greatness of the historical period somehow eclipsed interest in the preceding times.

The birth of archaeology

"L'archeologia italica di un secolo, o secolo e mezzo fa, avendo a disposizione i manufatti (raccolti per via antiquaria e svincolati quindi da ogni etichetta stratigrafica), delineò necessariamente una struttura scientifica strettamente legata alla tradizione scritta: ai testi. Intervenivano, come è ovvio, criteri personali di credibilità o meno dei testi: non di rado prendeva il sopravvento un soggettivismo esegetico, illimitato".

"A century, or a century and a half ago, italic archaeology, (having available the artefacts which were recovered by antiquarians and therefore devoid of all stratigraphic label) necessarily developed a scientific structure tightly linked to the written tradition: to the texts. There intervened, obviously, personal criteria of credibility or not of the texts: not rarely an exegetical and unlimited subjectivity took the upper hand ..." (S. Ferri 1969: 187. My translation.)

Even if the antiquarian pursuit declined notably in the eighteenth century, it did not cease completely. Occasional discoveries increased the range of prehistoric material then known, albeit little was said about its dating or provenance, and the information, if such there was, rarely circulated further than the local area of the discovery: the political and cultural scene in Italy, still divided into different independent states, meant that local rivalries were ripe, and hindered all diffusion of finds and analysis at pan-regional level. Local pride, however, also brought about an interest in the pre-Roman past, and individual states and towns sought their roots away from Rome, giving rise to plenty of archaeological activity. Thus, as an example, in 1728, excavations were carried out at Volterra, and a museum was set up with the Etruscan finds, to belittle the importance of its Roman-founded neighbour, Florence (Reich 1979: 36-37). Rivalries and a local outlook, even if of a different nature, have not ceased to be present in Italian archaeological research since.

By the nineteenth century, agricultural activity and the reclaiming of marsh lands had brought to light many more prehistoric remains. Many of the painted Etruscan tombs came to light when malarial areas became inhabitable and cultivable once more. Vulci's tombs, for instance, were accidentally discovered in 1828 while ploughing. Still the sense of past remained largely restricted to the Etruscans and Romans. The increase in documentation and the interpretative advances which spread across Europe concerning stratigraphy and typology, led to the first signs of interest and understanding of the nature of the prehistoric material. Explanation, however, followed two main trends: on the one hand, early prehistory moved along the lines of the discoveries made by geologists and biologists, and started to develop close links with the natural sciences. On the other hand later prehistory was explained within the framework of Italic groups known from the literature. This distinction also took a geographical outlook: the North represented the area where advances were made in interpretation and methodology, its scholars well linked to European trends; the South had its first scholars placed more within an antiquarian and erudite tradition (Guidi 1988: 28-29).

As S. Ferri rightly points out above, the lack of stratigraphic labels for the material discovered led Italian archaeologists to rely on textual evidence, a fault linked to the authority given to Classical writers. Italian archaeology grew, somehow, in the shade of history, something which would have been impossible in Central and Northern Europe where written records only existed on a minor scale, and where interest in prehistory was not so obscured by later Roman occupation and had to be satisfied exclusively by the analysis of its material culture. Thus, in Italy, the framework of later prehistory was established by historic writers, and interpretation moved along the lines set down by them.

A further distinction, then, started taking root, even if it would still take a while for it to develop fully. On the one hand the study of early prehistory kept pace with the rest of Europe, closely linked to the then prevailing theories of evolution (cultural and biological). On the other hand, the study of the Classical period kept its attention fixed on artistic and stylistic considerations, and its concern with corroborating the written records. In between both there lay a most obscure period.

The development of a new science

Along with the evolutionary determinism which marked the last half of the nineteenth and the early twentieth century, Italian culture was dominated by positivist thought (D'Agostino 1991: 52), in which the experimental method was the only valid approach. The approach proved an advantageous one to archaeology, by developing methodologies in the excavation and recovery of material and the application of stratigraphy to sites and classificatory schemes to artefacts.

From the middle of the nineteenth century, scientific interest in early cultures other than Etruscan and Roman became a reality, thanks to the many discoveries which took place around the time and to the maturing of perspectives. In 1853 excavations started in Villanova, near Bologna, bringing to light a rich culture earlier than the historical Etruscans. Soon after, agricultural activity was responsible once more for the discovery of a different archaeological manifestation, the Terremare ("dark earth") of Emilia-Romagna (Reich 1979: 42).

In many respects the 1870s were momentous years for Italian archaeology. The unification of Italy, completed in 1870, aroused the need for some sort of State control over archaeological investigations and finds. Thus, a Department of Antiquities was created, and an official bulletin, *Notizie degli Scavi*, was first published in 1875 (Reich 1979: 41). The first excavations at Este were directed by Alessandro Prodoscoimi between 1876 and 1882 (Chieco Bianchi and Tombolani ed. 1988: 12). In 1876 too, the first *Mostra Preistorica Veronese* took place, signalling a general interest in the past extending beyond Rome and the written accounts which had previously sufficed as explanations. The figure of Luigi Pigorini was responsible for much of the interest amid scientific circles (Guidi 1988: 25-29): even if his methods were deeply ingrained within the collecting and artefact oriented tradition then prevalent, he did, nevertheless, call attention to the many varied archaeological manifestations to be found in Italy before and contemporary with the Etruscans (e.g. Pigorini 1903). Special mention is deserved by Giacomo Boni, who at the turn of the century excavated sites from all periods with similarly revolutionary methods and precision (Guidi 1988: 54-54; D'Agostino 1991: 52), becoming the last unifying factor in the practice of prehistoric and classical archaeology

before the "Great Divide" (Hodges 1990: 84) between the two settled in.

The end of the nineteenth century and beginnings of the twentieth mark the growth of a trend which was to become absolutely predominant in Italian archaeology even to our days. The need to make sense of the material accumulated over the past centuries, and that being recently and so abundantly discovered, promoted the development of typological analysis, making it largely equivalent to archaeology itself. The analyses had a specifically chronological and local orientation: typology was the only available means to place in context material that was otherwise disassociated, and the new material being discovered provided the reference point: firmly datable horizons were then provided by comparisons of local material with imports and typological similarities from areas such as the Near East, Greece, or even across the Alps. Within this framework O. Montelius published his La civilisation primitive en Italie at the turn of the century, which was soon to become a reference work both in methodology and contents.

Developments since then centre around the figures of distinguished archaeologists and their *schools*. The Italian education system has fostered the 'maestro-pupil' relationship, giving rise to groups of students earnestly following the ideas and methods proposed by their teachers but all too often with less brilliance. These schools were in keen rivalry with each other.

Fascism in Italy brought about much archaeological activity, but this was largely oriented towards the discovery of the great Roman past, and prehistory was given little attention: politics dominated the discipline. The fascist regime also caused the isolation of Italian scholars, who remained in contact with their German colleagues only at a time when many of the great methodological innovations of archaeology were being developed in the rest of Europe. In a way, Italy is only now coming back to the forefront of European archaeology.

Soon after the war, during the 1940s, Bianchi Bandinelli gave a great thrust to the study of archaeological artefacts from an art-historical viewpoint (see for instance Bianchi Bandinelli & Giuliano 1973). Bernabò Brea (1957; Bernabò Brea & Cavalier 1956), who

in some aspects continued the tradition of Giacomo Boni, was careful to keep a constant comparison between the written and the archaeological record (D'Agostino 1991: 52).

In the field of protohistory the 1950s brought about the first syntheses on the study of the peninsular Bronze Age (Guidi 1988: 137). In the wake of Childe, under whom he spent a year in the Institute of Archaeology, S.M. Puglisi attempted an interpretation of artefacts with respect to the modes of production. The Childean revolution brought about by the definition of archaeological cultures was readily taken up in Italian prehistoric archaeology. The stylistic element, so developed by Bianchi Bandinelli (see above), and the already traditional concentration on artefact studies, meant that the Italian archaeological scene was more than ready for typological studies to develop and cultures to be enthusiastically defined with useful names provided by the Classical writers. This led to confusion. For even if Puglisi was careful enough not to associate cultures with ethnicity but rather with economic behaviour and the environment, others were not (e.g Laviosa Zambotti 1957; Fogolari 1965; S. Ferri 1969). The new emphasis on the identification and definition of cultures inserted itself in the more traditional chronological frameworks based on typology, giving to the team "culture-chronology" the nature of a marriage. Cultures were defined and re-defined within particular chronological facies, with different names being invented to fit the new subdivisions of typological refinement. Different schools followed different classifications proposed by different archaeologists. A false over-division of material brought about by the refinement of typological analyses caused a similarly false over-division of cultures in both geographical and chronological terms. Archaeological investigation grew in typological depth and complexity, but not in understanding or breadth.

During the post-war period, "traditional archaeology", with its tendency to divide typological manifestations into well defined cultures, got firm hold of the study of Italian protohistory (for a graphic illustration and references, see tables 1 & 2). The result is that a whole new range of limitations was added to the more general problems of shallow stratigraphies, early excavated sites, art-historical oriented excavations and the like. Those limitations were mainly the product of confused and localised relative chronologies, of terminological vagueness and redefinition leading to a generalised confusion over the

identity of any one group, of tight divisions into chronological and cultural compartments which were difficult to reconcile, and of the subsequent stretching, refitting, renaming and shrinking of chronological periods, cultures, cultural facies etc. The development, however, cannot be qualified as an absolute disaster: archaeologists such as Müller-Karpe or R. Peroni (e.g Müller-Karpe 1959; Peroni 1959, 1980, 1989) have given an immensely valuable impulse to typological studies, showing how artefact analysis can truly render very inspiring insights into the understanding of prehistory and the structuring of prehistoric communities. But either as straight materialism from a primarily chronological standpoint, or as a Marxist approach that concentrated on the socio-political structuring processes of prehistoric communities, typology and seriation became the outstanding tools of an intrinsically artefact oriented archaeology.

The *New Archaeology* hit Italy somewhat later than it did other countries: not until the early 1980s, when many of its propositions were being criticised and abandoned even by some of its earlier proponents. After that there have proliferated studies concerned with spatial distribution, changing economies and prehistoric behaviour, and a stress has been laid on the importance of theory and cultural change and diversity (see, for instance, the papers in *Dialoghi di Archeologia, n.s. 2 "Economia ed organizzazione del territorio nelle società protostoriche"*). A direct contribution has been to develop an interest in cultural and anthropological models, and to offer an alternative to typological analyses. Interest in areas that had until then been more neglected - settlement archaeology or social organisation for instance (e.g. Negroni Catacchio 1981; Bietti Sestieri 1992)- and in methodologies until then little explored - botanical and zoological analyses, field walking and surveying, application of statistical and computer models - is growing (e.g. De Guio 1985, 1986; Di Gennaro 1982; Guidi 1985). The *New Archaeology* has also brought its setbacks to Italian archaeology: confusion in the terminology and use of difficult jargon are only practical aspects, but too rigorous a trust in universal laws and purely empirical approaches have found some response in Italian circles. Finally, it is still too early to assess the impact of later developments such as contextual and symbolic archaeology which, to date, seem to remain extraneous to Italian archaeology.

After looking at the history of Italian archaeology, it is possible to identify a series

of tendencies that run through the whole and still appear in present research:

a) A prevalent interest in Classical archaeology, and an overestimation of the value of the classical world above that of earlier communities, which were seen as disassociated from Rome and its parent culture, Greece. As a result, unjustified credibility is attached to the texts of the Classical writers and there is a tendency to interpret developments which show higher complexity in relation to foreign intervention and influence.

b) A strong tendency to concentrate analysis on the artefacts, with these being almost an end in themselves. This position remains whether the artefact is sought as a work of art or as one more example in typological research or stylistic analysis.

c) Consequently, there has been a disproportionate study of artefact-rich areas such as burial sites, in neglect of settlement areas and sporadic occupation sites. Stress has been on chronologies and typologies largely developed by drawing parallels between Italian material and that from the Aegean or Central Europe.

d) An isolation of research into different schools which do not readily cooperate with each other. This is at personal level (as between *rival* professors and their pupils) and at establishment level (as amongst local museums, *soprintendenze*, university groups, and archaeological cooperatives and amateur groups).

e) Whereas classical archaeology and early prehistoric archaeology have had clear identities, aims and methodologies, there has not been a similar development for the later prehistoric periods. These have laid between the two and have been tackled by both with a subsequent stagnation and rarefaction in its study. Although they are strictly prehistoric, there has been a great historical influence in the way in which their study has been approached. Most damaging of all is the belief among protohistorians that there is a methodology of protohistory. Most of the time this amounts to studying the period with the hindsight of what is known as history. Methodology often reverts to an analysis of the material remains through typological analysis and, paraphrasing a comment made on that type of approach, there still hovers "a feeling that with just a little bit more effort in the study of the enormous corpus of artifacts from the Iron Age, we shall see the emergence of a Protohistory in Italy to place it alongside history. (...) Protohistoric studies suffer from the worst of both worlds: much (indeed most) of their data is no more precise than prehistoric data, but historical questions are still at the forefront of the discipline. Archaeological entities ill defined a century ago have taken on an historical

life of their own" (Barker and Hodges 1981: 3).

2. The History of Research in Later Prehistory

The Bronze Age and Protohistory

Within the wider trends and problems outlined above, the study of the late stages of the Bronze Age and the Early Iron Age has been traditionally carried out from its beginnings in the context of a number of archaeological cultures and chronologies, and under the umbrella of the term "protohistory". This term deserves some explanation. Italian archaeology was more than ready to accept the new culture-historical model prevalent for most of our century, and did so enthusiastically. A clear break was made between different cultures and the areas and periods ascribed to them. The study of the Bronze and Iron Ages was, to a very large extent, carried out separately, and a vacuum was created between the Early and Middle Bronze Age in the one hand and the Late Bronze Age and Iron Age on the other. The gap encompassed methodologies and approaches as already seen above, but was further enlarged by the coining of the term *protostoria* in Italian archaeology. The term "Protohistory" has not caused such an isolation of research in other countries because, whereas the word is usually taken to designate a period for which no written history is available in one area but is so for others, in Italy the term took a new shade of meaning in keeping with the history of the subject and the strong bearing of Classical historians. G. Devoto was the first to explicitly link the word *protostoria* to written ethnography (Devoto 1967): thus whenever the name of a people could be directly or indirectly assigned to a period or phase, the period was described as protohistoric. The equation worked mostly in the reverse direction: the period was protohistoric and, therefore, an identification of cultures and peoples had to be made, often by adding proto-, palaeo- and such prefixes to known names. Protohistory acquired in that way a distinctive culture-historical flavour: a chest-of-drawers approach was predominant. The period was regarded as an in-between stage which could be explained by working backwards from the historical period.

The consequences of this are many. On the one hand there has been a stagnation of research and the statement still holds valid that "the most alarming dichotomy in Italian

archaeology today is between the socio-economic goals of prehistoric/classical/medieval studies on the one hand, and the protohistoric goals of protohistory" (Barker and Hodges 1981: 4). On the other hand, the predominance of the culture-historical approach in protohistory gave rise to multiple definitions for periods, assemblages etc. The cultural sequence has been named and the frontiers between periods shifted so many times that the picture emerging is *per force* a confusing one. More recent feeling, however, is for less personalised interpretations and preferences and more consensus (Pallottino 1979: 21).

In order to understand the problem faced by anyone attempting a study of the later phases of the Bronze Age, it is necessary first to realise the extent of the link between the definition of archaeological cultures and the establishment of chronologies. The interpretations by different authors changed to accommodate new sites and material discovered, often with a definite bias towards the results produced by their own site(s). New subdivisions and terminology had to be invented to incorporate research results, altering the chronological framework. The objections raised by this phenomenon have been clearly summarised by M Pallottino:

"La prima (riserva) riguarda i limiti ai quali si può scendere nella individuazione dei gruppi omogenei interpretabili come amonfrazioni temporali (...). Il secondo problema riguarda il valore da attribuire alla compattezza delle manifestazioni culturali nell'ambito del periodo individuato e, conseguentemente, all'assolutezza del distacco tra periodo e periodo. La tendenza, pur comprensibile, ad accentuare astrattamente la nettezza di partizioni pur intelligentemente individuate finisce col far dimenticare quei fenomeni di continuità e di progressività che caratterizzano ogni evoluzione delle società e delle culture nel tempo".

"My first reservation regards the limits to which one can go in the identification of homogeneous groups to be interpreted as fractions of time (...). The second problem is about the value to be attributed to the unity of cultural manifestations in the defined period. The tendency, however understandable, to stress in an abstract way the neatness of divisions, no matter how intelligently identified they be, ends up by making us forget those phenomena of continuity and development which characterise every evolution of a society and culture through time" (M. Pallottino 1989: 207-208. My translation).

The lack of absolute chronologies for Italy prior to the arrival of radiocarbon dating forced chronologies to be tied to those of Central Europe and the Mediterranean. Chronological schemes have often been divided to neatly fit with the existing chronologies. After the advent of radiocarbon dating prospects are not much better.

Dates for Italy are still very few, particularly for the period that concerns us. Other absolute dating methods, such as dendrochronology, are still little developed. The integration of the few absolute dates available can alter the picture established by relative chronology, as shall be seen later on.

A general overview of the proposed chronologies is, thus, a necessary step. Nevertheless, there is no need to describe them in a detailed way here, rather it seems preferable to show instead the great dissension and variety which are present in the study of the period, and how easily the misuse of a word (or its use by different authors) can give rise to confusion (see tables 1 and 2). It is important to note as well that the regionalism of Italian archaeology can be responsible for minor differences in time ranges, but that even if one allows for this, the level of disagreement in the use of terminology and the vast differences in time ranges which are observable in already regionally defined areas can only be accounted for in terms of the personal interpretation and preferences of different scholars which is so characteristic of Italian archaeology. As tables 1 and 2 show, protohistory has not been a static concept, nor have its phases been coherently defined. There have been myriad definitions of the term concerning its length (whether it should include or not the late stages of the Bronze Age) and its exact nature and divisions. At the root of the confusion lies a historical and methodological problem, that of the link between cultural labels and chronological periods. Obviously, some of the diversity present can be accounted for in terms of the development of research that has made some classifications be superseded and refined or revised. What is surprising is to find that superseded terminology is still used (maybe a sign of scholarship). At present, as a glance at tables 1 and 2 quickly reveals, there has not been a satisfactory agreement reached, and "protohistory" has turned into a rarefied field. It is, one would think, the only logical result from the confusion which reigns in the area.

Centuries B.C.	Chronological periods	Trump 1958	Müller Karpe 1959	Peroni 1959	Pallottino 1962	Östenberg 1967	Hencken 1968	Fugazzola Delpino 1976	Potter 1976	Ridgway 1988	Peroni 1989	Centuries B.C.		
16th			Br B1		Bronzo Medio (Appennino nico)	Appennino Antico			Fase IA			B iniziale r. non avanz.	16th	
15th	MIDDLE BRONZE AGE	Early Apennine	Br B2/C1						App. Antico			M e pieno d - - i avanzato o tardo	15th	
14th			La Br C2 te		Appennino Tardo	Appennino Medio	Late Apennine		Fase IB	App. Recente			14th	
13th	LATE BRONZE AGE	A	Br D penn		Bronzo Recente (Subapp.)				Fase 2 Subapp.	Appennino Tardo	Apennine Phases I & II	Sub appennine	Bronzo Recente	13th
12th		E	vo	Pro	Sub appennino nico				Fase 3	Sub appennino nico	Proto villa no van			12th
11th	FINAL BRONZE AGE	I B ve d	Ha A1 to vi lla		Bronzo Finale (Protovillanoviano)		Sub appennine			III	Protovilla novan	B iniziale r. pieno	11th	
10th		C	Ha A2 no van		Protovilla noviano	Appennino Tardo	Protovillano van			IV		Finale tardo	10th	
9th	IRON AGE	A	Ha B1 Allumiere Tolfa						overlap	Protov. V				
8th		E	Ha B2 lla	Villanova	Età del Ferro I		Villanova		Vill. I	Villano van	Este I	9th		
		F	Ha B3 no van		Età del Ferro II				Vill. II	Villano van	Este II		8th	

Table 1: Chronological table for Central Italy according to various authors

Centuries B.C.	Chrono logical periods	Müller Karpe 1959	Peroni 1963	1989	Aspes, Fasani 1976	Fasani, Salzani 1975	Leonardi 1979	Marchesan 1985	Capoferri 1987	Bicego 1988-89	Centuries B.C.
16th	MIDDLE BRONZE AGE	Br B1	Bronzo Medio <i>Povegliano</i>	B. <i>iniziale</i> <i>non avanz.</i>	Bor			Br. Medio I	Br. Medio I		16th
15th			Br B2/C1	Br Medio II <i>Povegliano/</i> <i>Mt. Lonato</i>	M. <i>pieno</i> <i>de-</i> <i>avan-</i> <i>ta-</i>	Isolone			Br. Medio II	Br. Medio 2	15th
14th			Br C2	Br Medio III <i>Povegliano/</i> <i>Mt. Lonato</i>	d. <i>avan-</i> i. <i>ta-</i> o. <i>tardo</i>					Br. Medio 3a Br. Medio 3b	14th
13th		Br D (<i>Fase di</i> <i>Peschiera</i>)	Bronzo Recente "Bovolone"	Bronzo Recente	Peschiera	Br. <i>antico</i> Rcc. <i>recente</i>	Bronzo Recente	Br. Recente I	Br. Recente I		13th
12th		Ha A1 (<i>Individual</i> <i>finds</i>)	Bronzo Finale	B. <i>iniziale</i>		B. <i>Fase</i> r. <i>iniziale</i>	Br. Recente evoluto/Br. Finale iniz.	Br. Rec. II	Br. Rec. 2	1	12th
11th		Ha A2 (<i>Fase di</i> <i>Fontanella</i>)		r. <i>pieno</i>		o. <i>Fase</i> n. <i>centrale</i>	Br. Finale IA			2	11th
10th		Ha B1 (<i>Fontanella/</i> <i>Este</i>)		Fi. <i>na</i>		F. <i>terminale</i>	Br. Finale IIA			3	10th
9th	IRON AGE	Ha B2 (<i>Este I</i>)			Este I	F. <i>terminale</i>	Br. Finale IIB			4	9th
8th		Ha B3 (<i>Este II</i>)			Este II	c				5	8th

Table 2: Chronological table for Northern Italy according to various authors.

The study of the Bronze Age and Settlement studies

A general background to the research henceforth contained would not be complete without a summary of the history of research on settlement in both areas under examination. It is not necessary, on the other hand, to provide a detailed or exhaustive account of older research, but only in so far as it might affect current investigations (there is not, furthermore, an incredibly long history of research into this aspect and the account will, per force, be restricted to recent developments).

The growing interest in settlement studies detectable in the last thirty years has put protohistory in the limelight, as it was clearly in its last stages that the first urban settlements came into existence. As a matter of fact the link between the term protohistory and the Iron Age, and the Iron Age and phenomena of urbanisation have made settlement research a priority of protohistoric studies. The period has even been defined by some in that light: *"il concetto di protostoria, di là dalle moltissime accezioni proposte per questo termine, è per me legato ad un'idea 'dinamica' del formarsi delle grandi civiltà urbane, cioè di quella condizione di progresso che vedrà fissarsi nella scrittura ogni operazione ed ogni tradizione consentendoci di 'leggere' gli eventi del passato"* (M. Pallottino 1989: 205). However much one may disagree with his restricting view, it is undeniable that settlement studies are central to research in later protohistory and that, in this period, substantial changes took place in the spatial - and supposedly also the social, economic and political - organisation of certain groups. The research contained here hopes to provide similar knowledge for the earlier periods of protohistory which are intrinsically connected to late developments.

Funnily enough, interest in the urban phenomenon has not been accompanied by practical consequences: for instance, the full excavation of the settlement of Monte Castellaccio in Imola, published in 1887, remains an isolated example (Guidi 1988: 29). Partial settlement excavation has experienced a growth lately, but is still ludicrous when compared with the development of cemetery and burial investigation. As late as 1989 it is possible to find in the work of renowned prehistorians statements such as the one that follows, which totally exclude the evidence from settlement sites:

"Come si può cogliere archeologicamente questo insieme di fenomeni, e come in

concreto lo si coglie nel caso dell'età del bronzo europea ed italiana? Attraverso due categorie di evidenze, non di rado correlate tra loro: la composizione dei corredi funebri e la diffusione dei beni di prestigio, soprattutto in metallo".

"How can we archaeologically perceive this group of phenomena (socio-economic phenomena which reveal changes in the structure of the group), and, specifically, how can we perceive them in the case of the European and Italian Bronze Age? By means of two types of evidence, usually interrelated: the make-up of the grave goods, and the spread of prestige goods, particularly metal ones" (Peroni 1989: 18).

Yet, settlement studies have brought an important contribution: the necessarily spatial approach and the expansion of identified archaeological forms with those present in settlements widens the scope in methodology, database and general perspective on the subject. Of late, research in the Iron Age (for instance the ongoing research on the process of urban formation during the Archaic and Etruscan periods, carried out by scholars such as S. Stoddart - 1989, 1990, 1994 -, M. Rendeli - 1985 -, or A. Zifferero - 1990, 1992) has raised many questions concerning the nature of the relationship between Bronze and Iron Age, and as a logical follow up, the nature of the relationships between the groups taken to represent them. More theoretical issues, such as the validity of culture definitions, are finally bringing about a situation in which cultural names are being abandoned as chronological indicators, and are being used only to define typical assemblages (e.g. Pallottino 1979, 1989). It could be argued that this is a stage of methodological and theoretical transition in the study of Italian "protohistory", a transition hopefully marked by the regard for problems wider than those purely classificatory.

Research on settlement distribution and human patterning in the landscape is a direct consequence of the development of reconnaissance techniques such as field survey (e.g. Potter 1979). These techniques permit a wider understanding of the landscape than that allowed by excavation, albeit often rendering information on a lower qualitative level. The study of settlement patterns, however, is impaired in Italy not so much by the general shortcomings in the nature of the technique (for instance its low chronological resolution, or the difficulties in individuating spatial limits), as by the non-rigorous way in which it has been conducted by some Italian archaeologists. In most instances, what takes place is not survey but unsystematic field-walking, which is directed almost exclusively to the discovery of new sites (see for instance the surveys conducted by Di Gennaro 1979, 1982,

1986, by Pacciarelli 1982 and other present and past members of the *Gruppo Archeologico Romano*). Thus, the apparently good knowledge of the archaeology of the area is in fact more an increase in the number of sites known, than in what is actually known about the sites (and whether they are anything more than a small findspot). Properly conducted surveys (as the Alto-Medio Polesine Basso Veronese Project - see Balista *et al.* 1990, 1991, 1992 -) are a different case and the general disadvantages of the technique are outweighed by its efficacy in providing regional patternings. Once integrated with information from excavation it becomes the only acceptable approach to regional models.

As such, field survey in the form we know it today, was introduced to Italy through the work and impulse of J.B. Ward-Perkins. Ward-Perkins, for many years director of the British School at Rome, put into practice a project of field-survey in the area north of Rome with remarkable foresight. The post war years saw the introduction of deep ploughing to much of the area, and the subsequent destruction of many sites. To quote his own words: "*The romantic desolation of Southern Etruria is being transformed from one day to the next under the impact of a scheme of land reform comparable in scale to the great reforms of Classical Antiquity. Much of the damage to ancient sites is unavoidable. If this material is to be recorded the record must be made at once*" (Ward-Perkins 1955: 44). The project, ongoing in one form or another between 1950 and 1974, came to be known as the South Etruria Survey (Potter 1979), and served to discover, map, and place in relation with each other and with the landscape, an amazing number of sites of all periods from the prehistoric to the medieval. The publication of the survey's results in various Papers of the British School at Rome, and in T. Potter's book The changing landscape of South Etruria (1979), was followed by a growing interest in the subject of prehistoric settlement, an interest which particularly concentrated in the area where the survey had been carried out: Southern Etruria. There had been in the past summaries of known sites and analyses of landscape use by Italians, but these were mostly of a topographic nature. With the new upsurge of interest in the topic, topography came once more to the forefront (significantly enough, the early archaeological maps of Pasqui and Cozza were published only in the first years of the 1970s, almost a century after being compiled by the authors). In Central Italy, the work of F. Rittatore Vonwiller deserves

special mention (Rittatore Vonwiller 1969, 1974, 1975; Rittatore Vonwiller *et al.* 1978). From the mid 60s down to his death in 1979, Rittatore Vonwiller carried out, among others, a series of explorations of the river Fiora's valley which brought to light the extent of the occupation of the area during the Late Bronze Age.

Under the impact of the New Archaeology and of a younger generation of scholars, the emphasis from a topographical approach to regional settlement analysis and landscape use has shifted without disappearing, to encompass other directions. Thus topographical studies have given way to interest in reasons for settlement location, settlement continuity, cultural continuity and cultural evolution and change. Political and social issues have been tackled, such as the possible reasons behind the nucleation processes observable at the turn of the millennium, whether they were forced or wanted, spread over a long period or of a relatively sudden nature. In connection with this, the particular chronology and mechanics of the process have been investigated. Various statistical and mathematical techniques have been applied to the interpretation of the human landscape: A. Guidi's "Rank size analysis" of the settlements in Southern Etruria (1985), S. Stoddart's application of the "x-tent" technique to the same area and the study of territories and frontiers between sites (1990), and F. Di Gennaro's repeated and documented evaluations of settlement dynamics, extent and location (1979, 1982, 1986, 1991/2).

Research on settlement in the Veneto is as recent as that in Etruria, with which it shares origins and characteristics. Its results provide an interesting parallel to what has been presented above for Central Italy. Research on regional patterns is centred around the figures of Italian archaeologists such as A. De Guio, G. Leonardi, Ruta Serafini, L. Capuis, and of joint projects between British and Italian archaeologists such as the Alto-Medio Polesine - Basso Veronese project (Balista *et al.* 1990, 1991, 1992). It has also been taking shape in the works of several young researchers, most notably A. Malgarise (1989-1990) and C. Bicego (1988-1989). A difference with Central Italy, though, is that from the beginning special importance has been attached to interdisciplinary studies and settlement in the landscape, to the work of geomorphologists, botanists and so on, and its repercussions in archaeological research (see for instance the

work of C. Balista - 1982, 1985, 1990-91, 1990, 1991, 1992 -, of M. Cremaschi -1985- and of Ferri and Calzolari 1989). Knowledge of environmental conditions and relationships is far more complete than for Etruria. Particular problems which have received attention so far are settlement dynamics, the relation of settlements with the non-cultural landscape, the impact of the environment on human settlement, and phenomena of settlement continuity and discontinuity. Again a whole series of statistical and analytical methods have been applied to solve the problems under study, from simple seriation to cluster analysis (Balista *et al.* 1982), and other more recent types of analysis such as survival analysis (De Guio 1985, 1986).

Chapter 4: ENVIRONMENTAL RELATIONSHIPS

"Perhaps the environment is taken for granted. Certainly the environment is specified as a variable in most processual equations, but in all too many instances such an equation is then resolved by treating that variable as a constant. (..) For archaeology context implies a four dimensional spatial-temporal matrix that comprises both a cultural environment and a non-cultural environment and that can be applied to a single site or to a constellation of sites. (...) The essential components of the non-cultural environment become distance or space, topography or landforms, and resources - biotic, mineral and atmospheric" (Butzer 1982: 4).

"The earth's surface ... is a floor on which men have carved a mesh of superimposed 'graffiti'" (P. Barker 1982: 27).

The study of man's past environment is a necessary part of all archaeological research, a part which cannot be ignored. Man in the past, just as nowadays, did not inhabit a vacuum: for hundreds of thousands of years man has lived and developed on earth, continuously interacting with his environment. This interaction has naturally resulted in a series of traces on the surface and subsoil, which could be very well compared to 'graffiti'. Their form is not fortuitous but the result of converging forces, and the identification of meaningful sequences can certainly reveal data about past events and societies. Environmental analysis is two-tiered: on the one hand it encompasses the study of the natural environment as a background in which human activity takes place and by which it is conditioned, on the other there is also the impact of human activity on nature. Environmental analysis should then logically extend both to the study of "raw" natural conditions (i.e. the establishment of environments as they stood at any time), and to the study of change induced by humans to those natural conditions and any other minor modifications and adaptations. This two-sided relationship between nature and man is the indispensable source of an important body of data, data which is even more vital for early societies whose life was more directly shaped by their immediate surroundings.

1. Palaeoenvironments and environmental change

The realisation that any given geographical area has experienced changes to its environmental conditions is not a new one, but it is one that needs to be constantly

stressed. Otherwise, the normally slow pace of change tends to be equated with no change at all, until conditions are so different that a new environment altogether is defined, creating yet another "chest of drawers' effect". The pace of change might be slow, but change it does: this is an extremely important consideration when the realities being studied are, as tends to be the case in archaeology, long term.

A direct consequence of the awareness of change throughout time in any given environment, is that it produces a superimposition of traces, as well as conditioning in some way later environmental development. The traces of past environments compare, thus, to "a mesh of superimposed graffiti " or a palimpsest which is difficult to interpret. The largely causal nature of the relationships between successive environmental situations determines change not as simply a series of distinct environmental "snapshots" which follow each other in time, but rather as a continuum in which changes take place at different times, at different rates and affecting different aspects of the whole. The usually slow pace of change couples with the low chronological resolution of palaeoenvironmental analytical tools and with their difficulties in identifying single and minor oscillations and changes in the environmental whole, thus allowing the individuation of discrete environmental stages in what is really an environmental evolution.

2. Environment and Landscape

The term "environment" usually stands for the external conditions, comprising a whole series of variables, which together come to make up the natural setting. As such, it includes particular ecological relationships brought about by the interaction of all its different variables. These variables, which can be classified in various ways, have been defined here as climate, geomorphology, hydrology, topography and landforms and what Butzer (1982: 4) calls "biotic" resources (flora and fauna). In practice, all these different sub-aspects appear tightly interrelated, combining and interacting in such a way as to make it impossible to define one without mention of the others. Together with these, there are two other aspects which do not belong to the environment as such but in which environmental change develops: time and space (see fig 5).

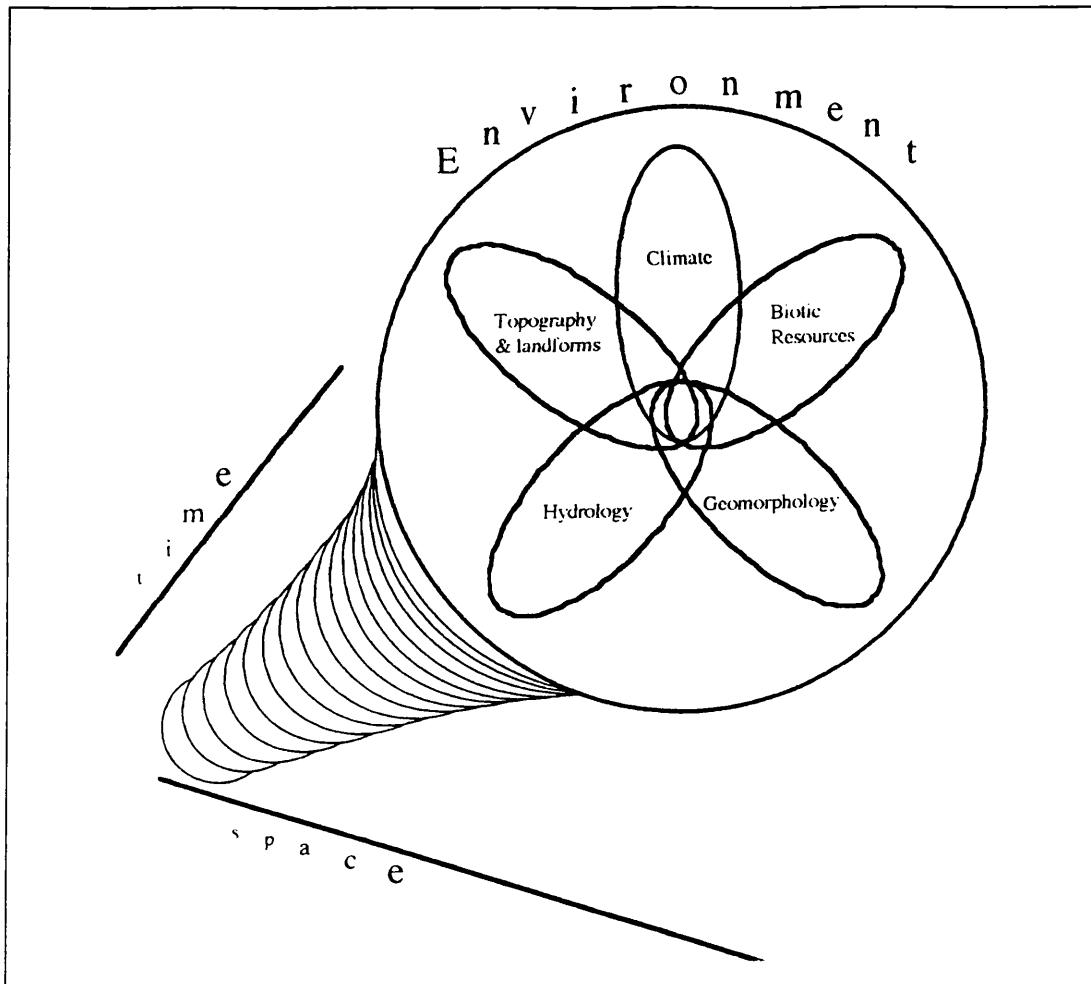


Fig. 5: Environmental relationships model.

A somewhat different concept is that of landscape, understood here, naturally, as the physical landscape, not a political one. A landscape could be thus defined as a heterogeneous area composed of a cluster of interacting ecosystems that are repeated in similar form throughout, and which can vary in size down to a few kilometres in diameter. There are different mechanisms operating within the boundaries of a landscape to bring about change. These are specific geomorphological processes taking place over a long time, colonisation patterns of organisms (including human beings), and local disturbances of individual ecosystems over shorter periods of time (Forman & Godron 1988: 594-595). Landscape can be understood, then, as a temporal space-bounded reflection of environment, the spatially and temporally defined specification of a more general concept.

3. Areas of study: the landscapes

The importance of an understanding of changes in the landscape cannot be underestimated. Archaeology largely depends on the traces left by the interaction of man with his environment. Without advocating a universally determinant role of the environment in human change (the relationship man/environment is bidirectional and, as such, the form taken by this correlation is dependent also on cognitive, social, economic, and symbolic factors), it seems only logical to try to understand the nature of the environmental factor. In practice this means that ancient landscapes should be reconstructed in order to provide the environmental setting for settlement.

Reconstructing the ancient Venetian and Etruscan landscapes is a difficult, yet necessary task: environmental factors might shed light on the reasons for particular settlement locations being chosen, they might point out where geomorphological change accounts for the lack of archaeological evidence, or might reveal similar or dissimilar trends in the selection of location for settlements which are now obscured by different environmental changes affecting previously similar landscapes. A situation in which large scale environmental change seems to leave spatial organisation untouched might also reveal the mechanisms a social group had recourse to so as to cope with environmental changes without altering its spatial arrangement. In a way, the group's level of complexity can be measured by its ability to set up buffers between itself and nature (urbanism representing the most extreme example of disassociation of the human group from contact with the natural environment). Some work of this type is already being carried out within the small scale of specific sites and locations. Geomorphological change in Veneto, for instance, seems to have been far more serious than that in Etruria, and the studies carried out so far reveal a very complex picture of ancient river courses and alluvial deposition (Balista et al. 1990 & 1991; Castiglioni 1977/78 & 1982; Veggiani 1974). It is, thus, proposed that as a first step a regional landscape reconstruction should be attempted, even if the data available and the large geographic scope permit only a low level of resolution.

4. Environmental reconstruction: palaeolandscapes

In order to reconstruct the environmental history of the two regions, each one will

be dealt with in turn. Each one of the different environmental variables established above (climate, geomorphology, hydrology, topography and landforms and biotic resources) will be examined, first individually and in general terms, and then in the specific form taken by the relationship of all of them in each area. Time and space are taken as axes for change, whenever this is possible. The role of time has been, and is, central to archaeology, whether as a classifying tool in the more traditional development of the discipline, or as a vital element of more modern archaeology, concerned above all with the explanation of cultural variability and cultural change. Time acts as a measure of change: the dimension of movement from one stage to another for everything. What is most vital in this respect is not only the pace of change, but our perception of it and how that affects interpretation. Archaeologists are only too familiar with the way in which time is mentally and perceptually compressed during periods in which nothing seems to have happened and how it expands when change takes place on a large scale (the mighty difference between our perception of a millennium in the Palaeolithic and a century in our own millennium). The need for a time scale in which events can be related to each other is particularly important if explanation is attempted, as the core of explanation is the setting into relation of events within a causal framework: explanation relies on finding the "be-cause".

Space is also important as events of whichever nature take place somewhere and are affected by this very location. Except in already geographically limited environments such as islands or isolated areas, seldom do two diachronic events develop within exactly the same spatial coordinates. In the case that concerns us here, both regions can be divided into different environmental zones. The topographic characteristic "altitude" is the most obvious indicator for such a division, since it affects climatic, faunal and vegetational patterns. Zones could be thus defined as the following: plain and coastal area, hill zone, montane zone, and highland alpine zone. All of these present different climatic, vegetational and faunal characteristics due to their specific location in the topographic sequence. Boundaries between them, however, are not static and change in relation primarily to climate, but also to soil deposition, erosion, and colonisation patterns by fauna and vegetation. The zonal composition of any landscape is an important consideration when trying to establish environmental conditions at any given time.

The environmental variables have been so far defined with a clinical precision and neatness possible only in paper. In practice, flora, hydrology, climate and so on are parts of a very complex system and largely dependent on each other. The very complexity of the system's networking and our imperfect understanding of it makes it necessary to point out that reconstruction will be piece-meal and, at times, simplistic. Still, it is hoped that by placing together all the information available some of the over simplification will be avoided, even if only because it will highlight the complexity of the relation man-nature and nature with itself and no absolute value will be attached to the reconstruction.

Climate

The standard periodisation of the postglacial climatic sequence was proposed in the works of two Scandinavians, Blytt (1876) and Sernander (1908), at the turn of the century, and it is still widely used today. Blytt and Sernander divided the post-glacial Holocene into six different zones, the climatic characteristics of each one corresponding to vegetational phases defined by them on the basis of plant remains (mostly in the form of macro-fossils and pollen).

Zone number	Zone name	Climate	^{14}C years BP	cal BC*
IX	Sub-Atlantic	More oceanic and wetter	post 2450	post 700
VIII	Sub-Boreal	Continental and dry	4450-2540	3500-700
VII	Atlantic	Warm winters, very wet	7450-4450	6250-3500
VI	Late Boreal	Increasingly warmer and drier	8450-7450	7450-6250
V	Early Boreal		9450-8450	8500-7450
IV	Pre-Boreal		10250-9450	9700-8500

Table 3: The traditional European climatic sequence of the post glacial Holocene as defined by Blytt and Sernander (after Embleton and King 1968 (table 3, p.14), Goudie 1992 (table 4.2, p.139), and other sources (Frenzel 1966)).

* Calibration is approximate only.

The traditional sequence, therefore, and it is important to notice this, was essentially one of vegetational, not climatic, change (Goudie 1992: 139). Climate characteristics were defined on the basis of the vegetational associations proper to each identifiable period. Their observations were based on North West European material, though this was not an obstacle for scholars to extend and apply them to the rest of Europe, Italy included. There are, however, many problems involved in its use as a climatic indicator even before considering it as the time specific barometer which would be useful to archaeology. The main difficulties arise from the weak capabilities of plant associations to diagnose climatic conditions alone (vegetation being very sensitive to all types of environmental conditions and not just climate) and our generally poor understanding of all the factors affecting their growth and autecology. Thus, it has been repeatedly shown that there are local agents affecting flora other than climate: water table, soil conditions, previous plant communities in the locality and migratory ability are only some obvious factors (Beug 1982: 85; Butzer 1964: 47; Dimbleby 1967: 21-24). Some other difficulties in inferring past climatic conditions from pollen analysis are related to particular palynological problems such as the over- and under-representation of some species in the palynological record (a consequence of pollination differences and different rates of pollen survival), or the geographical marginality of some of the samples (sampling conditions and requirements restrict the areas where they can be carried out). When it comes to the time range, vegetation also varies in its response to climatic events: there might be a jet-lag effect between the climatic change and its reflection in the vegetational record which can be years, sometimes even centuries, long if arboreal species are concerned (Lamb 1977: 207).

Research on prehistoric climatic conditions, however, is not restricted to pollen analysis. More recently other venues have been under much research bringing into play other environmental aspects: geology (geoclimatology), stable-isotope analysis from sedimentary deposits (ocean and lake sediments), glacier analysis, the study of faunal assemblages (non-marine mollusca, coleopteran, and insect populations in particular), plant macro fossils, pedology, and dendroclimatology (for a summary of the techniques' scopes see Bradley 1985: 4-9). Problems may arise in trying to correlate all the climatic data obtained by these different approaches, approaches which share neither the same level of

sensitivity to climatic phenomena nor the same chronological scale of measurement. Magny, for instance, has shown that the low level of the Swiss Alpine lakes is put forward as an indicator of the dryness of the period of occupation of the lake side villages in the Neolithic to Early Bronze Age transition (2200 to 1800 B.C.) and the Late Bronze Age (1200 to 800 B.C.), a situation also found in Northeast and Central Italy, and yet that the hypothesis does not agree with the local pollen record for the period, which shows an increase of beech and fir against mixed oak forest pointing towards colder and wetter weather (Magny 1982). Despite these problems, palynological studies have remained the most accessible, local, and extended form of climate determination.

Considering all the difficulties encountered in establishing past climates, it is hardly surprising that acute problems arise when climatic trends are linked to archaeological explanation. Neither of the two main principles on which such link rests (plant associations and their diagnostic capabilities on the one hand, absolute dating which allows the correlation of archaeological and climatic events on the other) are absolutely reliable. The careless use of climatic patterns as a *deus ex machina* in archaeological explanation has been rightly criticised (e.g. Mc Ghee 1981: 163). Yet, pointing out the uncertainties around the causal link between climate and archaeology has led on some occasions to a rejection of the value of environmental studies in archaeological explanation. Behind this rejection there sometimes lurks a positivist attitude in which only that which is ascertainable and testable is judged of any value. Palaeoclimatic reconstruction, however, cannot be neglected if nature is the important part to humans which it seems to have been. The degree of certainty might be low, but putting together as many streams of information as possible will yield a general climatic pattern and show any important environmental traits and changes. Furthermore, dangers arise only when the imprecise but scientifically obtained data are applied empirically, forgetting its shortcomings and that scientific methods do not provide precise measurable answers in this case.

Specific palaeoclimatic, and for that matter palaeoenvironmental, research in Italy is, to date, still amazingly sparse. Palaeoenvironmental studies are more frequent for the earlier prehistoric periods down to the end of the last Ice Age, a consequence, most

probably, of the development of these studies in close connection with the natural sciences. For the later prehistoric periods study concentrates mostly on pollen cores and, more recently (Lona 1957-1963a & b; Marchesoni 1958 & 1963), on the matching of local palynological investigations in specific areas to the general framework of climate analysis (e.g. Nisbet 1984; Stori 1990). The manner of it all usually remains descriptive rather than explanatory. As such, environmental and climatic studies rarely find their way into Italian archaeological reports and explanation.

The Sub-Boreal

Chronologically the period from the Late Bronze Age to the Early Iron Age is inserted within the Sub-Boreal stage, and is traditionally defined as a dry period. But the characteristics of Blytt and Sernander's periods are also under question and the "warm and dry" Sub-Boreal has been challenged both implicitly and explicitly (Beug 1982; Delano Smith 1979; Frenzel 1966; Magny 1982; Marchesoni 1963, among others). It was only to be expected that, as research advanced, a division of the climatic sequence in broad climatic stages based on vegetation would be difficult to maintain when confronted with specific area studies in which oscillations and local conditions of the soil, water table, and the like, can cause startling effects on vegetational patterns.

Different dates have been put forward for the beginning of the Sub-Boreal, ranging from 3500 to 2500 cal BC. Specific age estimates have been proposed for the two regions under study by, among others, Marchesoni (1963) and Bertolani Marchetti (1974) -2500 to 800 cal BC for the Veneto- and Delano Smith (1979) -3000/2500 to 800/700 cal BC for Central Italy-. If neither specific climatic characteristics nor dates can be universally and securely defined, the traditional terminology should have become obsolete for the purpose of specific analysis. The use, however, of the scheme and the associated terminology is well ingrained in the discipline and it does define after all rather general trends which refer to large areas but which work well for most periods with the exception of the Sub-Boreal. These general trends must, nevertheless, be then specified in time and space: the existence of wide range climatic stages should not be enough for the archaeologist as an analytical tool, and local research remains indispensable. Such an approach was followed by Frenzel (1966) in his paper on post glacial climate in the

Northern hemisphere. Making use of pollen cores from different areas and associated information such as fossil mollusc faunas, he identified two rather distinct climatic moments within the Sub-Boreal. After a cold spell marking the transition from the Atlantic to the Sub-Boreal at around 3400/3000 B.C., the weather became increasingly more continental, with warmer summers, colder winters, and a marked trend towards dryness. A change occurred after 1500 B.C. and, more noticeably so, between 900 and 700 B.C (in the last phases of the Sub-Boreal), when climate became more oceanic in nature and there was a tendency towards increased humidity and rainfall. He did note, though, that local patterns existed and the climatic deterioration was not observable in the surroundings of Lake Garda (Frenzel 1966: 113).

Other types of evidence support climatic variations during the Sub-Boreal. For instance, the position of the timberline -deduced from local pollen cores and the ratio of arboreal pollen (AP) to non-arboreal pollen (NAP)- seems to quickly respond to climatic worsening by lowering its altitude (Beug 1982: 88-89). A plotting of timberline movements throughout the Alps seems to reflect a sudden descent in the tree line at around 3000 BP (approximately 1250 cal B.C.) (fig. 6).

The study of glacier movements has also proved to be informative of climatic changes. Glacier advance is usually interpreted as a sign of colder weather conditions and general climatic deterioration. Different age estimates have been put forward by various authors for glacier advance in the Alps, and, therefore, for climatic deterioration in the area:

Delano Smith 1979: 1400-1300 B.C.

Porter 1981: 3000-2800 B.P.: *ca.* 1250-910 cal B.C.

Bintliff 1982: 1400-1300 B.C. and 900-300 B.C.

Lamb 1982: 1300-900 B.C.

Orombelli & Pelfini 1985: 2670 ± 130 B.P.: 922 (810) 771 cal B.C.*

Baroni and Carton 1989: 3015 ± 75 B.P. to 2345 ± 125 B.P.: 1387 (1260) 1024 cal B.C. to 752 (400) 207 cal B.C.*

Baroni & Cremaschi 1992: 3000 B.P.: 1377-1114 cal B.C.*

*Calibrations were obtained with CALIB 3.0 and show 1σ values

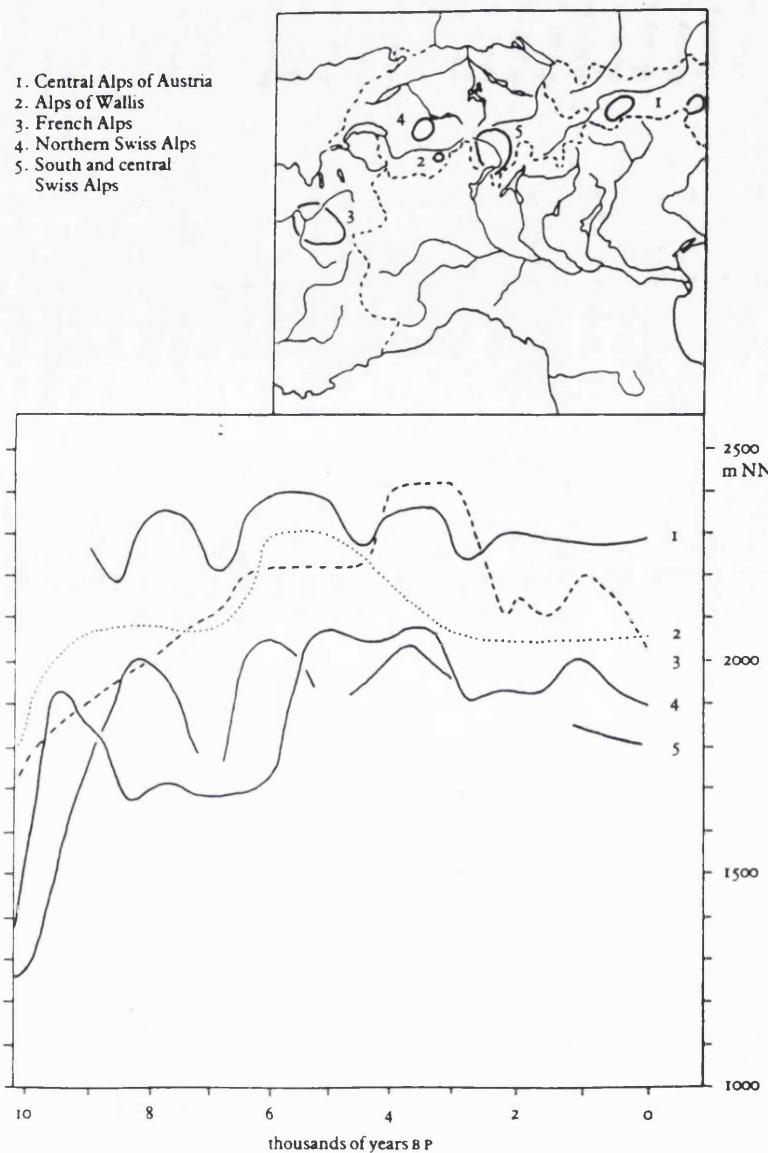


Fig. 6: Changes in timberline altitude throughout the Alps (after Beug 1982)

The differences visible in this small sample of estimates attest the intrinsic problems in dating climatological events from the one type of evidence alone. Single glaciers respond differently to climate depending on specific local factors. Besides, it is not yet clear how quickly on average glaciers respond to changing weather conditions, and whether short or small weather oscillations -which can be nevertheless important for human settlement- are reflected. Orombelli and Porter (1982) have argued that glacier advance follows within a few years periods of above average snow falls and below average temperatures. There are also problems with the applicability of glacial data to

other environments as mountain weather might in fact not reflect that of lower altitudes. It remains to be seen how specific zones relate to each other. It seems for instance, that the valleys in the Garda region which are, on average, placed at sub-alpine altitudes, enjoy nevertheless milder winters than the plain to the South, though summers are slightly colder (Jones and Rowley-Conwy 1985: 291). The particular microclimate of the Garda region might explain why climatic deterioration was not observed in the pollen records from the area in the Sub-Boreal (see Frenzel above). Glacier movements remain, nevertheless, an accurate though general indicating factor. As it should be clear by now, there are problems of interpretation with every single palaeoclimatic indicator: in the dearth of appropriate tools, every single piece of evidence must be used. The above dates taken together point towards a colder and wetter period between 1400 and 900 B.C. detectable in the Swiss and Italian Alps. This range fits adequately with results from other general climatic indicators.

Finally, an interesting venue of research was opened by the suggestion that ^{14}C levels in the atmosphere can act as a physico-chemical indicator of past climatic conditions (Suess 1965 & 1971; Lamb, Lewis and Woodroffe 1966). A direct correlation has been observed between low levels of ^{14}C and periods of high solar activity. Radiocarbon is produced in the atmosphere as a consequence of cosmic-ray bombardment. It has been argued that cosmic-ray flux is depressed by solar activity: magnetic fields created by solar eruptions would attenuate the cosmic ray flux and thus diminish the production of ^{14}C in the earth's atmosphere (Suess 1971). High sunspot activity can be also correlated with increased radiation and warmer weather conditions (Lamb, Lewis and Woodroffe 1966: 187-188). Observations based on the last 500 years tentatively indicate that greater quantities of ^{14}C in the atmosphere seem to coincide with periods of climatic deterioration leading to a "pessimum" after which levels slowly return to normal as climate improves (Suess 1971; Lamb, Lewis and Woodroffe 1966). Solar disturbance can thus be traced from ^{14}C levels, providing a possible general indication of climatic conditions if the correlation of low ^{14}C levels and weather optima is not merely a coincidental one and can be extended to earlier periods. As it is apparent from the graph shown in fig. 7, ^{14}C levels for the period of interest were above average, signalling climatic deterioration between 1400-1300 cal B.C. and again around 900-800 cal B.C.

Once more, the general trend towards climatic deterioration from the middle of the second millennium B.C. is suggested.

It still remains to be seen how the specific information for the two regions under study compares with this general trend towards climatic worsening after 1500 B.C., when all the available evidence is integrated.

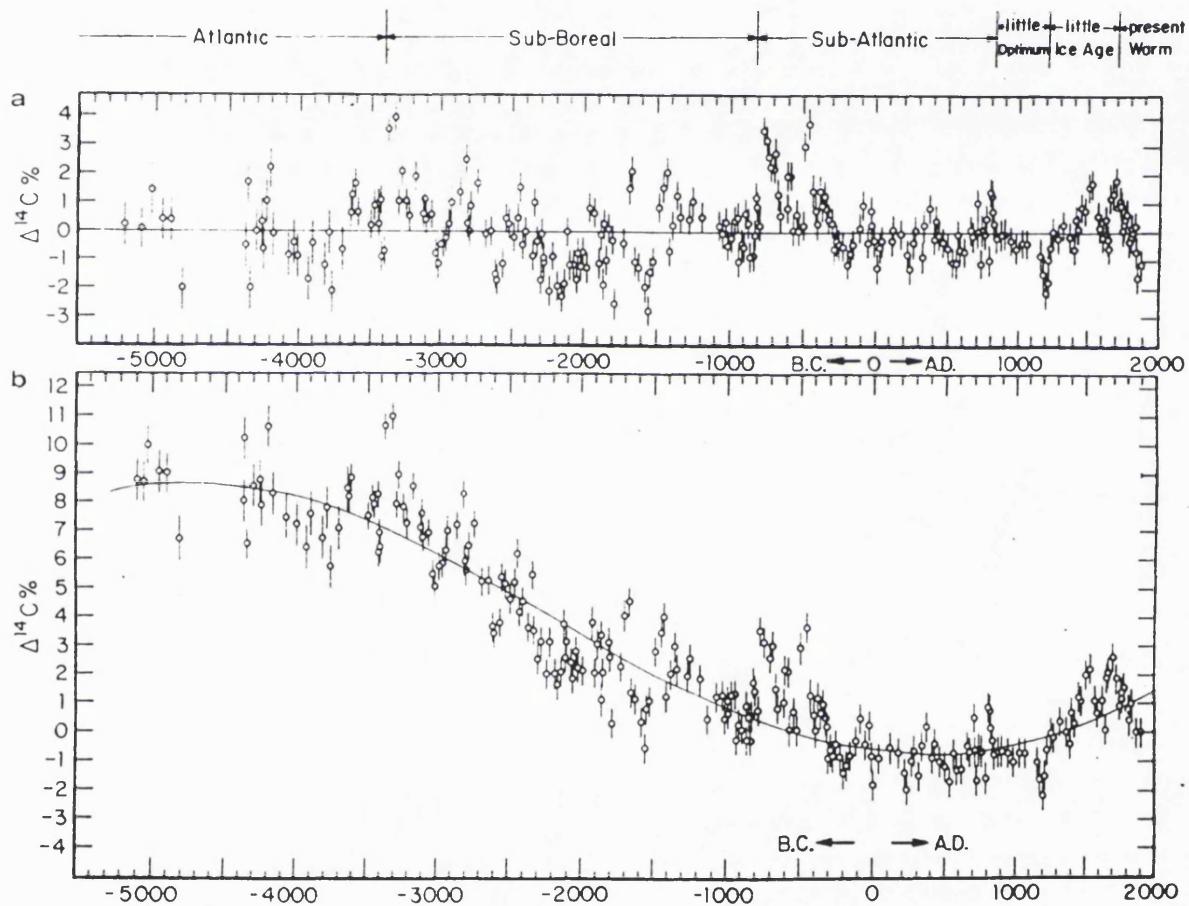


Fig. 7: Curve showing variations from average ^{14}C levels in the atmosphere (after Suess 1971). Fig. 7a shows the deviations from $\delta^{14}\text{C}$ from the sine wave shown in fig. 7b plotted vs. wood age. Fig. 7b shows deviations of $\delta^{14}\text{C}$ per mil of measured ^{14}C content of tree ring dated wood from age-corrected ^{14}C ($\tau_{1/2} = 5730$ years) relative to ^{14}C in fir wood vs dendrochronological wood age.

Geomorphology and Pedology

Geomorphology, the understanding of the formation processes affecting the geology of a region, is an important area in the reconstruction of palaeoenvironments. The particular composition and organisation of the geology of a given area determines a series of phenomena which deeply affect human populations and which range from its specific topography and hydrological network and water table, to soil formation processes, types of resources available, and liability to erosion and stability of the environment. By studying the history of a region's geological make-up, processes can be identified and dated which refer to climatic events, to phases of erosion or alluviation etc., processes, in fact, which can reveal human preferences for particular geomorphological situations and the possible reasons behind such preferences.

Geomorphological studies have, unlike pollen analysis, the advantage of being possible in most landscapes. There are, thus, studies ranging from the mountainous area to the plains, which allow a comparison to be made in the development of and relationships between the two zones.

Geomorphology can be particularly useful in understanding and dating climatic episodes through the study of palaeosoils and alluviation and erosion phases. The balance between geology and climate in erosive episodes is a very complex one. Increased rainfall usually accounts for greater erosion rates but it is important to stress that erosion episodes should not be interpreted exclusively as indications of a wetter climate. Erosion is unlikely to occur solely as a consequence of climate, and is directly related to factors such as land use, deforestation and exposed soils (Dimbleby 1967: 155). Without making reference to the climatic conditions at the time, greater risk of erosion can be expected for the period under study, as a consequence of human intervention with the vegetation: increased human occupation of the landscape and demographic growth during the Bronze Age have been argued for both areas (Cremaschi 1985; Potter 1979), and pollen analysis (AP:NAP ratios) reveals human interference with the landscape from already the Neolithic (Biagi, Cremaschi and Barker 1983). The erosion/alluviation ratio at any time is also in direct relation to the hydrology of the area and its wetness/dryness. The geology of an area is responsible for a great many of the characteristics of its hydrological system, as

it affects ground water levels and drainage capability, and therefore is also in direct relation to the erosion and alluvial episodes which fashion a landscape: the underlying geology, ground water levels, rainfall, and the difference between rainfall and evaporation will determine the amount of water available, vegetational patterns and, as a result, erosive and alluvial trends. But it is, finally, the geology of the area that will present differential resistance to erosive patterns depending on the strata composition: a soft volcanic landscape like that of many areas in Central Italy will be eroded more quickly than a granite formation in the Alps, for instance. What may result for the landscape from this differential resistance to erosion is most visible even in restricted areas in Central Italy. There, differences in geomorphology have brought about differential erosive patterns which have given the landscape a varied appearance and topography (Potter 1979: 20-21).

Understanding the geomorphology of the area is also the key to discerning other landscape changes such as variations in coastlines and river courses, both of which depend, among other factors, on tectonics and phenomena of land rise and subsidence. It appears, for instance, that the North Italian area was undergoing positive bradyseism during the Bronze Age (Cremaschi 1985: 17; Alberti and Peretto 1987: 21), which accounts for changes to river courses, differences in sea level and for a lower coastline in the Iron Age than that in existence during the Bronze Age. Geomorphology has permitted ancient coastlines to be plotted from the granulometric analysis of deposits. Granulometric analysis can, for instance, identify coastal dunes and marine deposits which can be then dated both absolutely and by archaeological material. Geomorphology has thus identified the ancient coastlines during the period 1500-900 B.C., which changed considerably (see fig. 10) and slowly made new territory available.

Hydrology

Hydrology is very complex in its patternings and responses. Rainfall, temperature distribution, topography, geological substrata and vegetation cover are the most prominent factors affecting the amount of ground water, the level of the water table, and river courses in an area. As indicated above, the impact which deforestation might have on the hydrological regime of an area is remarkable. Diminished vegetation cover (either as a result of climatic, anthropogenic, or endemic factors) will lead to soil exposure and

increased run-off. "Erosion is frequently brought about by increased run-off and this must have repercussions in basin sites (...). The increased influx of both water and the silt must bring about changes in the hydrologic conditions of such areas. This may have its repercussions on human life in such places" (Dimbleby 1967: 156).

The establishment of an area's past hydrologic network is an important source of information. Water courses often present important communication routes and are important for human settlement. It has been shown, for instance, that Bronze Age human activity and settlement revolved, to a large extent, along the axis of fluvial courses or on lake-shores (Corrain, Barollo, Piccolo and Polato 1984; Malgarise 1989-1990; Veggiani 1987; Fuggazola Delpino 1988). Ancient fluvial courses (in Italian *palaeoalvei*) have left traces deep enough on the landscape to be still detectable both from air photography and from sedimentology (Ferri and Calzolari 1989; Potter 1976: 79). The history of their activity reveals important episodes in landscape evolution. Veggiani (1987) has proposed, for instance, a direct correlation between rainfall, increased erosion and run-off, and changes in river bed and plain morphology (see also Vita-Finzi 1969 for a more dramatic view of the strength of the relationship). However many objections of oversimplification one could raise against such a direct correlation, it remains true that increased rainfall habitually leads to greater erosion; the effects of deforestation and subsequent soil exposure are more those of catalysts and magnifiers of the erosive trend, even though they might prove determinant factors in border line situations. Veggiani argues, for example, that increased rainfall and erosion in the water catchment area of main water courses' tributaries will bring more solid particles into the river than the river can carry, causing an elevation of the river bed which might lead to floods and alluvial phenomena in the river plain. Periods of decreased rainfall on the other hand, will result in less run off being transported into the river than the river carries and will cause the river to cut deeper into its bed. Very severe episodes of flooding and high water levels might result in water courses bursting their banks and finding alternative routes (Veggiani 1987: 73-74), that is to say, they might result in permanent changes to the hydrological network. The repercussions of such events for both the natural and human landscapes are clearly significant.

Topography and Landforms

Human perception of an environment is usually first determined by an understanding of its topography and landforms, by where things are: where rivers run, where mountains rise. In a word, by the particular locational associations between all elements of the physical space. Topography is, thus, an element particularly relevant to human occupation of the landscape. It follows that the reconstruction of ancient topography is an equally important task. It has already been seen above how geomorphological processes, hydrological changes and erosive or alluvial episodes can transform the topography of an area without any need for sudden natural disasters. True enough, mountains do not just disappear, but their topographical characteristics can be altered: a change in climate can provoke changes in wind exposure and vegetation, erosion might cause it to be less accessible, or alluvia deposition can infill some of its valleys, *de facto* transforming some of the place's characteristics. A change in the characteristics and location of one of the elements of the natural landscape alters the locational relationships of the rest too. Hence the importance of ancient topography, of the description of the landscape as it stood in its locational relationships and characteristics at the time.

When human settlement is concerned, there are important categories to be determined in relation to its positioning. Settlements emerged in particular locations, and as such were in direct spatial coordinates in respect to each other and in respect to the elements of the physical landscape. Studies have traditionally divided topographical locations mainly in relation to altitude (and hence to certain climatic factors), slope, and such landforms. There are four main land formations which respond to altitudinal differences and which act as the four main categories of settlement topography:

- a) plains
- b) plateaus
- c) hills
- d) mountains

Within these one can distinguish other topographical factors of importance, namely, placement at the foot, on the slope, on intermediate valleys or at the top of the elevation. Classifications vary according to the author that proposes them (see for instance Galassi 1986; di Gennaro 1979; or *Carta Archeologica del Veneto* 1990), but the general one

detailed below encompasses all major types (other differences refer to positioning with respect to water sources, soils, terracing, natural defences and the like):

Proximity to water	foot	plain
terracing	slope	plateau
natural defences	summit	hill
alluvial fan	valley	mountain

Biotic resources

Fauna and, more specifically, flora, are also elements of the landscape which condition to a greater or lesser extent its characteristics. They are particularly interesting as indicators of other environmental change, since their being living populations increases their sensitivity to changes in the environmental equilibrium. They are also extremely important factors to consider when human presence in the landscape is involved, as they often represent vital resources for man's subsistence.

Flora

Although vegetation cover has been already dealt with from various perspectives (climate reconstruction, anthropogenic impact and phenomena of erosion), the vegetational history of an area is one of the most difficult elements to be established precisely, because of the limitations of palynological information already mentioned above. The reconstruction of the vegetational history of an area is based on very detailed knowledge of plant fossils, of the autecology of the species represented, of the relationships between pollen rain and vegetation, of the chronological framework within which developments took place, and of the possible reasons behind changes. At the same time it is necessary to be aware of the various species' requirements regarding soils and climate, their migratory abilities, and the effects of human activity favouring certain species to the detriment of others for instance (see Appendix I for a summary of some of the requirements of various arboreal species frequently present in Italian pollen cores). Pollen studies are not the only tools for the reconstruction of past vegetation. Other sources of information are the study of carbonised remains and of other macrofossils. Yet it is necessary to be aware that, in this case, the problem arises that plants have already been subject to some sort of selection by man, and that their proportion or species represented

are not a perfect reflection of the natural habitat and population.

Pollen studies throughout the areas seem to indicate greater extension of forest coverage during the Bronze Age than at present. This cover was subject to species variations according to altitude and particular microenvironments. Research on the vegetational zonation of the two areas concerned has been usually linked to palaeoclimatological studies (Bertolani Marchetti 1974; Marchesoni 1963), since vegetational alignments and their specific altitude will differ from area to area according to the local environment and reigning climatological conditions. In the Venetian Alps, for instance, an area close to the centre of glaciations and therefore likely to have been subject to the effects of climatic worsening, local factors such as the mostly calcareous substratum (more suited to thermophilous plants), favourable orientation of some areas and proximity to the sea, create microenvironments and plant refugia which do not reflect the prevailing climatic trends (Bertolani Marchetti 1974: 45). Specific vegetational reconstructions, though important in their totality as climatic indicators, are first and foremost images of the available resources and soil cover at the time. Still some vague correlations can be made between vegetation zones and climate, for instance when particular forest zones are concerned. Thus, a Mediterranean type of vegetation depends for its distribution on summer aridity and mild winter temperatures (Beug 1982: 97). An eu-Mediterranean zone is typically characterised by evergreen xeric species, normally dominated by scrub (in Italian macchia) and evergreen oaks such as the *Quercus Ilex*. The sub- Mediterranean forest belt, on the other hand, is composed of deciduous plants, and vegetation is normally dominated by mixed oak forest (*Q. pubescens*, *Q. robur*, *Ostrya*, *Fraxinus Ornus*). The montane forest will be characterised by the presence in different degrees of Beech (*Fagus*), with Spruce (*Picea*), Alder (*Alnus*), Fir (*Abies*), and Pine (*Pinus*) -the last two being normally present at higher altitudes. Correlations can be made between the particular vegetational associations of any altitudinal zone in different areas.

Fauna

The animal population of an area is conditioned by a wide variety of factors: climate, resources available, vegetation cover, particular habitats (vicinity of water for

instance). Yet faunal assemblages as studied in archaeology or zooarchaeology, are not especially revealing as to environmental conditions, except in the cases of some species whose habitat is particularly restricted and characteristic (this is the case, for instance, of some mollusca and insect types). Animal ability to move, however, means that environmental conditions can be coped with by transferring location.

Faunal remains come mainly from human sites and have been normally studied in the context of human exploitation. It is in this context that animal bone assemblages tend to be classified already in human terms as "wild" and "domestic". The assemblages provide insights into the economy of the group, its subsistence patterns and particular interactions with the environment. Faunal assemblages can also shed light on symbolic and ritualistic behaviour, particularly if the "wild"/"domestic" ratios are considered and put in context. It is to be expected, for example, that an economy which depends on hunting will be characterised by bone deposits the larger part of which will belong to animals of nutritional value and large size. On the other hand, an economy dominated by husbandry will present bone deposits mostly made up of domestic species and some small wild animals, as a result of small-scale hunting activities (either as a prestige occupation or other reasons) or of selective killing of predatory animals. But in whichever type of economy, animal bone deposits are largely the product of human selection among the local population, and are not necessarily a representation of the local biotopes (Riedel 1991: 313). Keeping this in mind, faunal assemblages are particularly useful in determining human activities (economic, subsistence and symbolic) and not so much the natural environmental conditions: they represent a primary tool in understanding human interaction with the environment.

Middle Bronze Age economies are taken to be quite stably based on husbandry activities. The urban phenomenon under study is strongly linked to the distancing of human groups from primary activities such as hunting. It was long thought that human stable/permanent settlement and hunting/collecting activities were exclusive of each other. This has been now proved not to be always the case, and it is clear that prehistoric groups exploited a wide spectrum of resources available to them without adhering to single rules. The study of the assemblages from the settlements in our areas will reveal the extent of

involvement of each group in various types of economic activity.

5. Palaeoenvironment in Western Veneto

In defining past environments in Western Veneto, the first point to take into account is not only the diversity throughout time, but also in space. As a consequence of the sharp differences existing in altitude (the Alps vs. the Po Plain), and of particular topographic characteristic such as diverse proximity to the sea, different latitudes and specific microclimates, the region is rich in environmental situations. In very general terms, the following zones can be envisaged: the high alpine zone, a subalpine mountain area, a prealpine hill area, and the plain. They all display different characteristics, which cannot be ignored at the time of analysing past environmental conditions.

As stated above, research on past environmental conditions in Italy is sparse. This is particularly true of the low-lying areas of Northern Italy (research on Alpine conditions and climate is far more developed). For these areas information must often be transposed from higher altitudes in an attempt to fill the gap in the record, or alternatively be assumed from scarce evidence. It is, thus, important to be aware of possible differences operating between higher and lower altitudes in the region. For instance, present differences between the subalpine area around Lake Garda and the plain are not those that could be readily expected: instead subalpine valleys have fewer days with frost than the Po plain, snow only falls on a few days in the year, and south facing valleys have milder winters than the plain (Jones & Rowley-Conwy 1985: 291). By studying the present environmental situation of the area, it is relatively possible to see potential differences which might have operated in the past.

Present climatic conditions in the Po plain seem to differ substantially from those elsewhere in the region. No doubt its low-lying, relatively flat relief and its proximity to the Alps combine to give it a specific microclimate. Thus, whereas continentality is not a marked factor of Italian climate, the present weather pattern in the Po basin is very continental (Houston 1967: 21), though more particularly so in the westernmost area (Lombardia), which is enclosed by the Alps and the Apennines and outside the region under study. The role of the Alps in determining climatic conditions in the Po area is a

vital one. Apparently the mountains encourage a cut-off process during the winter, which isolates cold tropospheric pools in the Northern Adriatic area. These cold pools only disappear very slowly, causing high rainfall and storm activity in the area -contributing up to 20 or 25% of the yearly amount- during the summer months (Houston 1967: 13, 24). Consequences of the present pattern are slight differences in mean temperatures between the two sides of the Alps, and colder and wetter summers in the North Adriatic basin: a pattern which does not leave specific vegetational associations untouched but which is totally local. Transposition of information and results between areas is unavoidable until a way of assessing past climates uniformly across geographic areas is found. But as present climatic conditions show, to extrapolate information remains, though minor, an evil which should not obscure the more than likely existence of climatic differences brought about by local conditions. It is important to notice, though, that there are different forces operating in the building of the plain's environment which are not readily apparent. For instance, its flat relief should not be overstressed: the plain enjoys a particular microrelief, directly related to tectonics and its geomorphology, which is a decisive factor for its hydrological network flow. Its flatness and geological make-up also make it difficult for rivers to drain and, prior to human controlling of river flows and extensive channelling and draining, large areas were subject to severe flooding and marshing. The plain can be altogether considered as an environmentally borderline zone, where minor changes to the equilibrium can have quite drastic repercussions.

The climatic history of the area during the last half of the 2nd millennium B.C. has in the past relied mostly on the analysis of pollen cores. For reasons mentioned above (mainly the marginality of the samples with respect to the areas of interest, but also restrictions placed by the history of settlement and morphology of the area), pollen analyses refer mainly to the Alpine region. This has had an unbalancing effect in the past as the predominantly calcareous substrata of the Alps favours thermophilous and xerophilous species which makes the vegetational record not thoroughly representative of climatic conditions. However, pollen diagrams from the plain area exist, and the altitudinal differences have been addressed here.

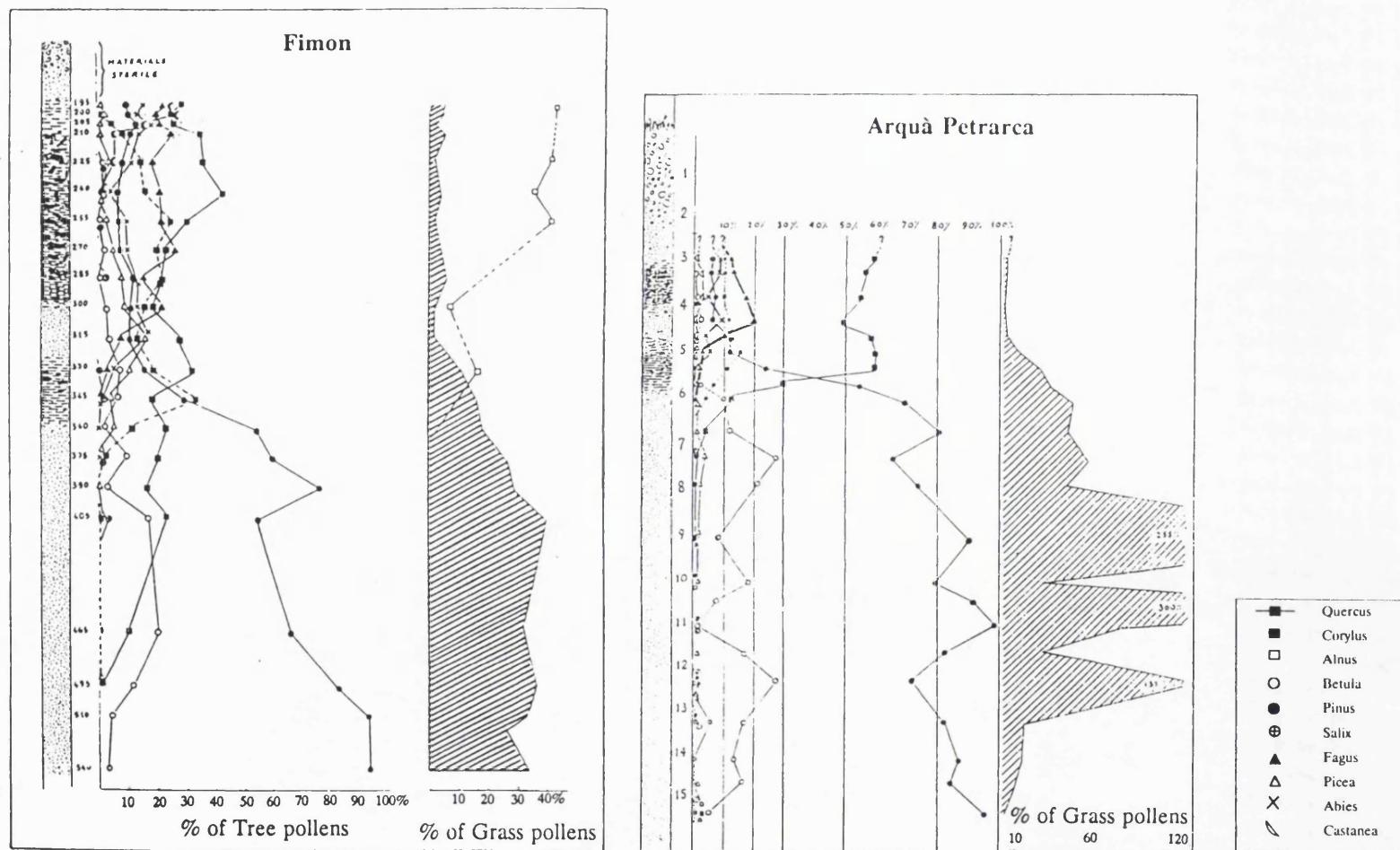


Fig. 8 and 9: Pollen cores from Fimon and Arquà Petrarca (after Lona 1957-63a & b)

In the plain area at Castellaro Lake (100 m.a.s.l.) and the area south of Lake Garda, the vegetational record is dominated by mixed oak and spruce forests. Hazel presence decreased throughout the second millennium b.c. (approximately the first part of the Sub-Boreal: 2400 -1200 B.C.), whereas beech pollen followed the opposite trend (Clark 1985: 4). Similar stories are apparent from the cores from Arquà Petrarca and Lake Fimon (Lona 1957-63a and b). Both cores have no accompanying absolute dates, but pollen analysis can be here associated to sedimentology and archaeological remains to produce an image of climatic conditions. Lake Fimon's pollen record seems to reflect in better detail the story shown by Arquà Petrarca's associations (see fig. 8 and 9). In between metres 5 and 4 the pollen record of Arquà Petrarca is characterised by a sharp decline of the *Quercetum mixtum* (oak, elm and lime), parallel with a rise in beech and fir, which could be read as indicative of reigning oceanic conditions. This stratigraphic layer consists of a clayey lake deposit, but is replaced in level 4 to 3 metres by peat formation. The peat layer showed dominant *Quercetum mixtum*, decreasing amounts of beech, increasing levels of pine and chestnut, and constant levels of hazel and fir, all of which suggest a return to more continental conditions. In the upper part of this stratigraphic layer were found the remains of a lake side dwelling. The core from Fimon adds detail to the information from Arquà Petrarca. There, as in Arquà, two phases of peat growth can be identified. The second phase, which also contains remains of wooden structures from a lake side construction, is most likely contemporaneous with the peat formation in level 4 to 3 metres in Arquà. The pollen records at that point are fairly parallel, but they are more detailed at Fimon, where they also seem to extend a little further than at Arquà Petrarca. Fimon's pollen profile for level 200 to 195 cm does not encounter a parallel in Arquà and most likely represents a new oceanic oscillation: there are rising values of beech and fir, whereas pine, spruce and chestnut (all trees of preferentially continental ranges) decline. The layer is in fact the last one to render pollen, and the sequence comes to an abrupt end with the arrival of extraordinary hydrological conditions and the alluviation of the deposit at an uncertain moment in time: the only indications as to the possible date for this phenomenon is that it covers the remains of a Bronze Age lake side village (Lona 1957-63a: 10), archaeologically dated to the 13th to 12th centuries B.C. (Bicego 1988-89: 133-134). The deposit from Arquà Petrarca also came to an end in a similar fashion, when it was covered by an alluvial layer

of rapid formation, the consequence of either a fluvial or torrential episode affecting the site (Lona 1957-63b: 16).

Given the low level of chronological resolution of the samples, to interpret this evidence in chrono-environmental terms means entering the realms of speculation. With this limitation in mind, the samples could indicate that:

- a) by approximately 1100 B.C. hydrological conditions could have changed dramatically for the worse.
- b) the advent of this episode of hydrographic activity was preceded by a brief return to oceanic conditions if the pollen record for Fimon Lake has been correctly interpreted.
- c) conditions during the 13th and 12th centuries B.C. (1300-1100) were continental as seen from peat growth and the vegetational associations.
- d) before 1300 B.C. everything points to a wet oceanic phase, the length of which cannot be determined.

In the prealpine area (cores from Cavazzo-Vuarbes and Garda region) the second half of the millennium is characterised by a decrease of the non-arboreal pollen (Lona 1957-63: 14). Oak, beech, hazel, alder and fir are the main species, but beech decreases slightly (more markedly towards the middle of the period), and alder increases, maybe a sign of more waterlogged conditions (Clark 1986: 1-5; Lona 1957-63). The deposit from Lake di Loppio (220 m.a.s.l.) also shows predominant mixed oak forest with *Ostrya* and varying percentages of holm oak and beech (Lona, Bertoldi and Bonatti 1965). The site of Fiavè (600 m.a.s.l.), a Middle Bronze Age lake-side village, was rich in vegetal remains both in the form of pollen and macrofossils (charred and uncharred), and showed the large numbers of vegetal resources in use (variety of nuts and fruits, cereals and pulses), as well as the natural vegetation of the region, in this case a generic typical northern European type, with Mediterranean additions such as ash, hornbeam and fir. Here, the site comes to an end with a peat formation episode and an increase in pine, spruce and fir (maybe indicating cooler and wetter conditions); the dating for this episode is unclear. A palaeovegetational study of the mountainous area of the pre-Alps and Alps in the Trentino shows that the highest levels of beech were attained between 1000 to 800

B.C. indicating a cool and humid phase (Marchesoni 1963: 58). Many other diagrams reveal the characteristic presence of beech as the dominant species in the pre-Alps and Alps. Beech often appears with fir (*Abies Alba*). There is a ^{14}C date for the *Abies/Fagus* association in the Western Alps: vegetal remains from the Lago di Molveno (between 500 and 1000 m.a.s.l.) gave a date of 2908 ± 153 B.P. (Marchesoni 1958), which once calibrated places the association in the last centuries of the second millennium B.C. (calibration within 1σ range: 1370 (1110, 1100, 1060) 899 cal B.C.). Obviously one date is not enough to provide more than an indication that climatic deterioration in the form of a colder, wetter phase, occurred in the last stages of the Bronze Age. The vegetational association revealed by the macrofossils and pollens of the Lago Molveno and dated by this date was as follows: Beech 41%, Fir 20%, Larch 10%, Spruce 9%, Pine 9%, English oak 6%, and small percentages of yew and alder (Bertolani Marchetti 1974: 53). Pollen cores from Folgaria (1263 m.a.s.l.) show the importance of fir as a component of the montane forest at this time. A further pollen core from Laghetto Lumera (1060 m.a.s.l.) shows a similar story, confirming the importance of fir in the south side of the Alps at altitudes between 800 and 1300 m. (Bertolani Marchetti 1974: 48), as well as that of beech which eventually substituted fir in importance.

All the above agree with a recent interpretation of climatic conditions in North-east Italy during the second millennium b.c. by G. Clark, who proposed for the sub-Boreal warmer weather than in the later sub-Atlantic period, with warmer winters and more oceanic tendencies. The Early Bronze Age would have been still humid and slightly cool, but occasionally dry oscillations would occur. By the Late Bronze Age and the Final Bronze Age a wet phase occurred, and climatic deterioration set in. The decrease in temperatures shows in the vegetational record by 1300 B.C. (the final years of the 2nd millennium b.c.). The transition to the sub-Atlantic would have been marked by a cold phase (Clark 1986: 5).

Of the above trees both oak and beech are thermophilous species, but whereas oak is capable of growing in rocky, poor ground, beech requires richer soil. Beech is, furthermore, characteristic of oceanic environments. The habitat for pine is dry sandy loam soils, and lower temperatures. Birch grows in shallow, poorer soils (Butzer 1964:

66), whereas hazel growth is conditioned by warm summer temperatures which allow germination, high light requirements (which implies clear forest cover) and by oceanic type climate (Huntley and Birks 1983: 167-170). Spruce develops in a variety of conditions, preferring cool and moist but well-drained environments. Considering that there is forest growth during the second half of the period (represented by the decrease in non-arboreal pollens) it can be suggested that this was still a relatively natural environment, not excessively affected by deforestation and agriculture, and that climatic conditions must have been such as to favour forest spread: temperate, moist weather. The major presence of oak and beech also seems to indicate a warm period, but the decrease in beech towards the middle of the period is difficult to interpret. This tree usually requires rich soils (Butzer 1964: 66), and a decrease in its representation in the sample might indicate either a climatic deterioration with colder weather, an increase in weather continentality, or an impoverishment of the soil and its increased acidification. The constant presence of oak, which survives poor soils, seems to indicate the latter possibility might be closer to the truth. The prealpine vegetation of the area represents a typical association of deciduous mixed forest, characteristic of temperate and Mediterranean climates. Nevertheless, the picture of associations is very complex, and the dates attached to these events too wide ranging to be more than mere indications of general climatic conditions. Assuming that circulation patterns were similar to present ones, colder and wetter weather might have been more intense in the Po basin, particularly in the vicinity of the Alps, as a result of the Alps blocking activity in the movement of cold pools out of the Mediterranean, causing storm activity and colder summers in the Northern Adriatic region. Yet the majority of pollen analyses are undated and rely for their chronological attribution on assumptions of previous climatic conditions: this in someway undermines the whole purpose of the exercise, and renders useless the pollen analyses taken on their own for the purpose of detailed environmental reconstruction.

The general picture of climatic conditions in Western Veneto is particularised by other types of evidence. A geomorphological study of the eastern Alpine valleys concluded that strong and intensive degradation of the landscape took place during the Bronze Age (Coltorti & Dal Ri 1985: 129). In Velturino, for instance, Bronze Age efforts at stopping floods were localised, possibly dating to the Late Bronze Age (Coltorti & Dal

Ri 1985; 127). Lower down, in the plain, the Alto-Medio Polesine - Basso Veronese Project, has revealed a complex history of strong hydrographic activity, with subsequent episodes of erosion, alluvial deposition and flooding events. The Late Bronze Age site of Canova, which stood on the banks of a long-lived river, disappeared as a result of flooding which first eroded and then buried the site under a layer of silty clay (Ferri in Balista et al. 1990: 159). It is not possible at present to date this event other than generically to some time after the 12th century B.C., which is the relative dating for the ceramic material present in the site (indeed, the settlement could have been abandoned long before environmental changes buried it (De Guio, pers. comm. 1994)). This second possibility could be substantiated by the information from the Late-Final Bronze Age embanked settlement of Fondo Paviani, which was also destroyed by flooding. There is a radiocarbon date for the phase (phase V) immediately preceding the destruction of the site, and there is reasonable stratigraphic evidence that the two events are close in time. The date 3010 ± 65 BP (OxA-4650), once calibrated within 1σ gives an age range of 1378-1126 for the phase (R. Whitehouse forthcoming). Calibration ranges have been obtained using the program CALIB.3). This could be interpreted, with enough confidence, to represent an 11th century date for a moment of hydrographic (and possibly climatic) deterioration.

A similar, though earlier, flooding event has been recorded in the Early-Middle Bronze Age settlement of Canà S.Pietro (Ferri in Balista et al. 1990; 159-161). The settlement was destroyed by a splay feature upon which the later site of Canova is built. As the material from Canà is not later than the beginning of the 15th century B.C., and that of Canova not earlier than the 13th century it is possible to date this moment of extraordinary hydrographic activity to this period in the middle of the Middle Bronze Age.

There is evidence as well for a later episode of burial by alluviation in the plain settlement of Frattesina, in the first half of the ninth century, after which the settlement was abandoned (Veggiani 1987: 77). All the above evidence, however, should not be immediately interpreted as an unequivocal indication of increased rainfall, until a clearer picture of the hydrography of the area, of its tectonics, and of corresponding events at higher altitudes confirms the non-intervention of man in the erosion episode: what remains

clear is that, whether the result of climatic changes or human intervention in the landscape, the Po plain was affected by increasing alluviation levels sometime in the Middle Bronze Age (seen in the burial of Canàr), once more in the Final Bronze Age (as shown by the sites of Canova and Fondo Paviani), and again in the Final Bronze Age/Early Iron Age transition (as revealed by the episode documented in Frattesina). It is tempting, though, to see a correlation between these alluvial episodes and climatic worsening as reflected by glacier advance in the Alps at approximately the same points in time: post *ca.* 1400 B.C. and again from 1100-900 B.C onwards.

The plain's hydrology is largely determined by the specific geological make up of the area. The active geological structures under land and sea platforms created with their movement various minimum values of ground depression in correspondence to high zones, and maximum values in correspondence to low zones. Deep tectonics, thus, control the morphology and, consequently, the hydrology of the plain (Calzolari 1989: 38; Peretto 1986: 22-23; Veggiani 1974: 56-58 & 1987: 74-75) as watercourses in the plain run according to ground depressions. It is the hydrographic network, however, that has acted as the main and most decisive variable of the environmental history of the Po plain. Yet, tracing the active fluvial network of the Po plain at any time in prehistory is hampered by the objective difficulties which arise in dating periods of activity, contemporaneity of fluvial courses and specific hydrological phenomena. Sedimentological information can be only of relative help here, as when it shows that the same alluvial phenomenon can be related to the sites of Canàr (Early to Middle Bronze Age) -which is buried by a crevasse splay of a particular extinct fluvial course- and Canova (Middle-Late Bronze Age) -which is built on the risen bank of the extinct course (Balista et al. 1992: 140). The "Harris project" (run within the Alto-Medio Polesine - Basso Veronese Project) is aimed at elucidating the complex fluvial history of the area and is already clarifying it by looking through specific and significant "stratigraphic windows" that allow hydrographic events and features to be set in relation to each other and in time by means of sedimentological analysis, as well as relative and absolute dating (De Guio in Balista et al. 1992: 155-157). Nevertheless, until research of this type starts being developed more extensively, the only remaining course of action is to roughly date riverine activity by placing it in relation to archaeological phenomena, such as settlements in the area. This, though the only feasible

approach at present, remains unsatisfactory for it mentally relates archaeological events to environmental episodes, the link between which is far from clear. Sites provide, furthermore, only *termini post quos* or *termini ante quos* a fluvial episode took place, depending on their stratigraphic relation.

The Po plain in the Bronze Age was characterised by the different courses of its major rivers -the Po and the Adige- as well as that of their tributaries. The river Po ran along two branches, the so-called Po di Adria (or Filistine) and the Po di Spina (Veggiani 1974, 1987). The Po bifurcated between Brescello and Guastalla: the northernmost branch went south of Ostiglia, through Ceneselli, Trecenta, Fratta Polesine, Adria and Donada. This branch of the Po must have been active already in the 12th century B.C., as it was the main axis for a series of settlements of that period (Mariconda de Melara, Frattesina, Ceneselli and Villamarzana) (Calzolari 1989; Veggiani 1987: 41). The other branch, that of the Po di Spina, went southwards through Cavo Tagliata, Cavo Parmigiana, Canale Quarantoli, Burana, Bondeno, Ferrara and ancient Spina. Settlements of the Late Bronze Age are also found along the axis of this watercourse, as is the case of La Boccazzola and Tesa di Mirandola (Veggiani 1974: 40-42) and its dating can be placed contemporaneously with that of the northern branch (see fig. 10). A change to this course took place some time in between the 9th and the 8th centuries, when the Po burst its banks between Brestello and Guastalla, and sharply bent North, causing the Po di Spina to become inactive down to Bondeno (Veggiani 1974:45). The changes to the Po's course must have affected also the Po di Adria branch, its tributaries and the rivers in the area: the Oglio, the Mincio and the Tartaro. There is evidence that the Po di Adria burst its banks at Sermide where a large crevasse splay and splay channels linked to a change in the course of the Po, can be observed. These phenomena have been also dated to the 9th or 8th centuries B.C. (Ferri 1985; Peretto 1986: 31). There seems to be a fair amount of evidence for hydrographic change at this time, linked to a rise in water levels.

The river Adige ran further north than its present position. An older course went from nearby Bonavigo, through Minerbe, Bevilacqua, Montagnana, Saletto, Santa Margherita d'Adige, and Este, and from there to Chioggia where it met the sea. Veggiani assigns to this branch a period of activity that lasts until at least 1500 B.C. (Veggiani

1974: 43), though it is possible that it was still active after that date. The second course of the Adige later in date than the one just outlined, went from the vicinity of Veronella, passed between Sabbioni and Cologna Veneta, and then continued along the present courses of the Guà and the Frassinelle to Este. According to Veggiani, the Adige's movement north-east would have affected the area between the Euganean and the Berici Hills, causing flooding and marshing of the ground (Veggiani 1974: 43). The reason put forward by Veggiani for the change in course is a change in the river's neutral point (the point or stretch of a river in which, as one moves towards the source, deposition finishes and erosion starts), which moved from the valley towards the mountains. This would have caused over alluviation, rise of the river bed, and the alleged change in water courses, which moved towards depressed areas (Veggiani 1974: 43). The reasons for the change in the neutral point of the rivers are as yet unclear: climatic events cannot be ignored -particularly if climatic deterioration had made itself noticeable by 1300 B.C.-, but it could also be that tectonic movement had a role to play and there are very strong indicators of tectonic movement during the Late Bronze Age. Both arguments, though, remain highly hypothetical since neither chronological information nor the causal relationship between events is clear. Still, it is apparent that major hydrographic changes occurred at the time and totally altered the Venetian landscape.

The Mincio's course also experienced major changes in the last stages of the Bronze Age. In the Late Bronze Age the river run west of Mantova, through Grazie and onto Borgo Forte along the course of the present Fossa Viva (paleoalveo di Osone). Near Borgoforte it met the Oglio and turned east going towards the Po di Adria along the present Scolo Zara (Veggiani 1974: 43; Cremaschi 1985: 17). When the Po changed its course moving North, the Mincio experienced a similar shift, sharply bending towards Mantova, and running south-east until it met the Po.

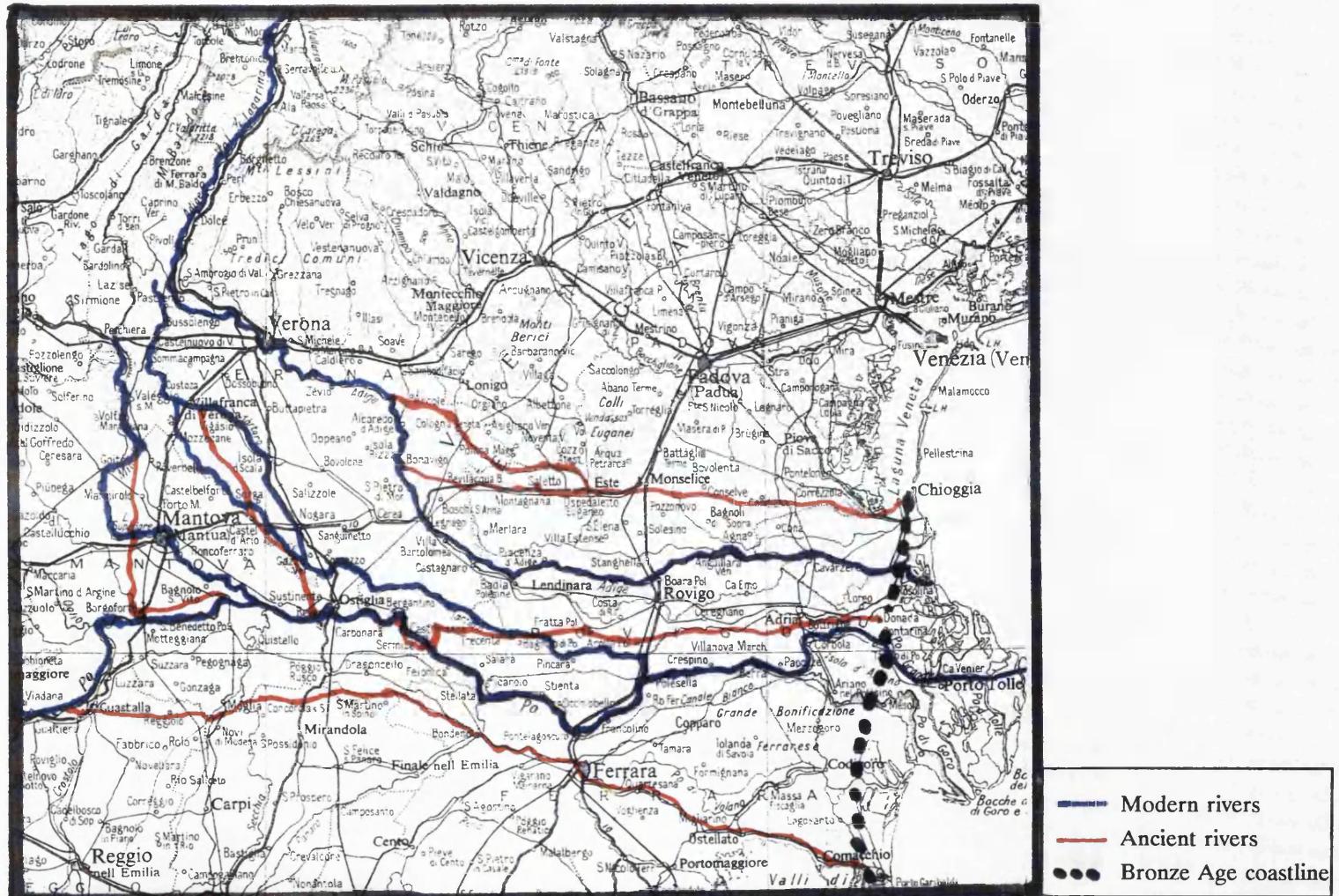


Fig. 10: Changes to coastlines and fluvial systems in Veneto.

The Tartaro's course during the Bronze Age was to the west of its present course and met the Po di Adria southeast of Ostiglia. Needless to say, changes to the course of the Po affected the Tartaro too: the Po seems to have been a main obstacle for the draining of the Tartaro, which was forced northwards (Peretto in Balista et al. 1990: 156). Two different ancient river beds are easily identifiable from the aerial pictures, associated with the prehistoric settlements of Marola, Canàr, Ghinatella and Campagna Canova (Peretto 1986: 27-28). The westernmost river, the Palaeoalveo di Canova, departs from the present day Tartaro, near Torreta, and moves towards Borghesa, Casa Motta and San Pietro, from where it runs south-east towards Canova and from there to Marola, keeping south of the Collettore Padano canal. On the left hand side there are clear signs of splay features, the largest of which overlies the Early to Middle Bronze Age site of Canàr San Pietro (Ferri in Balista et al. 1990: 159). The Middle-Late Bronze Age site of Canova, on the other hand, is built directly on the banks of this river, dating the splay feature to the mid Middle Bronze Age. Later on, the river seems to have first eroded and then buried this last site sometime in the last stages of the Sub-Boreal, and at the same time as the Po di Adria burst its banks at Sermide (Ferri in Balista et al. 1990: 159).

Fauna is of little relevance to climatic and environmental reconstruction in this particular case, mainly because of the lack of proper zooarchaeological investigation in the area. The only exception is the noted presence of porcupine remains in the Final Bronze Age settlements of the Rovigo area: it has been argued that porcupine is an animal characteristic of Mediterranean climates, which would support a hypothetical improvement of weather conditions at around that time (Veggiani 1987: 77). This evidence seems to contradict the data from plant remains.

If the evidence detailed above is pulled together, it becomes apparent that there were two stages of intense environmental change: the first one around 1400 B.C. (evidence for glacier advance, high ^{14}C levels, changes to river morphology, indications of climatic worsening in pollen records, evidence for increased erosion in the mountains and alluviation in the plain and so on); the second one (with similar manifestations of environmental instability) probably starting around 1100 B.C. and becoming more severe after 900 B.C. To a certain extent, settlement patterns could be seen to be linked to these

disturbances. Thus, settlement in the Veneto centred around water sources (lakes, river valleys) during the Early and Middle Bronze Age. A new settlement phase on higher ground starts in the last phase of the Middle Bronze Age, and lasts down to the Late Bronze Age. After this, by the end of the 12th century B.C., settlement contracts and to all intents collapses out the old river axes (the Mincio and the Oglio): new locations for a much more reduced pattern of settlement are found along the Po di Adria, and in the area of Rovigo. Settlement in these areas collapses after the 9th century, not to recover again on the same scale until the Second Iron Age. Though it is an unreasonable pretence to see settlement patterns as determined by and reflecting environmental conditions, it is nevertheless possible to distinguish a certain correspondence between the two and to put forward the hypothesis that the environment might have been one of the factors influencing settlement developments in the Plain.

Though by no means a clear picture has been achieved, it is very apparent that the environment in the plain has changed radically during and since the Bronze Age. The reasons for changes are complex and still little documented and unclear, but the results of the process can nevertheless be traced with some degree of plausibility. An environment which was stable to all intents and purposes at the beginning of the Middle Bronze Age, underwent a period of instability and change some time around 1400/1300 B.C. After this, there seems to have occurred a new period of environmental stasis, in which conditions could have improved slightly without actually returning to what they were before. River floods and increasing hydrographic changes renewed at around 1100 B.C. in traditional chronology, in this case almost certainly in connection with the worsening climatic conditions of the Sub-Atlantic period.

6. Palaeoenvironment in Etruria

Much of the evidence presented above is also applicable to the Central Italian region. All the general meteorological information, and the observations on 14C levels, together with Frenzel's study of pollen cores for the Northern hemisphere can be taken as a point of departure for specific analysis of the Central Italian data. The information from glaciers could also be taken as reflecting general conditions, but in this case it is more difficult to see it as directly mirroring the specific microclimate of Central Italy, if

only because of the geographical distance between the two.

The region's topography and geomorphology are very different from those of Northern Italy, a fact which will affect its particular microenvironment and climate. The landscape is varied, according to the different resistance to erosion of the local soils. The original Pliocene marine clays, which form the basis of the area's geology, were covered by the output from different volcanic episodes from the end of the Pliocene to circa 60000 years ago (Potter 1979: 20). Volcanic activity, which deposited a variety of lavas and soils of different hardness and characteristics, was followed by erosion mainly resulting from hydrological activity (Toti et al. 1986: 3). The different resistance of the geological layers to the erosive action shaped the aspect of the countryside. The landscape appears to the eye as a scarred one in which rolling hills alternate with the more frequent and rugged tuff outcrops; at places the soft "tufa" has been sharply cut by fluvial activity exposing the older layers, elsewhere the more resistant ignimbrites (rocks resulting from deposition and consolidation of material transported by burning gas rich in magma fragments) have been smoothed off into a series of hills (Alvarez 1972). The division in geological stratigraphy is in that way reflected by a geographical division in landscape appearance. The Volterrano and the Tolfetano areas belong to the hill country of smooth summits and medium slopes (a reflection of the ignimbrite acid lavas -mostly liparites and trachytes- which form the most recent geological layer from the Campigliese to the southern border of present Tuscany, including the Amiata). The South Etruria area (for the most part modern Latium) presents a different landscape of volcanic lakes and tuff platforms of weak inclination and little height (150-300 m.a.s.l.) sectioned into outcrops by rivers (Sestini 1981: 7; Potter 1979: 20). Along the coast, there run a series of small plains brought about by fluvial activity, their lowlying areas often subject to flooding (Sestini 1981: 7).

The geological and topographical landscape, as it appears today, was not markedly different from that which could have been observed in the later stages of the Bronze Age and the Early Iron Age. There remains to be determined how other factors of a more transient nature -climate, flora, fauna- might have stood at the time, conditioning the inhabitable and exploitable landscape. Altitude is a factor to be considered as well:

though the general profile of the region is a low one (only in some areas closer to the Apennine barrier are altitudes of more than 1000 metres encountered), the differences in exposure to sun, rain, and wind, and the different pedology of valleys and hill tops (affecting water tables and soil moisture) will condition vegetation growth.

Modern climate in the region is Mediterranean: mild winters and dry hot summers which register as little as 12% of the total rainfall, separated by a temperate and wet intermediate season. Rainfall increases as one progresses inland, and according to altitude (Sestini 1981: 11). However it has been pointed out that a slightly lower mean temperature and a bit more rain will change the forest bands (Sestini 1981: 14). If as indicated by the general meteorological data, a slightly wetter and colder climate is assumed for the late part of the Bronze Age, forest cover might have been more extensive at the time than it would be nowadays had agricultural activity not taken over most of the area. Once more pollen information is the more ready source of data for testing the possible climatic pattern during the last stages of the Bronze Age.

A number of palynological analyses carried out for the Central Italian area permit the reconstruction of an acceptable outline for the climatic conditions prevailing from the Middle Bronze Age to the Early Iron Age. Samples come, for the most part, from sediments taken in the many small volcanic lakes which characterise the hill area. There are also various pollen diagrams for the montane region, which are, however, undated and remain largely useless for the purpose of environmental reconstruction in time (for instance those reported in Chiarugi 1958 and Paganelli 1958). The lakes in the hill country, however, are reasonably close to areas of habitation and cannot be considered marginal for palaeoclimatic purposes: they have provided a whole series of cores of postglacial date. E.Bonatti's analyses of sediments from Lakes Baccano and Monterosi showed a marked rise of pollens from species which favour moist conditions -*Quercus petraea* (Durmast oak) and *Fagus sp.* (Beech)- in levels 5m to 4 m in Baccano and 1.78m to 1.58 in Monterosi (Bonatti 1963, 1970). The level 1.72m to 1.57m in Monterosi provided a ^{14}C date of 3037 ± 70 B.P. Y-970 (Stuiver & Deevey 1962: 254; Bonatti 1970: 28), which once calibrated within 1σ gives an age range of 1395 (1290,1270) 1137 cal B.C. which could be treated as a 13th century date for interpretation purposes. This

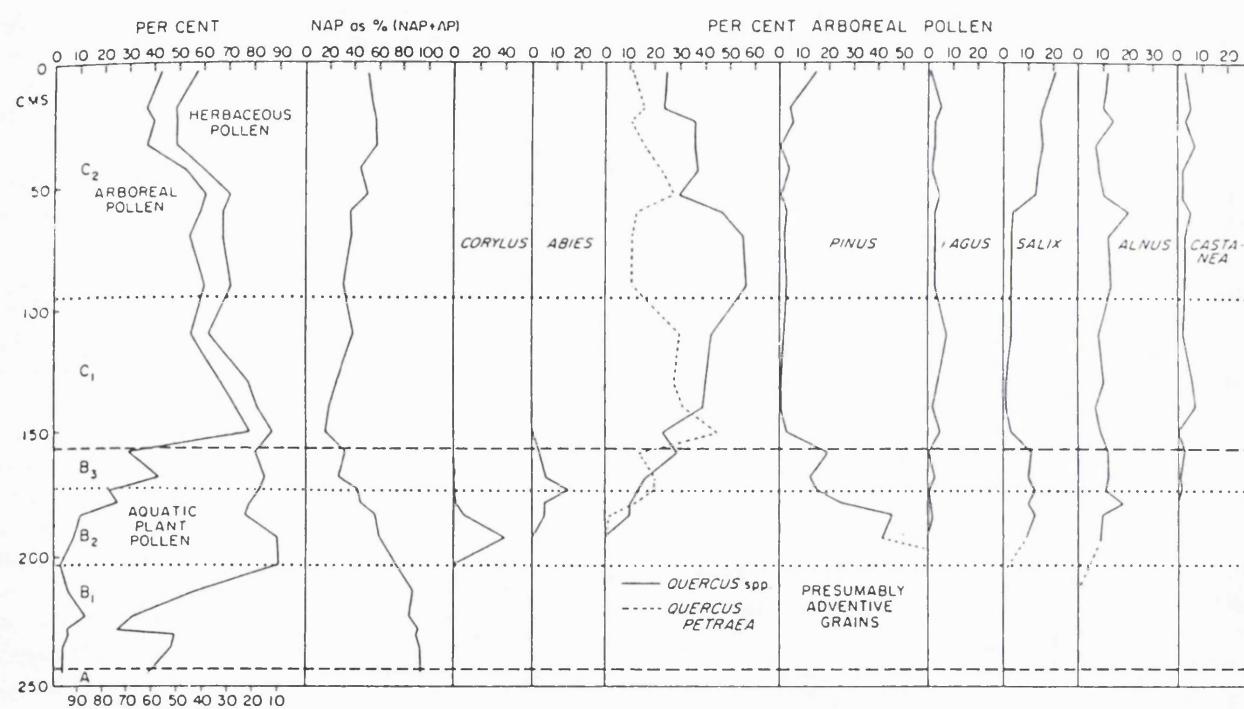


Fig. 11: Pollen cores from Lakes Monterosi and Baccano (after Bonatti 1970).

sediment showed high levels of *Quercus spp.* which were, nevertheless, at a low in the earlier part of the deposit. Other well represented species included *Quercus petraea*, a more oceanic and cool demanding type of oak, which peaked towards the middle of the layer to decline after that. *Fagus* also followed the same trend, as did *Alnus* and *Acer*. Species such as *Abies* and *Carpinus* saw a decline at this point. *Castanea* levels increased and pine peaked towards the end of the layer, corresponding to the decline in *Quercus petraea* and *Fagus* and signalling a dry oscillation towards the end of the layer (see fig. 11). The interpretation of this layer's pollen counts is definitely that of an association of oceanic species in a humid environment. It seems to indicate that an oceanic oscillation with cooler and wetter conditions took place and was reversed sometime between circa 1400 and 1100 B.C. It is interesting to notice that the oceanic species (Durmast Oak, Beech, and Alder) reappear or increase their presence again coinciding with the end of the layer 157-172 cm, at approximately 156 cm. and reach a peak at 150 cm (which is possibly that of the Early Iron Age). In agreement with the earlier part of the core the woods which were used to built the lake side structures of Middle Bronze Age found in Lake Mezzano revealed a similar forest composition: alder, deciduous oak, beech, elm and Norway maple (a species typical of cold climates which is now rare in Italy and favours shadowy places with deep and rich soils). Such association is now found in Etruria only above the 800 m. level (Follieri et al. 1982: 203-207).

Lake Baccano's profile is seemingly more detailed than Monterosi's, which had a very low rate of sedimentation (Stuiver & Deevey 1962: 254). In view of the pollen profiles it seems that level 157 to 172 cm in Monterosi finds a parallel in the Baccano levels that go from 5.50 m to 2.5 m. There are, however, no dates for the period of interest for the Baccano pollen profile. Bonatti interpreted a peak in pine in level 2.50 m. as revealing of a continental oscillation of climate, linked to a similar peak in pine observed at Monterosi in level 158 cm. (that is, in the Late Bronze Age). Beech and Durmast Oak disappear before this. If this information and the available ¹⁴C dates are put together, the outbreak of a short oceanic phase in Central Italy sometime after 1400 B.C. and before 1100 B.C. can be identified. This phase is followed by more continental one, which is reversed again by a new oscillation towards wetter weather (revealed in the new increases in Durmast oak and beech, and the descent in pollen levels of pine, oak and

chestnut), which is prior to the Roman period and which can be identified with the climatic deterioration at the outset of the Early Iron Age.

There is also supportive evidence for these climatic oscillations in the Bronze Age from the analysis of coals from Grottabella (TR) in Umbria (Longo and Ianonne 1987: 641-643). Grottabella level F (which was dated by the excavators to the Middle Bronze Age) was characterised by charcoals from the following species: *Sorbus Aria* (Whitebeam), *Acer Platanoides* (Norway Maple), *Quercus Ilex* (Holm Oak), *Populus sp.* (Poplar), and *Salix sp.* (Willow). The association was interpreted as indicative of a cooling of climate. Level G, dated by the excavators to the Late/Final Bronze Age, contains coals from the following plants: *Sorbus Aria* (White Beam), *Acer Platanoides* (Norway Maple), *Lonicera Etrusca* (Honeysuckle), *Quercus Ilex* (Holm Oak), *Corylus Avellana* (Hazel), *Laburnum Anagyroides* (Laburnum), *Fraxinus Ornus* (Flowering Ash), *Quercus Petraea* (Durmast Oak), and *Vitis vinifera* (Vine). This association was interpreted as indicative of a new warming of the climate. It is regrettable that, when deducing palaeoclimatic trends, no reference was made to percentages of representation but, rather, to mere presence: the authors rightly pointed out that the associations are not natural, but a reflection of gathering action in the ecological niche (Longo and Ianonne 1987: 641). Percentages would have been largely meaningless, but still they might have provided some sort of indication and diminished the chance factor that might have given some of the species represented a relevance they did not have.

Hydrographic changes have occurred on a lesser scale than in Veneto. River levels have changed since the Bronze Age, and it has long been recognised that sediments and sites of this period are buried under alluvia or below the present water table (Potter 1979: 27). Greater humidity at the end of the Bronze Age is shown in the rises in lake levels throughout Central Italy, which covered lake side villages on lakes Bracciano and Bolsena in the 9th or 8th centuries B.C. (Ferri Ricchi 1974). Lake levels in the Velinus area also rose sharply after the 9th century B.C. (Carancini, Massetti and Posi 1986: 83). Settlement along water courses and on valleys collapsed at this point: there is evidence of growing marsh conditions in the Rieti plain and the Piediluco basin followed by a sharp rise of the bank levels at the end of the 8th century (Carancini, Massetti and Posi

1986:82). The coastal strip of land has undergone remarkable changes, being between 2 to 5 km. further inland during the Bronze Age (Sestini 1981: 8). More than changes to sea levels, it is likely that this is a result of delta formation and increased aggradation.

The major watershed of the area, the river Tiber, is known to have had two north facing mouths between 3000 and 2000 B.C. Around the 10th century B.C. a short lived mouth of southern orientation was formed and increased water levels being transported by the river between 1200 and 700 B.C. have been argued as the reason for this. The mouth later formed a bay which was eventually closed and turned into a lagoon which served as Claudius and Trajan's port (Angle 1986: 249).

Changes to river courses, albeit little documented, seem to have taken place in a smaller scale than in Veneto: the Treia river movements have, for instance, been plotted for the past 2500 years. In this time the river has shifted in its course a few times, but always within reasonable limits and distance from the present course, and within its valley (Potter 1976: 1-7). Valley flooding and river movements are likely to have occurred, though, particularly at low lying points along river valleys and on the coastal strip (Sestini 1981: 7-10; Potter 1979: 27). It is possible that Etruria's volcanic landscape and its relative lack of drainage problems have offered the area greater environmental stability: a varied morphology and numerous high-lying areas, together with the resistance to erosion of large parts of the countryside (that composed of ignimbrite rocks), and the tempering effect of the sea on this marine oriented region in which the areas inland are normally open to the sea by means of the river valleys, are favourable factors.

To conclude, on general lines climatic deterioration after 1400 B.C. is apparent. It is difficult to identify periods of climatic recovery in Etruria, but pollen suggests a continental, possibly warmer phase before or around 1100 B.C. (level 158 cm at Monterosi, level G at Grottabella and level 2.50 m. at Baccano). This phase might have been followed by wetter climate in the Final Bronze Age, but there is little certainty for this period before the ninth century when more visible environmental change linked to climatic worsening is clear.

7. The impact of environmental change in both areas

The area of Etruria did not undergo as marked an environmental stress as that which is clear in Western Veneto. Climatic trends in both areas are roughly parallel. Pollen records indicate drier and wetter oscillations at around the same periods for both areas: a cooler and wetter phase *ca.* 1400 B.C., followed by an improvement -which in Veneto can be dated to after 1300- and a new deterioration again after 1100 B.C., after which the weather only becomes worse with the arrival of the Sub-Atlantic. It is not, then, in weather worsening that the reasons for the differences in the environmental stress experienced by both areas are to be sought. It is tempting to see a possible solution in the varied geomorphology of the regions, which would have affected their ability to cope with climatic and the ensuing hydrographic stress. As an example, the large flatlands and low lying terrains in the Po plain were, until drainage last century, still an environmental fringe area, where slight changes to the environmental equilibrium could have serious consequences. The zonation and topography of the areas is also very different: in Veneto there is a markedly linear progression in altitude (flat plain, hill zone, subalpine and alpine areas follow each other) and the range of changes in altitude is very large (from depressed land to the Alps); in Etruria, on the other hand, the contrast in altitude within the region is much less marked, but altitude distribution is more disordered (for instance, isolated plateaus crop up in the plain zone). In the case of Western Veneto, its active geological structures are a further reason for the impact of environmental changes.

The effects of all these factors on settlement patterns cannot be ignored. For a start, the same climatic trends would have had more severe consequences in Veneto where they affected the hydrology and erosion rates in a way which finds no correspondence in Etruria. More importantly, the same factors which mitigated the effects of climate in Etruria proved an asset for settlement continuity. Etruria's specific topographical configuration and make-up permit short range settlement dislocation in a way which is not possible in Veneto. Thus, the same reaction for settlements to move on the face of environmental change must have involved a far more serious decision and a more radical process in the Veneto area, where no geographically close alternatives can be easily found.

Chapter 5: THE TIME DIMENSION: TRADITIONAL CHRONOLOGIES AND CONTINUITY

"The existence of time (...) is not possible without the existence of change. When, in fact, there is no change, or we are not aware of changing at all within our spirit, it seems to us that time has not actually gone by." (Aristotle Physics, Δ 11, 218 b 21-23).

"That time be related to motion is shown from the fact that we perceive time and motion together. (...). Thus, whatever the motion, perceiving it we become aware of time; and conversely, in the awareness of time we have also the perception of the motion." (St. Thomas Aquinas, IV Physicorum lectio 17a).

Perception of change and perception of time are intrinsically united. Therefore, an understanding of the processes which affect developments and changes in human settlement -and indeed in most forms of human action- *per force* requires some sort of time scale, which set against events reveals the nature of change. The more precise the scale is for the specific problem under study, the truer the understanding of the process will be. Neither blurred nor overprecise measures of time are adequate. It is important that the scale be the right one for the problem under consideration, because although they all appear together and made uniform in the archaeological record, different entities have different time measures and change at different rates: one human life is to be measured differently from the social group in which it is integrated and which can rely on generations, and landscape phenomena usually have longer measures of time than, for instance, a settlement. The existence of all these different diachronic timescales of material culture becomes muffled in the archaeological record, but if the past is to be understood in all its social and historical depth, then the reflection and existence of these different timescales in material culture needs to be, if not well understood, at least realised when interpreting any archaeological manifestation.

In studying settlement nucleation as an archaeological reality which brings together aspects which move in time at different rates (the landscape, the settlement, the human group which inhabits the settlement, the artefact produced at a specific time by an individual of the group) a balance must be struck between over-division of time and lack

of precision. For a long time timescales in prehistory were provided by artefacts. More recently, absolute dates have been providing independent, though in some cases spuriously accurate, age estimates. If the processes of settlement nucleation which preceded urbanism are to be understood in all their depth, and not merely in their mechanics, it is most important to establish an appropriate chronological framework.

Some of the particular chronological problems affecting the study of Italian protohistory have been already discussed in Chapter 1. In this section I shall deal more specifically with the chronological problems involved in the archaeological study of human settlement during the last stages of prehistory, and with solutions that permit an analysis of both areas of study within a unified temporal framework which is above exclusively typological indicators. Problems in constructing such a framework stem both from the particular nature of the material and how it was recovered (problems already discussed and which affect archaeology in general), and also from the very nature of settlement at this time and our perception of archaeological time indicators.

The general process under study does not refer to the dynamics of settlement changes *per se*, but rather to the bearing of settlement dynamics on the process of urbanism: that is, we are not disputing the well documented trends in settlement organisation or their general regional timing -although recent research shows there is still a long way to go before a clear picture can be established (Di Gennaro 1991/92: 197)- but how the chronological framework as we know it now affects our understanding of the process of settlement urbanism.

By the Bronze Age, the diverse economic base which had allowed human groups to become more sedentary after the Neolithic, seems to have been well established. This, together with a documented trend towards population growth since the end of the last glaciation, shows in the archaeological record as an increase in the number of settlements in this period. Yet, more importantly, settlements seem to have also increased their size and consequently their life span (De Guio 1985; Di Gennaro 1991/92: 199-200). It is in fact during the Bronze Age that a process of spatial definition and organisation starts becoming apparent in various places in Italy, and in various degrees. Settlements are still

fairly "temporary", being used and abandoned with relative frequency, but it is noticeable that the "periods of life" of settlements become longer as time goes by. There is a tendency towards increased settlement continuity. In some cases, the process of spatial definition and organisation only came to be fixed with the emergence of an urban system which set city and countryside settlement in a relatively well defined relationship with each other and with their landscape. It is theoretically possible, then, by dating settlements, to observe the stabilising of the landscape as forms of land and social control develop, mapping settlements in time together with all the other factors which affect the human group. It should also be possible to discover the driving forces behind the settlement processes which crystallised in the emergence of urban forms.

1. Constructing a chronological framework for settlements

One of the aspects which presents more difficulties at the time of understanding the dynamics of settlement in a given region is the chronological span of each particular site. The two main sources of archaeological investigation -field survey and excavation- each have their own chronological limitations and advantages. Field survey contributes a regional and intersite perspective which excavation is unable to provide. Excavation, in its turn, can identify better the spatial and temporal internal limits of a site, such as those of the limited occupation of certain areas and of different phases of use and abandonment, thus overcoming to a certain extent the problems caused by the contextual openness and extended use of sites. On the negative side, field survey's results can produce diachronic and synchronic settlement maps to be drawn because of the low chronological level of resolution it achieves for each site.

The two general types of chronological determination -relative and absolute dating- also have different scopes and possibilities when applied to settlement study. Relative chronologies can be built with relative ease, and normally allow a general comparison of sites. Chronologies used in the study of settlements, therefore, have traditionally relied on typological considerations (references for this would be too extensive: for some examples see tables 1 and 2). Yet, relative chronologies have the disadvantage of being "relative", that is, they often refer to the region or local area from which the material comes and thus tend to carry cultural or ethnic associations, which make it impossible to

have an overall view of site relations with wider systems other than those local (though it is true that archaeologists such as Carancini (1975, 1979, 1982, 1984) and Peroni (e.g. 1980, 1989) have tried to build a general chronology for the Italian bronze work). Other disadvantages are that relative chronologies vary considerably from author to author, and depend entirely on restricted aspects of the material culture such as pottery or bronze typologies. This last point is particularly significant: it is argued here that object-based typologies often do not provide an adequate measure of time for settlement systems. They provide a sequence from which to start, but not a proper chronological framework for settlement dynamics. As mentioned above, it is a question of different time measures being significant for particular types of material culture, measures which might not be synchronous. Relative chronologies based exclusively on typology revert to the definition of phases in which settlements are grouped together though they might only have existed contemporarily for a very small period of time. When applied to settlements they can also carry to their study specific connotations about the identity of the group which produced a certain assemblage; yet, a settlement's life span could fall within the time of change from one style of pottery to other, without any other major changes having taken place than those in pottery style, but if the chronology is based on pottery, the transformation is easily projected onto the settlement and the social group, creating a false implicit division which is nothing but a restricted change in material culture. Circular arguments spring from this: settlements are dated from pottery, and then date pottery. Chronological progression and limits become blurred, and are expanded or compressed as a result (see fig. 12).

Furthermore, though it is normally possible to speak of assemblages of material and define chronological phases according to them, it is not possible to do the same for settlements, which have a far more independent life of their own: a specific sword type might, for instance, replace an older type in time and preference to the point of the one excluding the production of the other, but this is not the case with settlements, which can indeed replace each other but can too coexist and are not ruled by stylistic considerations.

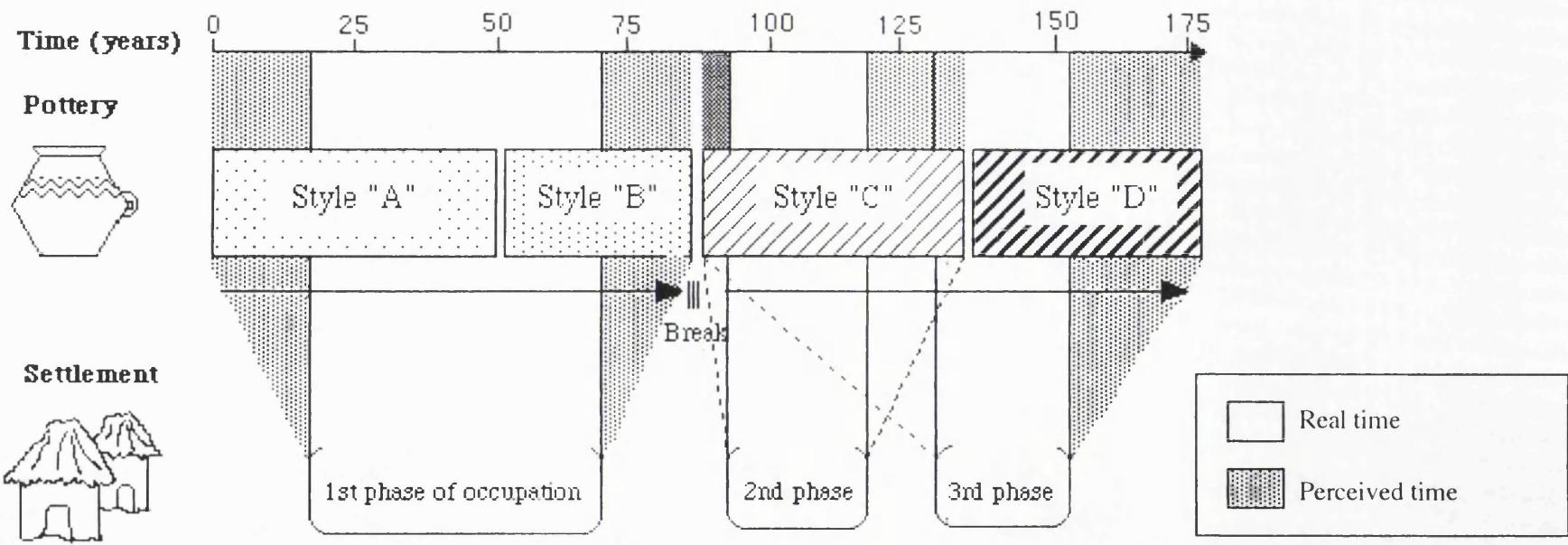


Fig. 12: Differential time scales and their effect on chronological interpretation.

Absolute dating of all excavated settlements would be ideal in order to date both the settlements themselves and the individual phases and areas of occupation. Yet, the difficulties of such an enterprise hardly need mentioning. Settlement excavations are still not numerous and only provide local sequences which become relevant to wider social change only when integrated in the regional perspective. Radiocarbon dating is still little used, and in some cases slightly mistrusted, as it often poses problems to the established relative sequences (see for instance the cases of Mezzano, Luni sul Mignone and Gran Carro in Chapter 6). Besides, though acceptably accurate in the earlier stages (Middle to Late Bronze Age), it becomes less precise for the later but crucial periods of the Final Bronze Age and Early Iron Age, when age estimates are too large to be of much significance. Other forms of absolute dating such as dendrochronology are still in their developmental stages, those of building an absolute chronology for the Italian Bronze Age (N. Martinelli pers. comm. 1992). Floating chronologies exist for some settlements of the Early and Middle Bronze Age in the Garda area (Martinelli 1990). Yet, the most common wood in these archaeological samples is oak, now almost totally extinct from the region. The scarcity of modern oak samples makes it difficult to construct a local sequence which goes back in time from the present or recent times. Correlations then have to be sought with the absolute dendrochronologies North of the Alps. Those from geographically close areas, such as the Swiss Alps, do not extend back into the Early Bronze Age (N. Martinelli pers. comm. 1993). The German chronologies, which do, are based on trees which are further away geographically, and problems arise in successfully correlating them with the Italian floating chronologies. Even though at present several possibilities exist for an anchoring of the latter on the German sequence, a final successful correlation depends on more finds allowing greater precision (N. Martinelli, pers. comm. 1993).

Because of the dearth of absolute chronological indicators, it seems impossible at present not to work upon the definition of phases. In this work, however, I use cultural identifications (i.e. terms such as "Sub- apennine") in an strictly cultural sense, and never with chronological implications. For chronological definition I use calendar years, either absolute or relative (i.e. "the thirteenth century B.C.") specifying whether they are absolute or relative dates.

On the other hand, the above impediments should not mean that the use of absolute chronologies is to be dismissed completely, as a utopian tool which would be nice to have but cannot be built. Absolute dates have to be used whenever available, and above all, with a view to increasing their numbers, reliability and scope: that complete absolute chronologies do not currently exist for the areas of interest does not mean that they should be abandoned altogether but simply that they have to be developed.

There are, as is apparent, very objective research problems in placing settlements in their right chronological framework, and indeed in choosing or constructing a particular framework altogether. The scarcity of absolute dates and properly stratified material renders impossible the use of an exclusively absolute chronology built on settlement material. Yet, the use of relative chronologies introduces problems already discussed and necessitates choosing one of the many available. Even though there is no doubt that the only precise way of analysing the possible universal factors affecting settlement organisation, and of picturing settlement movement would be to have a regional and interregional chronological framework constructed upon the use of stratified excavation and absolute dating methods for each site, or at least for the cultural aspects found in the sites, this total absolute approach is impossible at present and may only be achieved with time. Yet, as previously stated, it is not utopian to try to find new ways of approaching the existing data, and of limiting its handicaps at the same time as new research tools are expanded. This is the objective of this and the next chapter: to take a first step towards the achievement of a chronological framework based on absolute dating of stratified deposits by making use of all the evidence presently available (the regional information provided by field survey, the more detailed information from excavation, the chronological indications furnished by pottery sequences, and absolute dates).

The basic structure of the chronological framework is one that accepts the present need for a traditional chronological approach, but departs from it to incorporate absolute dates and test for consistencies between both sources of information. This chapter deals with the chronological framework as established by typological studies. The next presents the results from the exploratory overall use of radiocarbon dates and their application to traditional phases. The structure is, then, that of a compilation of relative regional

typologies for pottery, unified by the more general bronze typology and anchored on calendar years by ^{14}C dates. The methodology for the establishment of a chronology is, thus, one that brings together all artificial but cumulative information (pottery, bronzes) and any available absolute dates for the period under study, and is one that provides a general framework free from cultural attributions for study of settlement trends in both areas setting them in relation to each other on an objective basis. The sites to which the chronological framework is being applied are a few excavated sites whose stratigraphy and assemblages are known in detail. The results can be tentatively applied afterwards to all other sites known from field survey.

The relative chronologies for the pottery of the two areas define initial phases and, thus, a primary chronological distribution of all known settlements. Bronze typologies act as unifiers of the two regional sequences and provide in their turn a first indication of calendar years. ^{14}C dates are then used in the next chapter to test the validity of the phases, both internally (i.e. chronologically), and externally (i.e. contemporaneity between phases and areas) by discussing the available absolute dates in relation to site stratigraphy and assemblages. The chronological framework resulting from the combination of all these factors is one which can be used in anticipation of properly developed absolute chronologies. The integration of all this information should provide a complete appreciation of the time dimension of the urban phenomenon by setting two areas in relation whose processes exemplify the success and failure of groups to maintain nucleated forms of settlement.

2. The relative ceramic and bronze chronologies

As mentioned above, there does not exist for Italy a single relative chronology for the Bronze Age, and it has been necessary to work according to certain chosen typologies (see below). No advantage was seen in producing a new typology: revision of all the material would be a major research project in itself, and there is no reason to ignore previous work since there are no major doubts about the sequence (problems lying in the attachment of single types to one or other specific chronological phase and, far more importantly, on the attachment of phases to calendar dates: in relative typologies the latter has had so far no firm base on reality, but rather on assumptions about it.) It was, thus,

preferred to use established typologies.

The criteria for selection have been that the typologies be of recent compilation, generally accepted by Italian archaeologists (that is, used in other works for chronological determination), at least regional in scope but yet detailed, free from cultural attributions, inclusive of a variety of material and not only pottery, and, whenever possible, built with a view to settlement analysis. These requirements proved too demanding in some occasions: when considering the 12th to 10th centuries in Central Italy comprehensive typologies for the pottery simply do not exist (the reasons for this are succinctly but clearly expressed in Fugazzola Delpino and Delpino 1979: 308), a confirmation, perhaps, of the inability of pottery to define a chronological system valid for settlements, since this seems to have been a period of important settlement change, marked by a highly local orientation of pottery production. In the summary typology, therefore, pottery types for this period have not been included more than in generic terms, except for the last phase for which the evidence is slightly better.

The work here presented is based on the typologies defined by Capoferri (1987), Cocchi Genick *et al.* (1991/92), Macchiarola (1987), Fugazzola Delpino (1976) and Peroni (1989) for the Middle and Recent Bronze Age; Bicego (1988-89), Leonardi (1979), Fugazzola Delpino and Delpino (1979), Peroni (1989), and Potter (1976) for the Final Bronze Age and the Early Iron Age. A synthesis of all the different typologies has been made both for pottery and bronze, unifying terminology and solving slight differences in the chronological division into phases and the association of some particular types with a specific chronological phase. Whenever the typology for bronze objects has not been covered or updated by the above publications, the chronology used is that proposed by the various studies on Italy published in the *Prähistorische Bronzefunde* (Bianco Peroni 1970, 1976; Carancini 1975 and 1984) and in Carancini 1979 and 1991/92. The summary typology appears as Appendix II, preceded by a glossary with the chosen English renderings of the most common Italian terms.

In building up the combined relative chronology, it proved necessary to bridge two imposing gaps. The first one was the artificial conceptual gap between the Late and the

Final Bronze Age (between the 13th/12th and the 11th centuries in traditional relative chronology). The transition from one to the other is usually taken as a very clear break shown in the non-continuity of settlement (Peroni 1989: 84; Di Gennaro 1991/92). Yet the division is not so readily observable in the material, and the period remains one of transition, for which the chronology has been slightly revised. This is another case in which settlement and material culture appear to have clearly diachronic phases.

The second gap is a spatial one: the need to unite the Etruscan and Venetian chronologies. The comparison of two areas with diverse material culture necessitates the existence of a sequence that permits us to link the local typologies. Traditionally this has been done by studying the bronzes, since ceramic typology and decoration do not normally allow more than the identification of chronological correspondences based on typological affinity. The link is sought, thus, in the typology of bronze objects (bronze being a more specialised type of production than pottery and which to an extent requires the existence of specialised manufacturing centres that escape local barriers). Although it is generally accepted here that bronze objects were the work of specialised craftsmen and that the types were probably in use at approximately the same time in both areas (Carancini 1991/92: 250), the use of the bronze typology as a link for the local pottery typologies suffers from three serious drawbacks:

- 1) it is constructed mainly on the bronzes found in hoards (the main source of bronze finds until they become more common in settlements and burials by the end of the Bronze Age). Their contextual isolation means that bronzes are difficult to relate chronologically to the very pottery sequences they are supposed to unify.
- 2) bronzes are also known to be capable of surviving throughout time as heirlooms and prestige objects, a fact which creates problems for their role as a chronological bridge.
- 3) for most of the Bronze Age the typology is built, as with the pottery, on the grounds of typological affinity rather than on common types. Consequently, the more numerous Northern Italian finds create a bias which negatively affects their linking role with Etruria.

When the Central and Northern Italian sequences are linked exclusively on the grounds of local relative typologies, it becomes very difficult to have any real sense of

the nature of developments and their relation: the repercussions for the study of settlement nucleation are clearly serious. The link between them must be provided by a source other than relative typologies, even if these will provide more precise divisions once the general phases are established. It is only in the use of absolute time indicators that an independent link could be found for both areas.

3. Division in phases

For the purpose of chronological analysis, a series of general phases for both Central and Northern Italy have been defined as a starting point. The phases were designated traditionally, that is, they were defined upon the typological and seriation studies of ceramics and bronze work, and followed the above mentioned relative chronologies. Consequently, they should not be regarded as settlement phases but rather as artificial though necessary research tools to establish primary divisions in material culture. Interestingly, these divisions were shown not to be synchronous even for the pottery and bronze objects, reinforcing the already made point that the diverse aspects which form our concept of material culture each have their own individual rates of change. There are, thus, moments of innovation in pottery production which prompt the identification of a new phase but which take place during a period of continuity and stability in bronze making: the transition from the MB2 to the MB3 is one such period in Northern Italy (Carancini 1991/92: 239), as is the transition from the Late to the Final Bronze Age, when distinct pottery for each period appears initially with the same bronze types (what Müller Karpe called the Peschiera phase) (Peroni 1989: 82-85).

Therefore, though not a settlement chronology, the explicit use of settlement related typologies provided a point of reference to introduce, later on, the use of absolute dates and stratigraphic information in direct relation to settlement. Generally, the phases and their cultural attributions were as follows:

1) MB1: (traditionally the 16th century B.C.)

Reflecting the traditional MB1 period, and encompassing the so-called "Grotta Nuova" facies in Central Italy and the early Middle Bronze Age types of Northern Italy.

2) MB2: (traditionally the 15th century B.C.)

This period is also referred to as MB2, and it sees the continuation of "Grotta Nuova" pottery types in Central Italy.

3) MB3: (traditionally the 14th century B.C.)

The period traditionally embraces the full Apennine tradition. It has been possible to distinguish within this phase two different moments -the MB3a and MB3b- conventionally taken to represent two fifty year divisions.

4) LBA 1: (traditionally the 13th century B.C.)

Traditionally the first period belonging to the Late Bronze Age (LBA1) is marked by the appearance of subapennine types in the material culture.

5) LBA 2: (traditionally the first half of the 12th century B.C.)

Representing the final stages of the Late Bronze Age. In this period there is a continuation of subapennine characteristics, accompanied by a very rich bronze tradition.

6) FBA 1: (traditionally the second half of the 12th and first half of 11th centuries B.C.)

The initial moments of the Final Bronze Age see the apparition of the so-called protovillanovan traits in pottery production. On the basis of the bronze work the Northern Italian pottery sequence of the period can be subdivided into two sub-periods (once more each assumed to be 50 years long). The first sees the introduction of protovillanovan characteristics to what remains largely a subapennine assemblage. The second sub-period sees the establishment of protovillanovan types over subapennine ones, though the latter are still present in the assemblage.

7) FBA 2: (traditionally the second half of the 11th and first half of the 10th centuries B.C.)

The period of floruit of protovillanovan types, characterised by the relative uniformity of manifestations and the spread of few, but characteristic, types.

8) FBA 3: (traditionally the second half of the 10th century B.C.)

Still within the broader protovillanovan assemblage they now appear local types which show the incipient break up in uniformity of the protovillanovan cultural "umbrella".

Each one of these periods is defined on the basis of characteristic ceramic and bronze types which are broadly summarised here (for more detail about the specific types, see Appendix II):

1) 16th century B.C.

Central Italian pottery:

It is characteristic the presence of several forms of carinated and hemispherical bowls, and of axe and strap handles, hemispherical or carinated cups and bowls with more or less distinct necks, horizontal pierced lugs with modelled sides, raised vertical tongue handles with a twirling end or crowned by a knob. Decoration is not frequent, but includes incised arches, zig-zag motifs, chevrons and geometric designs, bands of dots or triangular incisions.

Northern Italian pottery:

The most common types are biconical vases with flared rims and decoration of grooves and fluting; Isolone type cups with zig-zag decoration enclosed by horizontal grooves; carinated bowls with caniculated handles from the rim to the carination (sometimes decorated with festoons in the belly of the vessel and small perforations on either side of the handles). Raised handles are mostly axe handles.

Bronze work:

Characteristic of this period are the daggers with distinct blade with concave base with two nails; the pins with triple ring head of the Bor di Pacengo type and those with horizontally perforated head, ring head with perforated neck, and oar-shaped head and twisting body or point. Characteristic too are the axes with not very marked raised edges.

2) 15th century B.C.

Central Italian pottery:

It is not really possible to distinguish phases within the "Grotta Nuova" pottery style more than in very general terms. The pottery of this phase includes probably various situla forms, the bowl with inturned rim and the plate with triangular lugs on the rim. Incised decoration, as described for the 16th century, becomes more frequent. Probably characteristic of this phase because of stratigraphic relations, is a complex of pottery of a different tradition which is more in keeping with a northern taste as indicated by the decorative repertoire of grooves, bosses and fluting and which has appeared in sites throughout Central Italy in strata with Grotta Nuova or with Apennine pottery types and on a few instances on its own (Di Gennaro 1988: 65).

Northern Italian pottery:

In this period there appear the biconical vases decorated with large bosses often surrounded by grooves and applied on the point in which the vessel acquires its widest diameter (normally the carination). The decoration on the walls uses also more complex motifs. Other forms of this period include carinated cups with four large bosses on the carination and the Fiavè type cups with raised handle and/or with bosses and small tongues under the rim. The carinated bowls with caniculated handles continue to be present, though a type with star decoration on the belly is characteristic of this period, and raised handles, normally little developed horned handles, become much more frequent. The decoration of bands of grooves and small perforations by the handle continues. Hemispherical bowls also have raised handles.

Bronze work:

In this period there appear pins of the Monte Lonato type with thick perforated neck and flat head, and pins with spiral head and square body in section. Daggers have now blades which are indistinct from the rounded base. Axes have raised edges in their upper section and a distinct heel. There are some elements of continuity between the bronze work of this and the previous period as shown by the sharing of a few types (such as the daggers with heart-shaped base, and the pins with perforated neck of the type Bor di Pacengo).

3) 14th century

Central Italian pottery:

The first moment is characterised by the presence of carinated bowls with middle and low carinations, inwardly sloping or vertical walls which are normally straight or slightly concave, and everted rims. Carinated cups have concave-convex bodies and a strap handle, and there are also the hemispherical cups. Other pottery forms include large cooking vessels (*olle*) with globular or ovoid bodies, cylindrical necks and everted rims. The characteristic apennine decorative repertoire of this moment is achieved by the use of incision both of linear motifs and of bands. It is formed by the well executed and careful geometrical arrangement of a rich series of motifs: incised bands infilled with one row of dots or general dotted infilling, lines of vertical hatching, wavy incisions, spiral meander motifs. A second moment is differentiated by an increase of hemispherical bowls against the carinated types, which now have convex walls and bellies. Decorative motifs are executed now by the technique of the intaglio: particularly characteristic is the

presence of intaglio triangles. Incision is used now only for linear or band motifs.

Northern Italian pottery:

Two different moments can be distinguished in Northern Italy. In the first, there appear the first urns biconical or ovoid in shape: those with neck marked by a thinning of the wall of the vessel and those decorated with horizontal cordons on the wall and over the tubular handles. Characteristic too is a type of bowl with festoon decoration inside the belly and large groove decoration over the sharp carination. Carinated bowls have concave walls and no handles, and Isolone type cups now are of a rougher and stouter form. The second period is characterised by Bovolone type urns with tubular handles, and by a type of large cup with ring handles used also as an urn. All in all, the ceramic of this second moment presents a more sober aspect, with decoration almost disappearing. Bosses, grooves and so on are still found, but they appear as isolated motifs executed in a cruder manner.

Bronze work:

The bronze work of the first half of this period includes the pins with swollen and perforated neck, a variation of this form which has a tall and thin head (Monte Lonato type), and the pins with seal-shaped head of the types Montata, Pieve S. Giacomo and Nogara. Daggers with rounded bases continue to be present, but in this phase they have longer and finer blades. Axes have strongly raised edges which seen in profile run towards the blade. There are also axes with distinct heel. There appear the Manacora type tanged-hilt sword and the Pertosa type sword with a simple base. For the second moment of this phase the following types can be distinguished: daggers with triangular base and three nail holes, daggers with triangular base and distinct blade, and a type of pendant with two biconical shapes united to the central ring by two small bars. Finally, there are a series of types which could belong to either or both moments of this phase: daggers with an ogival blade and two nail holes, the razors of the types Castellaro di Gottolengo, and Pieve S. Giacomo, and the pin with piston-shaped head.

4) 13th century B.C.

Central Italian pottery:

The pottery from this phase is made up of forms and types which derive from those of the previous phase, but it is made characteristic by the general lack of decoration on the

vessels and the elaborate raised vertical handles which accompany most bowls and cups. Bowls and cups tend to be carinated and have the maximum diameter at the rim, and to have convex walls and bellies. There is a rich repertoire of elaborate handle endings: horned, discoidal, bird shaped, and the traditional handle with central cylindrical knob (the "ansa cilindro-retta"). Worthy of notice is the increase in the frequency of finds of weaving objects (loom-weights, spindle whorls, spools, etc.).

Northern Italian pottery:

The assemblage in Northern Italy for this phase is characterised by a type of biconical urn with tubular handles on the point of maximum width, and which appears both as an undecorated form or decorated by a band of very large bosses surmounted by a groove. There are also two other types of usually undecorated biconical vessels which have two small vertical handles over the carination. Very abundant are the large bowls with s-profiles: this type of bowl somewhat substitutes the carinated forms, which are nevertheless still present. The type of carinated bowl in this period has concave walls: a type with equal diameter at the rim and carination and with a vertical handle with a small ridge on the top is characteristic of the phase. Also present is a type with concave walls, equal diameter, no handles, middle carination and groove decoration on the walls. Hemispherical bowls of this phase have either indistinct or slightly inturned rims, developed raised horned handles, lobulated handles, or the vertical handle with the central cylindrical knob.

Bronze work:

Specially characteristic of this phase are a variety of pins: the double spiral Peschiera type, the type Cá del Lago, the type Boccatura del Mincio with a large eyelet on the swollen neck, and the types Franzine Nuove and Colombare.

5) First half of the 12th century B.C.

Central Italian pottery:

There is a continuation of the forms indicated for the previous phase, innovations being the introduction of umbilicate bases and the use of small feet. A type of large plate with low vertical straight walls and a series of small clay animal figurines are seemingly types of this period too.

Northern Italian pottery:

There appear the large cooking vessels with a more or less flared rim with a sharp inner angle. The carinated bowls continue to be those with distinct rim and those with concave walls, and there is an increase in the number of bowls with vertical handles rectangular or round in section, which are slightly raised and attached to the top of the rim. Other types of bowl continue as for the previous period.

Bronze work:

The division of the Late Bronze Age into two phases corresponds more to the bronze work than to the pottery tradition. In fact the first half of the 12th century B.C., the latter period of the Late Bronze Age, is very rich in bronzes, indicating to the development to be seen in later phases with which there is much connection. Thus there is a rich number of pin types: with straight neck type Barche di Solferino, types Vidolasco, Iseo, Mezzocorona, types with globular head, as well as the possibly older pins with swollen neck of Canegrate type and those with large flat poppy-shaped heads. There appear three types of axe, all winged with heel. Among the knives there are the flanged-hilt knives type Matri, and tanged-hilt knives type Berguzzo and Boccatura del Mincio. Daggers have tanged hilts and distinct blades. Most characteristic of the phase is the violin bow fibula with arc decorated by twisting, engraving or by the presence of nodules.

6) Second half of the 12th and first half of 11th centuries B.C.

Central Italian pottery:

This is a period for which no comprehensive pottery typology exists. Bronze finds in the area are also rare and mostly from funerary or hoard contexts. There is a return to decoration and the first signs of the so-called protovillanovan tradition appear. Pottery appears mostly in funerary contexts and its traits are markedly local, making it difficult to define a sequence. The pottery of this period includes the simplest biconical urns decorated with lines and sometimes bosses under the rim, and the bowls which acted as lids and have flared rims and angled profiles, or a slightly inturned rim.

Northern Italian pottery:

Two different moments can once more be distinguished within the Northern Italian ceramics during the phase, though there is much continuity between both, the difference being in the absence in the second moment of any subapennine elements. The first moment is characterised by the appearance of the first protovillanovan elements, such as

an increase in decoration, decorative motifs such as grooves under the projecting rim or wavy festooned combed decoration, and lines of dimples. Handles continue to be raised, but now they are also horizontal ring handles and spool-shaped handles. The large cooking pots now have ovoidal bodies and thick flat rims. The second moment is characterised by the intensification of the new taste in pottery decoration and morphology: Fontanella type jugs, and the large cooking pots with outwardly sloping walls and cordon decoration on the shoulder are typical of this moment. Biconical vessels and large bowls often present a thickening of the wall on the carination which appears decorated with impressed plat motifs under a band of horizontal grooves. Decorative motifs, mostly combed grooves, continue to be confined and appear mostly over and under the rim. Raised vertical handles start to be replaced by horizontal lugs and strap handles round in section which are occasionally decorated by twisting of the clay or by modelling the sides.

Bronze work:

Again a time distinction can be seen from the bronze work: the first moment is typified by the Pertosa winged axes, the violin bow fibulae with raising arc over the foot, the violin bow fibulae with asymmetrical arc decorated by two nodules, the Sover type pins and the Gualdo Tadino type tweezers and shinguards. The second moment sees the introduction of the Verrucchio type pins and the appearance of the Tirinto type amber beads.

7) Second half of the 11th and first half of the 10th centuries B.C.

Central Italian pottery:

Lid bowls continue to have flared rims and angled profiles but they now present a spool-shaped handle on the carination. The decoration, though more abundant and rich, is still restricted to specific areas of the vessel and consists mainly on bands of lineal grooves flanked by dimples, horizontal and oblique lines of dimples and zig-zag combed motifs which enclose dimples in its angles or are flanked by a line of dimples. Characteristic too are a type of sharply carinated bowl with a small horizontal handle on the shoulder, and a deep and sharply carinated bowl with everted rim and oblique fluting on the carination.

Northern Italian pottery:

This phase enters completely within the protovillanovan tradition. Decorative motifs

include incised zig-zag lines enclosing dimples and linear roller-stamping with a toothed wheel. The urns are biconical with a squashed profile. Bowls have inturned rims and angular profiles and they are either undecorated or bear a band of horizontal grooving immediately below the rim. There is, in other respects, a marked continuity with the types which appeared in the last moment of the previous phase.

Bronze work:

There is an increase in the richness and variety of the bronze work. The types of fibulae which appear belong for the great part to the arc fibula type, and are decorated in various fashions (incised alternating decoration, nodules, swelling of the arc, leaf arcs with nodules, etc.) Winged axes are of the types Monte Primo and Ponte S. Giovanne, and pins belong to the nail shaped head class, the Ala type and the S. Giacomo di Riva type. Knives are flanged-hilt knives of Fontanella and Vadena "C" types, and characteristic too are the double edge razors type Croson di Bovolone as well as the much frequent presence of javelin and spear heads.

8) The second half of the 10th century B.C.

Central Italian pottery:

The pottery from this phase, normally identified as the Tolfa-Allumiere facies of Central Italy and with a generic 10th century chronological span, presents a characteristically evolved decoration as well as some regionally exclusive features. Evolved protovillanovan traits are the bands of grooves flanked by cord impressions, cord-impressed zig-zags, combed zig-zag motifs with one dimple over the angle, dimple rosettes, and horizontal grooves over oblique fluting. Vessel forms are the biconical/ovoid urns with long everted rim and squashed profile, or with a lenticular base, inwardly sloping neck walls and flared rim; the carinated bowls with umbelicated base, concave-convex body, raised vertical handle decorated with incisions on the upper part and with decoration over the shoulder and the carination. On the other hand, characteristic of the Tolfa-Allumiere facies is that decorative motifs take up more space in the vessel and become more complicated and elaborate: the horizontal decoration appears interrupted by vertical incisions at times. Typical too of the region are the large cups with one large strap handle, flared rim, short neck and lenticular body decorated by grooves and fluting; the small three-foot plates and the "askoi". Accompanying the urn burials the so-called

clay helmets start replacing the lid-bowls. These helmets normally display profuse decoration and appear in a variety of forms: spherical, hemispherical, in the shape of a truncated cone etc.

Northern Italian pottery:

It is in this phase that the first signs of a regional development within the until then broad Italian cultural matrix become apparent in the North too, though forms and types remain largely unchanged. A type of small cup appears in this phase which has a conical body. A larger version of the cup, which most probably acted as a lid, bears cordon decoration. Decorative motifs are roughly those to be seen in central Italy at this time: the association of horizontal grooving and oblique fluting, various elaborate motifs associating combed grooves and dimples, impressed cordon decoration and meandering cordons and grooves. Urn types are again similar to those present in Central Italy: biconical with squashed profile, and lenticular bodies with inwardly sloping necks and flared rims. And as in Central Italy there are now elements which are particular to the region: a type of small ovoidal pot with a slightly flared rim and the shoulder decorated by a horizontal sequence of notches; a small situla shaped amphora; various cups with s-profiles; a type of jug with elongated body; the ovoidal cooking pot with a marked narrowing of the body under the rim which is accentuated by an applied horizontal cordon.

Bronze work:

The pins of this phase normally belong to the types Fiavè, Sarteano, Marco, and Torri d'Arcugnano. New types of arc fibulae appear (decorated with annular incisions, with two nodules, or by twisting the arc), as do the first serpentine fibulae. Other personal items in bronze are the razors of the lunate Fontanella type, or of Allumiere type; winged axes such as the Tolfa Gabbro types and shaft-hole axes like the Chiusi and Cerchiara types; and the tanged-hilt knives types Castelnuovo and Bismantova varieties "A" and "B", the latter variety seemingly being the slightly earlier of the two (Bianco Peroni 1976: 61).

4. Traditional chronologies and settlement phases

After the periodisation of material, a first image of settlement dynamics emerges.

Settlement spans of life are summarised in the following tables:

WESTERN VENETO SITES

Site	Prov	EBA	MBA 1	MBA 2	MBA 3a	MBA 3b	LBA 1	LBA 2	FBA 1	FBA 2	FBA 3
Villa Bagatta	VR	X	x								
Canàr San Pietro	RO	X	x								
Morandine	VR	X	X	x							
Ledro	TN	X	X	x							
Mulino	VR	X	X	X	X	x					
Lazise-La Quercia	VR	X	X	X	X	x					
Peschiera Mulino dell'Otello	VR	X	X	X	X	X	x				
Peschiera Boccatura	VR	X	X	X	X	X	X	x			
Bor di Pacengo	VR	X	X	X	X	X	X	x			
Peschiera Bacino Maria	VR	X	X	X	X	X	X	x			
Isolone del Mincio	MN	X	X	X	X	X	X	x			
Vigolo Vattaro	TN		x								
Quartieri dei Maccacari	VR		x								
Lavagnone	BS		X	X	X						
Gazzo Veronese	VR		X	X	x						
Finilone	VR		X	X	X	x					
Ara di Spin	MN		X	X	X	X	x				
Cisano	VR		X	X	X	X	X	x			
Maccacari	VR		X	X	-	-	-	-	X		
Fiavè	TN	X	X	X	x						
Mazzagatta	MN			X	X	x					
Porto di Pacengo	VR			X	X	X	X	x			
Marola	RO			X	X	X	X	x			
Castello del Tartaro	VR			X	X	X	X	X	x		
Demorta	MN				x						
Stanghelle	VR		X	X	X	X	x				
Tombola di Cerea	VR				X	X	x				
Stanghelletti	VR				X	X	x				
Marzana	VR				X	X	x				
Feniletto	VR					X	x				
Fimon-Fondo Tornellero	VI				X	X	x				
Peschiera Palafitta centrale	VR				X	X	X	x			
Perteghelle	VR				X	X	X	x	X	X	x
Cop Roman	VR				X	X	-	X	-	X	X
Monte Madarosa	VI				X	X	X	X	x	-	x
Monte Rocchetta	VR					X	x				

Site	Prov	EBA	MBA 1	MBA 2	MBA 3a	MBA 3b	LBA 1	LBA 2	FBA 1	FBA 2	FBA 3
San Zeno di Cerea	VR						x				
Paerno	VR						x				
Ponterotto	PD						x				
Corte Bellintane	VR						X	x			
Fabbrica dei Soci	VR						X	x			
Corte Lazise	VR						X	x			
Canova	RO						X	x			
La Vallona	MN						X	x			
Aselogna	VR						X	X	x		
Fondo Paviani	VR						X	X	X	x	
Monte Rosso	PD						X	X	x		x
Castello di Bovolone	VR						x				
Venezia Nuova	VR						x				
Coriano	VR						x				
Monte Pipaldolo	VR						x				
Creola	PD						x				
Cavalzara	VR						X	x			
Terranegra	VR						X	x			
Monte Parnese	VI						X	x			
Bosco di Noventa	VI						X	x			
Monte Lago-Monte Bello	VI						X	x			
Castellon del Brosimo	VI						X	x			
Altavilla Vicentina	VI						X	x			
Monte Cavalrina	VI						X	x			
Monte Rovarola	PD						X	X	X	x	
Monte Casteggioni	VR						X	X	X	X	
Mariconda di Merlara	RO						X	X	X	x	
San Giorgio di Angarano	VI						x	X	X	x	
Parona	VR							x			
Castelgomberto	VI							x	-	x	
Monte Castellon di Marano	VR							X	X	x	
Frattesina di Fratta	RO							X	X	x	
Villamarzana	RO							X	X	X	
Montecchio Maggiore	VI							X	X	X	
Montebello-Lotto Maran	VI							X	X	X	X
Monte Zoppega	VR							X	X	x	
San Giorgio di Valpolicella	VR								X	X	x

Site	Prov	EBA	MBA 1	MBA 2	MBA 3a	MBA 3b	LBA 1	LBA 2	FBA 1	FBA 2	FBA 3
Prà d'Este	PD										x
Padova -ex Storione	PD										x
Coazze	VR										x
Fornace di Oppeano	VR										x
Desmontà di Veronella	VR										x
Beccacivetta di Coriano	VR										x
Montagnana Borgo San Zeno	PD										x
Este	PD										x
Lozzo Atestino-Vignalon	PD										x
Saline	RO										x
Arquà Petrarca	VI										
Magrè	VI						x	-	-	x	
Costabissara Pignare	VI										x
Monte della Croce	VI						x	x	-	x	
Monte Tondo	VI					x	x	x			
Monte Alto	VI					x	x	x			
Piovene Castel Manduca	VI						x	x	x	x	
Monte Corgnon	VI					x	x	x			
Marendole	PD					x	x				
Monte Summano	VI										x

SOUTH ETRURIAN SITES

Site	Prov	MBA 1	MBA 2	MBA 3	LBA	FBA
Masseto	VT	x	x			
Ragnatoro	VT	x	x			
Il Montione	VT	x	x			
Poggio del Mulino	VT	x	x			
Valle del Bovo	VT	x	x			
Cantinaccia di Montedonato	VT	x	x			
La Selva - 2	VT	x	x			
Castellaro di Prato Fabulino	VT	x	x			
Torre Crognola	VT	x	x			
Cavalupo di Vulci	VT	x	x			
Monte Piombone	VT	x	x			
Piano del Casalone	VT	x	x			
Orti di San Martino	VT	x	x			

Site	Prov	MBA 1	MBA 2	MBA 3	LBA	FBA
Cavone	VT	X	x			
Solfarate	VT	X	x			
Il Pizzo	VT	X	x			
Porciano	VT	X	x			
Vignacce	RM	X	x			
Tre Querce	RM	X	x			
Monte la Rosa	RM	X	x			
Fontanile della Breccia	RM	X	x			
Chiavichetta	RM	X	x			
Pizzo Prete	RM	X	x			
Vigna di Valle sub	RM	X	x			
Vigna Grande sub	RM	X	x			
Monte Pozzo di Ferro	RM	X	x			
Cicugnola	RM	X	x			
Sughera	RM	X	x			
Pontone delle Pallotte	RM	X	x			
Pontesilli	RM	X	x			
Monte Casella-Reale	RM	X	x			
Castellina di San Nicola	VT	X	x			
Castellina orientale di Poggio S. Pietro	RM	X	x			
Mercareccia	RM	X	x			
Mezzano	VT	X	X	x		
Monte Saliette	VT	X	X	x		
Santa Lucia	VT	X	X	x		
Larga Callare	VT	X	X	x		
Pontone della Noce	VT	X	X	x		
Portone	VT	X	X	x		
Pontone Colonna	VT	X	X	x		
La Casetta	VT	X	X	x		
Monte Venere - Nocicchiola	VT	X	X	x		
Monte Tufo	VT	X	X	x		
Pontone Cavaliere	VT	X	X	x		
Castellina del Cerasolo	RM	X	X	x		
Pian Sultano	RM	X	X	x		
Grottini di Santa Severa	RM	X	X	x		
Codata della Macine	RM	X	X	x		
Valdaliga	RM	X	X	x		

Site	Prov	MBA 1	MBA 2	MBA 3	LBA	FBA
Mattonara	RM	X	X	x		
Malpasso	RM	X	X	x		
Foce del Marangone	RM	X	X	x		
Chiaruccia	RM	X	X	x		
Vicarello sub	RM	X	X	x		
Acquafridda	RM	X	X	x		
Le Colonnacce	RM	X	X	x		
Cecio	RM	X	X	x		
Fornace di Cери	RM	X	X	x		
Ponte S. Pietro	VT	X	X	X	x	
Veiano	VT	X	X	X	x	
Gatta Pelosa	RM	X	X	X	x	
Tufarelle	RM	X	X	X	x	
Palidoro	RM	X	X	X	x	
Grotta Misa - Le Colle	VT	X	X	X	X	x
Uliveto di Cencelle	VT	X	X	X	X	x
Luni	VT	X	X	X	X	x
San Giovenale	VT	X	X	X	X	x
Pontone	VT	X	X	X	X	x
Rota	RM	X	X	X	X	x
Monte Abbadone	RM	X	X	X	X	x
Pitigliano	GR	X	X	X	X	x
Scarceta	GR	X	X	X	X	x
Osteriaccia del Punton di Villa	VT	X	X	x		x
Colle di San Pietro	VT	X	X	x		x
Pisciarello	VT	X	X	x		x
La Tolfa	RM	X	X	x		x
Castel Campanile	RM	X	X	x		x?
Norchia	VT	X	x		X	x
Monte Sant'Elia	VT	X	x		X	x
Ferriera	VT	X	x		X	
Bufalareccia	RM	X	x		X	
Rocca Respampani	VT	X	x			x
Sorgenti della Nova	VT	X	x			x
Le Rogge	VT	X	x			X
Poggio di Sermugnano	VT	X	x			X
Crostoletto di Lamone	VT	X	x			x

Site	Prov	MBA 1	MBA 2	MBA 3	LBA	FBA
Poggio Evangelista	VT	X	x			x
Caolino del Fosso Eri	RM	X	x			x
Poggio Pilato	VT	X	x			x?
Capriola	VT	X	x			x?
Ponterotto di Vulci	VT	X	x			x?
Rocca Ripesena	TR			X		
Santo Stefano	VT			X		
Fondaccio	VT			X		
Marmnone del Pantano	VT			X		
Monte Cellere	VT			X		
Pian di Mola - Acqua Forte	VT			X		
San Silvestro	VT			X		
Casale dei Gesuiti	VT			X		
Fosso del Mandrione	VT			X		
Grotta Porciosa	VT			X		
Torre Aliano	VT			X		
Lestre della Roccaccia	VT			X		
Omo Morto	VT			X		
Castellaccio dell'Ancarano	VT			X		
Castellina di Valle Campane	VT			X		
Castellina della Pampanare - Sant'Andrea	VT			X		
Cerreta	RM			X		
Monte li Santi	RM			X		
Giovita	RM			X		
Monte Radicata	RM			X		
Capannone	RM			X		
La Caldara	RM			X		
Monte delle Fate	RM			X		
Sassone	RM			X		
Cerqua Petrosa	RM			X		
Monte Bischero	RM			X		
Il Pigno	RM			X		
Quarto della Caduta	RM			X		
Riserva delle Pertuce	RM			X		
Fosso della Bottaccia	RM			X		
Riserva dei Grottoni	RM			X		
Casotto	RM			X		

Site	Prov	MBA 1	MBA 2	MBA 3	LBA	FBA
Veio, apendice orientale	RM			X		
Terre di Bettone	RM			X		
Valle Cencella	RM			X		
Lago Martignano (riva est)	RM			X		
Longarina di Malveto	RM			X		
Alveo di Baccano	RM			X		
Cupellaro	VT			X	x	
Castellina delle Pallarete	VT			X	x	
Vaccina	RM			X	x	
Prato la Corte	RM			X	X	
Punta Matteo	VT			X	X?	
Pontecchio	VT			X	X	x
Narce	VT			X	X	X
Montarana	VT			X	X	x
Monte Roncione	RM			X	X	x
Monte Rovello	RM			X	X	x
Norcino di Montetosto	RM			X	X	X
Castellina della Cività	VT			X		x
Ferleta	VT			X		x
Torre del Pascolaro	RM			X		x
Fosso delle Rote	VT				X	
Galeria	RM				X	
Formello	RM				X	
I Colli	GR				X	
Monte Fogliano	VT				X	x
Torrionaccio	VT				X	x
Castellina del Marangone	RM				X	X
Castellina della Roccaccia	RM				X	x?
Orvieto	TR					X
Torre della Stroppa	VT					x
Poggio Starnina	VT					x
Valderico alla Mandriola	VT					x
Torre d'Ischia	VT					x
Città di Bagnoregio	VT					x
Poggio Buco	VT					x
Bisenzio	VT					X
Casone	VT					x

Site	Prov	MBA 1	MBA 2	MBA 3	LBA	FBA
Farnese	VT					x
Le Bagnare	VT					x
La Palanzana - Monte Pizzo	VT					x
Monte Cimino	VT					x
Vallerano	VT					x
Vignale	VT					x
S. Giuliano	VT					x
Sutri	VT					x
Monte Sassetto	RM					x
Coste del Marano	RM					x
Elceto	RM					x
Monte Urbano	RM					x
Monterano	RM					x
La Tolfaia	RM					x
Campanile S. Giovanni	RM					x
Monte Sant'Angelo	RM					x
Monte Santo	RM					x
Poggio Castelsecco	RM					x
Selciatta a Mare	RM					x
Ceri - Pian Cerese	RM					x
Casale Campanella	RM					x
Fosso Pantano	RM					x
Veio porta NW	RM					x
Sovana	GR					x

Tables 4 and 5 showing the spans of life of sites in Western Veneto and South Etruria according to the phases defined by the material culture (after Capoferri 1987; Bicego 1988-89; Di Gennaro 1986; Di Gennaro 1988).

X= Site in existence

x= Site dies during that phase

-= Hiatus in occupation shown in the absence of material culture from that phase

It is apparent just from a quick look at the layout of the tables that sharp differences exist between the state of research in the two areas. The sites in Western Veneto are significantly outnumbered by those in South Etruria (93 to 185 sites), but the chronological information available for them is more detailed than for the Etruria

settlements, which can only be ascribed to general phases. These differences in the state of the information are the result of the diverse research approaches adopted in both regions. Thus, South Etruria has been subject for the last thirty years to systematic surveys (see however the comments made in Chapter 3), which have brought to light a large number of sites for which chronological resolution is low. Western Veneto, on the other hand, has seen much more excavation of sites and only recently is field survey being applied. The result is fewer known sites but a better degree of chronological certainty for them. The outcomes of the surveys carried out in the past years show that there is reason to believe Western Veneto might eventually yield similar settlement densities to those of South Etruria (Margarise 1989).

Patterns of settlement dynamics as revealed from these tables have been already outlined in Chapter 1. The two areas compare well in their general settlement trends when divided in typologically based chronological phases. Both in Western Veneto and Southern Etruria the process of settlement definition starts in the first stages of the Middle Bronze Age, though perhaps there is evidence for a slightly earlier beginning in Western Veneto. In neither area was this process unilinear. Sites of an open nature are predominant during the Middle Bronze Age, but it is those which have some sort of defensive system (whether natural as in Etruria, or artificial, as in the embanked settlements of Western Veneto) that have greater survival rates and the ones that will eventually become the norm in Etruria. The general resemblance of the processes affecting both areas will become less marked during the Late Bronze Age and clearly differ in the Final Bronze Age.

In Etruria continuity between the late stages of the Bronze Age and the Middle Bronze Age is quite marked, with a parenthesis in the Late Bronze Age for which the type of documentation available might be responsible (on the nature of field survey see Chapter 2 and 3) (fig. 13). The extent of geographic occupation of Southern Etruria is quite uniform as well, in general concentrating along the axes of the many watercourses -a general trend for settlements of this period-, but without striking preferences between one or another (recent research in new areas indicates that the greater number of sites known in the Tolfetano and the Fiora valley could be a reflection of the more intensive research

carried out there) (Di Gennaro 1991/92).

In Western Veneto the situation presents itself differently. During the last phase of the Late Bronze Age there seems to be a real phenomenon of depopulation of the area and not a lack of documentation or a failure to recognise sites of the period. This phenomenon is temporarily and partially redressed in the final moments of the Final Bronze Age, but depopulation will again affect the region and reach unsuspected proportions in some areas. Western Veneto sees two major phases of settlement and those born in the Middle Bronze Age disappear before the Final Bronze Age (fig. 14). Another feature which distinguishes Western Veneto from Etruria is the chronologically different geographical preferences for settlement location: at different times throughout the Bronze Age different geographical zones will be preferred for settlement, watercourses being favoured or abandoned. These preferences are largely in correspondence with the changes to water systems along which the settlements also concentrate, a fact which also affects the survival rate of sites, independently of the type of site. The major collapse of settlements along the Po-Tartaro axis which takes place during the Final Bronze Age gives way to the slow emergence of a new settlement system in a different area, the Atestine, but which only really develops during the Iron Age.

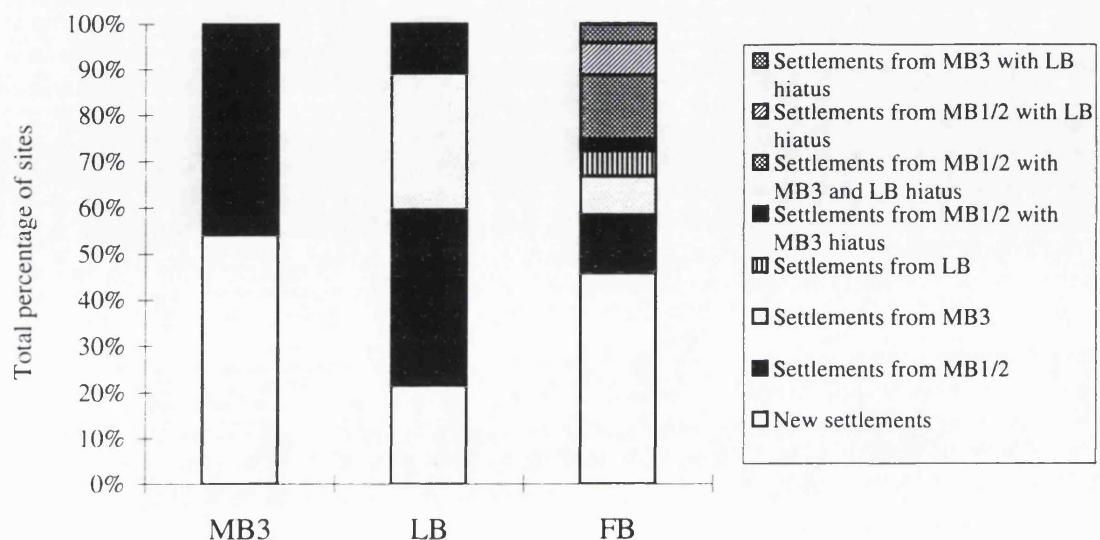


Fig. 13: Settlement continuity in South Etruria.

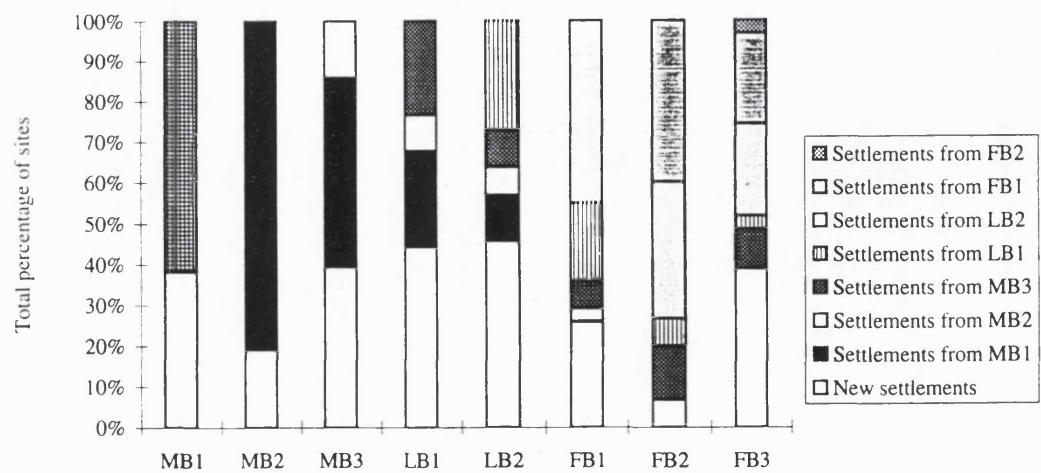


Fig. 14: Settlement continuity in Western Veneto.

From the image provided by a chronological scale built on material culture phases, it would appear that the two regions start, rather synchronously, a process of settlement definition which has as characteristics the growth of sites, longer survival rates for settlements, and consequently the tendency towards increased settlement nucleation (again it needs to be stressed that none of these characteristics follows a unilinear mechanical development). The forces behind such process would be seen in that way as universal agents (trade networks, peer-polity interaction, the environment, a need for defense and so on are just some of the possible answers).

Yet, from the initial division of the material culture into phases it is possible to observe the following flaws affecting the theoretical reliability of such an approach:

a) Pottery styles from the two areas are difficult to relate. They are obviously local products following local trends. At the most, affinity between types can be observed from the Late Bronze Age onwards, and this appears to intensify in the Final Bronze Age. Before that, some interregional contacts are reflected, as in the case of a type of pottery which occasionally appears in sites in Etruria, but whose characteristics, totally extraneous to the region, are in keeping with Northern taste: this type of pottery is decorated with bosses and grooves and the closest parallels for it are to be found North of the Po, though it appears in sites like Mezzano, associated in most cases to Grotta Nuova, or to apennine, material (Di Gennaro 1988: 65-67).

b) In many occasions -particularly in Etruria- there are also difficulties within each region in finding parallels which bear any chronological significance between sites. Types seem to appear with different assemblages in different sites, and sites present their own characteristics: predominant presence or absence of decoration, prevalence of specific types (the abundance of plate forms in Grotta Misa for instance), and so on.

c) Although it has been assumed that the bronze work is the work of specialised craftsmen, their production is also regional and types common to Etruria and Veneto appear only at the end of the Bronze Age: the Torri d'Arcugnano and Sarteano pin types, the Matrei and Palombara knives, a type of winged axe found both in Frattesina and Monte Rovello, and the association of pick axes and shovels with tubular hafting found in Manciano and in Montagnana and Frattesina (Bietti Sestieri 1981: 235 and 238-9). Before then, the typology is built, as with the pottery, on the grounds of typological

affinity rather than on common types.

When these observations are translated in terms of understanding the causes behind settlement developments in the run up to urbanism, it becomes clear that, so far, the chronological background against which such an important process has been set, is a background which has no firm base on reality. The scales of time are arbitrary and relate to each other on affinity and little more before the Final Bronze Age. The image of settlement dynamics might, thus, be subject to the limitations of an inaccurate and untested chronological background. If, as suggested at the beginning of the Chapter, the understanding of time perspectives is essential to the true perception of change, to which it is intrinsically linked, the need for an independent source of chronological information between phases and regions is only confirmed.

Chapter 6: CHRONOLOGICAL ANALYSIS

This chapter develops some of the theories presented in the previous section, and deals with the ways in which absolute dating can be approached in order to provide meaningful chronological information for settlements and settlement phases.

As seen before, the different time scales of complex patterns of human activity become muffled in the archaeological record, since, although they were not necessarily synchronous, they appear together. By way of an analogy, a kind of theory of relativity affects our perception of time in the archaeological record: time contracts or expands according to the speed of movement -to the rate of change- of the particular phenomenon under observation. Problems arise when change is detected but the speed of that change escapes notice: in order to value and understand the past it is not enough to know that things changed and how, we need to know when and in which ways change took place in time for that time depth is the one that opens up a true understanding of the past.

Continuing with the analogy, the contraction of expansion of time is not observable in the subject undergoing change except when compared with a different time scale. As differences of this type have been obliterated in the archaeological record, only a fixed and independent indicator can provide the clock for the rate of change. For specific sites archaeology has made use of independent time indicators such as strata accumulation rates, but these are neither the same nor are they universally present in every site. Thus, when it comes to the study of wide ranging settlement trends with respect to processes leading to urban forms, the need for an independent time scale is inescapable: it was also highlighted in the previous chapter, when some of the problems and drawbacks with the use of material culture for the purpose of establishing comparative time scales were pointed out. Absolute dating methods, on the other hand, provide independent and fixed time indicators which allow regional and interregional analyses to be placed in their historical and chronological depth. In this chapter the chronological scale is remodelled by applying absolute dates.

1. Linking absolute and relative dates: ^{14}C and stratigraphy

For some of the settlements mentioned in the previous chapter there also exist ^{14}C dates, which come from contexts which have more or less well associated assemblages of material culture (see tables 6 and 7 for the ^{14}C dates). The existence of absolute age ranges for some of the phases of the settlements in question allows the only possibility for an independent anchoring on calendar years of those phases, and consequently of the settlements themselves. In order to obtain calendar year ranges for the phases, two different approaches had to be followed: first, a general discussion of the ^{14}C dates available for each settlement, and of the material they appeared with in the stratigraphic sequence; secondly the application of statistical methods to test contemporaneity between phases and areas and thus establish a general absolute chronology.

The interpretation of ^{14}C dates, of the stratigraphy, and of the material culture represented in these sites is not without problems, mostly brought about by excavation and/or publication deficiencies as well as by undiscriminating sampling for ^{14}C dates. These problems affect the reliability of the link between absolute and relative chronologies and have been brought to light in each case. For Western Veneto the sites for which ^{14}C dates are available are nine (table 6), most of which belong to the Middle Bronze Age.

Lab no.	Site	Material	^{14}C date B.P.	1σ cal B.C.	2σ cal B.C.
R-1252	Lavagnone	Wood	3760 ± 50	2290, 2201, 2151, 2149, 1880	2396-2087
R-1251	Lavagnone	Wood	3700 ± 50	2200, 2135, 2080, 2072, 2058, 2042, 1983	2289-1925
R-1247 α	Lavagnone	Wood	3550 ± 50	2012, 1917, 1906, 1888, 1781	2110-1740
R-1253 α	Lavagnone	Wood	3430 ± 50	1871, 1739, 1662	1890-1606
R-1264	Lavagnone	Wood	3190 ± 60	1523, 1490, 1481, 1458, 1414	1678-1319
R-1259 α	Lavagnone	Wood	3150 ± 50	1493, 1434, 1408	1530-1319
R-1255	Lavagnone	Wood	3120 ± 50	1450, 1428, 1424, 1413, 1322	1500-1264
BM-2655	Canàr	Wood	3660 ± 50	2138, 2109, 2103, 2090, 2085, 2034, 1963	2268-1888
BM-2653	Canàr	Wood	3620 ± 70	2134, 2027, 2026, 2015, 1992, 1971, 1886	2267-1754
BM-2656	Canàr	Wood	3610 ± 100	2138, 2013, 1993, 1966, 1831	2291-1694
BM-2654	Canàr	Wood	3600 ± 50	2108, 2011, 1995, 1960, 1886	2138-1777
R-97	Isolone	Wood	3475 ± 60	1885, 1858, 1846, 1827, 1810, 1802, 1773, 1757, 1756, 1695	2012-1639
Pi-25	Isolone	Wood	3333 ± 115	1750, 1682, 1674, 1624, 1500	1921-1410

Lab no.	Site	Material	14C date B.P.	1σ cal B.C.	2σ cal B.C.
R-700	Isolone	Wood	3230±60	1602, 1502, 1437	1688-1410
Pi-18	Isolone	Wood	3100±113	1500, 1409, 1195	1681-1023
R-98	Isolone	Wood	3075±60	1432, 1382, 1331, 1324, 1264	1493-1114
Birm-34	Ledro	Wood	3659±66	2202, 2134, 2081, 2072, 2059, 2041, 1974	2329-1890
Birm-34*	Ledro	Wood	3642±36	2132, 2031, 1988, 1982, 1958	2192-1890
R-358	Ledro	Wood	3350±50	1729, 1686, 1672, 1658, 1654, 1639, 1542	1768-1520
R-7	Ledro	Charcoal	3310±210	1882, 1605, 1410	2194-1053
Pi-88	Ledro	Wood	3137±105	1520, 1431, 1418, 1416, 1317	1686-1110
R-769	R. Romagn.	Charcoal	3720±50	2269, 2139, 2078, 2075, 2048, 2046, 2035	2308-1966
R-770	R. Romagn.	Charcoal	3630±50	2132 (2029, 1990, 1977) 1922	2198-1833
R-768	R. Romagn.	Charcoal	3000±50	1373 (1292, 1281, 1262) 1114	1410-1053
R-700	M. Madarosa	Charcoal	3230±50	1600 (1502) 1449	1684-1412
Gx-15795	Lazise	Charcoal	3270±80	1687 (1583, 1573, 1529) 1454	1740-1410
BM-2757	Fabbrica	Bone	3230±210	1740 (1502) 1265	2107-939
OxA-3328	Fabbrica	Charcoal	3220±80	1603 (1496) 1416	1692-1321
OxA-4648	F. Paviani	Bone	3280±65	1622 (1520) 1455	1731-1413
OxA-4649	F. Paviani	Bone	3065±70	1407 (1370, 1350, 1310) 1216	1491-1117
OxA-4650	F. Paviani	Bone	3010±65	1378 (1260, 1230) 1126	1410-1020

Table 6: Radiocarbon dates for Western Veneto. (After Skeates 1994) The asterisk indicates a remeasurement.

Lavagnone's levels 2A and 2B from sector II (Perini 1976) can be dated, on the basis of the pottery present, to the MB2 phase -the 15th century BC in traditional chronology- (Capoferri 1987: 126). The radiocarbon dates for these levels (R-1259α and R-1264) fit comfortably within this span of time. R-1255, from sector II, level 1 (which can be typologically dated to the MB3b) could agree with the traditional dating of this phase (the second half of the 14th century), but the calibrated range is very close to that of the other two levels and could also show that the phase is to be placed slightly earlier in time. There are another four dates for Lavagnone from strata which have been generically dated to the early Middle Bronze Age by the excavators, but for which no comprehensive publication of the material is available (R-1252, R-1251, R-1247α, and R-1253α, from strata D₃, E₂, and E in sector II). All the dates coincide in posing a very early range for the period, from around 2000 to 1800 cal BC.

Canàr S. Pietro (Salzani 1986) is a site of the late Early Bronze Age and the beginning of the Middle Bronze Age for which there are four dates (Whitehouse, in Balista *et al.* 1992: 138-140). The exact relation of the dated samples to the material from the site is, however, unclear, since all stratigraphic relationships were mechanically removed before the sampling from the wood was made. In the absence of any more specific information the four dates have been used to date the very end of the EBA. The dates, which once calibrated revolve around 2000 BC, agree with the four earlier dates from Lavagnone in putting back the end of the Early Bronze Age and the beginning of the Middle Bronze Age, by at least 200 years, to circa 1800 BC.

The lake side site of **Isolone del Mincio** (Soffredi 1970) was divided upon excavation into three layers of buildings (supposedly showing habitation phases). The scarce published finds permit to tentatively assign layer 1 to the Early Bronze Age, layer 2 to the Middle Bronze 1 or 2, and layer 3 to a late moment of the MB3 (Soffredi 1970). There are five radiocarbon dates: two, Pi-25 and R-700, from layer 1; one, R-97, from layer 2; and two, Pi-18 and R-98, from layer 3. Except for the sample from layer 2, which is older than expected from its stratigraphic position, the other samples came out in the right stratigraphic order. 1σ calibrated ranges for layer 1 are between the 18th to the 15th century, which are slightly young but would fit with traditional chronology. Layer 2, has a 1σ range between the 19th and the 17th century, but stratigraphy casts doubts on the reliability of this date. The two samples from layer 3 calibrate within the 1σ probability between the 15th and the 13th centuries, again agreeing with the traditional chronology for the MB3.

Ledro is another lake side site (Battaglia 1949; Rageth 1974). Of the five dates available for this settlement, two come from the site at Molina di Ledro (Birm 34 and Birm 34*), which has rendered material of the Early Bronze Age. The calibrated ranges (2200 to 1900 BC) fit well with this date if an earlier beginning of the Middle Bronze Age as suggested by the Canàr and Lavagnone dates is accepted. The three other dates are from the *palafitta* itself: R-358, R-7 and Pi-88. As no stratigraphic division of the material from this site has been reported, the three dates can only be generically referred to the MB1 or MB2, which is the period within which the material of the settlement is

to be placed (Battaglia 1949; Rageth 1974; Capoferri 1987). Because of the lack of stratigraphic links for the material and the large standard deviations of both R-7 and Pi-88, R-358 is the date which can give a tighter calibrated range oscillating between 1800 and 1500 BC.

Riparo di Romagnano III (Perini 1975) is a long-lived site on high ground, for which two dates from two inhumation burials (layers P₁ and P_{2,3}) can be assigned to the Early Bronze Age, and one date to the earlier part of the Final Bronze Age (Luco culture). The material, however, has not been published and chronological and cultural attributions remain those of the excavators. The three absolute dates fit comfortably with the assumed ranges of these periods.

The hill top settlement of **Monte Madarosa** (Leonardi 1973) is another example of poor stratigraphic information concerning the excavation and the provenance of finds. The single ¹⁴C date available (R-700) comes from a hearth on the slope, which was associated only with some flint arrowheads. The date has been tentatively linked to the major phase of use of the site, the Late Bronze Age. The calibrated range, between 1600 and 1450 BC would seem to bring forward this phase, but in view of the uniqueness of the date and its very poor link to the Late Bronze Age, no need was seen to press this point further.

Lazise-La Quercia (Aspes 1993) is one of the numerous lake side sites found on the shores of Lake Garda. The only date so far available (Gx-15795) comes from the most recent levels of this site, the material from which has been classified as expanding from the Early Bronze to the end of the Middle Bronze Age (Aspes 1991/92: 153). However, because there is no more precise information as to the exact layer of sampling and the associated material assemblage, the date has been generally allocated to a middle or late moment of the Middle Bronze Age. The 1 σ calibrated range is between 1687 and 1454 with three middle dates in the 16th century, which could indicate a slightly earlier real span of time for this period, in agreement with an earlier start for the Middle Bronze Age.

Fabbrica dei Soci (Balista and De Guio 1990-91; Balista *et al.* 1991) is an important embanked settlement of the Po Plain, whose life expanded, according to the material culture available, throughout the Late Bronze Age. The two dates from Fabbrica come from the South section investigated in 1990 (Balista *et al.* 1991: 162-173), and correspond to a context from an occupation deposit associated with the embanked settlement and the main phase of occupation of the site (BM-2757), and with a context sealed by the embanked settlement (OxA-3328). The two dates seem to be very close in time and it could be assumed that they fall within the same phase (Whitehouse pers. comm. 1993). Given the material present in the site, both dates have been assigned to the Late Bronze Age. Their calibrated range (OxA-3328 helps to narrow down the large standard deviation of the stratigraphically posterior BM-2757) once more brings forward the chronology of a phase by at least two centuries: at the 1σ probability the calibration range is between 1527 and 1409 BC, and at the 2σ between 1677 and 1311 BC, that is, in no case later than the 14th century and in fact probably 16th or 15th century BC (Whitehouse forthcoming).

The last site of the area for which ^{14}C dates exist is **Fondo Paviani** (Balista *et al.* 1992), another embanked settlement in the plain. The settlement started its life, according to traditional chronology, in the Late Bronze Age, and continued in use without apparent interruptions until the 10th century BC (always in traditional chronology). The samples for the three dates available were obtained in 1989, during work in a section that cut through the bank and the centre of the site (Balista *et al.* 1992: 145-153). Three different phases within the settlement's stratigraphy were sampled (Whitehouse forthcoming). OxA-4650 comes from material from phase II, a phase of the pre-embanked settlement. The sample for OxA-4649 came from the layers of phase IV, the second phase of occupation and the one connected with the embanked site. Date OxA-4648 was taken from the layers of phase V, which form the last phase of occupation and abandonment of the site shortly before flooding buried it. The material culture found in these layers is still under study, but there is so far no other indication of the site being in use earlier than the Late Bronze Age other than for a vessel, found in earlier excavations, bearing the typical Apennine decoration. This unique find (Apennine vessels are also very rare North of the Po, the only other known cases in Veneto coming from Lozzo, Montebello, Monte

Madarosa and Marendole) does not seem to be enough to justify putting back the chronology of the site to the Middle Bronze Age. OxA-4648 could, then, correspond to either the end of the Middle or the beginning of the Late Bronze Age, whereas OxA-4650 is definitely related to the last moments of use of the settlement, that is, to an archaeological Final Bronze Age date of circa 10th century BC. It is more difficult, without a clear picture of the material culture found in phase IV, to assign OxA-4649 to a period. Yet phase IV and V appear close in their calibrated ranges. The only explanation for this is that phase IV be a long phase (hypothesis substantiated by the stratigraphy, which shows an earlier and later moment in the phase in which the character of the settlement was somewhat altered). In any case, the 1σ probability calibrated ranges of these three dates fall between 1622 and 1455 for phase II; 1407 and 1216 for phase IV; and 1378 and 1126 for phase V. This gives the site a real span of life between probably the 16th and the 12th centuries cal BC, once again showing traditional chronology to be between one and two centuries too young.

Lab no.	Site	Material	14C date B.P.	1σ cal B.C.	2σ cal. B.C.
St-1345	Luni	Wood	3195±75	1597 (1491, 1480, 1460) 1412	1686-1319
St-2045	Luni	Bone	3120±75	1495 (1428, 1424, 1413) 1317	1598-1134
St-2044	Luni	Bone	3005±75	1391 (1293, 1280, 1263) 1111	1440-1012
St-2047	Luni	Bone	2945±80	1367 (1212, 1202, 1192, 1142, 1132, 1119, 1114) 1017	1410-927
St-1346	Luni	Wood	2785±70	1049 (970, 961, 929) 834	1210-800
St-1147	Tre Erici	Charcoal	3075±70	1434 (1382, 1331, 1324) 1262	1500-1111
St-1340	Tre Erici	Charcoal	2865±80	1212 (1069, 1066, 1049, 1037, 1020) 928	1368-832
St-1341	Tre Erici	Charcoal	2775±100	1077 (969, 963, 924) 830	1258-790
St-2397	Narce	Charcoal	3005±100	1410 (1239, 1280, 1263) 1055	1490-935
St-2395	Narce	Charcoal	2990±100	1407 (1289, 1284, 1260, 1227, 1225, 1197, 1296, 1137, 1136) 1052	1491-929
St-2396	Narce	Charcoal	2910±105	1311 (1207, 1206, 1189, 1181, 1147, 1146, 1128, 1124, 1108, 1091, 1085, 1058, 1056) 937	1429-830
Pi-54	G. Misa	Charcoal	3030±75	1410 (1368, 1365, 1347, 1346, 1317) 1115	1490-1024
R-9*	G. Misa	Charcoal	2870±60	1211 (1073, 1065, 1050, 1031, 1023) 938	1292-846
R-24	G. Misa	Charcoal	2700±60	968 (888, 885, 832) 804	1006-790
F-103	Dicomano	Charcoal	3280±80	1688 (1598, 1569, 1533) 1460	1750-1410
F-74	Dicomano	Charcoal	3270±80	1687 (1583, 1573, 1529) 1454	1740-1410
F-73	Dicomano	Charcoal	3220±80	1603 (1496) 1416	1692-1321

Lab no.	Site	Material	14C date B.P	1σ cal B.C.	2σ cal B.C.
F-104	Dicomano	Charcoal	2850±80	1210 (1047, 1044, 1013) 906	1311-830
R-984α	Mezz. 1A	Wood	3320±60	1691 (1679, 1676, 1619) 1524	1750-1458
R-973α	Mezz. 1A	Wood	3230±50	1600 (1502) 1449	1684-1412
R-974α	Mezz. 1A	Wood	3220±50	1597 (1496) 1438	1681-1410
R-987	Mezz. 1A	Wood	3200±50	1523 (1492, 1478, 1463) 1433	1600-1395
R-976α	Mezz. 1A	Wood	3090±50	1433 (1407, 1394, 1327, 1326) 1318	1492-1135
R-975α	Mezz. 1A	Wood	2760±50	1000 (967, 966, 904) 833	1073-810
R-989	Mezz. 1B	Wood	2910±50	1241 (1207, 1206, 1189, 1181, 1147, 1146, 1128, 1124, 1108, 1091, 1085, 1058, 1056) 1014	1314-935
R-988α	Mezz. 1B	Wood	2730±50	970 (895, 867, 839) 828	1010-800
R-988	Mezz. 1B	Wood	2680±50	896 (829) 802	970-790
R-993	Mezz. 2	Wood	3100±50	1435 (1409) 1319	1598-1134
R-990	Mezz. 2	Wood	3000±50	1373 (1292, 1281, 1262) 1114	1410-1053
R-991	Mezz. 2	Wood	2970±60	1369 (1257, 1244, 1233, 1215, 1199, 1194, 1139, 1134) 1055	1416-1010
R-994B	Mezz. 2	Wood	2970±60	1369 (1257, 1244, 1233, 1215, 1199, 1194, 1139, 1134) 1055	1416-1010
R-995α	Mezz. 2	Wood	2920±50	1258 (1209, 1205, 1190, 1179, 1150, 1145, 1129, 1122, 1110) 1019	1368-940
UD-16	Mezz. 2	Wood	2900±50	1213 (1188, 1184, 1127, 1126, 1107, 1105, 1083, 1059, 1054) 1011	1294-931
R-994A	Mezz. 2	Wood	2900±50	1213 (1188, 1184, 1127, 1126, 1107, 1105, 1083, 1059, 1054) 1011	1294-931
R-985Aα	Mezz. 2	Wood	2870±50	1209 (1073, 1065, 1050, 1031, 1023) 943	1288-903
R-985B	Mezz. 2	Wood	2840±50	1187 (1010) 929	1213-837
R-992α	Mezz. 2	Wood	2840±50	1187 (1010) 929	1213-837
R-986	Mezz. 2	Wood	2800±50	1048 (972, 959, 936) 900	1189-830
R-992	Mezz. 2	Wood	2760±60	1004 (967, 966, 904) 832	1080-800
R-1121	GranCarro	Wood	3470±80	1917 (1808, 1804, 1771, 1760, 1754) 1665	2030-1600
R-1125	GranCarro	Wood	3040±50	1408 (1370, 1362, 1351, 1342, 1319) 1195	1430-1111
R-1126	GranCarro	Wood	3030±50	1392 (1368, 1365, 1347, 1346, 1317) 1135	1430-1110
R-1123	GranCarro	Wood	2860±50	1208 (1049, 1039, 1016) 937	1257-900
R-1124	GranCarro	Wood	2850±50	1188 (1047, 1044, 1013) 933	1240-845
R-1127	GranCarro	Wood	2850±50	1188 (1047, 1044, 1013) 933	1240-845
R-1120	GranCarro	Wood	2740±50	972 (898, 858, 850) 830	1048-800
R-1210	GranCarro	Burnt food	2740±50	972 (898, 858, 850) 830	1048-800
R-1122	GranCarro	Wood	2710±50	968 (890, 881, 834) 815	1002-800
R-859	GranCarro	Wood	2700±50	903 (888, 885, 832) 806	988-790

Table 7: Radiocarbon dates for Southern Etruria (After Skeates 1994).

For Southern Etruria, the sites for which ^{14}C dates exist are six. To these the site of Dicomano, in Tuscany, has been added, because it provided an interesting number of dates for the Middle Bronze Age with well documented assemblages (Sarti 1980: 183-247). Thus, information has been gathered for a total of seven sites (table 7).

Luni sul Mignone is, perhaps, the most famous Bronze Age Central Italian site. This long-lived settlement was in use through the Middle Bronze Age and down to the Early Iron Age. Five dates are significant for the period under study, though it must be stressed that the site's stratigraphy is far from clear and that mixing of material seems to be present at all levels: strata never yield "pure" chronological assemblages (Östenberg 1967; Peroni 1969a, 1969b; Fugazzola 1976; Di Gennaro 1988: 65). Of the five dates, then, St-2044, from trench 12, stratum 6, has been assigned to the Early Bronze Age or very early Middle Bronze Age. St- 2047 and St-1345 respectively from trench 15, stratum 5, and trench 16, stratum 4, were attributed to the MB3 phase. As for the other two dates from Luni, St-2045, from trench 13, stratum 3, was linked to the Late Bronze Age occupation levels of the site, and St-1346 from stratum 9 in the monumental building was connected to the Final Bronze Age or very Early Iron Age phase. The dates present problems in relation both to the site's stratigraphy and to the evidence from a series of Mycenaean sherds. Thus, dates St-1345 and St-2045, which are stratigraphically above St- 2047 and St-2044 turned out to be significantly older. St- 1345 is one of the two dates produced on wood samples, a fact which perhaps accounts for it being slightly older than expected. But when calibrated within the 1σ range it gives a 1597-1412 cal BC span which does not agree either with the presence of a Mycenaean IIIB sherd (dated 1300-1200) in the same stratum. The presence of the Mycenaean sherd there does not agree either with the material from the stratum, which mostly belongs to the earlier MB3. St-2045 is also related to two Mycenaean sherds found in the same trench but in the stratum above: one sherd was identified as Mycenaean IIIC, the other as a Mycenaean IIIB-IIIC, both dated normally to post 1200. The calibrated range of St-2045, however, is 1495-1317 cal BC, which is, on the other hand, consistent with the range from St-1345. The two dates taken on their own would seem to indicate that the MB3 and LBA phases took place at least one century earlier, and that the traditional chronology for Mycenaean pottery, or the identification of the sherds is also wrong. The other two Middle Bronze

Age dates are also problematic in that they are too young, even when calibrated, for their stratigraphic position and accompanying material. At the same time, their calibrated ranges agree with the dates of the associated Mycenaean pottery.

It is relevant to emphasize that the interpretation of the complex stratigraphy of this site has not yet been agreed upon. This site is also one of the main bastions for the Central Italian Bronze Age chronology, and the interpretation of its chronology has seen serious disagreements. Two different schools of thought exist: one, represented mostly by the Swedes, accepts the original chronology and identification of phases as defined by Östenberg (1967). According to this model there are four major phases which can be identified (Luni I, II, III and IV) from the Middle Bronze Age to the Early Iron Age, with a traditional chronology of *ca.* 1600 to 800 B.C. in traditional chronology. The Italians, on the other hand, follow Peroni's revised interpretation: Luni II does not exist as a phase, so Luni I is followed by Luni III (which coincides with the MB3 and LBA) and by Luni IV (in the Final Bronze Age). There is therefore no protovillanovan and Villanovan chronological coexistence, as the Swede chronology would have it were Luni IV going to extend into the Early Iron Age. Peroni's revision of the site's stratigraphy and chronology (1969b) provided an agreement between archaeological information, Mycenaean sherds and radiocarbon dates (Peroni 1969b: 171). However, after the advent of calibration, the agreement no longer can be upheld: it is difficult to explain the discrepancies in dating in this site as there are also internal consistencies, and I prefer to ignore the evidence from the Mycenaean sherds and take the dates and the material at face value.

Tre Erici is an open site, very close to Luni, for which there are three radiocarbon measurements (see Östenberg 1967 for information on the site, excavation, finds and radiocarbon dates). St-1147 comes from a test pit, from stratum 6, which corresponds to the uppermost level of stratum 7 of trench 1 (Östenberg 1967: 58, note 2) and was associated with decorated Apennine pottery. St-1341 comes from trench 1, stratum 6, which contained late LBA and early FBA material mixed in a homogeneous group. Finally, St-1340 was from a sample from trench 1, stratum 3, a layer which yielded Final Bronze Age pottery of the Tolfa-Allumiere type. When calibrated the 1σ probability

range for St-1147 is 1434-1262 cal BC, which fits adequately with the traditional chronology for the MB3. The 1σ probability calibrated range for St-1341 (1077-830 cal BC) is, on the other hand, too young for an association which seems to correspond to an initial moment of the Final Bronze Age. The 2σ probability range (1258-790 cal BC) would fit the traditional chronology better. In the light of the 1σ calibrated range for St-1340 (1212-928 cal BC), which despite its stratigraphic position several strata above, is older than St-1341, a 12th/11th century calendar year date is likely for this sample. In this case, both St-1341 and St-1340 calibrated ranges fall within the traditional chronological spans for the pottery with which they are associated.

Narce is an open but naturally defended settlement which, like Luni, is placed on the top of a tuff plateau (see Potter 1976 for a report on the excavations). The stratigraphic layers in Narce show, from the typological point of view, a considerable amount of mixed material appearing together. Three dates have been obtained in the past and the phases of material culture to which they have been linked are those of the youngest material present to allow for possible admixture. St-2397 comes from the layer overlaying the structures from phase II. The material from phase II is a mixture of Middle and Late Bronze Age types and the date has been taken as representative of the Late Bronze Age. The sample for St-2395 came from a hearth in phase IIIB of the settlement. This phase was characterised by the presence of some Late Bronze Age sherds and a majority of Final Bronze Age types, and it is to an initial moment of the Final Bronze Age that the date has been linked. Sample St-2396 came from the transition layer between phases IV and V. Associated material was of evolved Final Bronze Age type. The large standard deviations for the three dates, however, cause very broad time spans for each date, already within the 1σ probability range: 1410-1055 cal BC, 1407-1052 cal BC and 1311-937 cal BC respectively. This makes any further comment meaningless, except for the fact that the ranges are within the expected periods of the traditional chronology, although there is a tendency towards slightly older limits, the significance of which is unclear.

Two separate sites have been included under the name of **Grotta Misa**: Grotta Misa *per se*, a cave deposit with habitation, ritual and burial functions and which was the

one to be first discovered; and Grotta Misa-Le Colle, an open settlement outside the cave. For the purpose of analysis and on the basis of the scarce published information about this second settlement (Casi and Di Gennaro 1991/92: 690), both sites have been treated as contemporary. The ^{14}C dates available come from samples taken in the cave. When the cave was excavated no stratigraphic record was made of the location of the finds. The pottery, therefore, although obviously spanning a considerable amount of time, has been taken as a unit, with a general cultural attribution to the MB3 (Cocchi Genick and Poggiani Keller 1984: 63). When calibrated, the three dates for Grotta Misa -one of which, R-9*, is a remeasurement-, are young. The 1σ probability calibrations are 1410-1115 cal BC for Pi-54; 1211-938 cal BC for R-9*; and 968-804 for R-24. Of course the degree of certainty of association is very low, and the pottery, which is mostly undecorated, also shows traits which could indicate use of the site in later periods (the abundance of plate forms encountered in Grotta Misa is, for instance, more characteristic of the Late Bronze Age). The dates, in any case have been taken as representative of the MB3, in want of better information.

Dicomano (Sarti 1980) is not, strictly speaking, in the area of study, but slightly further North, in the province of Firenze in Tuscany. The site, however, has been included in the analysis of radiocarbon dates and pottery sequences because of the few dates available for Etruria which come from stratified contexts with good assemblages. Dicomano is the site of a Middle Bronze Age settlement, dated to the MB1/2. There are four dates available, three of which come from the large hearth in layer 4 of area 1: F-103, F-74 and F-104. The fourth date, F-73, comes also from area 1, but was obtained from charcoal in the upper part of layer 4 which was in contact with layer 3 (Sarti 1980: 243). The 1σ calibrated ranges of the three dates from the hearth fit well within the traditional span for the MB1/2 (see table 7). F-73, which is much younger and not in direct relation to the archaeological material, has been ignored because of possible contamination from layer 3 (Sarti 1980: 243).

Three submerged sites are known in the volcanic lake of Mezzano. Of these, radiocarbon measurements exist only for **Mezzano 1** and **Mezzano 2** (Franco 1982). Mezzano 3 is a recent discovery for which no information has yet been made available

(D'Erme, Pellegrini and Petitti 1991/92: 692). The site of Mezzano 1 is in its turn divided into two areas, **Mezzano 1A** and **Mezzano 1B**, separated by an sterile zone but assumed to be contemporary. The material from Mezzano has been extensively published (Franco 1982), and it is generally agreed that the finds from Mezzano 1 belong to the Early Bronze Age and beginning of the Middle Bronze Age, whereas Mezzano 2 was in use for the whole of the Middle Bronze Age (MB1/2 and MB3). Recently, however, Late Bronze Age material has also been reported from Mezzano 1 (D'Erme, Pellegrini and Petitti 1991/92: 692), though it has not yet been published.

There are nine radiocarbon dates available for Mezzano 1 (six for Mezzano 1A, and three for Mezzano 1B), and twelve measurements for Mezzano 2. All samples were taken from the wood from the stakes. The problem has usually been discussed in terms of the coexistence or not of Mezzano 1 and 2, but a study of the twenty-one radiocarbon dates show this is not the main chronological issue. With the exception of most dates from Mezzano 1A, which are consistent with traditional chronology and encompass a period from the 17th to the 15th centuries when calibrated, the dates from Mezzano are invariably too young for the traditional Middle Bronze Age chronology. This effect is the more unexpected for wood samples which normally provide older dates on account of their longer life before being incorporated as archaeological material. R-975 α which has a 11th to 9th century cal BC date, and R-976 α which calibrates between the 15th and the 12th centuries, are the young exceptions in the Mezzano 1A sequence: there is, in fact, a gap of 300 to 400 calendar years (95% confidence) between the youngest possible calibrated date from the oldest samples and the oldest possible calibrated date from the youngest sample. The dates from Mezzano 1B, on the other hand, are more in agreement with the younger samples from Mezzano 1A, and have calibrated ranges between the 12th and the 9th centuries. The 2σ calibrated age of samples R-988 and R-988 α from Mezzano 1B would in fact seem to narrow down the life of this settlement to the very end of the Final Bronze Age! The calibrated dates from Mezzano 2 again consistently cluster between the 14th and 10th centuries, with outliers between the 16th and the 9th. The archaeological material does not permit such a break in time between the different settlements, particularly between Mezzano 1A and 1B. Calibrated radiocarbon dates suggest here what material culture has been unable to indicate, that Mezzano 1A and 1B

are not contemporary. What becomes interesting is the difference between the evidence from material culture, which shows the bulk of occupation took place in the early Middle Bronze Age, and the results from radiocarbon dating which would converge in dating a much later phase of settlement. The interpretation of the overall evidence is problematic and poses the following possibilities:

- a) if the absolute chronology is rejected we could be looking at two different settlements, Mezzano 1 and 2, which might have overlapped or not at some stage in the Middle Bronze Age.
- b) if the absolute dates are accepted, but with reservations about the two young dates from Mezzano 1A, we could be facing three chronologically different settlements, Mezzano 1A in the first part of the Middle Bronze Age, Mezzano 2 in the Middle and Late Bronze Age, and Mezzano 1B in the Final Bronze Age.
- c) if the presence of the two younger dates in Mezzano 1A is accepted, and interpreted as an indication that the age of wood is in some cases resulting in older dates, we could be in the uncomfortable position of having a Middle and Late Bronze Age settlement (Mezzano 2) and a Late Bronze Age settlement (Mezzano 1A) which dislocated to a nearby area (Mezzano 1B) in the Final Bronze Age, and whose material culture has been wrongly attributed to the early Middle Bronze Age.

The doubts that the absolute chronology casts over the attribution of the pottery from Mezzano to the Middle Bronze Age advised an initial elimination of this site in the regional and interregional analyses of radiocarbon dates, and for the purpose of linking absolute dates and typologies. At the same time, the interesting possibilities suggested by its study prompted an analysis of the data from the site on its own right, and after this also in relation to other sites. We shall return to the results from this site later on, putting them in relation to the evidence for a chronology of the Bronze Age and seeing how they can open interesting possibilities.

The last site in Etruria for which ^{14}C dates exist is **Gran Carro** (Guidi 1976), another submerged site on Lake Bolsena. The material belongs to the Early Iron Age Villanovan phase, and to later Iron Age cultures. Of the ten dates from Gran Carro, one, R-1121, is far too old to be considered acceptable. Another five dates (R-1125, R-1126,

R-1123, R-1124 and R-1127) are too old for the Iron Age, but they are in fact quite consistent in their dating and all have 1σ probability calibrated ranges between the 14th and the 10th centuries. The remaining four dates, one of which R-1210, is from a sample from burnt food found inside a vessel with Villanovan decoration, agree without problems with a traditional eighth century date for the Villanovan phase. There are two possible explanations for the older dates: either the longevity of the wood sampled has adversely affected dating, or the site was built earlier but no material culture of that period has so far come to light. Of the two possibilities, the first one seems to be more likely since the oldest material is Villanovan, but later material is also present. Because of this, the site was not considered for the purposes of discussion, being an Early Iron Age site.

2. Interpreting the evidence from absolute dates: general comments

The Western Veneto sequence

The evidence from radiocarbon dates for late Early Bronze Age and MB1 sites in Western Veneto (Lavagnone, Canàr, Ledro) clearly indicates that the traditional chronology of the MB1 is to be put back by some 200 years in real terms, to approximately 1800 cal BC. What the repercussions of this are for the other periods - whether they have to be put back too, or if the only period which length is affected is the MB1- is unclear yet. Late Bronze Age and Final Bronze Age sites such as Fabbrica dei Soci and Fondo Paviani would suggest a revised chronology for these periods too, going back to the 15th or 14th century for the beginning of the Late Bronze Age, and to as early as the 12th century for the end of the Bronze Age occupation of the Po area. However the evidence for the MB2 and MB3 is not as strong and is reasonably in keeping with the traditional chronology: the only site with a clear MB2 assemblage is Lavagnone, and both dates agree with traditional chronology. The MB3 period is represented by Lavagnone sector II, level 1, by Isolone level 3 and by Lazise-La Quercia. All of these fit the traditional chronology but the dates from Lavagnone and Lazise show a certain antiquity with respect to traditional dating. This is not significant enough to put back the chronology of the whole of the Middle Bronze Age.

All in all, the evidence seems to be explained only by a case of overlap of cultural manifestations, reducing the chronological value attached to pottery, and putting forward

the hypothesis that material culture manifestations overlapped and coexisted for long periods of time in different social groups. Another possible explanation can be sought in the fact that the sites that have yielded older dates (Canàr, Fabbrica and Fondo Paviani) are all located in a specific geographical area, and that, therefore, the developments witnessed there might not have affected other areas in Veneto, but represent a local precocious phenomenon.

The Etruria sequence

A rather different picture is suggested by the dates from Etruria. In general the traditional chronology seems confirmed by most sites, exceptions affecting cases where the attribution of the radiocarbon date to the pottery is tenuous (as in Grotta Misa). Doubts also affect two important sites: Luni and Mezzano. It is interesting though that some parallels in pottery are apparent between Mezzano and Grotta Misa and that both sites agree in producing younger dates which would fit better a Late Bronze Age than a Middle Bronze Age chronology, suggesting perhaps that pottery has been wrongly identified, or that there was so marked a continuation of pottery traditions so as to make differences between sites of the two periods invisible.

Comparing the evidence from the two areas in general, it becomes apparent that settlements from Veneto seem to have developed earlier, and have accepted earlier too, forms that are characteristic of the MB. If absolute dates are accepted, it would appear that by the time settlements start increasing their size and numbers in Etruria, that trend had already affected Veneto for a considerable length of time.

3. Absolute chronologies and regional and interregional analysis

After a general discussion of the ^{14}C dates available for some of the settlements it became clear that the one-to-one chronological correspondence assumed to exist between the two regions may not be true. Questions also arise concerning the contemporaneity and possible overlap of material culture phases and, indeed, as the study of sites like Mezzano suggests, about the correct identification of assemblages and material culture altogether.

It was decided that further tests should be executed to confirm in so far as possible the internal and external contemporaneity of the defined phases. For this purpose two different approaches were chosen: dispersion diagrams which make use of inter-quartile ranges, and the statistical non-parametric Mann-Whitney U-test for the equality of means. The choice was prompted by the nature of the data: a series of possibly random samples of dates from different cultures. The results are presented below.

Statistical approaches: dispersion diagrams

The archaeological use of dispersion diagrams for the comparative study of large numbers of radiocarbon dates from different cultures was first proposed by Ottaway (Ottaway 1973), but since then very little use has been made of the method in archaeological explanation. A fuller description of the general principles and advantages of this approach can be found in Ottaway 1973, but a summary is given here.

Dispersion diagrams are a form of graphic presentation of a sample or "population", which takes into account the average range of the population: when applied to ^{14}C dates it shows the average range of dates from a single culture. Diagrams can be drawn using calibrated or uncalibrated dates without the dispersion diagram changing substantially in shape (the dates do of course). For conciseness' sake uncalibrated dates are presented in the diagrams here. A particular advantage of this approach for archaeological investigation is that it allows the dates from several archaeological cultures to be compared at a glance. When samples of nine or more dates are compared, there is, furthermore, a 97% probability of them belonging to different populations (i.e. being chronologically distinct) if their inter-quartile ranges do not overlap. The probability increases when one or more dates fall in between the inter-quartile ranges. The diagrams provide, therefore, a clear and graphic way of testing against cultural and geographical contemporaneity, but the opposite situation does not apply: when the inter-quartile ranges overlap it does not mean that the samples must be contemporary.

Given the restricted number of dates, dispersion diagrams were used tentatively, but it is clear that there is room in the future for further research and that their use opens a whole new field for large scale absolute chronological interpretation. It was realised

that the restricted number of dates would not allow outstanding results, but it was felt anyway that the application of such method constitutes in itself a valid contribution and sets a valuable precedent for further research along these lines. There were very few samples of nine or more dates for any one culture in each of the regions, which impaired the explanatory potential of the method for our particular case-study. In these cases the Mann-Whitney test was used, and probabilities of the samples being significantly different were established when appropriate (see for instance Lindley and Scott 1984: 66). The Mann-Whitney test is particularly efficient with small samples and works on the basis of finding significant differences between samples from two populations by establishing the probability of the ranking of the samples responding to random factors or to actual differences in populations.

Dispersion diagrams were drawn for the periods in both regions for which more dates were available. This meant that only the EBA and MBA for Western Veneto, and the MBA for Etruria were covered. The diagrams for Southern Etruria do not include the dates from Mezzano since doubts had arisen concerning this site. The dates, their provenance and cultural attribution were as follows:

Western Veneto

EBA (10 dates)

BM-2655 Canàr 3660±50
BM-2653 Canàr 3620±70
BM-2656 Canàr 3610±100
BM-2654 Canàr 3600±500
Pi-25 Isolone 3333±115
R-700 Isolone 3230±60
Birm-34 Ledro 3659±66
Birm-34* Ledro 3642±36
R-769 Riparo Romagnano 3720±50
R-770 Riparo Romagnano 3630±50

MB1/2 (11 dates)

R-1252 Lavagnone 3760±50
R-1251 Lavagnone 3700±50
R-1247α Lavagnone 3550±50
R-1253α Lavagnone 3430±50
R-1264 Lavagnone 3190±60
R-1259α Lavagnone 3150±50
R-97 Isolone 3475±60
R-358 Ledro 3350±50
R-7 Ledro 3310±210
Pi-88 Ledro 3137±105
Gx-15795 Lazise 3270±80

MB3 (3 dates)

R-1255 Lavagnone 3120±50
Pi-18 Isolone 3100±113
R-98 Isolone 3075±60

LBA (4 dates)

R-700 M.Madarosa 3230±50
BM-2757 Fabbrica dei Soci 3230±210
OxA-3328 Fabbrica dei Soci 3220±80
OxA-4648 Fondo Paviani 3280±65

FBA (3 dates)

R-768 Riparo Romagnano 3000±50
OxA-4649 Fondo Paviani 3065±70
OxA-4650 Fondo Paviani 3010±65

Southern Etruria

MB1/2 (4 dates)

St-2044 Luni 3005±75
F-103 Dicomano 3280±80
F-74 Dicomano 3270±80
F-73 Dicomano 3220±80

MB3 (6 dates)

Pi-54 Grotta Misa 3030±75
R-9* Grotta Misa 2870±60
R-24 Grotta Misa 2700±60
St-1147 Tre Erici 3075±70
St-1345 Luni 3195±75
St-2047 Luni 2945±80

LBA (3 dates)

St-2045 Luni 3120±75
St-1341 Tre Erici 2775±100
St-2397 Narce 3005±100

FBA (4 dates)

St-1346 Luni 2785±70
St-1340 Tre Erici 2865±80
St-2395 Narce 2990±100
St-2396 Narce 2910±105

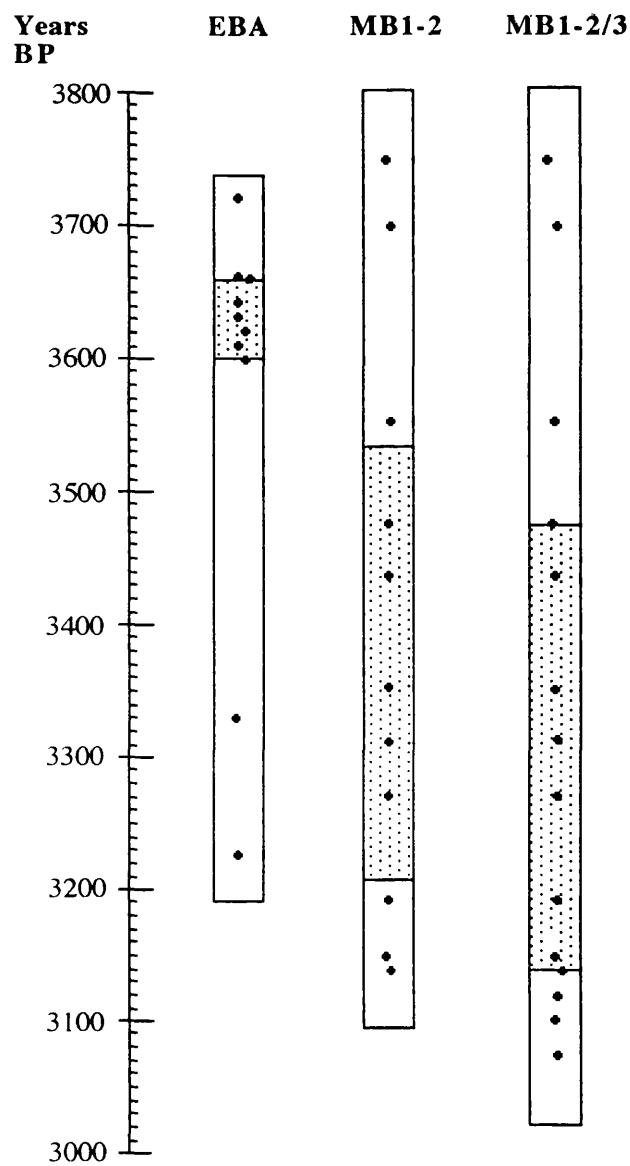


Fig. 15: Dispersion diagrams of uncalibrated ^{14}C dates for Western Veneto.

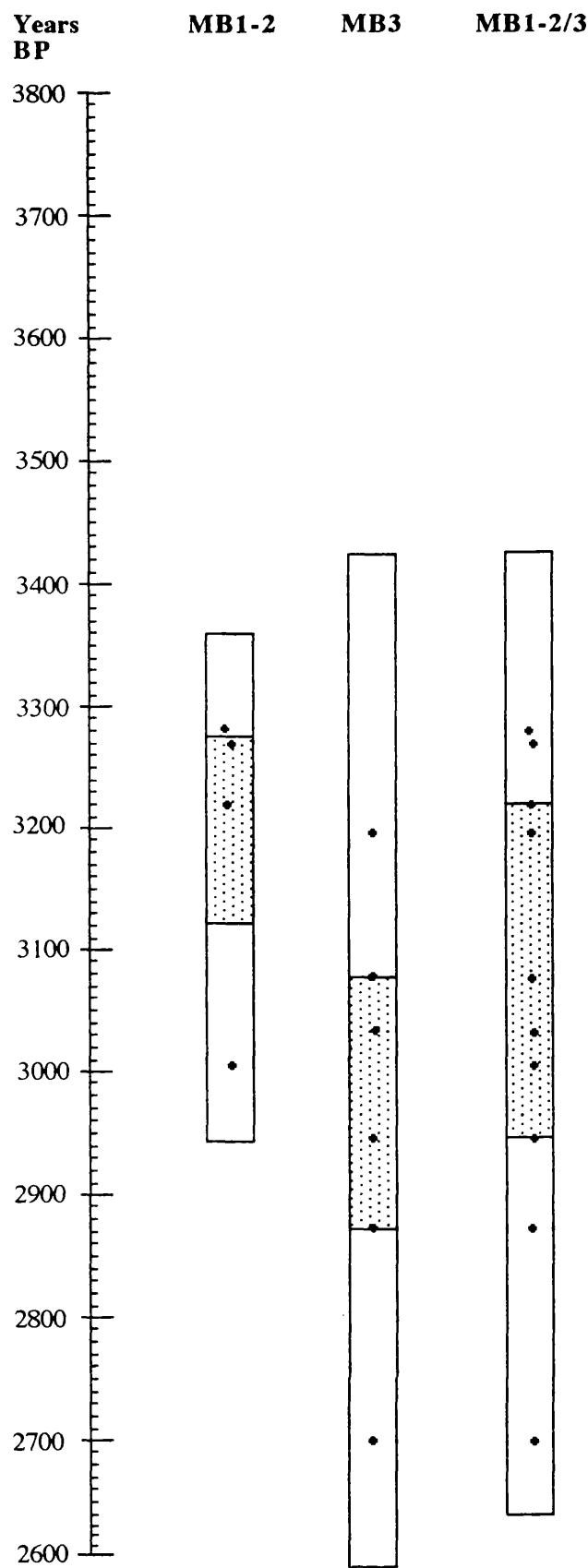


Fig. 16: Dispersion diagrams of uncalibrated ^{14}C dates for South Etruria.

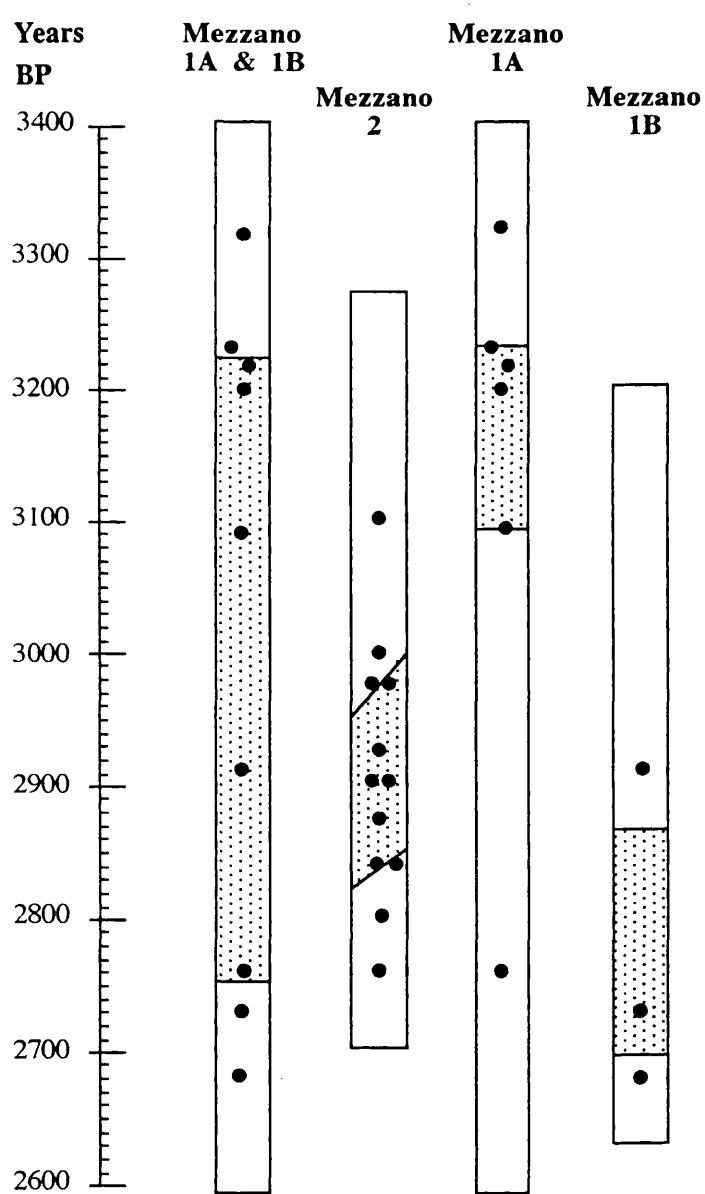


Fig. 17: Dispersion diagrams of uncalibrated ^{14}C dates for Mezzano Lake.

As is apparent from the diagrams for Western Veneto (fig. 15), there is no overlap between the EBA and the MB1/2 samples. This can be interpreted not only in chronological terms as showing temporal differences, but also in cultural terms as indicative of assemblages different enough not to create confusions. As there are only three dates for the MB3 it was not possible to prepare a separate diagram for this period, nor to test MB1/2 and MB3 contemporaneity. However a diagram was prepared with all MB dates for Western Veneto to compare it with that from Southern Etruria.

In Etruria neither the MB1/2 nor the MB3 dates were enough to allow for a 97% probability (see fig. 16). Yet the fact that they do not overlap is an indication of the two being distinct. Again a MB diagram was prepared for comparison with Western Veneto's.

The information for Mezzano was treated separately and the site was internally tested. Four diagrams were prepared to this purpose (fig. 17): for all the dates from Mezzano 1, for all the dates from Mezzano 2, for all the dates from Mezzano 1A and for all the dates from Mezzano 1B. Mezzano 1 and Mezzano 2 diagrams overlapped, but Mezzano 1A and Mezzano 2 did not. As there are only six dates for Mezzano 1A the results are only indicative that the two sites are probably not contemporary. Once again the Mann-Whitney test was applied to the data to obtain further information.

When the diagrams for the Middle Bronze Age of the two areas are compared, the inter-quartile ranges overlap, but the difference in their chronological position could indicate that the MB in Western Veneto took place at a slightly earlier moment than that in Southern Etruria, even if the two might have coexisted for some time. The other element which is interesting when comparing the diagrams for the two areas is that the inter-quartile ranges of Western Veneto's MB1/2 and Etruria's MB just fail to overlap: this could be again an indication of the earlier beginning of the Middle Bronze Age in the Po area, and seems to suggest that by the time the MB1/2 was over in the North, the Middle Bronze Age in Etruria had just started. These results were further tested by means of the Mann-Whitney test.

Statistical approaches: non-parametric statistics

Procedure

The Mann-Whitney U-test is the non-parametric counterpart of the uncorrelated t-test for the equality of means (Lindley and Scott 1984: 66): it tests for significant differences, particularly in their means, between two samples with non-normal distributions.

The procedure for conducting the test is simple and is based on the ranking of the observations from two samples A and B of sizes n_1 and n_2 (where $n_1 \leq n_2$), from the lowest to the highest value.

The sum of the ranks (R_A and R_B) is then found for each sample, and they in their turn provide the U values, where $U_A = R_A - \frac{1}{2} n_1 (n_1 + 1)$, and $U_B = R_B - \frac{1}{2} n_2 (n_2 + 1)$.

A test of the null hypothesis (H_0) that the two populations are identical, and in particular that their means are equal, is given by rejecting at level P per cent if $U_B \leq x(P)$ -in which case $\mu_A > \mu_B$ -, where $x(P)$ is the largest tabulated x such that, on the assumption that the two populations are identical $Pr(U_A \leq x) \leq P/100$. A similar one-tailed test of the null hypothesis against $\mu_A < \mu_B$ is provided by rejecting at the P per cent level if $U_A \leq x(P)$. The two-tailed test against both possibilities is given by rejecting at the 2P per cent level if $U \leq x(P)$ (U being the smaller of U_A and U_B). Tables with percentage points of the Mann-Whitney distribution can be found in Lindley and Scott 1984: 66-67.

Statistical analyses

In order to establish both regional and interregional levels of contemporaneity between phases, tests were first carried for the phases in each region, and only after among the phases from both regions. In every case the intention was to be able to reject the null hypothesis that the means of each two populations under consideration are identical. For this purpose different levels of significance were accepted, providing that they were never above the 5% level of significance. One-tailed tests were preferred since the general direction of the difference could be established in most cases.

Results for Southern Etruria were as follows:

The MB1/2 and MB3 were shown to be different at the 5% level of significance, and the μ of MB1/2 to be older than the MB3. This confirmed the results suggested by the dispersion diagrams, which showed no overlap between the two, but which could not be considered as substantial enough because of the shortage of dates.

The samples for the MB3 and LBA did not show to be significantly different when compared, nor did the LBA and FBA or the MB3 and FBA comparisons.

In Western Veneto the EBA and MB1/2 were shown to be different, confirming the results from the dispersion diagrams, with a rejection of the null hypothesis at the 5% significance level in favour of the EBA being older than MB1/2.

The MB1/2 and MB3 samples proved to be very different, at the high 0.5% level of significance. However, when compared with the LBA, the MB3 was shown to be younger, the null hypothesis rejected at the 5% level. If the MB1/2 and the LBA were compared, there were no significant differences detected between the two samples. Both the MB3 and the LBA were compared with the FBA to establish the extent of possible chronological differences, but both comparisons resulted in significant differences at the 5% level, not allowing the gap between the LBA and MB3 to be determined.

Given the anomalies in the internal testing of the Western Veneto samples, that is, the very early dates for the LBA in comparison with those for the MB3, clarification of results was sought too in the comparison of samples from phases of the two areas.

A comparison of the samples for the MB1/2 in both areas showed no significant differences between them. However, the comparison of Western Veneto's EBA and MB1/2 had resulted in differences becoming significant at the 5% level, whereas if the same EBA sample was compared with Etruria's MB1/2 differences were detectable at the 0.5% level: this would seem to indicate that differences were much more marked, and confirm the suggestion of an earlier beginning for the phase in Veneto.

Again no significant differences were detected by the test between the MB3 of both regions. Etruria's MB3 was also compared with Veneto's MB1/2 in an attempt to establish the differences in the MB3 of both areas with respect to another sample. The test showed that at a significance level of 0.1% the samples were different. The significance level for the difference between Veneto's MB3 and MB1/2 was 0.5%, slightly lower, which could indicate that the MB3 was somewhat earlier in Veneto than in Etruria.

When the LBA of both areas were compared, a 5% level of significance for the LBA of Veneto to be older was detected.

The comparison of both samples for FBA did not show differences either.

Veneto's MB3 was not shown to be significantly different from Etruria's LBA, but Veneto's LBA once again came out as older than the MB3 of Etruria at the 0.5% level of significance. Considering that the significance level between the LBA and MB3 of Veneto was much lower, 5%, the suggestion that the MB3 of Northern Italy might have taken place slightly before than that of Etruria was reinforced.

A point which has not yet been covered is that involving the results from the sites in Mezzano Lake. When the Mann-Whitney test was carried out for these sites, Mezzano 1 and 2 did not show significant differences, just as the dispersion diagrams had indicated. Internally, Mezzano 1A and 1B were shown to be different at the 2.5% level of significance, with Mezzano 1A being the older of the two. If Mezzano 1A was compared then with Mezzano 2 the difference between the two was significant at the 2.5% level, with Mezzano 1A being again the older of the two. Conversely, Mezzano 1B and Mezzano 2 did not appear to be significantly different.

On these grounds the site would seem to be best explained by the hypothesis of three different sites, Mezzano 1A, Mezzano 1B and Mezzano 2, of which the last two may have or may not have been contemporary. As seen in the general interpretation of ^{14}C for the site detailed above, possibilities b) and c) take on particular relevance, the data from radiocarbon dates becoming difficult to ignore in favour of the typology.

Because of this, a new series of test were run, this time including the data from Mezzano. The dates from Mezzano 1A were added to those of the MB1/2 on the grounds of both calibrated ranges and material from the site. The dates from Mezzano 2 were tentatively included with those of the MB3, and those from Mezzano 1B were reckoned with the LBA. This operation did not substantially alter the results for the regional phases within Etruria: the difference between the MB1/2 and MB3 become more clear, with the significance level increased from 5% to 0.1%. Between the MB3 and the LBA, the LBA and FBA, and the MB3 and FBA, there was still no significant difference.

This apparent uniformity of results was reversed when the samples from Etruria which include the Mezzano dates were compared with those from Veneto. In such case, the MB1/2 from both areas were shown to be significantly different, the null hypothesis rejected at the 2.5% level of significance in favour of Veneto's MB1/2 being older.

The MB3 from both areas also showed a 2.5% significance level in favour of an earlier development in Western Veneto: before the Mezzano dates were included the possibility of the Etruria MB3 being younger was only given by the difference in level of significance of both MB3 with a third independent sample.

The results for the LBA of both areas when compared remained unaltered, showing Veneto's LBA to be older than the Etruria phase.

When the MB3 of Veneto was compared with the LBA of Etruria, it turned out to be significantly older (2.5% level of significance for the rejection of the null hypothesis) whereas there had been no difference detectable before the inclusion of the Mezzano dates. Also when comparing Veneto's LBA and Etruria's MB3, the former turned out to be, once more, the older of the two, but in this case the significance of the difference had increased from 0.5% to 0.1%.

4. Interpretation of results: Chronological regional and interregional analyses

The interpretation of these results is not straightforward and has been dealt with in two manners: not including the Mezzano dates and including them. As it will be

shown, the latter clarifies some of the issues raised by the former.

There are substantial indications (dispersion diagrams and statistical testing) that the EBA and MB1/2 in Western Veneto are two well defined and distinct chronological phases which do not overlap. On the other hand, the relation between the MB3, the LBA and both of them with the MB1/2 is far from being so clear. From the statistical test on the samples, it would appear that the LBA is to be placed somewhere in between the MB1/2 and the MB3. There are obvious problems with accepting such an option, both in chronological and stratigraphical terms, particularly since the dates from the LBA come from three sites, Fabbrica dei Soci, Monte Madarosa and Fondo Paviani, for which the association of dates and material is far from secure. Hypothetically, the position could be held that these sites, particularly Fabbrica and Fondo Paviani which are close geographically, might represent an early development with respect to the rest of the Veneto area: we already saw this interpretation as a possibility for the sites of the area of the Alto-Medio Polesine and the Basso Veronese. The situation goes back to normal with the FBA, which is shown to be chronologically distinct from both the MB3 and the LBA.

The analysis of the internal chronological phasing in Southern Etruria shows a distinction between the MB1/2 and the MB3, just as it did in Veneto. The test could not perceive differences between any other of the phases, that is, between the MB3 and the LBA, the LBA and the FBA, and the MB3 and the FBA. All this would seem to indicate the possibility of certain contemporaneity between phases. Of course the fact the test is unable to detect significant differences between the samples does not mean that the samples must have been contemporary: the very dearth of dates introduces a random element which decreases the chances of identifying true chronological patterns. Yet stratigraphic information would support the view that the trends normally identified as separate chronological phases, did see a good amount of contemporaneity, and that in fact the chronological limits of the assemblages may be our own constructs, rather than realities; or that objects, particularly pottery, were produced and used within locally oriented groups, each following their own rates of development. Thus, the very mixed strata from excavated sites such as Luni or Narce can be seen as a true reflection of types in use at any one time, and not simply as the product of reworking of material into

different layers. In any case, the results open up a path for research in the future, which should provide more dates from contexts with well established assemblages, and carry out further tests on the contemporaneity between phases.

If the results given by the comparisons which include the Mezzano dates are considered, then the impression is reinforced that Veneto's phases from the MB1/2 to the LBA started and developed earlier than those which until now have been assumed to be their Central Italian counterparts. Indications that this could be in fact closer to the truth could be seen in finds such as the already mentioned decorated Apennine vessels in LBA Venetian contexts such as Fondo Paviani and Monte Madarosa. As it has been repeatedly shown, links between the two areas were never established on an independent basis, but always on the grounds of typological affinity. It is hardly surprising that there could be a de-phasing between the two areas which has never been detected by typology, since the only established link between the two, the bronzes, have problems of their own in fulfilling this role, which have already been discussed.

Chapter 7: SUBSISTENCE AND TECHNOLOGY

"The most important quality defining the city is its complexity and form of integration. Cities are made up not simply of large populations, but of large diverse populations that account for the economic and organisational diversity and interdependence that distinguishes a city from simpler settlement forms" (Redman 1978: 215-216)

"The questions that any research design should address deal with the links between the management of basic resources (plants, animals, raw materials) and people, and with the transformation and maintenance of institutions within the process of social change and reproduction". (Barker & Gamble 1985: 5).

Any study of the trends leading up to settlement nucleation and the establishment of the bases for urban development (see Chapter 2), cannot ignore the importance of subsistence and economic factors. The difference between rural and urban living entails, among other things, a different subsistence and economic basis, and different production and distribution relations among settlements and between settlements and landscape: the emergence of town systems is inextricably linked to economic changes, the seeds of which can possibly be found for the areas concerned in the Bronze Age. The monitoring of economic changes sheds light on the overall development process affecting settlement. But these economic changes also imply the creation of a new spectrum of social relationships within each community and between different communities: the producers of primary products, the consumers, the producers or distributors of other objects and commodities and trading networks. For instance, the emergence of the figure of the full-time craftsman, a person who largely depends for his subsistence on the primary production of others and on demand for his products, is associated with forms of settlement nucleation (Bietti Sestieri 1984: 117-118; Carancini 1991/92: 250-252). The emergence of the town and settlement continuity and nucleation are, thus, socio-economic processes. This affirmation does not mean that the causes behind settlement nucleation have to be exclusively socio-economic ones -a trap into which research has often fallen in the past- but that the results of the process are mostly seen in the socio-economic sphere.

There is no denying that socio-economic factors are a driving force behind any form of human organisation, regardless of the level of complexity of a group. Yet, within less developed groups, the socio-economic binomial tends to be dominated by the need to ensure sufficient food supply (that is, by subsistence factors to which the social aspect is subordinated). In more developed groups, such as those of a nucleated, stable nature, social factors might rule over production, the balance being redressed from subsistence to the production and circulation of other goods that maintain social structures and group division, and which in turn ensure food supply. The period which laid the basis for the transformation from village to town systems might well be characterised by this change in stress from subsistence to social aspects in the economic make up of the groups concerned.

The type of economic organisation of a group is, thus, in direct relation to the level of social organisation attained and its external social orientation. Mention has been made of "less developed" and "more developed" groups: by "less developed" groups, I refer to groups with markedly local orientations and/or little group organisation, which will normally, as a result, concentrate on subsistence economy activities since the lack of exchange networks -which can be a forced or freely chosen situation- means that this is their only vehicle for food and product procurement (Apennine societies would be examples of such "less developed" groups, since their culture was largely shaped by their subsistence base (Barker 1981: 122 and 151-158)). By "more developed" groups I refer to groups with external contacts or organised division of production, which can therefore exchange surplus for needed materials, and/or enter single object production aimed at trade. The type of socio-economic model of a group does not need to be related to its size, but rather, to the existence of forms of control which can be personal, as is the case with elites, or cultural/institutional, as happens with the existence of exchange traditions, religious practises, marriage customs etc. Large groups, however, tend to enter into the second category, as they are usually associated with tighter forms of social control and facilitate the breaking up of the group into production units. It is clear, however, that although population numbers are an important factor, it is in new economic and social forms, and not in just sheer population growth, that the strength to sustain the change from village to town is to be found. Within this realisation two variables which

incorporate demographic considerations have often been addressed: intensification of production and increased social complexity. It is within their framework that I approach the comparative study of the socio-economic conditions of the two areas. I deal first with the local economic evidence (subsistence and technology), to incorporate in the next chapter the evidence for regional and interregional contacts (trade/exchange) and social orientation. Particular attention has been paid to the identification of the moment(s) in which the emphasis in the economic life of the groups might have changed from subsistence to socio-economic factors (or from primary to secondary production), as a necessary organisational transformation in town emergence processes and landscape formalisation.

1. Economic potential

Any study of settlement needs to take into account what resources the community had available, and how they made use of them. It is clear that no group will settle in a landscape which does not provide the minimum resources for survival, though technology and human ingenuity play an important part in guaranteeing that few landscapes fail to fulfil this. However, the more stable and permanent the form of settlement and the bonds within the landscape (as in country/town relationships), the more important landscape resources will be for settlement continuity and the development of socio-economic patterns. A study that takes into account the resources known to and exploited by a community will put into perspective the depth of their achievement, showing their technological or cultural adaptation to the landscape.

Resources in South Etruria

The landscape of South Etruria is a very varied yet stable one. Varied too are its natural resources: good agricultural land appears close to natural grazing land; altitude variability within a short geographical range ensures all-year pasture availability and there are also indications of more extensive woodland coverage in the past (see Chapter 4 above) with possibilities for hunting and fruit and wood gathering. The area is, furthermore, favoured by a hydrographic system which ensures water supply and ease of communication between coast and inland, and a series of volcanic lakes also guarantees water supply to some of the inland regions. Possible stress areas, susceptible to flooding,

can be found along some of the low-lying river valleys and areas of the coastal strip, but in general the topographic and environmental configuration of the area is stable and not subject to extreme climatic pressures. In terms of resources, both agriculture and stock-breeding are possible within short ranges; trade is facilitated by communication ease along river valleys, and there are no considerable altitudes that have to be negotiated; the area is also rich in minerals.

Much has been made of the metal resources of Etruria (see for instance Bietti Sestieri 1981b and the other papers in the *Convegno Etruria Mineraria*): in the area of our study these are concentrated in the Monti della Tolfa (copper, lead, iron, zinc, and other metallic minerals) and around the Monte Amiata (iron and other metallic minerals), with isolated iron ores on the coastal strip south of Cerveteri and between the Fiora and the Marta rivers. Outside the area, to the north, the greater concentration of mineral and metal resources is found in the Colline Metallifere in Tuscany (rich in copper, tin, zinc, lead, iron and other metals). However, there are not, as yet, clear indications of what was being exploited in the late stages of the Bronze Age, or whether bronze for the region was produced locally or had to be imported. That at least the copper ores were known and worked already during the Copper Age can be argued from the relative concentration of finds around the metal ores, a pattern also found in the Early Bronze Age (Barker 1981: 172-173). It has been pointed out that since copper was being mined, the area would have been self-sufficient for its bronze needs if the tin ores were also under exploitation during the Bronze Age (Bietti Sestieri 1984: 105). Even though at present it is still not possible to clarify this important issue, the scarcity of finds and their local distribution suggests that during the Middle, and perhaps the Late Bronze Age, mining remained a locally controlled activity without great repercussions for other areas (Barker 1981: 196; Bietti Sestieri 1981b: 250-251).

A last point which deserves noting is that South Etruria's varied landscape allows for economic diversification within relatively short geographical ranges. The importance of this fact lies in that it favours settlement stability and continuity, by providing a broad subsistence base. The region's scope for economic diversity, together with its heterogeneous topographic configuration also means that if settlement dislocation becomes

necessary because of climatic or social reasons (site becoming too small, or environmentally uninhabitable), economic territories can continue to be exploited, by means of short range settlement dislocation: this gives economic activities a stability which would be impossible if new locations for settlement implied different exploitation territories. It is in its variety that South Etruria finds precisely one of its greatest assets for human occupation and expansion of activities.

Resources in Western Veneto

If South Etruria's landscape has been described as stable and varied, that of Bronze Age Western Veneto could be typified as unstable and more homogeneous. In contrast with South Etruria, where geographical zones are interspersed, in Western Veneto clear environmental zonation exists: the mountainous range of the Alps, the pre-Alps and Alpine valleys, the foot-hills and the river plain. All these zones offered uniform environments and different resources to the human groups which inhabited them. The fertile alluvial plain of the Po is a potentially rich area for agricultural production. The assumption has been that during the Bronze Age agricultural activity (and productivity) was impaired by the marsh conditions that dominated much of the area until artificial drainage took place last century. Recent research has discovered, however, the existence of irrigation channels connected to the site of Stanghelle and dated from pottery material to the Middle-Late Bronze Age (Balista, forthcoming). This would suggest that by then the settlements in the plain had achieved a considerable degree of adaptation to landscape conditions, which allowed them to exploit the heavy clayey but very fertile alluvial soils of the plain better. Still, initially Bronze Age settlements tended to concentrate on the lighter soils of the foothill area and the upper plain, where access to pastures is also much easier. In the region as a whole there are winter and summer pastures, which would have been available to any one group by means of short distance transhumance between the lower plain and the hills, or between the hills and the Alps. There is, in fact, some palaeobotanic evidence for seasonal pastoral movements in Veneto already from the Early Bronze Age (see Migliavacca 1985 & 1990). In historic times the plain's abundance of water resources favoured its use as pasture land, a situation probably encountered also in prehistory. The mountainous areas and the more extensive wood cover of the plain during the Bronze Age provided wood and hunting resources.

The intercommunicability of the region is favoured by two major watercourses, the Po and the Adige, and their tributaries. The Po's navigability ensures sea trade can penetrate well into the Peninsula. The area is also a natural route for traffic from or towards the Alps (there are several passes along the Venetian Alps), and is, therefore, potentially attractive to trade and ideas exchange. However, as seen in Chapter 4, it is in an environmental fringe zone, and unsettled environmental and hydrographic conditions will affect communication routes, roads and trade within and among the different ecozones.

In terms of raw materials, the metal resources of Western Veneto concentrate in the Alps: in Trentino there are signs of metallurgical activity at Riparo Gaban (smelting ovens and metal scraps), already in the Copper Age levels (Peroni 1989: 172). Early Bronze Age sites along the Adige valley -Romagnano, La Vela-, and the sites of Valsugana and Montesei di Serso have revealed similar signs (Peroni 1989: 172). It is in fact from Trentino that most of the metal resources must have come to Western Veneto. Signs of metallurgical activity are relatively abundant: bellows, moulds and crucibles from Ledro; casting droplets from Monte Covolo (Barfield 1994: 133); in Laghetti di Vela the remains of a smelting oven for extracting copper from chalcopyrite were found (Peroni 1989: 172); and there is evidence for the mining and smelting of chalcopyrite to obtain copper in Montesei di Serso and Tezze di Luserna in the Late Bronze Age (Bianchin Citton 1984: 641). The rich bronze tradition of centres like Peschiera, or Frattesina later on, suggests that bronze was readily available in the region. Copper ores can be found in the area of Schio-Recoaro (De Guio in Fogolari *et al.* 1987: 101) and although there is no direct evidence that these were under exploitation during the Bronze Age, the finds of crucibles in sites there - Piovene and Magrè - (Balista *et al.* 1982: 128), could be taken as indirect evidence that they were.

Western Veneto could be described as a high yield-high risk zone: agriculture and pastoralism find perfect territories for all-year round exploitation; the area's trading assets are high, with good communication routes and a favourable geographic position; metallurgy is guaranteed by the mining resources in the Alps. Yet all these assets can become valueless if environmental conditions are not favourable. In contrast with Etruria,

and as shown in Chapter 4, a small climatic fluctuation can cause a disproportionate response in the environment and affect all the above activities. The region's topographical configuration in zones does not permit short range settlement dislocation if the cause behind it is environmental pressure: as such, this implies the exploitation of new territories every time climatic conditions necessitate settlement dislocation.

2. Subsistence basis

South Etruria

The current interpretative model for the socio-economic make up of the groups inhabiting South Etruria at the onset of the Middle Bronze Age (*ca.* 1600 B.C.) is that of a series of communities practising a stable subsistence economy based on a mixture of agricultural and stock-raising activities (e.g. Barker 1981; Guidi 1992: 438-439; Peroni 1989: 139). The range of cultivated plants was reasonably wide: cereals such as emmer and club wheat, barley, horse beans, grass peas, and acorns. Stock-raising was also diversified: cattle, sheep/goat and pig appear in most faunal samples of the period. In general the picture is one of a well-established adaptation to individual community needs and landscapes.

A general point must be made concerning the evidence from faunal remains: percentages might refer to number of bone fragments or minimal number of individuals (MNI). Bone fragments percentages might overestimate the importance of smaller animals in the economy. Besides, in some cases even if both percentages of bone fragment and of MNI of cattle are low, their importance (because of its size) might have been greater than reflected. Whenever possible I have quoted MNI percentages: only when this information was not available do I use number of bone fragments percentages, but in that case I have weighed that factor in my interpretation.

It is possible that in this context a certain amount of lowland and upland seasonal settlement dislocation took place for parts of the human group involved in stock-raising: settlements, in fact, appear in the Apennines at altitudes that only allow them to be interpreted as summer sites dedicated to pastoral activities (Barker 1981: 156). The zooarchaeological and palynological evidence from these sites shows high percentages of

sheep/goat and an extension of grazing areas, which has been interpreted as a possible reflection of short range transhumant activity at the time between summer and winter pastures (Barker 1991/92: 193). Settlements with good grazing capabilities, which could have acted as winter pastures, also appear at regular intervals along the coastal plains (Barker 1981: 156).

The animals raised in the Middle Bronze Age remain the same from site to site, but there are differences in the composition of the faunal deposits as to the dominant species. This has been interpreted as an indication of a diversified economy adapted to the particular needs of the community: in the larger settlements with good evidence for important agricultural activity (Luni, Narce) percentages of bone fragments show cattle as the dominant species (Luni) (Gjevall 1967: 263-276), but variations to this model (predominance of sheep/goat in Narce) occur (Barker 1976), pointing to the existence of local adaptations to community needs. Other sites on high ground, such as Scarceta and Pitigliano, also show predominance of cattle (De Grossi-Mazzorin 1992). In most cases cattle seems to have been raised for working purposes, rather than for meat, which was obtained together with wool and milk from sheep (De Grossi-Mazzorin 1992). Significant also in indicating a successful agricultural and stock-raising adaptation is that the importance of hunting activities clearly diminishes with time: in Pitigliano the 41% representation of wild species in the bone assemblage at the beginning of the Middle Bronze Age was reduced to 18% by the Early Iron Age (De Grossi-Mazzorin 1992).

The botanical, zooarchaeological and archaeological evidence, however, indicate that this successful subsistence model started undergoing changes with the beginning of the Late Bronze Age (i.e. towards 1300 B.C.), towards an intensification of the use of resources.

Greater cereal cultivation starting at around this time can be inferred from increases in cereal levels in particular sites, such as the one between phases II and III in Narce (Jarman 1976: 310).

The zooarchaeological evidence also shows the beginning of increased species

management. Thus in Monte Rovello there is a concentration on cattle and pig parallel to the sudden descent of the importance of sheep/goat: sheep's MNI percentages fall from 33% in layer 10 (beginning of the Late Bronze Age) to 26% in layer 9 (full Late Bronze Age) (Caloi and Palombo 1986: 90). In Narce, as already mentioned, the predominant species is sheep/goat (Barker 1976), and although Narce is an example of a decisively non-fluctuating assemblage, in which sheep/goat bone fragments represent about half of the faunal remains throughout phases I-V, specialisation is seen in the diminished importance of cattle. The faunal assemblages from San Giovenale also show a concentration on sheep/goat against cattle (data in form of number of bone fragments percentage). In Sorgenti della Nova pigs make up 70% of the number of bone fragments of domesticated species, though, in this case the sample comes mostly from the one context, cave 10, which includes also 8th century B.C. levels and the predominance of pigs could have been a later development (Caloi & Palombo 1986: 93). The faunal sample from Sorgenti della Nova is also somewhat special in that the large quantities of pig remains from the cave are predominantly those of foetuses and very young individuals (De Grossi-Mazzorin & Di Gennaro 1990: 464) and the sample could therefore be a ritual deposit.

Although the small number of sites with studied faunal assemblages does not permit sweeping generalisations, it would seem that the tendency towards the greater importance of cattle which can be seen in many sites (Luni, Monte Rovello, Pitigliano) might be related to agricultural intensification, and not simply to specialisation in stock-raising. Substantiating this point is the presence in all levels of the Monte Rovello assemblage of adult, male cattle, whose primary purpose must have been to provide traction, and not meat (Caloi & Palombo 1986: 94). This is also true of sites such as Narce, where sheep/goat prevailed: there too most cattle were killed not when they reached their optimum weight, but into their second year, with many living into their third or four year (Barker 1976: 302).

Increased use of resources after 1300 B.C. can also be seen in the archaeological record: tools and objects relating to wood working, weaving, and so on acquire more relevance in production (scalpels, sickles, knives, spools, spindle whorls, and loom

weights appear or become abundant in the Late Bronze Age); bronze-working begins to diversify and become more abundant.

Another thrust to intensification of subsistence activities could be hypothesised around 1000 B.C. (the end of the Final Bronze Age). The faunal assemblages from some sites show specialisation in stock-raising: San Giovenale's faunal assemblage for the Final Bronze Age (Sorrentino 1981) reveals, when compared with the Late/Final Bronze Age sample, a considerable concentration on sheep/goat against the presence of cattle. The same can be said of Narce: though percentages of sheep/goat bone fragments do not change considerably from those of the previous phases, those of cattle suffer another decrease, showing a greater reliance on sheep/goat. In Monte Rovello's layer 6, corresponding to a late phase of the Final Bronze Age, the marked increase is towards cattle, which make up 44% (MNI) of the faunal remains in comparison with the 33% of the previous layer (Caloi & Palombo 1986: 98). The data from Pitigliano, despite the lesser quantity of finds for this period, still shows that cattle (34% MNI) becomes more important with respect to sheep (20% MNI) and pig (23% MNI). The trend towards subsistence intensification was not one of specialisation exclusively in stock-rearing, though: considering the information about agriculture it becomes obvious that sites with important agricultural activity, such as Luni, show increases in sheep/goat bone fragment frequencies even if cattle continues to be the most represented animal and percentages do not decrease. On the other hand, sites such as Narce, which had large sheep/goat assemblages, show increased signs of agricultural activity. In Narce, between phases III and V (i.e. between approximately 1150 and 900 B.C.) there is a strong increase in the numbers of crop weed seeds, which could have been the result of agricultural intensification in the form of increased soil use and shorter length of fallow (Jarman 1976: 310). This interpretation is backed by the increase in phase V (*ca.* 900 B.C.) in the frequency of legumes, which are soil enriching plants which can be also used as fodder (Jarman 1976: 308).

Material culture data confirm the new impulse to intensification: with the Final Bronze Age (after 1150 B.C.) bronze sickles become more common, an innovation related to agricultural intensification; the presence of weaving implements continues to grow

conspicuously; bronze tools become more abundant in a variety of contexts and of forms (chisels, axes, knives). Technological developments run parallel to this process of intensification: new axe forms (shaft-hole axes, tubular hafting axes) show differential hafting methods and possibly different uses (some authors have linked them to the deforestation process necessary for the procurement of agricultural land - Peroni 1989: 134-135 - though the few pollen records available at present for the area do little to show substantial deforestation occurring until well into the Iron Age).

There is reasonable evidence to argue that intensification of subsistence practices in South Etruria occurred from 1300 B.C. onwards, and that the process became particularly strong around 1000 B.C. (late Final Bronze Age). Generally, the process seems to have been primarily related to agricultural intensification (concentration on cattle for traction purposes, clear palaeobotanical indications of innovations to improve soil production and of greater exploitation of agricultural land), but there were exceptions to the pattern and the paucity of faunal studies for the area does not permit a better knowledge at present. The subsistence economy, though still an integrated one which made use of a variety of resources, clearly underwent a process of intensification by diversification, related to the need for greater food production. It remains to be seen whether this was in turn linked to increasing population numbers (as indicated by the growing size of sites), to the development of mechanisms for the exchange of surplus, or to both.

In the past, a demographic boom in the Final Bronze Age in Etruria was argued on the basis of site densities (Potter 1976). Recent research has shown that the increase in site densities is a phenomenon that goes back as far as the Middle Bronze Age and probably earlier (Di Gennaro 1991/92). Yet population growth after 1150 B.C. can be still demonstrated on the basis of increased site sizes, shown by the locations chosen for new settlements and also by the survival of older sites with possibilities for expansion. It is much more problematic to identify evidence for the second possibility behind subsistence intensification, surplus exchange and economic development, and by doing so we abandon the realm of subsistence to enter that of economy, and start with the inspection of the growth in importance of social aspects in the economy, a growth which

I have argued to be vital to the development of town/village economic systems.

Western Veneto

The subsistence basis of the groups inhabiting Western Veneto during the Middle Bronze Age (*ca.* 1800 B.C.) was, as appears from the scarce data available, of a similar nature to that of South Etruria, though greater specialisation in socio-economic patterns took place at an earlier stage. Communities practised, as in Etruria, a mixture of agricultural and stock-raising activities: thus in the Basso Veronese area, settlements tend to concentrate on the plain or the edges of the plain, in good agricultural land, and in the area of the pre-Alps and the Alpine valleys a whole series of settlements emerge with access both to agricultural land and winter/summer pastures. Yet, the pastoralist component seems to have had a greater relevance. Some definite evidence for transhumance is given by the site of Fiavè, located at 600 m above sea level, in one of the Alpine valleys north of Lake Garda and surrounded by higher Alpine formations. The site's location means that flocks could not have been kept there during the winter, but the possibility of their number being reduced by slaughtering before the winter is disproved by the mortality data (Jones and Rowley-Conwy 1985: 291). Moreover the likelihood of the site's available pastures being given over to hay making during the summer is put forward by the evidence from pollen analyses which show hay storage (Greig 1985). This evidence suggests great pastoral mobility, with herds wintering in the lowlands and enjoying the good summer pastures available in the highlands and within the site's reach. It also shows a considerable amount of economic sophistication and planning, which made use of the specific advantages of the landscape (accessibility to winter and summer pastures, agricultural land and woods, grazing land use optimisation) in a highly diversified way.

Fruit-gathering seems to have had more importance for the diet of the Middle Bronze Age sites in Western Veneto than in Etruria: in Fiavè plant analysis has shown that, besides the rich evidence for cereal cultivation, at least four different species of storable fruits and nuts were consumed at the site (Jones & Rowley-Conwy 1985: 289).

The relevance of hunting to the subsistence economy of Western Veneto is, as in

Etruria, very restricted already during the Middle Bronze Age (after 1800 B.C.), and continues to diminish throughout the period. The main wild species present in sites is red deer. Faunal assemblages reflect a stock-raising economy based on cattle, sheep/goat and pig, with differential representation according to the regions: in the plain settlements the importance of the three species is more or less equal, though cattle tends to have the upper hand over sheep/goat. In the area of the pre-Alps and Alps, on the other hand, sheep/goat are the most abundant species, followed by cattle or pig (Riedel in Cremaschi *et al.* 1991/92: 175): in Fiavè, for instance, sheep/goat bones made up 50% of the faunal assemblage, followed by 30% cattle, (Jones & Rowley-Conwy 1985: 290); in Fimon, on the other hand, sheep/goat bone fragments make up 45% of the total assemblage, pig 26% and cattle only 14% (Balista *et al.* 1982: 129). In general the evidence is for animals being kept for their meat and killed when young (Riedel in Cremaschi *et al.* 1991/92: 175), an important difference with Etruria, where the stress seems to have been on secondary products and traction.

Agricultural activity is attested in a number of ways: palynological analyses, macro-plant remains, and archaeological finds such as the wooden ploughs from Lavagnone and Ledro (Battaglia 1949: 43; Peroni 1989: 113-114). Pollen analyses and plant remains show cultivation of a variety of species: cereals (millet, spelt and bread wheat, einkorn, barley), and legumes (beans, peas, lentils) (Jarman 1975; Jones and Rowley-Conwy 1985; De Guio 1987; Nisbet in Cremaschi *et al.* 1991/92). As already mentioned, there is evidence for hay-making for the site of Fiavè, where the sickles found might have been used for the hay, since cereals were plucked (Jones & Rowley-Conwy 1985: 291). There is also palynological evidence for possible forest clearance at this time (reflected by NAP:AP ratios, and by the increase in the presence of Gramineae in pollen diagrams). Though firmer proposals must await further investigation during the next seasons, the discovery of irrigation channels in connection with the site of Stanghelle, in the last season of work of the Alto-Medio Polesine - Basso Veronese Project (Balista forthcoming), already throws light on the involvement in agriculture of the plain settlements already at this time, as well as it opens up many questions concerning land control, control of resources such as water, and social cohesion of the groups.

The beginning of the Late Bronze Age (*ca.* 1400 B.C. in calendar years) is a period of continuity with the Middle Bronze Age for subsistence activities. Settlements such as Castellon del Brosimo, in the middle hill area, continue with a model of exploitation which integrates pastoral and agricultural activities and makes use of pasture areas and of marginal territories for cultivation (Fogolari *et al.* 1987: 100-101). Plant remains from Fabbrica dei Soci show among others, the cultivation of cereals (wheat, millet) and legumes at this point (Balista and De Guio 1990-1991). In Montebello, plant remains show cultivation of cereals (barley, millet and spelt wheat) and legumes (lentils and beans), and a fauna in which cattle and sheep are the two main components, with a slight predominance of sheep/goat (Balista *et al.* 1982: 128). The exploitation of fluvial and sea resources is also documented from mollusc shell finds in Fondo Paviani (Bianchin Citton 1984: 621). The intensification process of Veneto's subsistence economy seems to have been very different from that which took place in South Etruria a century later: rather than diversification and maximisation of production, the process is one of concentration on specific subsistence resources. It could be that the scarcity of plant and faunal studies for the area be responsible for this impression, but, as the sites come from a variety of environments (plain and hill), it is reasonable to assume that diversification did not affect the area of subsistence. It would seem instead, that groups continued using the same forms of successful exploitation of subsistence resources, without any need for intensification in food production: the severe demographic contraction which affected the region after 1200 B.C. in calendar years might be the explanation for a continuation, rather than an intensification, of practices. A change which can be detected, though, is the diminished importance of transhumant activities from the second half of the Late Bronze Age and through the Final Bronze Age (in true years between 1250 and 900 B.C.). Settlement dynamics show that within the general trend of settlement discontinuity and depopulation which affected the region, it is precisely those settlements linked to the practice of transhumance that disappeared first (De Guio in Fogolari *et al.* 1987: 99). On the other hand, settlements with access to large pastures (M. Tondo, Castellon del Brosimo, M. Madarosa, M. Cavalrina, M. Corgnon, Rotzo) have better rates of survival. The general trend shows the formalisation of the landscape, and a movement towards greater stability of settlement, which runs parallel with a specialisation and concentration on certain resources. In Western Veneto, intensification occurred not by diversification

as in Etruria, but by specialisation.

More information is available for the Final Bronze Age (1150-900 B.C.). In Montebello I (*ca.* 1150-1050 B.C.) bone numbers % of sheep/goat and cattle are roughly equal (around 35%) (Fogolari *et al.* 1987: fig. 89), and might show the greater importance of cattle. In the plain settlement of Frattesina the traditional subsistence basis of mixed agriculture and stock-raising appears once more. The use of fluvial and sea resources is also attested, as in Fondo Paviani, by the presence of mollusc shells (De Min 1986: 117). The repertoire of animals is again the familiar one: pig, cattle, sheep/goat and, in a much lesser scale, horse and dog (De Min 1984b). The predominance of pig and cattle, however, introduces a change and indicates both greater settlement stability (i.e. diminished importance of transhumance) and a concentration on the production of meat. The bone ratios from the site have also suggested that meat was being imported to the site from other places (Clark 1985: 261). The somewhat exceptional nature of this site (for which there is rich evidence for complex and intensive forms of industrial activity) restricts the applicability of this information to the region, more than in very loose terms: if the site was not self-sufficient for its subsistence, there must have been other sites dedicated to overproduction for export, which in turn, implies a considerable degree of landscape and social organisation. These possible sites remain, so far unidentified, opening a new path for research into the socio-economic patterning of the region.

There are indications that the subsistence basis of Western Veneto underwent further specialisation towards the very end of the Bronze Age, and the beginning of the Iron Age (1050-900 B.C.). Data from the final stages of the Final Bronze Age shows even greater settlement stability. Agricultural intensification for Montebello is suggested by level III's faunal sample, which is now dominated by cattle for the first time and in which sheep/goat and pig percentages appear reduced (Fogolari *et al.* 1987: fig. 89), and in the presence of granary-like features in the site. The 11th-10th century level II also shows an amazing increase in specific cereals and legumes (bread wheat and lentil) with respect to the 12th century level I. The increase in the cultivation of specific cereals of finer strands (*Triticum monococcum* or *dicoccum* disappear in level II) and legumes at this time, the presence of large containers for storage, the increase in quantity and quality of

finds which represent domestic activities, all point out to greater agricultural involvement and settlement stability (De Guio in Fogolari *et al.* 1987: 99-100). This view is reinforced by the settlement dynamics of the time. Settlements linked to a predominantly agro-pastoralist subsistence basis -those located in the mountains and high hills of the Alps, in the Berici hills, and also lake side settlements-, and which had survived the collapse of the transhumance network, are now abandoned. Instead the settlements that survive are those on the foothills (Montebello, Montecchio), and primarily related to agricultural land. The impression is that a restriction of the subsistence basis, linked to specialisation, occurred, and economy concentrated even more on agricultural exploitation against the maintenance of an equally important pastoralist system. Revealing too is that the other type of settlement which survives into this period is that related to the mining or circulation of metals (M. Summano, Angarano).

It is possible to argue, then, that Western Veneto's subsistence basis underwent a process of intensification in the form of a concentration of economic activities on agricultural exploitation from 1400 B.C. onwards, and that at the same time the economic basis was enriched by growing metallurgical activity. The process of economic specialisation is linked to a model of greater sedentism and formalisation of the landscape. Everything suggests that it is not until this moment that the landscape starts becoming truly formalised. I would argue that it is Western Veneto's zonal configuration that is to be held responsible for this concentration on singular economic activities against generalised intensification, because it does not allow groups to exploit different ecozones without considerable settlement dislocation or seasonal movements of the whole or part of the group. The causes behind the movement to greater sedentism remain open to speculation and might not have affected every group universally. Yet, the link with a response to the trading and metallurgical potential of the region cannot be overlooked as a possibility.

3. Subsistence versus social factors in the economy

Having looked at the subsistence basis of the two areas, it remains to assess the development of secondary economic activities. Special attention is also given to identifying possible transformations in the economic orientation of the groups from

reliance on subsistence to reliance on socio-economic considerations, since this is considered a key element in the development of town/countryside economics proper to urban systems (see Chapter 2). The prevalence of social considerations in economic production over those of a subsistence nature can be accompanied by an expansion of the social base of a group and increases in intercommunicability levels within the region and between different regions. In the next chapter the extent of such contacts will be assessed, and linked to the subsistence and technological information to reveal the full socio-economic base of the regions throughout time.

4. Technology and secondary activities

In general terms, prehistoric industrial activity can be classified along three main strands:

- a) activities which are not strictly part of the economic system of a group, but rather social (for instance the occasional production of prestige goods in societies with no clear hierarchical organisation);
- b) activities primarily related to subsistence and geared towards bettering productivity, adaptation to the landscape and so on (tool-making, some types of functional pottery production, etc);
- c) industrial/technological activities with no clear relation to the subsistence basis but, rather, with a social content (some types of specialised pottery production, amber and bronze working and so on).

This distinction provides a useful indicator of the balance between the importance of subsistence and of social factors in the economic sphere, which is what I intend to document.

South Etruria

The secondary activities documented in Southern Etruria in the Bronze Age are largely those encountered also in other periods and areas: some flint working (mostly negligible in the later periods), weaving, bone and antler working, pottery making and metallurgy.

Pottery making is, by far, the most widely represented. The functionality and

omnipresence of pottery makes it difficult to assess its role as a subsistence or social item in assemblages, and it is more than likely that many vessels fulfilled both functions. A distinction too should be drawn between coarse and fine wares, and it is through the latter that it can become possible to observe economic trends. I shall therefore be referring to fine pottery.

In the first stages of the Middle Bronze Age (1600-1400 B.C. in calibrated ranges), pottery production seems to be local but within the limits of some cultural unity: Grotta Nuova style pottery can be divided into several regional groups, of a few sites each, which share some common types (Cocchi Genick *et al.* 1991/92). The difficulties in finding parallels between the pottery from different sites suggests a production aimed at covering site needs. A different situation can be seen after 1400 B.C., when Apennine style pottery throughout the Peninsula indicates a high level of work investment and standardisation of forms and decoration which was not present before. There is cumulative evidence, however, which still shows this pottery to be locally produced: thin section analyses of Apennine style sherds from the Biferno Valley in Molise (roughly across the Apennines from South Etruria), confirmed local manufacture (Barker 1981: 171-172); a recent and detailed typological study of all decorated Apennine pottery also showed discreet regional groupings in morphology and decoration (Macchiarola 1987). It would seem that at this stage pottery reflects a situation of considerable mobility of ideas and cultural similarity between neighbouring groups, but the thrust in production is still one based on local needs and subsistence: many of the vessels are functional (milk-boilers, sieves and vessels used in cheese-making) and directly related to the subsistence basis of the groups. During the Late Bronze Age (1300-1150 B.C.) pottery types continue to be well diffused over large areas. Less effort seems to have been invested in pottery production at this time: decoration practically disappears (an aesthetic preference rather than reduced technological skill).

There is a slow return to decoration after 1150 B.C.. Pottery is stylistically akin to the previous Late Bronze Age types, though rather unstandardised from site to site in the initial moments of the Final Bronze Age (1150-1050 B.C.). As time progresses decoration becomes more important, and specific morphologies and motifs characteristic

of particular regions. With the progress of the Final Bronze Age regional groupings emerge which bear strong similarities with each other in morphology and decoration, but show persistent local traits and increasing regionalisation of types and decorative motifs. The pattern is in many ways similar to that seen for Apennine pottery but more marked, and the reason is to be found in the growth of the metallurgical industry. The regionalisation of pottery types corresponds with the emergence of specific metallurgical areas in South Etruria: thus the 11th-10th centuries metallurgical production of the Monti della Tolfa is paralleled by the so-called Tolfa/Allumiere pottery facies (e.g. Di Gennaro 1988: 64). Yet, there are no indications at this point either that we might be dealing with pottery commerce between sites or that production be other than local: it would seem once again that the pottery reflects a situation of cultural homogeneity, within which local identities emerge in relation to the exploitation of metal resources.

All in all, pottery gives some indications as to the social orientation of the groups, but the importance of this technology seems at all times to have been restricted to the local and subsistence levels, rather than industrial production. Even at the times when finewares might have been used as exchange items, cultural homogeneity (probably based on subsistence activities) made exchange redundant.

Other activities represented in the archaeological record are weaving and antler and bone working. Weaving becomes particularly relevant from 1300 B.C. onwards, when there is a noticeable increase in the frequency of loom-weights, spools, spindle whorls and so on. The tendency continues during the Final Bronze Age (1150-900 B.C.) as shown by finds from settlements like Narce (Potter 1976), Scarceta (Rittatore *et al.* 1978) and Sorgenti della Nova (Rittatore *et al.* 1978; Negroni Catacchio 1981), and into the Iron Age, when weaving implements become a characteristic component of funerary assemblages. Yet the role of weaving as an industry during the Bronze Age remains open to speculation and, with no indicators of extensive production, it seems unreasonable to assume that production was other than local. Bone and antler working are not particularly well documented, and seem to have been restricted to the elaboration of tools (spatulas, punches) and some personal objects.

Sporadically, other materials have been documented in South Etruria: one small bead in vitreous paste comes from Scarceta, and vitreous paste was also found in Elceto (Toti *et al.* 1986: 83), one rounded amber bead from Grotta Misa, two Tyrins type beads were found in the funerary area of Ponte S. Pietro Valle (Rittatore *et al.* 1978: 72). In the Final Bronze Age amber is more abundant: Allumiere type amber beads come from the Poggio La Pozza necropolis (Bietti Sestieri 1981, nt.36) and amber beads are relatively frequent in the Protovillanovan graves of the Tolfa area (Toti *et al.* 1984: 81). In neither of these cases is there evidence for amber or vitreous paste being worked locally, which could suggest that they were imports.

Metallurgy is represented only in a limited way until the end of the period: bronze finds are rare and distribution seems to have been mostly local to the ore sources if one judges by their composition, distribution, and the little standardisation of metal alloys used (Barker 1971 and 1981). Central Italian metallurgy between approximately 1600-1200 B.C. seems to have combined a social and an economic component: bronze finds are mostly axes (and therefore, probably functional), with some daggers, swords, and ornaments (all prestige items) with restricted circulation, distribution, and economic impact.

A change can be observed from 1200 B.C. (the end of the Late Bronze Age), but above all between 1150-900 B.C.. Hoards become more frequent, and are mostly located near metal resources (for instance, the hoards of Coste del Marano, or the later hoards of Monte Rovello and Tolfa are all in the Monti della Tolfa district - see Bietti Sestieri 1981b). Hoard composition appears altered: broken and whole pieces appear together (suggesting foundry hoards), and items related to work (chisels, knives, saws, pick axes, shovels and needles) appear besides weapons and ornaments indicating to the slow penetration of bronze objects in the economic sphere. It is at this point, when bronze becomes important to subsistence, that its production starts acquiring socio-economic relevance as distinct from social relevance only. There are signs that bronzes begin to be locally produced in the settlement: the numerous moulds from Scarceta (Rittatore *et al.* 1978: 59; Negroni Catacchio 1979: 322) show bronze was being worked on site, which coupled with the few bronzes found in the settlement could be interpreted as indirect

evidence for production for distribution, rather than for consumption. A comparison of the fibula types between Veneto and Southern Etruria shows that bronze types certainly become more regionalised, indicating the greater involvement and control of specific communities in production. Intensification is also behind the development of lead metallurgy (which might have involved the exploitation of the Tolfa galena deposits) documented in the deliberate bronze-tin-lead alloy used in the Coste del Marano whirl-shaped pin head. The use of this alloy shows a good technological knowledge of bronze alloys and of the advantages and disadvantages of lead and tin alloys in casting (Caneva and Giardino 1992: 40-44).

In general, an infiltration of bronze at this time can be seen at all levels of society: in technology and the economy (the presence of tools and increasing specialisation of metal working), in settlement organisation (areas close to metal resources, i.e. the Fiora valley, the Monti della Tolfa and to the North of the area the Colline Metallifere, become particularly relevant to settlement), in the social sphere (ornaments and prestige items continue to be present - for instance the large leaf-shaped arc fibula and the bronze-sheet cups of the Coste del Marano hoard can only be interpreted as prestige items), in burials and ritual (bronze ornaments, normally fibulae and spirals, start becoming relatively frequent in burials after 1100 B.C.). It was after 1150 B.C. that bronze technology started to be ruled by socio-economic factors: an analysis of the Final Bronze Age hoards in the area (Bietti Sestieri 1984: 111-117) shows a tendency towards increased technological ability, greater richness of types, as well as the mixture of local and foreign types which is evidence for long-distance trade (and will be discussed later).

The case of metallurgical exploitation in the area is, I would argue, one in which a prestige material of social importance becomes relevant to the ongoing process of subsistence intensification and acquires, as a result, a new economic dimension which re-casts its original social role. Between 1200 and 1150 B.C. (Late/Final Bronze Age) metal production is diversified to a new field - subsistence - and is no longer centred on isolated "prestige" items, yet the importance which diversification acquired must have helped increase bronze circulation and demand, whereas the unavoidable locality of the raw material necessarily meant greater contact between areas and possibly differential

exchange of goods (i.e. unequal exchange systems in which sought after materials attract better products in exchange). Metallurgy is the only field of technology for which there is evidence that production becomes specialised enough to affect the social order.

Western Veneto

The technological activities documented in Bronze Age Western Veneto are similar to those of Etruria: weaving, bone and antler working, pottery making and metallurgy. There is also notable evidence for other activities such as wood-working, and the working of amber, vitreous paste and other valuable imported materials such as ostrich egg and ivory.

Pottery is, once again, the most abundantly represented technology. The evidence at present available indicates pottery production to be local, even for fine wares: analyses of fine Late Bronze Age (1400-1150 B.C.) pottery from the site of Marendole showed the clay contained local volcanic inclusions from the Colli Euganei soils (Bianchin Citton 1989: 177). In the past several foreign-type sherds have been put forward as indicators of trade links and cultural involvement between Veneto and other areas (particularly the Apennine type sherds from Fondo Paviani, Marendole, Montebello, Lozzo and Monte Madarosa, or the Mycenaean-style sherds from Fabbrica, Fondo Paviani, Montagnana and Frattesina). This evidence, probably the result of exchange systems rather than of patterns of production, will be discussed later. On a different scale is the evidence for specialised pottery production in the late Final Bronze Age (1000-900 B.C.) site of Montagnana, which according to the excavators was concentrated in one area of the settlement (De Min 1984a: 648): yet, site finds are not numerous enough to suggest massive pottery overproduction, and it is obviously difficult to trace possible exports from this to other sites.

Direct evidence for weaving in the Middle Bronze Age comes mostly from palafitte sites such as Ledro (Battaglia 1949), where both weaving implements and woven materials have been recovered. Weaving objects (loom-weights, spindle-whorls etc) have also been recovered from sites like Bor di Pacengo and Isolone del Mincio. After 1400 B.C. traditional weaving implements become more common, a tendency, which as in

South Etruria, is intensified after 1150 B.C. in calendar years. Again as in Etruria, the finds appear in settlement contexts, and are not numerous enough to indicate that production was other than local. The presence of weaving implements in most settlements from the Late Bronze Age onwards (Monte Alto, Montebello, Costabissara, Montagnana, Frattesina) reinforces the idea that weaving remained a local industry aimed at meeting site needs, throughout the period.

Between 1800 and 1400 B.C., bone and antler working have a different geographical distribution in Veneto: in the area of the lake-side villages, that is, the pre-Alps and Alpine valleys, industries of this type are represented, but the number of finds indicates they were not remarkable in production. On the other hand, the plain settlements between the Po and the Adige are rich in bone/antler objects and in that respect they are close to the Terremare settlements south of the Po, which are characterised by their rich bone/antler industry (Mutti and Rossi 1991/92: 229). The objects produced are mostly implements such as arrow-heads and handles for several types of tools and weapons, ornaments such as pinheads and pins, combs and buttons, and working implements such as spatulas and awls. Weaving implements in bone are less frequent (Tosatti 1991/92: 225-227). A link between the development of the bone industry and leather-working has been suggested (Tosatti 1991/92: 227), but there is not enough evidence at present to back this view. After 1400 B.C. Bronze Age production in bone and antler continues along the same lines, that is, spatially limited to the area between Po and Adige and aimed at settlement needs: the lack of bone/antler objects in neighbouring areas of Veneto shows products did not have a wide circulation. The reasons behind this geographical patterning might well be cultural (the two areas were under different cultural traditions: the Po plain was influenced by the Terremare culture, the lake and Alpine area had closer links north of the Alps). Alternatively, I would argue that the lake and alpine area's rich bronze industry (represented in sites like Bor and Peschiera) substituted bone/antler working in importance and scope. During the Final Bronze Age (1150-900 B.C. in calendar years) the importance of this industry in the plain is documented for specific sites such as Montagnana and Frattesina, which have yielded bone and antler objects both finished and in the process of being worked. In Frattesina a separate area for the working of bone and antler was identified within the settlement (De

Min 1986: 118). Ornaments and also some tools were produced to a very high standard of workmanship, and from this and the number of finds it seems that bone/antler working here was integrated within modes of production which are more akin to industrialised production: yet there is little evidence at present to suggest that this pattern is valid for the whole region, and the site remains an exception.

Flint work is present, with decreasing importance, throughout the whole of the Bronze Age, in the form of largely unstandardised arrow heads (Monte Madarosa), grinders (Monte Madarosa, Monte della Croce, Monte Tondo, Castellon del Brosimo, Monte Corgnon, Monte Cavalrina) and burnishers (Montebello, Castellon del Brosimo, Monte Summano). There is evidence that between 1800 and 1400 B.C. a flint exchange network operated from the area of the Lessini or Monte Baldo, and provided flint for the Veneto area and the Terremare. The site of Ponte di Veia has also provided evidence for the export of finished flint knives and sickles in its characteristic grey flint to areas in northern Italy: from the finds of whole and broken objects in this site, it is almost certain that the products were produced locally and travelled from there (Cremaschi *et al.* 1991/92: 178-180).

An important industry in Veneto for which there is not much evidence in South Etruria is the working of wood. Under this heading I include not only the wooden objects preserved in some of the waterlogged sites in Western Veneto (particularly Ledro), but also the building technology which is demonstrated in the *palafitte*, embanked settlements, and sites built on reclaimed land. Lake settlements, which already appear in the Early Bronze Age and continue through the Middle Bronze Age, involve considerable skill, technological specialisation and work investment, and must have been the product of organised collective effort. Between 2000-1500 B.C (the Early and Middle Bronze Ages) they are the prevalent settlement type. There is evidence that, after 1500 B.C. and as the Middle Bronze Age progressed, some *palafitte* moved or grew towards the lake shores (Cremaschi *et al.* 1991/92: 153) and employed draining and reclaiming of land technology which involved complex wooden structures: Fiavè, Lavagnone, Ledro, Canàr. Some other settlements, like Castello del Tartaro, evolved from a complex palafitta structure to an even more work-consuming bank and ditch type (Fasani 1984: 568), which became

common in the plain with the Late Bronze Age, and can be found in sites like Fabbrica dei Soci or Fondo Paviani. In the past the social effort involved in settlement building has been put forward as evidence for the emergence of settlement hierarchy (Fasani 1984: 490). In view of the socio-economic evidence so far available, I maintain, however, that the building of these time-consuming and socially demanding types of settlement only affected economic realities at the subsistence level: they were a successful adaptation to particular environments for their exploitation, an adaptation, which I suggest strengthened the groups' social bonds without actually affecting economic structures outside the site or intra-site relations (wood used for construction was locally available). Their existence demonstrates that some complex forms of settlement are a reflection of social bonds and social strength rather than of the development of the town/country economics necessary for the emergence of a pre-urban model. In Veneto, the development of tighter forms of social control within settlements seems to have been the result of environmental and/or cultural conditions (water-orientation of settlements during the Early and Middle Bronze Age could indicate environmental conditions or cultural choice; Middle and Late Bronze Age preference for higher grounds and/or employment of draining technology reflects an environmental situation).

Already from 1800 B.C. there is abundant evidence that sites in Veneto, particularly those around the Garda basin, were deeply involved in metallurgical activity. Metallurgical activity *in situ* is demonstrated in Bor di Pacengo by moulds, working tools (one anvil, burins, scalpels), unfinished objects, crucibles and smelting refuse, and in other sites like Cisano and, in a lesser scale, Ledro (Fasani 1980b: 25; 1984: 548). The thousands of objects recovered show that metallurgy had a dominant role in the economy of these sites. At the same time, single bronze objects appear discretely in other settlement contexts throughout the region, showing a more integrated, though not yet primary, economic role of bronze in all settlements. Prestige/ritual bronze use is documented from isolated sword finds throughout the territory: for instance the bronzes found in burials in Povegliano and Ponte Molina (Fasani 1984: 662).

Evidence for bronze technology is continuous for the Late Bronze Age (after 1400 B.C.), at which point there is also evidence that the production of bronzes in some sites

is fulfilling trade requirements (and therefore acquiring socio-economic relevance). This is the case of Peschiera, which is certainly a working centre (finds include ornaments, working tools, and evidence for sheet bronze working) from which production was being diffused over large areas both within Veneto and in Central Italy and the Aegean. There is also recent evidence now for an intensification in smithing practices, shown not only by the general increase of bronze finds throughout the area, but also by technological innovations such as the development of horn-shaped bellow nozzles. They are found throughout the central Po valley, both north and south of the river from the 13th century in traditional chronology onwards (equivalent to 1400 B.C. onwards in real years): in our area an example comes from Mazzagatta. They are linked to smelting ovens capable of reaching higher temperatures (De Marinis and Frontini 1991/92: 215). Bronzes include tools and implements, weapons and ornaments and are found throughout the area. The presence of tools in settlement contexts testifies to the integration of bronze in the subsistence economy: for instance in Montebello, associated with a hut floor and material of the Late/Final Bronze Age (1200-1100 B.C.) there were found numerous bronzes linked to domestic production (needles, awls) and also ornaments (pins) (Fogolari *et al.* 1987: 103). Bronze was certainly being worked now in other settlements, though not to the same scale as in Peschiera: in Fabbrica dei Soci semi-worked and worked bronze, bronze ingots and moulds were found; in Castello del Tartaro a shaft-hole hammer, scalpels and punches show bronze-working in the site; from Fondo Paviani comes one mould and bronze ingot; from Monte Madarosa and Castellon del Brosimo moulds; and from Magrè a crucible. All this implies that bronze circulating networks were functioning to provide metal to settlements, and that metallurgy had acquired a wider economic role for the economy of the sites. The presence of bronze throughout the area, including sites on the plain, is that much more remarkable when one considers the lack of local metal resources for the sites, and their distance from metal ores (an important contrast with South Etruria).

After 1150 B.C. bronze production is intensified, and there is a change in the centre of gravity of production: the site of Peschiera and the Garda basin which had until then dominated gave way to a whole series of sites in the plain, the most important of which is once again Frattesina, where activity certainly reached industrial proportions, and for which exchanges within the region and with other areas is clearly attested (see below).

Evidence continues to show that bronzes were produced in other settlements (for instance Mariconda where numerous bronzes, a mould for an axe and smelting refuse were found).

To conclude with metallurgy, metal-working in Veneto had an economic role from 1800 B.C. (the Middle Bronze Age), when centres of production in the Garda area must have met the needs of the region. These centres coexisted with sites, (for instance Isolone del Mincio), in which bronze appears but economic models are still based on agriculture and stock-raising (Fasani 1980b, 25-26). Finds are normally weapons and ornaments, and there is no evidence of the impact of bronze in the subsistence economy. The situation changes after 1400 B.C. and bronze use is attested in more settlements: bronze becomes a relevant economic activity throughout the region, and contacts intensify between mining areas, major centres of production and other settlements where bronze was worked. Products embrace now the subsistence sphere and tools become more common. The process escalates after 1150 B.C. (in the Final Bronze Age), when the site of Frattesina is an extraordinary example of the level of industrial activity and of the socio-economic importance of bronze in some settlements.

Ivory and ostrich egg were worked in Frattesina (e.g. Bianchin Citton 1984: 623; De Min 1986: 118). Their presence is exclusive to this site, and suggests them to be exotic imports which tell us more of the contacts between the site and the Mediterranean world than of the economic make up of the region. They do show, however, the level of economic involvement and importance of this settlement in the Polesine.

Amber finds indicate external contacts, since amber had to be necessarily imported into Italy, most likely from the Baltic. Amber has been found in the region already in late Early Bronze-Middle Bronze Age contexts (Fiavè 6, Ledro, Isolone del Mincio), mostly as beads and buttons (Bergonzi and Cardarelli 1991/92: 218), and always as finished objects which might have been imports. In the Late Bronze Age (1400-1150 B.C) amber beads have been found in Fabbrica dei Soci, Monte Madarosa and Monte Corgnon. With the transition to the Final Bronze Age (*ca.* 1150 B.C.) there comes certain evidence for amber-working: from Fondo Paviani come a lump of unworked amber and beads (Bianchin Citton 1988: 40) which show the material was imported raw and worked in the

site. Again from Frattesina comes amber worked and in the process of being worked (De Min 1986: 118)).

Vitreous paste is usually found together with amber. Though some vitreous paste beads are reported from Early and Middle Bronze Age contexts (Bergonzi and Cardarelli 1991/92: 218), it is really after 1150 B.C. that they become more frequent. Earlier (between 1400 and 1150 B.C.) vitreous paste is found in Fabbrica (Bianchin Citton 1984: 618) and Fondo Paviani, where it was worked on site as shown by the discarded bits of vitreous paste found together with the beads (Margarise 1989-90: 147). Final Bronze Age finds (post-1150 B.C.) come from Mariconda, Montebello, Monte Corgnon, Frattesina and Montagnana. Evidence for production and not simply working comes from Mariconda, where a crucible with vitreous paste inside was found, together with refuse and finished beads (Margarise 1989-90: 189-190), and Frattesina, where a settlement area for this purpose has been identified, together with crucibles for glass smelting, numerous lumps of unworked vitreous paste and thousands of beads (De Min 1986: 117-118). Given the number of beads found in Frattesina and the similarities with those of, for instance, Montagnana (De Min and Bietti Sestieri 1979: 210), it is quite likely that, although production in other sites is proved by Mariconda's finds, beads were in fact produced in Frattesina for other sites, and that the increase in vitreous paste finds in Final Bronze Age settlements in the area is a reflection of the commercial activity of Frattesina in this field. Overall, there is evidence at this point in time for an important commercial centre in which full-time craftsmen must have worked to provide for the neighbouring areas. Frattesina is not, furthermore, isolated in showing industrial production: it was preceded by sites like Fabbrica dei Soci, and accompanied at different stages of the Final Bronze Age (between 1150 and 900 B.C.) by the settlements of Fondo Paviani, Mariconda, Montagnana and Montebello, which disclose some of these activities occurred elsewhere even if at a lesser scale. By 1250 B.C. Veneto seems to have been involved in an economic system in which secondary activities of socio-economic relevance formed a substantial part of the economy.

5. South Etruria and Western Veneto: the differences.

The evidence portrayed above shows sharp differences between South Etruria and

Western Veneto within their apparently similar subsistence basis and industrial achievement. For a start, the already mentioned differences in time ranges mean that developments in Veneto were much more precocious than indicated by the relative chronology.

Differences in landscape configuration are seen as highly significant for the divergent trajectories of economic growth. First, Western Veneto's more difficult environment did not allow subsistence diversification to the same extent as Etruria's without substantial (and disruptive) settlement dislocation, but favoured instead the early development of internally socially strong settlement units (seen in the adoption of community demanding forms of settlement). As the review of Middle Bronze Age industrial activities reveals, the early development of apparently powerful settlements in Veneto was the response to an environmental situation and was not accompanied by the emergence of settlement hierarchies or production networks which would indicate territorial organisation and control: to all intent and purposes settlements' production remained local. The only exception is metallurgy, where tool production and bronze frequencies show bronze was of some economic consequence. South Etruria, on the other hand, had during this period a stable and well-adapted subsistence economy, which constitutes the bulk of the economic activity: there are no indications of secondary production of any economic relevance at the time in which Veneto was starting to become actively involved in metallurgy.

During its Late Bronze Age (1400-1150 B.C.) Western Veneto's economy starts incorporating industrial production: the number of settlements involved in some sort of local industry increases, reinforcing the idea of a series of self-sufficient communities, which are nevertheless in good communication with each other and share ideas and technology. Subsistence undergoes a process of specialisation in which agriculture acquires a dominant role. Metallurgy is during this time practised by a considerable number of settlements, and a metallurgical network is functioning for the supply of raw material and distribution of some of the finished products. In South Etruria the period between 1400 and 1150 B.C. encompasses both the Apennine Middle Bronze Age and the Late Bronze Age. It is only after 1300 B.C. that a process of intensification both in the

subsistence and the technological/industrial level begins in Etruria, but the latter bears no comparison with Veneto's: Etruria will only catch up in the Final Bronze Age. Etruria's subsistence base, on the other hand, is enlarged by increasing exploitation of different ecozones and resources from carefully located settlements, rather than by specialisation as in Veneto. Bronze production starts to affect the economy after 1200 B.C. with the appearance of bronze tools and the general increase in bronze finds, indicative of greater circulation of the finished products, though these are still restricted to areas neighbouring metal bearing locations. A comparison of the two areas at this point in time shows that in Etruria metallurgy developed in the wake of the ongoing process of subsistence intensification, whereas in Veneto the growth of the two activities is earlier and parallel.

The Final Bronze Ages of the two areas are chronologically contemporary: 1150-900 B.C.. In Western Veneto this period sees the emergence of a series of industrial sites, the most important of which is Frattesina. Subsistence continues to concentrate on agriculture. Finds show that secondary production played an important role in the economic life of sites, though it is really only for Frattesina that there is some evidence that the site might have been partially dependent for its subsistence on a series of satellite settlements (as suggested by the possible meat imports to the site and the impressive evidence from exotic raw materials and industrial activities, which must have implied considerable political control and the existence of full time craftsmen). Frattesina, however, represents an extreme case surrounded by industrially active but less glamorous settlements: Fondo Paviani, Mariconda, Montagnana and Montebello are the most developed (see evidence above). In these settlements secondary production (including metallurgy) is well attested, though it remains unclear the extent to which these activities dominated the economic life of the sites and configured the political landscape. What is remarkable, though, is that at this point in time these settlements have acquired a considerable degree of internal economic diversification almost proper to pre-urban groups, and yet keep a fairly similar standard of development with no indications of economic competition between the communities. Once again the impression is one of largely self-sufficient units, with a common cultural background and good communication among them. These units might have depended on Frattesina for some of their raw material or occasional specialised finished products.

A quantitative and qualitative leap for South Etruria takes place in the Final Bronze Age, particularly after 1000 B.C.. Its subsistence basis sees a further intensification, and technology and industry also undergo important developments. Bronze is present at all levels, and the indications are that it is controlled by communities with direct access to the raw material. This was not the case in Veneto, where bronze circulation was freer and reached settlements throughout the area: in Etruria, on the other hand, hoards and objects cluster around metal bearing areas and pottery styles indicate the emergence of specific local identities.

I hold this to be a major difference between the two regions: historically, Veneto's record as a trade enclave and contact area between zones promoted a freer circulation of ideas, technology and goods: the extensive evidence detailed above on the various industrial activities present in sites throughout the region shows that ideas and goods travelled with relative ease. In Etruria, on the other hand, resources of an industrial nature seem to have been dominated by local groups. This might be a consequence of the lack of metal resources in Veneto, which seems to have prompted freer circulation of goods and exchange, and helped equal access to resources by different settlements. In Etruria, on the other hand, groups local to resources were in an advantageous position with respect to other sites. Though in Etruria the evidence for industrial activity is not as important as in Veneto, I would argue that in the former metallurgy helped the development of power relationships within the landscape, whereas in the latter it stimulated industrial activity but functioned within well established good circulation networks and did not provoke the same reaction. At around 900 B.C. there was a turn of events in both regions. In Veneto, settlements disappear and economic activity suffers a regression, for the settlements which emerge do so in a new and limited area. In Etruria, settlements also disappear but in a lesser scale, and instead we are confronted with the growth of specific sites and the emergence of clear territorial hierarchy from then on. Whereas Etruria's path could have been predicted, Veneto's seems to have been linked to some extent to environmental deterioration. Veneto's topographical configuration did not allow diversification without settlement dislocation, and the socio-economic base of the groups, by then considerably influenced by industrial production, could not be maintained.

Chapter 8: SOCIAL INTERACTIONS

After having looked at the importance of subsistence and economic factors, this chapter investigates the extent of the groups' involvement in exchange and communication networks through time, at regional (that is, between sites in the one area), interregional and "world" levels. This geographical approach to social interaction is aimed at documenting the level of social involvement of the groups, their adaptation to the human landscape, and their possible access to other resources (material through exchange, human through contacts), which are necessary for the diversity which characterises town systems. It also analyses the degree of development of territorial and group control during the Bronze Age, as displayed by ideological and economic contacts, and gives an index of the relevance of internal and external influences to the process of settlement nucleation. Regional, and in some cases interregional, communicability is often interpreted as an internal factor in development, whereas most interregional contacts and "world" involvement can represent external influences in the process of socio-economic sophistication of a group. Since both exchange and communication networks are included, the chapter incorporates both economic and cultural-ideological patterns.

1. Intercommunicability: regional, interregional and world contacts

Regional interaction

South Etruria

In the previous chapter I discussed how the evidence from Middle Bronze Age pottery and metallurgy production and distribution indicates the local orientation of the settlements. Sites produced enough to suffice for their needs, and were served for a few prestige items by probably itinerant smiths (Peroni 1969a). Pottery styles bear local forms, which share however cultural affinity. Communities seem to have been loosely in contact with each other, and there is a good possibility that pastoralism provided the vehicle for settlement relationships and contacts. This pattern intensified during the last phase of the Middle Bronze Age, when marked cultural affinity rather than exchange/trade can be seen in the uniformity of Apennine style pottery. The nature of these loose Middle Bronze Age contacts has not left clear remains in the archaeological record: considering

the dearth of evidence and the central role played by subsistence in this period, it is to be assumed that contacts must have been occasional and unorganised, without a real economic base. The level of disassociation between economic and social activities was such as to maintain cultural links without bringing about economic competition or permanent economic relationships.

Late Bronze Age data shows an intensification of subsistence activities and the greater importance of agriculture. There are no signs, on the other hand, of increased contacts or territorial control. Similarities in Late Bronze Age pottery show that the cultural Apennine matrix continued to be active, and that there was contact between groups along the same lines as in the previous phase. Metal work does not provide good indications of cultural and economic contact or dependency either: metal objects are still rare finds in contexts of this period, and those found show Peschiera and central European influences (Bietti Sestieri 1976/77: 226), which argue against the control of metallurgy by local communities, so there is reason to suppose that the itinerant smiths providing prestige goods were still responsible for metal production and technology. The intensification of subsistence activities which is documented for the period seems, thus, not to have been accompanied by socio-economic change (diffused exchange patterns with no economic base). Subsistence intensification was not destined to support a growing craft force, but simply a larger population.

With the Final Bronze Age there is evidence for changes in the nature of contacts within sites in the region: this evidence becomes more abundant as the Final Bronze Age progresses. It is interesting to consider the evidence from pottery. After the cultural similarities apparent in Late Bronze Age assemblages from different sites, early Final Bronze Age pottery seems to become largely unstandardised from site to site. At this time of transition, "Protovillanovan" characteristics begin to appear at the same time as "Subapennine" traits start disappearing. The change is a gradual one which reveals cultural continuity between the two periods and rejects a possible invasion hypothesis. Yet, despite some common traits in vessel morphology (specific carinated bowls and biconical urns) or the slow return to incised geometric decoration, pottery is largely unstandardised, and the difficulty in finding good parallels between sites which permit the

establishment of a clear typology is a sign that production was markedly local, and that therefore this was not a period of particularly strong cultural links between sites.

What might have been the cause behind this change in the social openness of the different groups is suggested by the subsistence data, which at this point shows a movement towards more intense agricultural practice, and by the settlement data which suggest greater sedentism and stability of Final Bronze Age settlements. Although the evidence is not strong enough to establish the point conclusively, the transition to the Final Bronze Age might have been accompanied by a decrease in importance of transhumant-pastoralist activity, which until then seems to have been the main vehicle for contact between the different groups inhabiting the sites. In fact it has been pointed out that most Final Bronze Age settlements no longer follow river valleys and the characteristic transhumance routes, as Middle and Late Bronze Age sites did (Bartoloni 1986: 8), but concentrate on isolated tufa outcrops with good access to grazing and agricultural land. Though the occupation of tuff outcrops was not exclusive to the Final Bronze Age, it reached considerable proportions at that time.

The evidence from metallurgy is consistent with this interpretation for reduced contacts between groups. Bronze objects of the late 12th century are still rare. The most important hoard, that of Piano del Tallone (Manciano), is just outside the region, in Northern Etruria. This hoard, made up of 54 mostly broken objects, was most likely a foundry hoard (Rittatore Vonwiller 1978 *et al.*: 59-60; Bietti Sestieri 1981b: 230). Types present have wide geographical distributions but are no longer exclusively dependent on Northern models: they include ingots, weapons (one Ortucchio axe), tools (a Matrei type knife, a sickle) and metal scraps. From my study area come an isolated Ortucchio axe found in the territory of Blera (Viterbo), and an important find from the settlement of Scarceta, where several moulds for winged axes, daggers and pins were found in one of the hut floors. The impression from these finds is that bronze distribution continued along the same lines as in the previous phase: types are still common to large areas, and objects are still mostly prestige items. The finds from Scarceta, however, and the presence of tools in the Piano hoard, suggest that production became more integrated in the community at this point. Although production became more region-based both in its

typology, and in its integration within the community, bronze was not still a major economic element and product distribution took place along the same diffuse lines of unorganised exchange as in the previous phase. The changes to production organisation, together with the maintenance of distribution modes can be interpreted as a sign of lessened communication networks within the region because of increased sedentism and the growing importance of agriculture.

In the 11th century, and within the framework of increasing landscape exploitation for subsistence purposes, there appear signs of growing social differentiation and, perhaps, more communication between sites as shown by more regular pottery types (though it is within specific zones such as the Fiora valley and the Tolfa mountains that this is most noticeable). Metallurgy, on the other hand, is better represented, with an increase in the number of finds from this period in all contexts (hoards, settlements and burials). The early 11th century hoard of Coste del Marano displays an impressive number of high quality objects (ornaments, prestige items and some tools) (Bietti Sestieri 1981b: 231-232). Both Peroni and Bietti Sestieri have defended the local origin of the objects but emphasised their cultural affinities over large areas (Bietti Sestieri 1981b: 231-232). The objects are obviously prestige items, and the hoard seems to have been the supply cache of a smith. The high quality of its contents suggests the development of social differences between individuals. Another foundry hoard, this time from the late 11th century, is that of broken axes and ingots from Grotte S. Stefano (Viterbo). Once again the types encountered are widely diffused geographically (Bietti Sestieri 1973: 399 ff). Of great relevance is the hoard of Manciano-Samprugnano (Grosseto), once again a foundry hoard which is made up of ornaments, tools and ingots of widely distributed types. From the settlement of Sorgenti della Nova comes a shovel with tubular hafting, similar to the ones found in this hoard (Bietti Sestieri 1981b: 235, 1984: 113). Production and distribution patterns seem to be similar to those of the previous phase, yet the growing number of working tools found indicates that the role of bronze in the economy was increasing, even if prestige items and ornaments still constituted the greater part of finds.

Increased social differentiation in this period can be seen from the presence of prestige items in all of these hoards, as well as in differences in funerary ritual: the tumulus burials of Crostoletto de Lamone are not only a sophisticated burial form but also had some small bronze gravegoods (spirals etc). The settlement at Crostoletto also shows signs of organised effort in building a perimeter wall. Some authors have seen in this a proof that people were being taken away from primary production and that labour division was well under way (Fugazzola Delpino and Delpino 1979: 305). This needs not be the case: primary activities such as agriculture involve periods of relatively little work (crop growing time for instance). What it does reveal is the development, by then, of forms of authority capable of organising construction at the level of individual communities, and of strong group bonding.

The 10th century marks a period of unprecedented development in Etruria. The subsistence basis is again intensified. Pottery styles show for the first time marked local affinities which presuppose the existence of continuous cultural exchanges between geographically close settlements. This is particularly true of areas like the Fiora valley and the Tolfa hills, where, as we have seen, characteristic pottery forms and decorative motifs argue for strong cultural links between sites. Furthermore, these areas seem to have experienced at this time an even more marked increase in population and site densities. The reason put forward for the concentration of settlement in these areas is their mining resources (in the case of the Fiora valley its role as a trade route from Monte Amiata and the Colline Metallifere). That metallurgy was an important factor can be seen in the development of local metalwork: types such as the Gabbro axes, or fibulae which share similar manufacture technology indicate the importance of local metallurgy and the control of the community over the production of bronze objects. Axes characteristically display a narrow concave blade and very developed wings and marked shoulders; fibulae share specific technological and stylistical treatments (i.e. helicoidal central bows, or sequences of close notches and grooves in the bow). These traits appear, for instance, in the hoards of Orvieto, Tolfa and Monte Rovello, and in tombs in Poggio La Pozza, Forchetta and Tolfa (Bietti Sestieri 1981b: 239-240), and they strongly suggest the existence of related workshops in the area from which the material was distributed elsewhere. This in its turn presupposes more organised control of metal production and

distribution by specific communities, and as such, increased contacts between settlements. It is possibly at the end of this period that incipient settlement differentiation happened for the first time: Guidi's rank size analysis of settlement in Southern Etruria demonstrated that it is in the 9th century when settlement hierarchisation started to become apparent (Guidi 1985).

It is important to qualify the possible extent of such control, which should not be understood as being either political or economic: even when the Etruscan states emerge, three centuries later, they do so as independent city-states vaguely linked to each other by a common cultural background rather than by political or economic bonds. It is rather the control over one aspect of the production which, as we have seen in the previous chapter, acquires at this point a marked economic relevance. Bietti Sestieri has argued that the development of metallurgy was behind the social changes which can be observed in the late stages of the Final Bronze Age, but I would argue, in view of the chronology of developments which I have just set out, that it is precisely social change (specifically the abandonment of traditional economic practices such as transhumance and the consequent increase in sedentism and cultural isolation of settlements at the beginning of the Final Bronze Age) that fostered the growth of metallurgy, first as a vehicle for contact, and then as an economic element. The intensification of agricultural practices, and the growing importance of land possession in a society which was undergoing population growth also gave metallurgy the opportunity to expand into the economic realm, and from there, eventually acquire a reinforced social role.

Western Veneto

At the beginning of the Middle Bronze Age, Western Veneto's material culture presents the unity which characterised the previous Polada phase. Pottery styles and metallurgy coincide in showing considerable cultural homogeneity between sites, and consequently, good levels of communication. The existence of functioning transhumance networks, the well established routes to and from the Alps, and the documented active role played already at this time by metal circulation networks must have been important factors in this situation.

A turn in the tide comes with the full Middle Bronze Age, when different geographical areas follow different cultural traditions: the area of lake Garda (also known as Benacense), the area of the plain, and the area of the hills and pre-Alps. The division is almost complete: settlement types, pottery forms, and involvement in activities such as flint, bone or antler working bear marked differences from one area to another. The Benacense is characterised by lake-side settlements and pottery types with a taste for decorative motifs such as the repetition of a double band of three grooves under the rim and on the shoulder. The settlements in the hill and pre-alpine area, on the other hand, are normally hilltop settlements solidly built on rock, and with some traces of possible defence structures. The area of the plain characteristically shows a different pottery style with Emilian connections (half moon handles, biconical vessels decorated by large bosses, carinated cups with walls modelled by long horizontal grooves and with groove decoration also in the inner belly). Settlements in the area are of the bank and ditch type or open plain settlements.

Industrial production also shows geographical divisions. From spectrometry we know that that the hill and pre-alpine area was involved in the trade/exchange of flint either from the Lessini or Monte Baldo to the Terremare and possibly also other parts of Northwest Italy. In Ponte di Veia, evidence for the quarrying and working of flint is provided by many unfinished and broken products, and the flint sickles and knives produced from its characteristic dark grey flint have been found throughout the region and south of the Po (Cremaschi *et al.* 1991/92: 178-180). I have already discussed in the previous chapter the predominant distribution of bone and antler industries of the settlements of the plain. The Benacense, finally, seems to have been more actively involved in metallurgy: the sites of Bor and Cisano have yielded impressive evidence for the working of bronze *in situ* both in the form of thousands of finished and unfinished products and of tools for working bronze. The fact that bronze objects are not otherwise frequent in Western Veneto, and seem restricted to the occasional axe find or prestige item, would seem to indicate to diffusion from the Garda basin to the rest of the region.

The implications of these data for the understanding of contacts between sites are many. There are internal similarities within each of the geographical units, and

differences between them which, however, do not exclude the existence of some common ground, but suggest the emergence of stronger social groups at this time. Backing up this view is the fact that all settlement types, except for the open plain settlement, involve considerable amounts of organised collective effort. I have argued this effort to be not so much an indication of settlement hierarchisation as the product of the emergence of internally strong social groups. Another point I would like to make in relation to settlement types is the degree of technological knowledge involved in the building of these settlements, and the fact that it was shared throughout each geographical area. The existence of evidence for strong group organisation for each settlement is thus accompanied by some indication of contacts between sites (at the pottery level and also at the technological level). These contacts were not exclusively the product of outsiders to the community (as could be argued if it affected only metallurgy), but must have involved substantial numbers of community members to be reflected in the pottery and in settlement building. Since subsistence data suggests sites were largely self-sufficient, contact must have remained mainly at the ideas level and must have been helped by mobility both in the subsistence and in the industrial level (through transhumance and resources procurement networks).

The reasons for these cultural differences in Western Veneto remain unclear. The obvious continuity between the two phases of the Middle Bronze Age rules out ethnic differences. It is more likely that they be related to environmental factors, trade routes and social orientation of the groups. In Chapter 4, and in view of glacier and hydrographic data, I suggested that an environmental change to wetter conditions took place sometime in the Middle Bronze Age, and that the change seemed to have affected the hydrography of the Po. It could be that the breaking up and reorientation of groups in Veneto was a reflection of more difficult communication with areas such as the plain. Through the Adige the Benacense was still open to the Northern Alps and mining areas for metallurgy (from the pottery, the pre-Alps seem culturally linked to the Benacense, though the area became populated mostly during this period). The river Po and its tributaries had different courses (see fig. 18): the Po di Adria and the Po di Spina, enclosed a territory and provided it with natural communications with Emilia, Central Italy and the Adriatic.

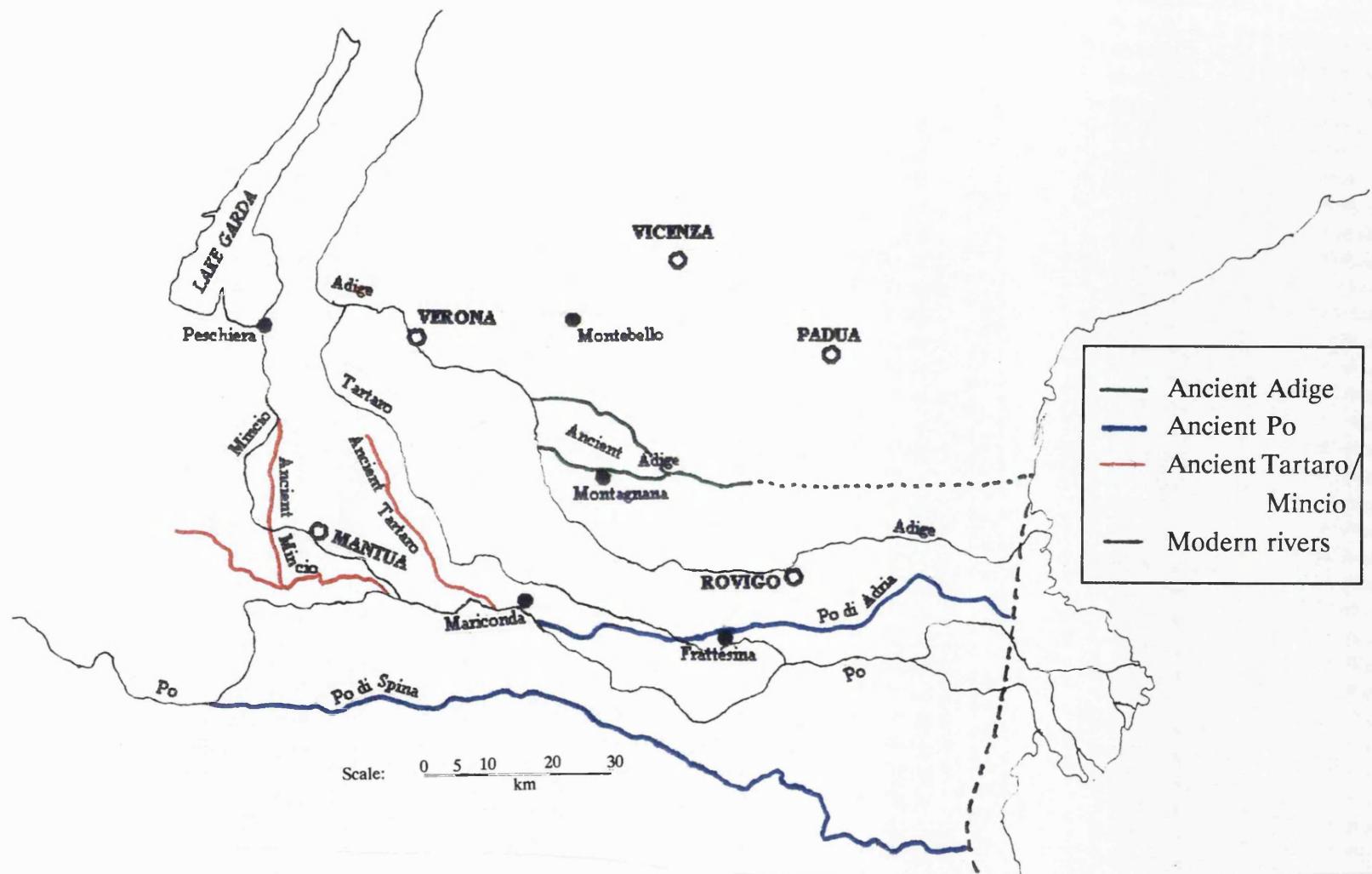


Fig. 18: Final Bronze Age sites in Western Veneto set in relation to the ancient hydrography.

During the Late Bronze Age, and in the context of increasing concentration of economic practices on specific resources, pottery assemblages from the plain appear increasingly influenced by subapennine characteristics: horned tubular handles, raised handles with central cylindrical knobs, undecorated ovoidal and globular urns, lobulate handles etc. The Garda area, on the other hand, underwent a process of depopulation during this period which in the pottery assemblage was accompanied by a decrease in the traditional Middle Bronze Age elements. Later on, with the beginning of the second part of the Late Bronze Age, subapennine traits appear also in the pottery assemblage from this area, which gradually loses the taste for decoration (Fasani 1980: 27; Marchesan 1985: 116-117).

The evidence from metallurgy shows some of the centres in the Garda basin, such as Peschiera, playing an intensely active role. The nature of the production and distribution of certain "Peschiera" types throughout Veneto and abroad, for example the double spiral pins (found for instance in Fabbrica dei Soci), the Peschiera type daggers (one found in Fondo Paviani), and the violin bow leaf fibula with two nodules, would suggest that this production centre supplied metal products and technological knowledge for the region. In the second part of the Late Bronze Age a change occurred which affected contacts between settlements: on the one hand, settlements linked to transhumance collapsed (De Guio in Fogolari *et al.* 1987: 99) and new settlements emerged in the area of the Polesine plain. Bronzes (ornaments, tools and prestige items) became far more frequent in hoards and in finds from settlements, with types showing similarities throughout Veneto. More importantly, bronze working extended to settlements outside the Garda area, -Fabbrica, Fondo Paviani, Castello del Tartaro- which also took active part in other secondary activities (amber, vitreous paste etc). In parallel to these developments, the role of Peschiera starts to decline though production continued into the Final Bronze Age. For the first time there is also some evidence for social differentiation, even if it is tenuous: tombs from the necropolis of Franzine (close to Fabbrica) had gravegoods such as amber beads, bronze pins, earrings and spirals, and one tomb had a gold spiral (Aspes 1987a: 99).

In terms of contacts between groups the material evidence for the Late Bronze Age

suggest an initial continuation of the trends observed during the Middle Bronze Age, that is, strong single units which have good social contacts with other sites from the same geographical area. With the second half of the period, a trend to population regression and greater sedentism can be observed, as well as the greater economic importance of bronze and its insertion into the settlement context. It is to be emphasised that there does not seem to be dependency among sites either in the realm of subsistence or of secondary production, and that settlements seem to continue to function as self-sufficient units. However, it is possible that the strong social links observed in the previous period gave rise to incipient different social statuses as indicated by the sparse funerary evidence. The burials from Franzine might well be related to the neighbouring settlement of Fabbrica dei Soci, and the various productive activities documented there. This is, nevertheless, the only suggestion that objects from Fabbrica were produced for trade or that they attracted other wealth, and the point remains inconclusive for the time being.

Interesting is the change in orientation of the region, which begins to gravitate heavily around the axis of the Po and its tributaries, with productive settlements such as Castello, Fabbrica and Fondo Paviani. A possible reason could be the emphasis on agriculture which can be observed from the subsistence data, and which might have favoured the occupation of plain settlements with access to more cultivable land. The newly discovered irrigation ditches of Middle-Late Bronze Age date around the site of Stanghelle (Balista, forthcoming) supports the possible agricultural interest of the human groups in the plain area. As a consequence, from this moment onwards Veneto will open up towards continental Italy, rather than towards the Alps.

The Final Bronze Age provides plenty of evidence for an area in which the economic self-sufficiency of sites combines with continued contacts and exchanges *sensu lato*. From the earliest moments of the period, the pottery shows that a new cultural unification is taking place, as suggested by the pottery assemblages of the last part of the Late Bronze Age. Once more, it is interesting to compare the timing of this event with the environmental evidence, which indicated drier weather conditions during the 12th century. Cultural uniformity, and arguably increased communicability and contacts between sites, took place much earlier than in Etruria: standard decorative motifs such as

combed geometric designs or lines of dimples as well as specific vessel morphologies appear in various sites. The beginning of the Final Bronze Age is also characterised by a new increase in the frequency of bronze tools in what was by then an eminently domestic production (e.g. the sample from Montebello discussed in the previous chapter). Personal ornaments, mainly fibulae and pins, are also abundant. Communities seem to have taken an active role in the production and circulation of objects at this time, and there is no doubt that they were produced for an economic role.

There is evidence for the existence of active bronze circulating networks which served also as vehicles for other types of exchange. Thus 11th century Luco type pottery from Trentino has been found in Magrè and Santorso (M. Summano), two sites with evidence for bronze smelting (De Guio 1987: 102): the pottery indicates the metal was coming from the ores in Trentino. Protovillanovan style pottery from a neighbouring site in Vicenza has also been found in Montesei di Serso, showing metal trade from the mining zone of the Alta Valsugana was reaching the area along the Brenta river (De Guio in Fogolari *et al.* 1987: 102). The site of S. Giorgio di Angarano is linked to Montesei by the Brenta, and is strategically placed at the entry to Valsugana: it seems to have occupied an advantageous commercial position between the high plain and the mining areas (Bianchin Citton 1984: 641). De Guio's survival analysis of Venetian sites (1985: 371, 1987: 99) shows that it was precisely those settlements which had access to good agricultural land and/or were connected to metal circulation networks that survived the longest (i.e. S. Giorgio di Angarano, Monte Summano, Montebello). There is thus evidence for increased stabilisation of the landscape and greater emphasis on agriculture. The site of Frattesina, however, is the only one for which exchanges at the subsistence level (meat) have been suggested (Clark 1985: 261), and it would seem that the nature of this stabilisation was still centred on singular settlements and agricultural resources.

In the last phase of the Final Bronze Age the hoards from Montagnana (De Min and Bietti Sestieri 1979), Malandrina (Aspes 1984), Basso Veronese (Aspes 1984) and Frattesina (Bellintani and Peretto 1972) confirm the abundance of bronze and its economic role and integration in society. Finds are exclusively tools and personal ornaments and metallurgy at this time was a vital component of the economy of the region and of

specific sites. There are various centres of production -Montebello, Montagnana, Mariconda and Frattesina-, which display close parallels at the material level (i.e. pottery), and even at the symbolic level (e.g. the worked human femurs found both in Montagnana and Frattesina). The importance of good communication and trade for these sites is underlined by their location along river axes, mainly the Po. Although it may be a product of defective research, at present all late Final Bronze Age sites for which there is evidence for secondary production are evenly spaced in the landscape, with an average distance of 30 km. between them (see fig. 18). This suggests incipient landscape organisation and control of economic modes at this time, since there are other sites in the territory (for instance Villamarzana, Cop Roman, or Montecchio Maggiore) which are located at shorter distances from these settlements, but do not present signs of productive activities. There is also evidence that products from these centres, certainly from Frattesina, were distributed through the region and further afield: for instance the Fontanella type razor or the serpentine fibula in two pieces from Angarano necropolis which probably come from Frattesina (De Guio in Fogolari *et al.* 1987: 104). The hoards of Frattesina and Montagnana also display unique parallels in composition and particular associations of types (the shovels with tubular hafting and pick-axe ingots), which suggests links existed between the two settlements in relation to metal trade and bronze distribution. At the level of internal organisation of these centres, the evidence from the necropolis of Frattesina revealed groups of cremations in urns buried in the ground and separated by empty spaces. Some of these groups might have been signalled by stone alignments (De Min 1984: 655).

It is possible that the last phase of the Final Bronze Age represents a moment in which landscape and economic organisation becomes more controlled. The centres with documented secondary activities are placed along communication routes and show the vital importance of contacts for their development. These contacts do not necessarily refer to material trade, which with perhaps the exception of Frattesina is not momentous enough to justify the sole existence of the settlements, but rather to communication between zones. The sites might have been able to exploit their geographical position on agricultural land capable of maintaining larger populations and on a communication route, to develop secondary activities or attract the artisans who had been carrying them out until

then. It is, once more, not a case of the emergence of political powers, but of economic optimisation of resources in a society in which so far there are no indications of economic competition.

Interregional interaction: contacts between Veneto and Etruria

Traditionally, Central and Northern Italy have been seen during the period that concern us, as two separate cultural regions. The areas, though, were in contact at various points in time, and in studying the chronology and nature of these contacts it might become possible to assess the influences on each other when it came to settlement organisation and increasing complexity.

A problem which has to be addressed at this stage is the chronological link between the two areas. In Chapter 6 I showed how it is possible to see a chronological mismatch between the phases in the two areas. Thus, the MBA 1-2 in Veneto would be older than its Etruria counterpart, with differences in time seemingly reduced as the Bronze Age came to an end. The timing of the various phases seems to have allowed some contemporaneity between them, even if Veneto's started and finished earlier: it is only the FBA of both regions that seem to have been fully contemporary. These conclusions must remain still hypothetical in anticipation of more radiocarbon dates which will allow greater certainty, but at present a comparison with the traditional chronology can be suggested as follows:

	VENETO (cal B.C.)	ETRURIA (cal B.C.)
MBA 1-2	1800/1750 - 1500/1450	1600 - 1400
MBA 3	1500/1450 - 1400/1350	1400 - 1300
LBA	1400/1350 - 1150	1300 - 1150
FBA	1150 - 900	1150- 900

Table 8: Correlation between absolute time ranges for the cultural phases in Veneto and Etruria.

During the MBA contacts between the two areas are only documented by the pottery and the metal assemblage. During the MB1/2 of Etruria, a type of pottery appears in some sites which has clear northern influences in its decorative repertoire of large bosses, grooves and dimples (Di Gennaro 1988: 64). As these assemblages remain at present unpublished it has been impossible to study the affinity further and to try to establish more exact parallels for this decorative taste. It would be interesting, for instance, to determine whether the parallels are precise enough to ascribe them to a particular pottery phase and/or region in the North.

The opposite phenomenon, Central Italian style pottery in Veneto, is also documented: Middle Bronze Age Apennine-style pottery has been found in some sites north of the Po: Montesei di Serso, Fondo Paviani, Marendole, Montebello, Caltrano, Monte Madarosa and Lozzo (Bianchin Citton 1989: 172). It is remarkable that, with the exception of Monte Madarosa, for which there is evidence of Middle Bronze Age occupation, the others are all Late-Final Bronze Age sites. I would argue that this fact can be explained by the chronological diachronism in the MB3 of Veneto and of South Etruria which has been documented in Chapter 6: the Apennine sherds might have reached Veneto at the beginning of the LBA, which coincided with the Apennine pottery momentum in Central Italy. This suggestion re-opens the question of a possible overlapping of Apennine and Subapennine trends, but it does so in a different light since it is their non-geographical marginal overlapping that it proposes. The Apennine style sherds are, however, unstratified finds and the suggestion must remain a hypothesis until the study of the stratified assemblages from sites such as Fondo Paviani allow greater chronological precision for the site.

The developing metal technology of the LBA and its increasing economic importance seems to have been a significant vehicle for contacts and exchange: metal sources were located in Etruria, Calabria and the Eastern Alps (Bietti Sestieri 1984) and it is from there that metal must have come. Contacts between the Basso Veronese and Central Italy can be seen in the shovel with tubular hafting of Gualdo Tadino type (Fasani 1980a: 96) found in Fondo Paviani, as well as in the many Peschiera type bronzes found in Tuscany, just outside our area (Bietti Sestieri 1973: 386). The direction of these

contacts seems still to be mainly North-South (as indicated by the Peschiera products): they are related to metal supply and circulation, and are generally diffuse, since there are no signs of control or organisation of exchanges.

With the Final Bronze Age, there comes once more evidence for increased contacts between the two areas. For a start, similar pottery traits appeared, which eventually replaced Subapennine elements and became common throughout the Peninsula. Eleventh century evidence for contacts is wide-ranging. From Sasso di Furbara comes an urn decorated with deep grooves which affect the vessel's morphology, a decorative motif unique in South Etruria but common North of the Po in sites such as Villamarzana, Frattesina, Garda and S. Giorgio di Angarano (Delpino 1987: 14). A type of bronze tweezers with leaf-shaped legs and twisted handle is found both in Etruria (Coste del Marano and Limone) and Veneto (Vidolasco, Fontanella, Peschiera, Lozzo) (Delpino 1987). From the 11th century hoard of Coste del Marano come some decorated rods with one tapered end, which are also found in Frattesina and Mariconda (Delpino 1987: 15). Finally Allumiere type amber beads are found throughout Etruria and also in Frattesina. These data indicate a particular link between Veneto (and more specifically the plain area and Frattesina) and the Tolfa area, as well as an increase in the exchange of finished products, which would suggest more controlled distribution. Once again the contacts seem to be the product of the North's interest in metallurgy, rather than of demand in Etruria, which would have simply partaken of the exchange, and provided raw material (hence the connection with the Tolfa region).

Evidence for contacts between the two areas in the 10th century comes from the association of tubular hafting shovels (palette a cannone) and pick-axe ingots (pane a piccone) found in the Manciano-Samprugnano hoard in Etruria and in the hoards of Frattesina and Montagnana in Veneto (Bietti Sestieri 1976/77, 231; Bianchin Citton 1988: 41). Also radiated wheel shaped pin heads and some axe and sickle forms are common between the two areas (for instance the winged axe found in Frattesina which is similar to one found in Monte Rovello (Bietti Sestieri 1981b: 238-239)). Recent metallurgical analyses have also suggested that other material such as swords, fibulae and axes had a common origin (Pellegrini *et al.* 1992). The two foundry hoards from Frattesina and the

one from Montagnana show what might have been a metal route between the Alps and Etruria through West Central Emilia (Bianchin Citton, 1988, 41). All the evidence considered, contacts between South Etruria and Western Veneto do no longer follow the pattern of wide metal circulation characteristic of the previous phase. The greater response of the Etruria communities to metallurgy which can be seen in the emergence of local types and the penetration of metal objects into the economic sphere (see review of evidence for intra-regional communicability, above) together now with the exclusive association of types between Veneto and Etruria, shows the beginning of organised long-distance trade and directional exchange between these two areas with metallurgical assets (Etruria primarily because of its metal resources, Veneto because of its long-tradition of metal working).

World involvement

In discussing the evidence for the "world" involvement of each one of the regions, I shall be considering mainly the European and Aegean worlds and the Tyrrhenian islands which are linked to the Aegean world by trade/exchange networks.

South Etruria

During the Middle Bronze Age, there is very little evidence for the involvement of any of the groups from the area with societies further afield. Some Capo Graziano pottery imports have been reported from Luni (Bietti Sestieri 1985: 317) and Pitigliano (Pacciarelli 1991/92: 270). Mycenaean pottery finds show that, during this time, the South of Italy and the islands were already actively involved in contacts with the Mycenaean world. Mycenaean presence is, on the other hand, practically absent from the mining areas of Northern and Southern Etruria, at a time when the evidence would suggest that some of their metal ores were already under exploitation. The only indication of contact at this time is the Mycenaean sherd from a full Middle Bronze Age context found in Luni (trench 16, stratum 4). The sherd, identified as Mycenaean IIIB (1300-1200 B.C. in traditional chronology), is far too young both for the material it appears with, and for a radiocarbon date from the same stratum which calibrates 1597-1412 cal BC (St-1345, 1σ calibration with CALIB 3.0). The lack of internal agreement between

stratigraphy, pottery assemblages, calibrated dates and Mycenaean imports is a constant in Luni. As I argued in Chapter 5, in view of the lack of internal agreement I have preferred to ignore the chronological evidence from the Mycenaean sherds: what cannot be ignored is their presence. Although some authors have seen in them an indication of the early involvement of Luni in exchange networks, the lack of chronological correspondence could perhaps indicate to a later re-working of the sherds into the contexts in which they were found, a re-working which would correspond to the chronology of the sherds, and would have taken place in the Late/Final Bronze Age, when the evidence for Mycenaean contact with that part of Etruria is better established, and when the area begins to develop its own internal networks. The complex stratigraphy of the site (Östenberg 1967; Peroni 1969b) and its long period of occupation do in fact substantiate the possibility of re-working of material into older strata.

The reason for the Mycenaean absence, as I see it, can be sought in the internal social configuration of the Etruria groups at the time, as detailed above. As Bietti Sestieri has demonstrated, Mycenaean contacts with Lipari, Sicily and the South Italian Tyrrhenian coast took place within the context of established local exchange systems, along systematic and traditionally established communication routes, mainly by sea (Bietti Sestieri 1985). Mycenaean material (particularly the more easily identifiable pottery), must have travelled across local internal networks, since actual Mycenaean presence does not seem to have moved up North, either in the Adriatic or the Tyrrhenian sea. The strategy employed by the Mycenaeans was to use existing exchange networks. Contacts occurred, therefore, with societies of significant social openness: in the case of Lipari, for instance, obsidian exchange networks which had been functioning since the Neolithic were exploited. The fact that early Middle Bronze Age Mycenaean exchanges by-passed Etruria is, thus, not simply a sign of the cultural isolation of the area with reference to the areas in contact with the Mycenaeans, but also a consequence of the lack of internal communication networks and the little degree of social cohesion between settlements in the region which I have previously discussed (see above).

Once again, a historical perspective helps to clarify the link between local

communication networks in the establishment of long-distance contacts: the cultural homogeneity of the MB3 with the spread of classic Apennine decoration did not affect the islands where Mycenaean presence seems to have been based. With the end of obsidian distribution at around that time, Lipari and Sicily remained outside the Apennine trend, and they culturally distanced themselves from the southern Tyrrhenian coast. Parallelly, Mycenaean trade re-oriented itself towards these islands, and their presence in the coast was much diminished (Bietti Sestieri 1985: 121-123). This proves, not only that the level of external contact was determined by the cultural affinity of the groups at the time (as Bietti Sestieri argued and demonstrated in her 1985 paper), but also that it was the groups' socio-economic attitudes that seriously conditioned it. It is not simply a matter of how culturally close they were to each other, but of how high social contacts ranked in the group's set of values: we have seen that Apennine society was primarily subsistence oriented, and that its social contacts depended on this. Contacts between sites were good, and the pastoral basis of the economy must have constituted the main vehicle and reason for contacts. It is to be expected, then, that the areas affected by Apennine culture, and therefore dominated by the economic constant in the socio-economic binomial, would be uninterested in investing effort in external contacts outside the realm of subsistence. When in the Late Bronze Age the intensification of subsistence practices brought about the increased importance of secondary activities and the slow integration of metallurgy in the economy, the involvement in exchanges slowly started to increase. Once again, the archaeological data makes us face the importance of the change in balance between economic and social factors in the development of complex societies.

With the Late Bronze Age the Subapennine cultural umbrella encompassed most of Italy, including Etruria and the islands of Sicily and the Lipari. This can be interpreted as an index of greater, if diffuse, cultural contacts, in which Etruria is this time included. If the theory set out above is correct, namely that the lack of Mycenaean contacts with Etruria in the Middle Bronze Age is a consequence of the specific social orientation of the region at the time as determined by its economic basis, then it again fits into the picture to consider that in the late Bronze Age, contacts with outside societies are more documented, as contacts between sites and non-subsistence activities become more regular. Several bronze types of Italian origin appear in the Aegean (Bietti Sestieri 1973; Bietti

Sestieri 1985: 307), and pottery which is either of Italian origin or follows Italian prototypes is found in Crete (Holloway 1992: 42). From Luni come three more Mycenaean sherds: one, identified as IIIB, from trench 15 stratum 4A, where it appeared associated to Middle Bronze Age material; the other two come from trench 13, strata 2A and 2B, are a IIIB-C and a IIIC. Monte Rovello is another site where Mycenaean pottery has been found, also from this phase. By the end of the Late Bronze Age metallurgical typological links can be established closely between Etruria and the Aegean world (Bietti Sestieri 1976/77: 226). It all seems to indicate that at this point, Etruria was beginning to be included into existing communication networks, particularly with the Aegean. The scarcity of finds suggests, though, that contact was not direct, but rather through other Italian areas such as Sicily from which the products were circulated. An indirect confirmation of this hypothesis can be seen in the location of Luni, supposedly the northernmost outpost of the Mycenaeans in their search for metal: it is interesting to notice that the site is not particularly close to the metal sources in Tuscany or Tolfa, as would have been expected if direct presence was involved.

With the beginning of the Final Bronze Age begins the period of the greatest involvement of South Etruria in world networks during the Bronze Age. Once more, as the evidence for intraregional contacts and diversified economy becomes more intense, the involvement of the area with the outside world becomes more direct and controlled by the individual communities, rather than continue along the lines of diffuse exchange until then in operation.

Documented external contacts for the end of the 12th century are few, in agreement with the picture of decreased communication between sites. From the necropolis of Ponte S. Pietro come two Tiryns type amber beads (Rittatore *et al.* 1978: 64). Amber is in itself an imported material, but the particular shape of the beads is of Aegean type. The beads, which have been found in other parts of Italy, could in fact come from settlements like Frattesina, and do not need to represent an Aegean import other than in morphology. That contacts were related to metallurgy is shown by the Ortucchio type winged-axe mould from the house of the oil merchant in Mycenae which dates to the 12th century (Bietti Sestieri 1984, 112). Another Mycenaean IIIC sherd

comes from the settlement of San Giovenale, associated to Protovillanovan style pottery.

The hoard of Coste del Marano (11th century) provides an index of the wide ranging metallurgical contacts of the area at the time: the leaf-shaped violin bow fibulae show typological links with the Aegean; the bronze sheet cups bear affinities with Transalpine Europe, though the bull-shaped handles are similar to Aegean types (Bietti Sestieri 1973: 392); the pendant "a fermaglio" is akin to examples from Lipari, Pantalica and Piazza Monfalcone in Sicily (Bietti Sestieri 1984: 113; Fugazzola Delpino & Delpino 1979: 290); the stilted and knobbed arch fibula finds close parallels in examples from Sicily (Milazzo necropolis), Pantalica, and Submycenaean contexts in Attica (Bietti Sestieri 1981b: 233-4). The objects both from Coste del Marano and Greece are, nevertheless, local. This, and the lack of definite exports from one area to another, shows that unorganised contacts between the Aegean (and other Italian regions linked to it) and South Etruria occurred at this time, mainly affecting metallurgical types and production. These contacts, at least on the side of Etruria, centred on a specific area, Tolfa, which started to become particularly relevant because of its mining resources and the increased involvement of the local communities in their exploitation.

The 10th century provides evidence for organised long distance exchange for the first time. The contacts with the Po area have been discussed already. Besides them, Italian types continue to appear in Aegean contexts, (e.g. wheel shaped pinheads as the ones in the Manciano-Samprugnano hoard found in Greece (Bietti Sestieri 1981b: 235)), and there is also evidence for systematic contacts with nuraghic Sardinia, particularly for the Tolfa region. All hoards of the area and of this period contain at least one piece of Sardinian origin: the hoard of S. Marinella included a Huelva type sword (Fugazzola Delpino 1979, 307; Bietti Sestieri 1981, 242), the hoard from Tolfa had a heeled axe, and Monte Rovello's hoard contained two axes with side notches (Bietti Sestieri 1981b: 242; Fugazzola Delpino & Delpino 1979: 291). Tolfa seems to have maintained at this point a constant exchange effort with the North of Italy and the Tyrrhenian area (Sardinia), and this effort was centred on metallurgy, with settlements controlling to a great extent this socio-economic asset.

Western Veneto

Western Veneto's close contacts with Central Europe during the Early Bronze Age seem to intensify during the MBA, and affect metal production in particular, when the same basic metal forms can be found north and south of the Alps (Fasani 1980b: 26). Swords common in Veneto, such as the Cascina Ranza or Sauerbrunn types, find close parallels north of the Alps (De Marinis and Frontini 1991/92: 213; Peroni 1989: 213). European links can be also seen in the family of pins with swollen and perforated necks, which are found both throughout Europe and in Northern Italy. The funnel-shaped pendants known as *tutuli*, a type exclusive to Northern Italy, find close parallels in the Carpathian area (De Marinis and Frontini 1991/92: 213). Similarities also affect settlement types, the characteristically water-oriented lake-side villages. All this must reflect a situation of considerable communication and mobility, at least of ideas. Contacts outside Italy involve mainly the metallurgical area of the Benacense, indicating the possible impulse behind communication: metal circulation and technology. The impression is confirmed by the existence of common metallurgical forms with the Terremare area, despite the sharp cultural limits which otherwise exist between the two (Fasani 1980b: 26). The area of the plain, as we have seen, is culturally oriented towards the Terremare at the end of the Middle Bronze Age.

The LBA presents a changing picture of external contacts. Initially the Benacense continued to be oriented towards Central Europe, whereas the plain developed Adriatic and Central Italian connections. As the Late Bronze Age progressed, contacts with the Adriatic and Central Italy started also for the Benacense (pottery affinities have been discussed above). Metallurgical links with the Adriatic can be argued from one of the swords from Cavalzara, which had a tanged hilt with raised edges and two nailholes and finds a good parallel in a sword from Manaccora in the Gargano (Aspes 1987b: 105). Contacts with Central Italy in the last stages of the LBA are documented by a decorated pierced rod from Peschiera, similar to one in the Umbrian Gualdo Tadino hoard (Fasani 1980a: 74), and by a Gualdo Tadino type shovel with tubular hafting (Fasani 1980a: 96) from Fondo Paviani.

Bronze production from Peschiera reveals that technological and decorative links

developed over broad areas. Baierdoff knives or the Terontola and Arco swords, widely diffused north and south of the Alps (Peroni 1989: 215), reflect continued contact with Central Europe. In the second half of the Late Bronze Age metallurgical contacts involved also the Aegean, Central Italy and Sicily. Peschiera daggers are widely diffused in Europe and the Aegean (Bietti Sestieri 1973: 384; Harding 1984: 173). A finger ring and a spiral decorated disk from Peschiera (Fasani 1984: 554; Barfield 1994: 140) are of Aegean inspiration. A Pantalica type razor and fibula also from Peschiera (Fasani 1980b: 96; Aspes and Fasani 1986: 17), the leaf-shaped arch fibulae, the violin bow fibulae and the fibulae with nodules, show contacts with Central Italy and Sicily. Most Aegean fibulae types also have parallels at Peschiera (Bietti Sestieri 1973: 402-406; Harding 1984: 138). This and the fact that most Italian bronzes found in the Aegean came from funerary contexts and belong to Northern types (Smith 1987: 35-37), strongly suggests that the contacts were in the realm of technology, rather than product exchange.

Two Mycenaean style sherds from Fabbrica dei Soci (Margarise 1989-90: 164) and Fondo Paviani (this last one probably an imitation from the Adriatic region), were identified as IIIC, and probably belong to the very end of the Late or the very beginning of the Final Bronze Age. Possibly also from this moment of transition are the wheel-shaped pinheads, an Italian form adopted by the Greeks in the 12th century (Harding 1984: 142), and the Tiryns type amber beads, an Aegean shape found for instance in Fondo Paviani (Fasani 1980a: 96). Tiryns type beads come also from full FBA contexts in Montagnana and Frattesina. These two sites produced Mycenaean IIIC pottery as well (Vagnetti 1982: 203; Peroni 1989: 274), which suggests that they were very important centres for exchange and production (in the previous chapter we saw that evidence for secondary activities on site was found in all of these sites).

The intensification of contacts between sites documented with the Final Bronze Age affected external communications. Networks with the North were still active as demonstrated by the Luco sherds from the 11th century sites of Magrè and Santorso (De Guio in Fogolary et al. 1987: 102), the Italian material from Nin in Dalmatia, or a Fontanella type razor from Hungary (Salzani 1979: 150). Yet this link was no longer predominant, and the main direction of exchanges was towards Central Italy and the

Mediterranean. Significantly, in the Final Bronze Age Peschiera is definitely replaced by the plain settlements, more easily open to this new world of contacts.

Once more the bulk of evidence comes from Frattesina, though it is likely that the other sites technologically akin to Frattesina were involved in the exchanges. Links with the Aegean, and in particular with Cyprus, are documented by the ivory comb from Frattesina, which finds a parallel in execution and decoration in an example from a 12th century tomb in Cyprus (Peroni 1989: 274). Both ivory and ostrich eggshell are imports found in Frattesina, possibly from North Africa. They could have reached the settlement via Central Italy. In fact a link can be established between the abundant evidence for Cypriot presence in the mid-Tyrrhenian at this time, and the combs found in Cyprus and Frattesina, which could be products of the close contacts between the three areas. Sicilian contacts are many: a violin bow fibula from the site is connected in shape and decoration both to a fibula found in Cassibile in Sicily, and to Balkan pieces. Similarly a type of arch fibula with rhomboid bow-section is comparable to pieces from the Aegean (Salamis, Athens and Crete) and Sicily. Other Aegean and Central Italian links can be seen in the similarities between Frattesina's bronze hair-rings, gold examples from Kerameikos and bronze ones from Allumiere (Bietti-Sestieri 1973: 412). Associations of similar Frattesina type material, which would suggest more direct and controlled exchange, are found in funerary contexts in Bismantova, Timmari and Piazza Monfalcone (Bietti Sestieri 1976/77: 231). The distribution of the above mentioned material reveals the existence of a metallurgical route from Northern Italy, through Emilia and Umbria, to Southern Etruria, Sicily and the islands at this time, and through there, probably to the Aegean and more specifically Cyprus. The route must have ensured both metal supply (through Tolfa), and the distribution of various prestige items. Once again, it is interesting to notice that it is these Italian areas that appear affected by the Protovillanovan phenomenon, many times in cultural isolation from its immediate geographical neighbours.

The route from Veneto down the Adriatic coast to Apulia, which connected the area with various actively trading posts and Aegean presence, also continued in operation throughout the Final Bronze Age, as shown by the 10th century tanged-hilt knives from the area of Fimon, which are typologically similar to examples found in the mid-

Tyrrhenian and Adriatic coasts (De Guio in Fogolari *et al.* 1987: 103-104).

From the evidence set out above it is clear the Western Veneto's external contacts during the Final Bronze Age were carried out in a considerably organised fashion. Judging by the degree of involvement, the number of spheres affected (subsistence, personal ornament, prestige), the geographical spread of links, and the control exercised over them, external contacts and exchanges must have ranked high in the groups' economic life from the beginning of the Final Bronze Age. The importance given to socio-economic factors did not create, however, signs of territorial control or economic competition between sites, and the area remained an open thoroughfare which was exploited by the groups that inhabited it.

2. Veneto's and Etruria's socio-economic modes

A comparison of the two areas' economic and social involvement reveals very different histories of development despite the similar factors coming into play. Etruria entered exchanges as an active element really only at the end of the Final Bronze Age. Before that, its economic configuration attached primary value to subsistence practices. The groups, consequently, did not show particular interest in entering exchange networks outside the realm of subsistence. And external contacts at the time involved prestige goods, raw materials and secondary products, not subsistence products. The breakthrough for Etruria came with the combination of a series of factors from the Late Bronze Age onwards. First of all, in the Late Bronze Age there was a change in economic orientation parallel to demographic increases, which brought about by the need to increase subsistence production: this need opened the way for bronze tools, but bronze objects in general (until then only a few prestige items) slowly followed suit. The need to acquire access to finished products and technology necessitated a broadening of the social sphere at inter-regional level.

With the Final Bronze Age Etruria became part of a metal route between the North, the Tyrrhenian islands, and the Aegean. The moment of transition to the Final

Bronze Age was characterised by an intense exchange of technological and stylistical notions between Veneto, Central Italy, the Tyrrhenian islands and the Aegean world. This exchange was primarily carried out in the context of metallurgical production and distribution. This is a time when cultural similarities are easily recognisable, and when the groups which we know as Subapennine had developed an economy in which pastoralism began to play a secondary role in relation to agriculture, whilst secondary production acquired certain relevance (see Chapter 7). But the role of metallurgy in the economy of the various areas is different. In Veneto metal working had already acquired economic relevance, both for subsistence and for trade purposes, and it was an integral part of the economic sphere. For the Tyrrhenian islands, and the Aegean, metallurgy was even more so an integrated part of their socio-economic make-up. For South Etruria, on the other hand, bronze was still a social item with a limited economic impact, but the area's bridge position between the North and the islands constituted it in a natural beneficiary of the influences from both, once its economy had ceased to be exclusively subsistence oriented in the Late Bronze Age.

Finally, with the 10th century in traditional chronology, the area's metal resources started to be controlled locally, a phenomenon which affected mainly the areas with metal resources. Site densities kept increasing in these areas, probably a consequence of population being attracted to them and not simply because of natural growth. By that time metal working had acquired a definite economic and social role. Etruria seems to have benefited from its position as a trade corridor to develop one of its main assets: metal resources. If external factors were the only cause behind socio-economic complexity and development, it is to be expected that the local control of metal resources would have taken place before, from the end of the Middle Bronze Age and in the Late Bronze Age. Yet, the "late" wakening of the local groups to their economic potential shows that it was specific group choices, such as their economic basis and social orientation that might have prevented the earlier development of forms of control. Change came about as a consequence of the development of their own established economic system and as a response to population growth.

In Veneto, on the other hand, the settlements' economic foundations were based

from the beginning on an element of communication, between sites and with other areas. The need to adapt to an unstable environment gave rise to internally strong social units. Exchanges were important for the groups, and it is possible that it is the areas' agricultural potential, together with its geographical position that made it attractive to settlement, and ideal to support larger populations.

An important change came in the Late Bronze Age, when settlements became more stable, transhumance lost importance, and the area started opening up towards Central and Southern Italy. The reasons behind this change are obscure: it could be that the metal resources from Etruria attracted more attention, or that Mycenaean presence in the South became a natural objective, but these explanations seem insufficient. The mounting importance of secondary activities might be a reason: during the Middle and Late Bronze Age the area established itself as a metallurgical centre, Peschiera bronzes are widely distributed and contacts with various areas were diffusely established (see Fasani 1980a & b). With the growth of secondary production, settlements that were located along natural communication routes and which had good agricultural potential to sustain large populations would have been favoured by arriving craftsmen. This type of settlement could be found in the plain, and as a consequence of the topographical and hydrographical configuration of the area, contacts with the north lost importance whereas those with Central Italy gained it. Once contacts started to be established, interest in metal resources from Central Italy and possible exchange reciprocity from the Aegean would have fed the exchanging networks and increased their importance. A comparison of Mycenaean sherd findspots shows that contact with the Aegean was as important in Veneto as in South Etruria: four sites in Veneto against three in Etruria have yielded Mycenaean style pottery (see Vagnetti 1982). In fact, in Veneto, Mycenaean influence seems to have penetrated the area much more radically than in Etruria, since the sites are not coastal sites. The existence of well-established communication networks must have been an important factor in this presence.

This trend continued throughout the Final Bronze Age, and, as it closes, the first indications appear that landscape might be becoming organised. However, a vital difference with Etruria laid not only on the timing of their growth from subsistence to

socio-economic development, which in Veneto took place much earlier, but on where they based the foundations of this growth. In the case of Etruria, socio-economic development grew primarily out of the need to develop the subsistence base and represented a widening of this base. In Veneto, on the other hand, growth came out of its fortunate geographical position, and might have even led to over-expansion. The fact that Veneto's topographical configuration favoured specialisation rather than diversification of subsistence activities might have made the area largely dependent on its agriculture and brought about its abandonment when climatic conditions diminished its carrying capacity. The climatic crisis documented during the Middle Bronze Age took place when the subsistence basis of Veneto was still flexible and broad enough. When a similar oscillation took place in the Final Bronze Age, the reliance on agriculture for support and on ease of communication for the continuity of secondary activities, had restricted the groups' choices and might have motivated a deeper change.

Chapter 9: INTERPRETATION

"As a number of writers have pointed out, including Halstead and Lewthwaite, to understand growth in one area it is relevant to understand its absence in its neighbour. Likewise to understand development at one time it is necessary to seek insight into the converse at another point in the trajectory" (C. Renfrew 1994: 6).

After the study of the two areas has been completed, I now move onto the final analysis of the information set forth above, with a view to providing an answer to the reasons which prompted the research. My aim throughout has been to analyse the bearing of different factors on settlement choices in the past, and particularly, the role they played in the adoption of nucleated settlement forms which preceded urban formation (see Chapters 1 and 2). I have also sought to provide some insights into the nature of the urban phenomenon in Italy, by understanding its pre-formative stages. In order to achieve this broad outlook, detached from single site/region biases, I chose to compare two areas with a history of Bronze Age settlement development but with very different final trajectories: one, Etruria, which succeeded in developing nucleated forms of settlement which grew into proto-urban and later urban centres; the other, Western Veneto, where settlement nucleation did not continue nor develop, but dissolved back into simpler forms of organisation in a new geographical area.

My research has been based on the currently accepted models of settlement dynamics for both areas (Bartoloni 1986; Bicego 1986; Di Gennaro 1986, 1988, 1991/92; De Guio 1987; Malgarise 1989-90; Peroni 1989), which it took as a basis in order to then move onto the extent of the impact of various factors in the process of nucleation in each region (ref. Di Gennaro 1986, 1991/92; Bartoloni 1986; Peroni 1989; Malgarise 1989-90; Balista *et al.* 1982). It is precisely by comparing the effect of these variables in each region that it becomes possible to assess the general importance of their role on the tendency to nucleation observable throughout Europe and the Mediterranean in the Bronze and Iron Ages. The comparison of related yet different areas to provide an independent assessment of general issues such as settlement nucleation is still, sadly, a novel approach, though statements like that of Renfrew quoted above may help spread the practice. The theoretical considerations behind the adoption of this comparative approach were set out

at the beginning of this work (see Chapter 1). There have also been other objectives attained, which could be defined as side effects of the main research aim: for instance the need to bridge gaps resulting from defective research (for instance conceptual gaps brought about by phase and regional divisions which impeded a comparison of the areas on an equal footing), or the need for the establishment of a real time scale to allow an independent comparison of the two areas in time.

The study has involved the analysis of the following variables: environmental relationships, material culture and settlement continuity, development in terms of absolute time-scales, subsistence basis, technological achievement, and social involvement of the groups (see Chapter 1). I am aware that these represent only a choice, and that other aspects which have been touched upon could have been considered extensively. Among these I would specially like to mention the evidence for the emergence of individuals' social statuses, and the developments in symbolic systems in connection with changing forms of group organisation. The time and space restrictions imposed by a Ph.D. are responsible for their absence here. However, I believe that my research provides a vital substratum for the future study of these aspects, by setting out the more material features of subsistence, environmental adaptations, social contacts and so on.

Chapters 1 to 3 established the basic background to the research: methodology and aims, a review of the accepted pattern of settlement dynamics throughout time, explanation of the terminology used, and the review of the history of research. But the chapters do more than simply set out a background or outline of past research. Chapter 1 and 2 proposed a novel methodology to tackle the problems specific to the issue under consideration and Chapter 3 identified the historical issues affecting our understanding of the problem and the nature and quality of the data available. By doing so it highlighted the areas needing special attention (for instance, the historical bias towards later periods and ethnic interpretations, the stress on typological chrono-indicators, or the local nature of research which must be overcome in space and time before meaningful hypotheses can be formulated), allowing thus the research to be properly directed.

Chapters 4 to 8 developed the study of the different variables. Chapter 4

concentrated on environmental relationships, and the differences in environmental conditions. By providing an extensive analysis of the data available the chapter showed clearly that factors like climatic trends, which can be considered "universal" affected the two areas in very different ways.

Chapter 5 reviewed the traditional material culture of the areas building a unified typology from the single typologies used by various authors. It also analysed the material culture of each region, the life spans of the settlements under consideration, and the issue of settlement continuity. By doing so it permitted the study of the chrono-historical development of the areas, and showed it to be inappropriate to the study of settlement nucleation.

Chapter 6 follows directly from the conclusions from the study of the relative chronologies, by providing a detailed statistical analysis of the absolute dates available for the period. The results, which, despite the few dates still available I deem reliable enough, disagree with the traditional phasing in calendar years, and show that a mismatch between the two regions existed at least in the earlier periods, Western Veneto's Middle Bronze Age being approximately two hundred years ahead of South Etruria's. Besides these factual results which affect chronological and cultural interpretations, the chapter also established a potential way of approaching the development of absolute chronologies.

Chapter 7 dealt with two of the variables under study: the subsistence basis and the technology of the groups in the two areas throughout time. The main objective was to understand what the balance between these two aspects of the economy was in each area. This balance was judged to be an efficient indicator of increases in complexity, the main consideration being the dominant importance in the economy either of subsistence over technology or of technology over subsistence. Clearly Western Veneto's groups had an earlier and more important investment of energy in technology, many times directly in relation to environmental adaptations and building, but also to subsistence and social networks. In Etruria, on the other hand, subsistence remained the main basis of economic activity down to the Final Bronze Age. Even when technology began to acquire a more relevant role, it was initially prompted by subsistence considerations. The subsistence

basis seems to have shaped groups' attitudes for far longer than in Veneto, where secondary activities and technology played an important economic role already by the Late Bronze Age. The subsistence bases of the two areas, though apparently similar in its agro-pastoralist component, had different histories of development. In Veneto subsistence intensification concentrated on certain resources, most commonly agriculture. In Etruria, intensification took a more diversified form, affecting both agriculture and stock-breeding.

Finally, in Chapter 8 I incorporated the evidence for social interactions. I decided to approach this issue in close connection with that of subsistence and technology, by monitoring the importance of social aspects in the economy over those of strictly a subsistence nature. The approach was, thus, not centred on individuals but rather on group social attitudes. The geographical slant of the research (contacts between sites in each region, contacts between the two regions, contacts between each region and the outside world) provided some interesting insights on the importance of internal networks to the establishment of external ones, and on the vital importance of the group's set of priorities for the development of diversified forms of economic activity which is so characteristic of town/village systems. For instance, it became obvious that groups in Veneto developed an open orientation which determined their economic path, at a time when groups in Etruria remained a rather closed society, also in connection with their economic models.

1. The causes behind the settlement dynamics of Veneto

What are the individual images emerging from this study? In Veneto several factors of importance for the process of nucleation can be identified. The environment has often been put forward as a determinant factor in settlement dynamics (particularly deteriorations in climate causing settlement collapse). Yet, identified periods of environmental deterioration coincide both with demographic growth and expansion of settlement onto higher ground (around 1400 B.C., in the LBA1), and with settlement decline and disappearance (around 900 B.C., at the end of the FB3). These different outcomes prove that the environment was not the only factor at play. There were other long-term environmental elements which I sustain were more decisive to the history of

settlement development than climatic deterioration. First of all the topographical configuration of the area in clear separate environmental zones, which had high levels of potential for human exploitation yet provided little room for diversification or settlement dislocation without implying the need to exploit new territories. Secondly the area's widespread but unstable hydrographic system, along which settlement concentrated and which provided many of the area's assets (agricultural potential, ease of communication and exchange) but also many of its problems (unstable hydrographic systems liable to flooding, waterlogged areas). However, the role of the environment, as I see it, is a shaping one in which the groups still had the final word. During the Middle Bronze Age, communities preferentially opted for one environmental zone (the lakes, river axes and lower alpine valleys) with ease of access to several ecozones. Communication and control of waterways seems to have been a priority: though research is still in its initial stages, the discovery of irrigation channels dating from this period suggests that some of the large settlements already in existence may have controlled access to water in some areas. In fact, despite the apparent abundance of water in the plain, the importance of irrigation systems to take the water to the right places at the right times is confirmed by local agricultural practices. There was also experimentation on new locations on higher ground on the inner hills. The fact that climatic deterioration did not do away with sites at this moment shows that the groups had enough resources to cope with environmental worsening: in fact it is possible that the environment acted as an asset for complexity, by encouraging the development of socially strong units necessary to adapt to a wetland system, which they did successfully. There are already at this moment some settlements which because of their size and characteristics we could consider "nucleated". The broad subsistence basis at the time, and the location of settlements on frontier areas between ecozones would have facilitated coping with environmental stress.

The main change for Veneto came with the Late Bronze Age. In a period of demographic growth shown by increases in site numbers, it is possible to identify a change in the economic and locational strategies of the settlements. For a start, they are now preferentially placed on the hills overlooking the plain or on the mid to low plain itself, again along major watercourses. Access to agricultural land becomes more important, and it is possible that part of the change in orientation be due to the greater

agricultural potential of the plain. At this time, in fact, settlements seek preferential locations in the plain against the previously favoured Garda area. With the change in the preferred locations came also a change in the orientation of the groups, which strengthened their Adriatic and Central Italian social links: this was the easiest and more natural opening, considering the then active river network. In parallel to the growing importance of agriculture and the plain, there is a development of technology, particularly metalwork, which acquires economic relevance at this time. At the root of these changes rest specific group choices, but these must have been facilitated by the plain's capabilities for agriculture and trade, and it seems that the growing populations began to exploit the landscape in the most obvious way. The growing importance given to secondary activities and external contacts by the Veneto groups is graphically shown by the progressive shift of settlements from West to East, a tendency which can be observed also throughout the Final Bronze Age.

The tendency towards demographic growth is reversed at the end of the Late Bronze Age. Settlement contracted and growth was negative from that moment onwards. It is at this moment that the cycle of settlement which began in the MB1/2 comes to an end. The settlements that will reach the Final Bronze Age are those born in and after the MB3. On the other hand, the involvement of the groups in agriculture and trade continued to increase: settlement locations were ruled by access to agricultural, metallurgical or trading resources. The evidence still suggests, though, that these developments were not accompanied by the growth of the subsistence basis or of landscape control systems: there are indications that the groups began to narrow their subsistence basis by cutting down the effort of transhumance systems. This could be a reflection of the increasing interest in agriculture and sedentism, which made transhumance from the plain area a more labour intensive job, but it could also be that the so far independent demographic contraction made intensification of subsistence resources redundant in an area with decreasing population. The growth of exchange systems does not seem to have been accompanied by a parallel increase in settlement dependency: access to technological progress, raw materials, trade networks and products seems to have been carried out quite independently by sites functioning as self-sufficient units.

In the Final Bronze Age exchange is an economic priority for the location of settlements in the area. This is reflected in the chosen preferred locations for settlements, along the Po di Adria. This provided not only a good communication route with the inner Northern Italian area, the Adriatic and Central Italy, but is also surrounded by rich agricultural land. Settlement contraction continued throughout the Final Bronze Age, affecting mainly settlements in the hills overlooking the plain, and those on the plain not placed along the Po di Adria or in direct relation to the circulation of metals. The continuous concentration on agriculture and exchange in the life of the settlements, and their development in connection with these two realities might have meant that when environmental change affected the area again at the end of the Final Bronze Age, the groups had so channelled their economic basis so as not to be able to withstand the deterioration: both agriculture and communication and trade routes must have been affected by the extraordinary hydrographic conditions of that moment. By the end of the 10th century most settlements have disappeared: the few that survive do so only until the end of the 9th century when practically all traces of sites disappear from the area.

Veneto's failed process of nucleation seems to have been propelled mainly by the expansion of two variables: agriculture and trade. Yet it was not accompanied by population growth or the maintenance of a broad subsistence base. When environmental and demographic factors were favourable, the area seems to have over-expanded: some sites like Frattesina acquired outstanding levels of diversification and, presumably, organisation, but there was no real substratum for that growth either in the subsistence or in the existence of forms of power and control beyond the individual settlements. When the hinge of their expansion (the stable river system) went, the settlements which had built their existence on it went also. Bronze Age settlement nucleation in Veneto had not been accompanied by the development of social stratification or control of resources. Therefore, with the end of the 10th century the few settlements that survive seem to do so precariously. Most of them, except those in the area of Este and Padova, disappear in the 9th century. The area is practically deserted after that, until well into the second Iron Age. The settlements that grew in Este and Padova eventually developed into complex sites of protourban character, but this was not to take place until the 7th century, when the Etruscan city-states had already achieved full urban characteristics.

2. The causes behind the settlement dynamics of Etruria

How was settlement in Etruria affected by the different variables? For a start, its landscape provided the area with a prime asset for development: sufficient resources (including metals), scope for subsistence expansion, environmental stability, and a topography which allowed economic diversification within short geographical ranges (and therefore without substantially affecting sedentary patterns of settlement and stability). Environmental deterioration did not have the same impact in Etruria as it did in Veneto: the movements onto high ground and away from lakes, the coastal plain and river valleys do not coincide with evidence for climatic deterioration and seem to have been independent of environmental phenomena. Once again, as in Veneto, at the root of settlement choices one can find a series of group choices linked to the communities set of values. In the case of Etruria, these were not exchange priorities as in Veneto, but rather subsistence considerations. The life and attitudes of the groups inhabiting the area from the Middle Bronze Age was largely shaped by one variable: subsistence. Throughout the Middle Bronze Age, settlement locations and social contacts were ruled by the subsistence basis (agro-pastoralism with a transhumant component). The clustering of smaller sites around larger ones on tuff outcrops suggest the use of several sites by a group and a certain amount of mobility. Secondary activities are largely negligible at this time, as are organised contacts outside the realm of subsistence. If the groups in Veneto were characterised by an outward looking approach, those in Etruria seem the perfect opposite, with an inward-looking attitude to other groups and to innovation. Yet, the stable subsistence basis of the period was to sustain continuous population growth.

By the beginning of the Late Bronze Age efforts at intensifying production to support a growing population become more and more noticeable in the archaeological record: sites chose locations with access to agricultural and grazing land. In fact it seems that there is increasing value attached to access to land and, therefore, to settlement stability. Despite the deficient evidence for the period it would seem that the increasing tendency to reduced site numbers and larger site sizes might have been also in relation to land control, and the development of more efficient systems of food production. The sites of the Late Bronze Age do not cluster around larger settlements like those of the MB3 did, because, I suggest, the single groups that used them had started to aggregate as

a consequence of the intensification of practices like agriculture, and increased settlement stabilisation.

With the beginning of the Final Bronze Age and in the context of maintained population growth, it becomes obvious that smaller open sites began to disappear and give way to larger sites on defended positions (sites in relation to transhumance start disappearing at this time). A factor which has been often put forward at the root of the explanation for nucleation and increasing complexity in Central Italy is the development of metallurgy, which starts to become more apparent by the end of the Late Bronze Age and throughout the Final Bronze Age. My research, however, suggests that the development of metallurgy was itself a product of subsistence strategies, and of changes in the groups' social attitudes. Middle and Late Bronze Age groups certainly knew of the existence of metals in the area. Yet, no importance was attached to them even at a time when the Aegean market was active in neighbouring areas to the South. Metallurgy started to become relevant only after the development of more stable settlement systems as the consequence of the intensification of agriculture and the abandonment of transhumance (though not pastoralism). The concentration of sites on isolated heights and the discontinuation of transhumance networks are reflections of a development of the subsistence basis which gave more importance to land and territory control. The consequence was a diminution in the levels of communication between sites, which had until then been linked to subsistence contacts, and possibly, also the greater isolation of the individual communities and a more "local" outlook. This is reflected in the archaeological record by the lack of standardisation in pottery forms characteristic of the beginning of the period. In the context of this assertion of local property and identities, and in a vacuum for a vehicle for social contacts with other sites, the expansion of metallurgy into the subsistence system provided the groups with an interest in metal working and exploitation. It is possible that the diffuse contacts evidenced by distribution and technology of bronze objects during the Late Bronze Age were more the consequence of the presence of itinerant smiths from the North in the metal bearing areas of Etruria than of the actual involvement of the local communities in exploitation of resources. However, with the Final Bronze Age the communities start to take control of production, as shown by the gradual development of local types and technologies. The control of this

resource grew according to the then reigning social climate: individual communities local to the resources benefitted the most from them.

Subsistence intensification provided then, the main impetus for the introduction of metallurgy to the area. However, once metallurgy began to be exploited, the process accelerated more and more, until it affected the social sphere and the economy of the groups stopped being exclusively ruled by subsistence considerations. The concentration of finds and settlements in the Fiora and Tolfa areas from this moment onwards suggests that the slow change in the economic orientation of the groups started to attract population to the areas. Settlement sizes are again increased, and population growth must have favoured the survival of those settlements with possibilities for subsistence and territory expansion (i.e. settlements on the larger plateaux onto which settlement could grow, and with access to both agricultural and grazing land). The gradual increase of bronze finds of a utilitarian and local taste monitors the growth of metallurgy into an economic activity in its own right. It is in the context of the exploitation of localised resources that there was room for incipient control over production and distribution: there is some evidence for differences in the status of individuals from gravegood composition.

With the end of the Final Bronze Age the area was apparently shaken by a major change in settlement patterns. The majority of sites seemed to cease suddenly, settlement contracted, and population concentrated in the areas of Tarquinia, Vulci, Orvieto and what would later be other important Etruscan centres, whose sizes were remarkably larger. The communities that developed there were culturally akin to those of the Final Bronze Age, which could well be termed their predecessors. I wish to stress, nevertheless, that the change might only have been apparently grandiose, since given the low chronological resolution for many of the sites, it is difficult to determine the exact moment in which they ceased to function, and there are suggestions that many of them were abandoned already in the course of the 10th century. Therefore, the change did not take place overnight, nor did the groups find themselves in a new settlement and the Iron Age from one day to the next. The change was spectacular in its relative speed and thoroughness but not in its characteristics. As we have seen the tendency towards increases in site sizes and decreases in site numbers had been gathering momentum since the Middle Bronze

Age. With the change in economic basis in the 10th century the process was accelerated, and even this acceleration might be once again magnified by our deficient perception of time scales.

Etruria owes the development of nucleated settlement not to metallurgy, as commonly argued in the past, but rather to specific economic choices which shaped its social structure. The primary value attached by the communities to subsistence activities determined the location of the settlements already from the Middle Bronze Age. Continuous demographic growth, built upon a stable and well developed subsistence system, resulted in subsistence intensification. It is within this context that metallurgy first acquired some relevance. Subsistence considerations also led to emergence of forms of land control. It is only once the area had begun to move away from the emphasis on subsistence activities that metallurgy grew into an economic activity with social repercussions.

3. Conclusions

From the outlined individual histories of settlement dynamics it becomes clear that there was no single factor responsible for settlement nucleation, nor a universal "prime mover" that set it off. The environment was decisive for both areas but in very different ways: it provided the human groups in Veneto with a challenge that had to be overcome by increasing social internal cohesion in the sites, and it gave Etruria the topography and stability which allowed increasing settlement sedentism. What was common in both cases is that the areas were capable of sustaining large populations (nowadays Etruria and Veneto are still two of the main agricultural regions in Italy). External stimulus, another of the great explanations put forward for the development of more complex forms of settlement organisation, does not seem to have played a vital role either, at least not in the way it is usually understood (i.e. the less developed groups being recipients of the wisdom of more developed groups and imitating their structures). Both in Veneto and Etruria external factors were important only in so far as the communities wanted them to be so and incorporated them into their own organisation. Again, it becomes clear that these contacts were in turn dependent on the groups' own internal social networking.

The following table provides a summary of the different trajectories of development followed by human groups in both regions:

	Veneto	South Etruria
History of research	Mainly excavation	Mainly field survey
Environment: topography hydrology	Environmental fringe zone Marked altitudinal zonation Unstable hydrography	Stable landscape Varied & moderate topography Stable hydrography
Settlement distribution	According to preferred topo-ecological zones	More homogeneous, with later preference for metal bearing areas
Degree of settlement continuity	High from MBA to LBA New settlement cycle of LBA ends with FBA, affecting all settlement types	High from MBA to FBA Sites abandoned & reoccupied Preferential survival of certain settlement types
Sites: densities (d) sizes (s)	MBA (d) increasing (s) increasing LBA (d) decreasing (s) increasing FBA (d) decreasing (s) maintain/increase	MBA (d) increasing (s) increasing LBA (d) decreasing (?) (s) increasing (?) FBA (d) increasing (s) increasing
Chronology (approx. cal B.C.)	MBA: 1800 - 1400/1350 LBA: 1400/1350 - 1150 FBA: 1150 - 900	MBA: 1600 - 1300 LBA: 1300 - 1150 FBA: 1150 - 900
Subsistence	Diminishing importance of pastoralism Growing importance of agriculture Concentration on specific resources	Variety from site to site as to whether agricultural/pastoralist basis is predominant Generalised intensification Expansion in use of resources
Technology	Generalised access to resources and technological knowledge Important economic impact	Restricted access to resources and technological knowledge Limited economic impact
Social aperture	Open groups with extensive social links	Closed societies down to end of FBA

Table 9: Contrasting summary between Veneto and South Etruria.

Before concluding this work there are some points that need to be made. I hope to have shown that urbanism, as it developed in the Early Iron Age, had a long history of developments behind it without which it would have been impossible. Though no single cause or combination of causes could be identified, there are several factors which took special significance in the comparison of the two areas, either because of their presence or absence being significant in the settlement histories.

a) Demographic growth, either natural or through incoming population attracted by the areas' resources.

b) Well established, stable subsistence bases, as diversified as possible.

c) The growth of forms of internal control at settlement and at landscape levels.

In Veneto part of the problem seems to have been the lack of control of the landscape: sites developed as independent units, and there is not much evidence either for the development of individual forms of control within the sites, which seem to have remained largely egalitarian, with access to resources from the outside not apparently controlled. In Etruria, on the other hand, territoriality developed much more markedly, and access to resources was also geographically localised.

d) The change in balance from subsistence to secondary production in the economic basis of the group, fostering diversification and expansion.

e) At some point in time there needs to be a situation of stress to act as a stimulus for change. In the case of Veneto this was the environment, in Etruria the need to intensify the subsistence basis.

f) What seems absolutely necessary is the groups' attitude to this stimulus: whether they were closed or open to it, and whether they accepted innovation or clung to tradition. It is in fact a whole new field that remains open to investigation to try to document the symbolism of traditional or innovative attitudes in these groups, as a way of documenting the hypothesis that the early development of nucleated forms of settlement in Veneto was related to the "open-minded" or "entrepreneurial" attitude of the groups inhabiting the region, whereas Etruria took that much longer to open up to new forms of economic and social organisation, and did so only upon increasing pressure.

4. Future research

This brings me to a last consideration, that of the areas for future investigation opened up by my research. I think the chapter in chronological analysis has clearly shown the inadequacy of exclusively typological chrono-indicators. Regional chronologies have never been challenged since they are internally consistent, but my research has highlighted their interregional inconsistencies. I hope future research will follow suit by providing more radiocarbon dates from well stratified contexts that permit the firm anchoring of typological phases in calendar years.

Another field where more research would definitely be needed is that of environmental relationships, particularly in Etruria. Given the importance of subsistence considerations in the development of the area which my research has identified, zooarchaeological and palaeobotanic studies to elucidate the exact nature of the development of its subsistence basis would be particularly useful, as well as to provide clearer reasons for the differences in predominant species in different sites. Veneto's environment is already the subject of an intense environmental study by the Alto-Medio Polesine - Basso Veronese project, but an study of possible subsistence dependencies among sites (along the lines of that of Clark 1985) is a particularly interesting area to investigate in a region characterised by exchange.

I have already mentioned the recent discovery of irrigation channels of Middle-Late Bronze Age date in the Veneto plain (Balista, forthcoming). This discovery is so far limited to one site only, though trial excavation is programmed to ascertain the existence of irrigation channels in other sites. The path of research and the possibilities offered by this discovery are many and very exciting, since it could show, among other things, the extent to which those communities controlled their environment.

As a whole my Ph.D sets a new way of approaching settlement issues, by comparing the developments as they took place in different areas. The method (the advantages of which I discussed in Chapter 1), could be applied to other areas and periods. Particularly interesting because of its repercussions in later developments, would be to compare comprehensively the area of South Etruria with Southern Lazio during the

Bronze Age. A comparison of Veneto with Emilia during the Middle and Late Bronze Ages would be also interesting to elucidate the nature of the contacts between the Terremare and Veneto.

Finally, I think the study of the symbolism of tradition and innovation in relation to the problem of nucleation might prove a very rewarding, if difficult, area of research. My research has highlighted constantly that despite all the factors at play in the process of nucleation, there is always a final element of choice by the group, and that choice of the course of action to be followed was often in relation to their set of values and their priorities. A study of those values and of their attitude to the introduction of new priorities and solutions is central to the elucidation of the processes affecting settlement configuration. The city, as it emerged and as it still stands nowadays, is not simply a conglomerate of buildings, or even of different people, but the image of a society's historical, political, social, economic and ideological stories.

APPENDIX I
PLANT ECOLOGY INFORMATION

PLANT ECOLOGY INFORMATION

(Elaborated on data from: Huntley and Birks 1983, Follieri et al. 1982 in Franco 1982, Lamb 1977).

Fir: *Abies alba*

Poor dispersal of pollen: ≥2% local presence

≥5% significant presence

≥25% dominant species in locality

Deciduous-Coniferous montane zone sharing dominance with Beech

Variety of soils.

Cool weather, restricted drought tolerance.

Maple/Sycamore: *Acer Platanoides/Acer Opalus*

Poor pollen production and dispersal

Mixed deciduous forests

Favour deep rich soils, rocky places. Absent from base-poor, freely-draining and waterlogged soils.

cf. *Platanoides*: Typical of cold continental climate

cf. *Opalus*: Grows in calcareous soils (as in the pre-Alps and the low and medium Apennine mountains).

Alder: *Alnus*

High pollen producers: >2% local sparse presence

>10% alder dominated vegetation

Favours wet and waterlogged situations, flood plains.

Favours peaty soils, but also silty or gravelly substrates.

Intolerant of poor nutrient soils.

Requires more moisture and summer warmth than Pine and Birch.

Birch: *Betula*

High pollen producers: 10% local presence

>25% local birch dominated woodland

>50% birch dominated landscape

Light demanding seedlings

Mean temperature of warmest month must not be below 10°C.

It can survive long and severe winter frosts.

Grows on disturbed soils, bogs, heathy areas and podsols.

Hornbeam: *Carpinus Betulus*

1% local presence

>5% hornbeam prominent areas

>10% local dominance

Typical of a continental range.

Absent from driest and calcareous soils, and from podsols (tolerant of many types of soil and moisture).

Occurs in sandy and clay soils.

Unable to compete with Beech.

Flowering and fruiting hampered by early-spring frosts. Successful fruiting in Western Europe also restricted to years following long hot summers.

Intolerance of drought.

Increase in Central Italy at around 3000 B.P. (10%).

Northern Italy remains at 1%.

Sweet Chestnut: *Castanea Sativa*

Poor production and dispersal of pollen: >5% widespread woodlands near site

Calcifuge, favours well drained soils

Favours temperate climate.

Hazel: *Corylus*

2% local presence

>25% dominant in canopy

Mull (non-acid) soils

Light demanding

Continentality of climate is damaging: thrives in rather cool continental climate.

It does not tolerate very warm dry summers.

Around 3000 B.P. values of 5% in Northern and Central Italy.

Beech: *Fagus*

- ≥2% local sparse presence
- >5% regional presence of beech dominated woodland
- >25% beech dominated local area

Growth in a variety of soils

Oceanic species, spreads where humidity and rainfall are higher (for instance in foggy areas of Mediterranean mountains): it is not tolerant of late spring frosts and low summer temperatures (mean July temperature not below 12° C). It is not tolerant either of spring/summer evaporation excess and winter cold.

It grows above the warmer Castanetum and below the colder Picetum. In the southern Apennines it often appears associated to *Quercus Cerris*, *Alnus Glutinosa* and *Carpinus Betulus*.

Expansion in cleared forests

Expansion around 4000 B.P. in Mediterranean may reflect increase in precipitation and cooling of temperatures.

Constant 10% presence in Northern Italy around 3000 B.P.. Increase to same percentage in Central Italy at that time.

Manna Ash: *Fraxinus Ornus*

- >3% local presence in catchment area.

Sub-mediterranean species

More light demanding than other trees of the temperate zone.

It favours dry, calcareous soils: it cannot stand waterlogging.

Walnut: *Juglans*

Poor pollen dispersal: >5% abundant in area

Thermophilous species

Juniper: *Juniperus*

- >5% abundant in regional vegetation

Associated primarily with open woodland or scrub.

Avoids waterlogged soils.

Xerophilous.

Light demanding favours treeless situations.

Larch: *Larix*

10% dominated locally.

Sub-alpine forests

Calcareous bedrock. Favours humus-rich soils of moderate pH.

Avoids waterlogged situations.

Ostrya-type:

Favours fertile soils of moderate to high base-status.

Tolerant of moderate drought

Spruce: *Picea*

≥5% local presence

≥25% spruce dominated areas

Avoids very dry or waterlogged soils

Presence on calcareous bedrock

Requirement for persistent snow cover in winter, can survive long and severe winter frosts.

Seedlings cannot resist summer drought.

Increase in precipitation/evaporation ratio is more important climatically than temperature, but mean temperature of warmest month must be between 12.5°C and 19°C.

Pine: *Pinus*

>25% local presence

>50% locally dominating

Light demanding seedlings, growth in marginal zones

The mean temperature of the warmest month should not be below 10°C.

It can survive long and severe winter frosts.

Dry, sandy soils, podsols, peats, montane and boreal situations.

Avoid waterlogged soils

Aspen/Poplar: *Populus*

Poorly preserved pollen: >5% and even $\geq 1\%$ indicates abundant presence

Favours flood plains and river valleys.

Aspen: moist and waterlogged sites

Oak: *Quercus*

Favours acid or neutral soils

Mean temperature of warmest month should not be below 12°C (in oceanic conditions) or 16°C (in continental climates).

It is intolerant of severe winter frosts.

Absent from rich and waterlogged soils.

Lime: *Tilia*

Poor pollen dispersal: $\geq 5\%$ local presence

$\geq 10\%$ Dominated

Favours deep fertile soils

Avoids waterlogged, freely draining soils, podsols

Considerable drought and shade tolerance of seedlings, but intolerance of severe drought excludes it from the Mediterranean.

Minimum 13°C for germination, optimal temperatures for pollen-tube growth are between 22 and 28°C. However plant has great longevity and will produce pollen but no fruit in relict situations. It is more demanding from summer warmth than *Quercus*.

Retreat of *Tilia* in Northern Italy at around 3000 B.P.

Elm: *Ulmus minor*

Grows in clayey soils, better if they are fertile, deep and cool.

Grows from the plains to the Alps up to 1000/1200 m above sea level.

APPENDIX II
POTTERY AND BRONZE TYPOLOGIES

APPENDIX II: POTTERY AND BRONZE TYPOLOGIES

GLOSSARY

Vessel types

<i>Bicchiere</i> :	Cup	<i>Rientrante</i> :	Inturned
<i>Boccale</i> :	Big cup	<i>Svasato</i> :	Everted
<i>Brocca</i> :	Jug	<i>A calota</i> :	Hemispherical
<i>Ciotola</i> :	Bowl	<i>Carenata</i> :	Carinated
<i>Olla</i> :	Cooking pot/Large pot	<i>Emispherica</i> :	Hemispherical
<i>Piatto</i> :	Plate	<i>Biconico</i> :	Biconical
<i>Scodella</i> :	Bowl	<i>Concavo</i> :	Concave
<i>Scodellone</i> :	Large bowl	<i>Convesso</i> :	Convex
<i>Tazza</i> :	Cup	<i>Cilindrico</i> :	Cylindrical
<i>Tazzone</i> :	Large cup	<i>Cipolliforme</i> :	Onion shaped
<i>Urna</i> :	Urn	<i>Ovoide</i> :	Ovoid
		<i>Risega</i> :	Ledge

Vessel parts

<i>Labbro</i> :	Lip	<i>Schiacciato</i> :	Squashed
<i>Orlo</i> :	Rim	<i>Spigolo</i> :	Sharp angle/edge
<i>Collo</i> :	Neck	<i>Troncoconico</i> :	With outwardly sloping walls
<i>Spalla</i> :	Shoulder		
<i>Carena</i> :	Carination		
<i>Vasca</i> :	Belly		
<i>Piede</i> :	Foot		
<i>Ansa</i> :	Handle		
<i>Presa</i> :	Lug		

Vessel morphology

<i>Appiattito</i> :	Flat
<i>A tesa</i> :	Projecting perpendicularly
<i>Esoverso</i> :	Everted
<i>Imbutiforme</i> :	Funnel shaped

Decoration

<i>Bugna:</i>	Boss	<u>Handle morphology</u>
<i>Bozza:</i>	Large boss	<i>a apofisi a disco:</i> with discoidal ending of the handle
<i>Costolatura:</i>	Rib(bing)/Flutting	<i>a apofisi a lobo:</i> lobulated
<i>Scalanatura:</i>	Groove	<i>a bastoncello:</i> round in section
<i>Solcatura:</i>	Groove	<i>a corna di lumaca:</i> horned handle
<i>Cuppella:</i>	Dimple	<i>ad anello:</i> ring handle
<i>Fascia/Bande:</i>	Bands	<i>ad apici rivoluti:</i> with curling ends
<i>Riempimiento:</i>	Fill	<i>ad ascia:</i> axe handle
<i>Intaglio:</i>	Intanglio/Cut outs	<i>a gomito:</i> L-shaped
<i>A tacche:</i>	With notches	<i>a nastro:</i> tongue handle
<i>A ditte:</i>	Fingered/with finger impressed decoration	<i>a rocchetto:</i> spool-shaped
<i>Meandro:</i>	Meander	<i>a testa di papavera:</i> bird shaped handle
<i>Ondulata:</i>	Undulating	<i>a (pseudo-) tortiglione:</i> twisted
<i>A nastro:</i>	In bands	<i>canalicolata:</i> caniculated
<i>A nastro liscio:</i>	Plain band	<i>cilindro-retta:</i> with central cylindrical knob
<i>A nastro campito:</i>	Infilled band	<i>cornuta:</i> horned handle
<i>Cordone liscio:</i>	Plain cordon	<i>modellata:</i> with modelled sides
<i>A scacchiera:</i>	Chessboard motif	<i>pizzuta:</i> pointed
<i>Tratteggio:</i>	Hatching	<i>soprelevata:</i> raised handle
<i>Voluta:</i>	Curl/Volute	
<i>A onda:</i>	Wave/wavy	

Bronzes:

<i>Ascia a margini rilevati/rialzati:</i>	Axe with raised edges
<i>A tallone distinto:</i>	with distinct butt
<i>A tallone indistinto:</i>	with indistinct butt
<i>Ad alette:</i>	winged
<i>Ad occhio:</i>	with shaft-hole
<i>A cannone:</i>	with tubular hafting
<i>Capocchia:</i>	Head
<i>Collo:</i>	Neck
<i>Gambo:</i>	Body
<i>Punta:</i>	Point
<i>A tortiglione:</i>	Twisting
<i>Ingrossato:</i>	Swollen
<i>Perforato:</i>	Perforated
<i>A lingua da presa:</i>	with flanged hilt
<i>A codolo:</i>	with tanged hilt
<i>A coda di rondine:</i>	swallow-tail shaped/ with elongated pointed ends
<i>Ad anello:</i>	ring-shaped
<i>A manico pieno:</i>	solid hilt
<i>A base concava:</i>	concave hafting
<i>A base semplice:</i>	simple hafting
<i>A base semicircolare:</i>	simple/ rounded hafting
<i>A base arrotondata:</i>	rounded hafting
<i>A mazzuolo:</i>	maul-shaped
<i>A remo:</i>	oar-shaped
<i>A riccio:</i>	curled
<i>A rotolo:</i>	Coiling
<i>A suggello:</i>	seal-shaped
<i>Rastremato:</i>	narrow(ing)
<i>Rientranze laterali:</i>	ricasso

CENTRAL ITALY

MB1-2 (traditionally the 16th and 15th centuries B.C)

"GROTTA NUOVA":

MB1 (Fig. II, 1)

Deep bowl, high carination, tubular handles above shoulder and everted rim. (3)

Bowl not too deep, high carination, tubular handles projecting over the rim and under shoulder, straight walls. (13)

Large carinated bowl with low carination and plain simple rim, decorated or, more frequently, undecorated. When decorated, it is incised or roller- stamped festooning above the shoulder.

Decorated: (30 & 31)

Undecorated: (32)

Bowl not too deep, midle carination, large everted rim, large omphalos base and large strap handle on the rim. (7 and 9: low carination)

Raised flat vertical handle with upturned end (sometimes decorated). (44)

Small storage jar with straight rim and incised diagonal hatching on the shoulder.

(33)

MB2 (Fig. II, 2)

Bowl not too deep, middle carination, everted rim, small strap handle above shoulder. (5)

Bowl not too deep, high carination, inturned plain rim and triangular knobs on rim.

(22)

Shallow bowl, high carination, inturned plain rim and triangular knobs on rim. (21)

Bowl with high carination, elongated tubular handles on shoulder. (12)

Deep bowl, high carination, inturned plain rim and large omphalos base. (25)

Deep bowl, high carination, inturned plain rim, small rectangular horizontal handles with two holes on shoulder. (20)

Deep bowl, high carination, inturned plain rim, small ring handles from shoulder to rim. (23)

Deep bowl, sharply carinated bowl with everted rim the diameter of which is narrower than at the shoulders. (4)

Bowl not too deep, inturned plain rim and rectangular handle with two holes on shoulder. (18)

Shallow bowl, inturned plain rim and rectangular handle with two holes on shoulder. (19)

Shallow bowl with inturned plain rim. (24)

Raised ring handle with plastic ribbon-shaped decoration and inturned sides. (49)

Undecorated situla with vertical triangular perforated handles on the rim. (38)

Undecorated situla with vertical rectangular perforated handles on the rim. (39)

Situla with applied cordon decoration and vertical perforated handles on the rim. (40)

Shallow plate, with triangular knobs on rim and straight walls. (26)

MB1/2 (Fig. II, 3)

Bowl not too deep, high carination and everted rim. (10)

Deep bowl, middle carination with strap handles on upper body above shoulder.

(11)

Bowl not too deep, middle carination, curving walls and tubular handle on the shoulder. (6)

Shallow bowl, high carination, slightly everted rim. (14 and 17)

Deep bowl, high carination, omphalos base, strap handle from rim to shoulder. (8)

Bowl not too deep, middle carination, s- profile. (16)

Deep bowl, high carination, everted rim of smaller diameter than carination, slightly convex walls and elongated tubular handles on shoulder. (1)

Hemispheric bowl with everted rim, undecorated. (28)

Hemispheric bowl with slightly everted rim and large strap handle on the rim. (29)

Shallow bowl with straight walls, slightly everted rim and incised horizontal lines on the body. (15)

Hemispheric bowl with s-profile and incised decoration over shoulder. (2)

Everted axe-handle (48)

Rectangular handle with two holes and side conical knobs. (47)

Broad axe handle. (43)

Raised flat ring handle. (45)

Axe handle with side conical knobs. (46)

Tubular handle with side lobes. (50)

Biconical jar with strap handles on shoulder, tall and wide neck and everted rim.

(37)

Small biconical jar with one small tubular handle on shoulder, large everted rim and incised geometric decoration on upper body. (35)

Biconical jar with concave narrow neck, small everted rim and bossing on shoulder. (36)

Deep jar with convex walls and strap handle on the body. (34)

Plate with inturned rim. (27)

Milk-boiler of Trump's northern type with small everted rim. (42)

Milk-boiler of Trump's northern type with straight plain rim and strap handle on the body. (41)

Axe with raised edges restricted to the top part, with distinct blade (f)

Axe with markedly raised edges, Canterano type (e)

Dagger with simple hafting and no nail-holes (c)

Dagger with heart-shaped hafting (a)

Small dagger with simple hafting and two nail-holes (b)

Pin with perforated neck, Bor di Pacengo type (g)

Pin with triple ring head (d)

MB3a (traditionally the 1st half of 14th century B.C)

"APENNINE":

BOWLS (Fig. II, 4)

1. Carinated bowl with everted rim, diameter wider at the shoulder, inwardly sloping straight walls, low carination and straight or slightly convex belly walls. Type 35 (no. 14)
2. Carinated bowl with everted rim, diameter wider at the shoulder, inwardly sloping straight walls, middle carination and straight belly walls. Type 37 (no. 15)
3. Carinated bowl with everted rim, diameter wider at the shoulder, inwardly sloping concave walls, low carination and slightly convex belly. Type 39
4. Carinated bowl with slightly everted rim, diameter wider at the shoulder, inwardly sloping concave walls, soft carination and convex belly. Type 40 (no. 17)
5. Carinated bowl with funnel shaped rim, diameter wider at the shoulder, straight

walls markedly sloping towards the inside, high carination and convex belly. Type 38 B (no. 16)

6. Carinated bowl with everted rim, diameter equal at the shoulder and rim, middle carination and inwardly sloping straight walls. Type 29 (no. 12)

7. Carinated bowl with everted rim, diameter equal at the shoulder and rim, inwardly sloping straight walls, middle carination and convex belly. Type 30 (no. 11)

8. Carinated bowl with flared rim markedly everted, diameter equal at the shoulder and rim, concave walls which become thicker at the carination, low carination and straight belly walls. Type 31 (no. 13)

9. Carinated bowl with everted rim, diameter wider at the rim, and inwardly sloping straight walls, low carination and straight or slightly convex belly walls. Type 7A (no. 3)

10. Carinated bowl with everted rim, diameter wider at the rim, and inwardly sloping straight walls, middle carination and straight belly walls. Type 8 (no. 4)

11. Carinated bowl with funnel shaped rim, diameter wider at the rim, vertical straight walls, middle carination and slightly convex belly. Type 4 (no. 1)

12. Carinated bowl with funnel shaped rim, diameter wider at the rim, vertical straight walls, middle carination and straight belly walls. Type 5 (no. 2)

13. Carinated bowl with slightly everted rim, diameter wider at the rim, slightly concave walls which slope towards the outside of the vessel, low carination and slightly convex belly. Type 10 (no. 5)

14. Carinated bowl with everted rim, diameter wider at the rim, markedly concave

vertical walls, low carination and straight or slightly convex belly walls. Type 12 (no. 6)

15. Carinated bowl with everted rim, diameter wider at the rim, inwardly sloping concave walls, low carination and convex belly. Type 18 (no. 7)

16. Carinated bowl with everted rim, diameter wider at the rim, strongly concave walls, middle carination and convex belly. Type 21 (no. 9)

17. Hemispherical bowl with funnel shaped rim. Type 46 (no. 18)

18. Hemispherical bowl with funnel shaped rim and rounded belly. Type 51, A and 54 B (no. 19)

(Fig. II, 5):

19. Large bowl with inwardly sloping straight walls, with swollen and flat rim. Type 64 A (no. 5)

20. Large bowl with inwardly sloping straight walls, with inturned rim and curved profile. Type 65 (no. 7)

21. Large bowl with inwardly sloping straight walls, and with funnel shaped rim. Type 64 A (no. 6)

STORAGE/COOKING VESSELS

1. Globular cooking pot with inturned rim Type 66 (no. 8)

2. Globular cooking pot with everted rim and neck either cylindrical in shape or with straight walls that slope inwardly. Type 68 (no. 9)

3. Ovoid cooking pot with very slightly everted rim and cylindrical body. Type 71 (no. 10)

4. Cooking pot with concave-convex body and sharp angle between the neck and the shoulder. Type 72 (no. 11)

CUPS

1. Carinated cup with concave-convex shape, decorated, with strap handle above shoulder. Type 57 (no. 1)

2. Carinated cup with everted rim, middle carination and straight belly walls. Type 58 A (no. 2)

3. Hemispherical cup widest at the body, with slightly everted rim and rounded belly. Type 61 A & B (no. 3)

4. Hemispherical cup widest at the body, with short concave neck and onion shaped belly. Type 63 (no. 4)

LIDS

1. With concave-convex profiles. Type 77 (no. 12)

DECORATIVE TECHNIQUES AND MOTIFS (Fig. II, 6-10)

1. Undulating lines.

1. Linear motifs. Type 1, 4, 8

2. Forming a plain band. Type 2, 3, 9

2. Festoons

1. Formed by a plain band. Type 11, 15A, 16

2. Formed by a band infilled by a single line of dots. Type 15B

3. Formed by a band infilled by many dots. Type 10, 12, 15C

3. Circular motifs

1. Linear concentric circles. Type 18

2. Forming a plain band. Type 21

3. Forming a plain band infilled by a single line of dots. Type 20
4. Forming a band tightly infilled with dots. Type 22, 23

4. Spirals

1. Linear spiral. Type 27
2. Forming a band infilled by a single line of dots. Type 29B
3. Forming a band tightly infilled with dots. Type 29C, 31A, 33A
4. Forming a band infilled with one or several lines of dots arranged in zig-zag. Type 29D

5. Wave motifs

1. Linear. Type 38
2. Forming a band infilled by a single line of dots. Type 41A, 42
3. Forming a band tightly infilled by many dots. Type 39B, 41B

6. Curl/Volute motifs

1. Forming a band infilled by a single line of dots. Type 35A

7. "A cani correnti"

1. Formed by a band infilled by a single line of dots. Type 44B
2. Formed by a band tightly infilled by dots. Type 44C

8. Motifs with impressed circles. Type 45-48

9. Rectilinear motifs.

1. Linear. Type 51
2. Forming a band infilled with a single line of dots. Type 52A
3. Forming a band tightly infilled with dots enclosed by vertical hatching.

Type 54

4. Straight line of cut out half moons. Type 50
5. Cut out straight bands. Type 55

10. Rectangular meanders.

1. Linear motifs. Type 64, 86
2. Formed by a band infilled with a single line of dots. Type 58B, 61, 63, 66A, 74, 79B, 80B
3. Formed by a band tightly infilled with dots. Type 58C, 60, 65, 66B, 68, 72, 80C, 84A&B
4. Formed by a band tightly infilled with dots and enclosed by vertical hatching. Type 69
5. With a middle line parallel to the lines delimiting the motif. Type 76, 80E

11. Oblique meanders

1. Linear motifs. Type 103
2. Formed by a band infilled with a single line of dots. Type 89A, 92A
3. Formed by a band tightly infilled with dots. Type 90, 92B, 94, 96, 97, 98A
4. Formed by a band infilled with vertical hatching. Type 98B

12. Motifs using triangles and squares

1. Formed by a band infilled with a single line of dots. Type 104
2. Formed by a band tightly infilled with dots. Type 105A, 107

13. Cross motifs

1. Formed by a band infilled with a single line of dots. Type 110

14. Toothed motifs infilled with dots. Type 111-124

15. Diamond shapes

1. Linear motifs. Type 125-127, 132
2. Formed by a plain band. Type 139, 148, 151, 156
3. Formed by a band infilled by a single line of dots. Type 138, 143A&B,

157B

4. Formed by a band tightly infilled by dots. Type 128-130A&B, 131, 142, 145A, 147B, 154B, 155

5. Formed by a band tightly infilled by dots and enclosed by vertical hatching. Type 130C, 145B

6. Forming a band infilled by dots with cut outs in the blank areas. Type 146, 147C

16. Chessboard motifs/Checked motifs

1. Linear. Type 159

2. With alternating blank and infilled squares. The infill is of dots. Type 163, 164

17. Zig-zags

1. Linear. Type 167-169, 171, 185-187A

2. Formed by a plain band. Type 174A, 176

3. Formed by a band infilled by a single line of dots. Type 170, 174B, 175B

4. Formed by a band tightly infilled with dots. Type 174C, 175C, 177A&B, 178-181A, 182-184

5. Formed by a band infilled with interrupted horizontal hatching. Type 174D

18. Herringbone motifs

1. Linear. Type 189, 190

2. Formed by a band tightly infilled with dots. Type 191, 192

19. Motifs with triangular cut outs

1. Type 200

2. Enclosed by bands infilled with dots. Type 203A, 206A

MB3b (traditionally the 2nd half 14th century B.C.)

BOWLS (Fig. II, 11)

1. Carinated bowl with everted rim, diameter wider at the shoulder, concave wall, middle carination and straight belly walls. Type 41 (no. 14)
2. Carinated bowl with funnel shaped rim, diameter equal at the rim and carination, convex wall strongly sloping towards the inside of the vessel, middle carination and convex belly. Type 34 (no. 12)
3. Carinated bowl with everted rim, diameter equal at the rim and carination, concave wall that becomes thicker at the carination, low carination and convex belly. Type 32 (no. 11)
4. Carinated bowl with low carination, diameter wider at the rim, straight walls which slightly slope towards the outside, horizontally projecting rim and slightly convex belly, vertical strap handle with bird shaped ending. Type 1 (no. 1)
5. Carinated bowl with low carination, diameter wider at the rim, straight walls, horizontally projecting rim and slightly convex belly. Type 2 (no. 2)
6. Carinated bowl with low carination, diameter wider at the rim, straight walls and belly, and with funnel shaped rim. Type 3 (no. 3)
7. Carinated bowl with diameter wider at the rim, and slightly convex wall which slope towards the inside, low carination and convex belly. Type 26B (no. 9)
8. Carinated bowl with diameter wider at the rim, slightly convex walls which slope towards the outside, everted rim, high carination, convex belly and vertical strap handle with twirling ends and central triangular hole. Type 28 (no. 10)

9. Carinated bowl with perpendicular projecting rim, diameter wider at the rim, concave walls. Type 15 (no. 4)

10. Carinated bowl with funnel shaped rim, diameter wider at the rim, concave wall slightly sloping towards the inside of the vessel. Type 16 (no. 6)

11. Carinated bowl with everted rim, diameter wider at the rim, concave walls slightly sloping towards the inside, middle carination and convex belly. Type 20 A (Large) and 20 C (Narrow) (nos. 5 & 7)

12. Carinated bowl with funnel shaped rim, diameter wider at the rim, convex vertical walls and low convex belly. Type 24 (no. 8)

13. Hemispherical bowl with funnel shaped rim which has a sharp inner ledge, and with rounded belly. Type 49 (no. 15)

14. Hemispherical bowl with funnel shaped rim and rounded and compressed belly Type 50 (no. 16)

15. Hemispherical bowl with everted rim and with deep s-profile belly. Type 51B (no. 17)

(Fig. II, 12A):

16. Hemispherical bowl with funnel shaped rim and rounded and compressed belly, and with the maximum diameter at the body. Type 55 (no. 2)

17. Hemispherical bowl with everted rim and s-profile. Type 52 (no. 1)

18. Hemispherical bowl with slightly everted rim, sinuous profile and narrow shape. Type 53 (no. 6)

STORAGE/COOKING VESSELS

1. Cooking pot with everted rim, globular body and sinuous profile. Type 69 (no. 5)

CUPS

1. Carinated cup with everted rim, high carination, concave-convex shape. Type 59 (no. 3)
2. Hemispherical cup with everted rim and sinuous profile. Type 60 (no. 4)

DECORATIVE TECHNIQUES AND MOTIFS (Fig. II, 12B-14)

1. Undulating lines.
 1. Linear motifs. Type 5A
 2. Linear with cut outs in the free spaces. Type 5B
 3. Forming a plain with cut outs. Type 7
2. Festoons
 1. Cut out. Type 13, 14, 15E
3. Spirals
 1. Forming a band infilled by vertical hatching. Type 33B
 2. Cut out. Type 28, 29F, 31B, 32
4. Wave motifs
 1. Cut out. Type 39D, 40, 41C
5. "A cani correnti"
 1. Cut out. Type 43
6. Rectangular meanders.

1. Cut out motifs. Type 58E, 59B, 66C, 70, 73B, 75, 77, 81, 83
2. Formed by a band infilled with vertical hatching and cut outs. Type 59A

7. Oblique meanders

1. Linear motifs. Type 88
2. Cut outs. Type 99, 100

8. Diamond shapes

1. Formed by a plain band. Type 144, 157A
2. Cut outs. Type 136, 149
3. Formed by bands that are both blank and infilled with vertical hatching.

Type 152

9. Chessboard motifs/Checked motifs

1. With alternating blank and vertical hatching infilled squares. Type 166
2. With alternating blank and cut out squares. Type 158B, 162, 165A&B

10. Zig-zags

1. Linear and with bands infilled with vertical hatching. Type 188

11. Motifs with triangular cut outs

1. Type 105B, 193-195, 203B, 204, 205, 210, 211B, 215-218
2. Enclosed by bands infilled with vertical hatching. Type 206B, 207, 208, 211A, 214, 219

MB3a/MB3b (Fig. II, 15)

Axe with short everted edges (9)

Flanged hilt sword, Manaccora type (15)

Dagger with triangular hafting and three nail-holes (18)

Winged axe with medium wings (11)

Axe with distinct trapezoidal butt (1)

Simple hafting sword, Pertosa type (12 & 13)

LBA (traditionally the 13th century - 1st half 12th century B.C)

BOWLS (Fig. II, 16)

1. Very shallow and large carinated bowl, with short slightly everted rim and diameter larger at the rim. (TYPE 1B) (9)

2. Deep and large carinated bowl, diameter larger at the rim, with convex bottom walls (TYPE 5B) (10)

3. Small carinated bowl with curved and slightly everted rim, diameter larger at the rim (TYPE 14) (7 & 8)

4. Shallow and very large carinated bowl with everted rim, diameter larger at the rim, concave shoulder and convex belly and vertical tongue handle from under the rim to the carination, or directly over the carination (TYPE 4A & B) (Fig. II, 18, no.5)

CUPS

1. Small cup with outwardly sloping convex walls and irregular rim with tripod base or cylindrical foot with omphalos base (TYPE 15) (no. 5)

HANDLES

1. Vertical raised handle with an appendix which is discoidal with side knobs

(TYPE 84A) (no. 4)

2. Double loop handle with keeled upper loop and transversal knob between the two rings (TYPE 80) (no. 1)

3. Oblique lugs placed on the base of the vessel (TYPE 65)

4. Tongue handle ending on a lobe-shaped knob (TYPE 74E)

5. Handle ending on a fan-shaped knob (TYPE 74D)

(Fig. II, 17):

6. Bird-shaped ending of raised vertical handle (TYPE 81) (no. 5-8)

7. Vertical tongue handle with raised cylindrical central appendix. (TYPE 82) (no. 3)

8. Vertical raised horned handle "a corna di lumaca" (TYPE 84B) (no. 1 on left)

9. Vertical handle round in section with transversal knob in the lower part and two side knobs on the top (TYPE 88) (no. 4)

10. Double-ring handle (TYPE 85) (no. 1 on right)

(Fig. II, 18):

11. Vertical handle round in section with pointed side knobs and keeled cross-section (TYPE 89) (no. 12)

PLATES

1. Plate with low vertical walls and flat bottom, with lug handles on the rim (TYPE 17) (no. 7)

STORAGE VESSELS

1. Ovoid/globular urn with or without distinct cylindrical neck and with a large tongue handle over the carination
2. Biconical urn with elongated body

OTHER POTTERY OBJECTS

1. Spindle whorls

1. Flat section (TYPE 68) (no. 10)
2. Hemispherical (TYPE 69) (nos. 13, 16, 17)

2. Spools

1. Cylindrical body which widens at both ends (TYPE 72) (no. 2)

3. Loom weights

1. Trapezoidal and quadrangular in section, with transversal hole (TYPE 71) (no. 19)

4. Other

1. Clay figurine of a quadruped (TYPE 73) (Fig. II, 17, no. 2)

BRONZES (Fig. II, 19)

1. Tanged hilt sword, Terontola type. (6)

2. Flanged hilt sword, Treviso type.

3. Flanged hilt sword, Cetona type. (10)

4. Flanged hilt sword, Montegiorgio type. (9)

Types characteristic of the LBA2

5. Double edge razor with narrow blade, Pertosa type. (8)

6. Flanged hilt knife, Matrei var. A. (11)

7. Flanged hilt sword, Frassinetto type. (148)

FBA (traditionally the 2nd half 12th century B.C - ca.900 B.C.)

FBA1 (Fig. II, 20)

Simple biconical urn decorated with lines and sometimes bosses under the rim. (6)

Lid-bowl with everted rim and angled profile. (11)

Lid-bowl with slightly inturned rim. (5)

Decorative motifs:

1. Series of incised parallel lines. (AA)
2. Irregular combing. (BB)

Winged axe, Ortucchio type. (2)

Flanged sword, Allerona type. (153)

FBA2

Lid-bowl with everted rim, angled profile, and spool-shaped handle on the carination.

Sharply carinated bowl with a small horizontal handle on the shoulder.

Deep and sharply carinated bowl with everted rim and oblique fluting on the

carination.

Decorative motifs: still restricted to specific areas of the vessel.

1. Bands of lineal grooves flanked by dimples.
2. Horizontal and oblique lines of dimples.
3. Zig-zag combed motif which encloses dimples in its angles.
4. Zig-zag combed motif flanked by a line of dimples.

BRONZES (Fig. II, 21 A)

Winged axe with oblique shoulders, S. Stefano type. (20)

Arc fibula with swollen arc and two side nodules. (3)

Double edge razor, Croson di Bovolone type. (19)

Pin with nailshaped head. (11)

Shovel with tubular hafting. (16)

Shaft-hole pickaxe. (17)

FBA2-FBA3 (Fig. II, 21 B)

Double edge razor, Terni type. (1)

Winged axe with side protruberances, Mt. Rovello type. (15)

Winged axe, Goluzzo type. (19)

Wheeled pinhead Narce type. (10)

Wheeled pinhead Benacci type. (11)

Arc fibula with slender arc with double fold. (12)

FBA3 (Fig. II, 22)

Biconical urn with long everted rim and squashed profile. (11)

Ovoid urn with long everted rim and squashed profile.

Ovoid urn with everted rim and one or two obliquely horizontal handles on the lower part of the shoulder

Biconical urn with a lenticular base, inwardly sloping neck walls and everted rim.

(27)

Ovoid urn with a lenticular base, inwardly sloping neck walls and everted rim. (30)

Carinated bowls with umbelicated base, concave-convex body, raised vertical handle decorated with incisions on the upper part and with decoration over the shoulder and the carination.

Ovoid amphora with decorated shoulders, short everted rim and two vertical handles placed from the rim to the upper part of the shoulder. (8)

Large cup with one large strap handle, everted rim, short neck and lenticular body decorated by grooves and fluting. (8)

Small three-foot plate. (3)

Askoi. (22)

Decorated spherical clay helmet. (A)

Decorated hemispherical clay helmet. (B)

Decorated clay helmet in the shape of a truncated cone. (C)

Decorative motifs:

1. Bands of grooves flanked by cord impresions
2. Cord-impressed zig-zags
3. Combed zig-zag motifs with one dimple over the angle
4. Dimple rosettes
5. Horizontal grooves above oblique fluting
6. Occasional interruption of the horizontal decoration by vertical incisions

BRONZES (Fig. II, 23)

Tanged hilt knife Celano type (243)

Tanged hilt knife, Bismantova B type. (279)

Double edge razor, Allumiere type. (11)

Winged axe, Gabbro type. (14)

Winged axe, Tolfa type. (9)

Winged axe, Campese type. (12)

Shaft-hole axe, Chiusi type. (10)

Shaft-hole axe, Cerchiara type. (13)

Shaft-hole axe, with oval hole, S, Francesco type. (4307)

Flat axe with broad blade, Scorrano type. (4476)

Torri d'Arcugnano type pin. (6)

Sarzana type pin. (4)

(Fig. II, 24):

Large fibula with bow decorated by continuous annular incisions. (1)

Arc fibula with wire forming series of loops. (7)

Arc fibula with elicoidal central arc. (4)

Arc fibula with swollen arc, double fold and symmetrical foot. (10)

Serpentine fibula with detachable straight pin, bow with incised decoration and spiral foot. (14)

Serpentine fibula with three loops, and symmetrical foot. (13)

Serpentine fibula with three loops, spiral foot and flat bow. (12)

Serpentine fibula with spiral foot, bow decorated by annular incisions and with large spring. (11)

NORTHERN ITALIAN POTTERY

MB1 (traditionally the 16th century B.C)

MB1

Cup of Isolone type, without rim or foot, decorated (Fig. II, 25, 15)

Cup of Isolone type, without rim and with broad foot, undecorated (Fig. II, 25, 17)

Cup of Isolone type, without rim and with broad foot, decorated with fluting which encloses zig-zag or triglyph motifs (Fig. II, 26, 7)

Shallow carinated bowl, with caniculated handle from rim to carination, with lobulated decoration on the belly (Fig. II, 25, 16)

Shallow carinated bowl, with caniculated handle from rim to carination, with straight walls, low carination (Fig. II, 26, 11; (Fig. II, 27, 1)

Shallow carinated bowl, with caniculated handle from rim to carination, with straight walls, carination not too low (Fig. II, 27, 4-5)

Shallow carinated bowl, with caniculated handle from rim to carination, with straight walls, middle carination (Fig. II, 27, 7)

Shallow carinated bowl, with caniculated handle from rim to carination, with slightly concave walls which are inclined towards the outside, decorated belly and low carination (Fig. II, 27, 3)

Shallow carinated bowl, with caniculated handle from rim to carination, with rim diameter wider than the carination, decorated (Fig. II, 27, 8)

Shallow carinated bowl, with caniculated handle from rim to carination, with carination diameter wider than the rim, decorated (Fig. II, 27, 9)

Shallow carinated bowl, with caniculated handle from rim to carination, with slightly concave outwardly sloping walls, middle carination (Fig. II, 27, 6)

Shallow carinated bowl with raised handle, straight vertical walls and typical decoration (Fig. II, 27, 10)

Shallow carinated bowl with raised handle, inwardly sloping straight walls (Fig.

II, 28, 1)

Shallow carinated bowl with raised handle, slightly concave walls, wider at the carination, with narrow profile and undecorated (Fig. II, 27, 2)

Fairly deep carinated bowl, with raised handle, equal diameter at rim and shoulder and decorated walls (Fig. II, 25, 14)

Fairly deep carinated bowl, with raised axe handle, inwardly sloping straight walls (Fig. II, 28, 2, 4)

Fairly deep carinated bowl, with raised axe handle, wider at the carination (Fig. II, 28, 3)

Fairly deep carinated bowl, with raised horned handle, inwardly sloping walls and decoration on the shoulder (Fig. II, 28, 5)

Bowl with s-profile, deep, and with slightly concave walls (Fig. II, 25, 13)

Bowl with s-profile, slightly everted rim and pronounced shoulder (Fig. II, 26, 13)

Miniature carinated bowl (Fig. II, 26, 8)

Biconical urn with strongly everted rim, undecorated (Fig. II, 26, 9)

Biconical urn with everted rim and narrow and tall mouth, decorated with fluting and/or grooving (Fig. II, 26, 12)

Hemispherical cup with horizontally pierced lug (Fig. II, 28, 7)

Cup with high, concave walls, low carination, decorated (Fig. II, 28, 6)

Vessel with multiple mouths, decorated with grooves (Fig. II, 28, 8)

Winged axe with raised and slightly broad edges (Fig. II, 25, 1)

Pin with ring-shaped head and narrow neck (Fig. II, 25, 6)

Pin with obliquely perforated head (Fig. II, 25, 8-9)

Pin with ring head and swelling and perforation at the neck (Fig. II, 25, 7)

Pin with oar-shaped head and twisting at the point (Fig. II, 25, 4)

Pin with coiling head and twisting of the point (Fig. II, 25, 5)

Daggers with concave hafting and two nail-holes (Fig. II, 25, 2)

Daggers with semicircular hafting with no nail-holes (Fig. II, 25, 3)

Pin with coiling head and twisting of the body (Fig. II, 26, 5)

Bone pin with flat perforated triangular head (Fig. II, 26, 6)

Daggers with hafting distinct from the blade by means of slight side narrowing (Fig. II, 26, 4)

Daggers with simple hafting undistinguishable from the blade, two nail-holes, and triangular blade (Fig. II, 26, 3)

Daggers with rounded hafting undistinguishable but slightly broader than the blade (Fig. II, 26, 1-2)

BM1-BM2 (long duration)

Biconical cup with axe handle (Fig. II, 30, 1)

Biconical urn with incipient rim cut in the inside, decorated (Fig. II, 29, 16)

Biconical urn with strongly everted rim, decorated (Fig. II, 30, 2)

Isolone type cup, with everted rim and broad foot, decorated (Fig. II, 29, 10)

Fiavè type cup, with outwardly sloping straight walls and raised pointed handle (Fig. II, 29, 15)

Fiavè type cup, shallow, with bossing under the plain rim (Fig. II, 29, 11)

Shallow carinated bowl, with caniculated handle from rim to carination, with slightly concave vertical walls, carination not too low, decorated (Fig. II, 30, 3)

Shallow carinated bowl, with caniculated handle from rim to carination, with straight vertical walls, middle carination, decorated (Fig. II, 30, 4)

Shallow carinated bowl, with raised handle, with straight vertical walls slightly inclined towards the outside, decorated (Fig. II, 30, 5-6)

Shallow carinated bowl, with raised handle, with straight vertical walls, undecorated (Fig. II, 30, 7)

Shallow carinated bowl, with raised handle, diameter wider at the rim, undecorated, or decorated with fluting and small holes (Fig. II, 30, 9; Fig. II, 31, 3)

Shallow carinated bowl, with raised handle, with slightly concave walls and slightly everted rim, diameter wider at the rim (Fig. II, 30, 8)

Shallow carinated bowl, with raised handle, diameter wider at the rim, undecorated

(Fig. II, 31, 2)

Fairly deep carinated bowl, with raised handle, with straight vertical walls, small in size (Fig. II, 31, 1)

Fairly deep carinated bowl, with raised handle, with straight vertical walls and convex belly (Fig. II, 31, 5-6)

Fairly deep carinated bowl, with raised handle, inwardly sloping straight walls and slightly everted rim (Fig. II, 31, 7)

Fairly deep carinated bowl, with raised axe handle, with slightly concave walls inclined towards the inside, decorated (Fig. II, 31, 8)

Deep and narrow carinated bowl, with raised handle, equal diameter at rim and carination, convex belly, undecorated (Fig. II, 31, 4)

Hemispherical bowl with axe handle (Fig. II, 31, 9)

Hemispherical bowl with festoon decoration (Fig. II, 29, 17)

Hemispherical large bowl with coarse axe handle or L-shaped handle (Fig. II, 31, 10)

Sword with simple hafting, Castione type (Fig. II, 29, 1)

Tanged sword, Castiglione di Marano type (Fig. II, 29, 2)

Winged axe with raised and slightly broad edges, average narrowing (Fig. II, 29, 3)

Dagger with heart-shaped hafting (Fig. II, 29, 14)

Dagger with rounded hafting and lense-shaped blade (Fig. II, 29, 8)

Dagger with simple hafting and three nail-holes, triangular blade and nearly parallel edges (Fig. II, 29, 4-5)

Dagger with triangular hafting and blade (Fig. II, 29, 7)

Dagger with broad triangular hafting distinct from the blade by means of side narrowings, and with three nail-holes (Fig. II, 29, 12)

Dagger with hafting "a spina", and two nail-holes (Fig. II, 29, 9)

Pin with curled head (Fig. II, 29, 6)

Pin with perforated neck, Bor di Pacengo type (Fig. II, 29, 13)

BM2 (traditionally the 15th century B.C)

Big biconical cup with horned handle (Fig. II, 32, 10)

Biconical vessel with inconspicuous rounded rim, decorated (Fig. II, 32, 13)

Biconical vessel with distinct flat rim, decorated, medium-sized (Fig. II, 32, 11)

Biconical vessel with strongly everted rim with sharp inner edge, decorated (Fig. II, 32, 12)

Fiavè type cup with horned handle (Fig. II, 33, 1-4)

Fiavè type cup with tongue handle (Fig. II, 33, 5)

Fiavè type cup with vertical bands of plain cordon decoration (Fig. II, 33, 6)

Fiavè type cup, rather deep, with bosses under the plain rim (Fig. II, 33, 7)

Fiavè type cup, shallow, with bosses under the fingered rim (Fig. II, 32, 7)

Shallow carinated bowl, with caniculated handle from rim to carination, slightly concave and inwardly sloping walls and low carination ((Fig. II, 33, 8, 12)

Shallow carinated bowl, with caniculated handle from rim to carination, inwardly sloping concave walls, low carination, undecorated ((Fig. II, 33, ,10)

Shallow carinated bowl, with caniculated handle from rim to carination, diameter wider at the rim, middle carination, undecorated ((Fig. II, 33, ,11)

Shallow carinated bowl with raised handle, outwardly sloping straight walls, undecorated (Fig. II, 33, 9)

Shallow carinated bowl with raised handle, vertical straight walls, decorated with one or two bands of grooves (Fig. II, 34, 1)

Shallow carinated bowl with raised handle, inwardly sloping straight walls, slightly everted rim, undecorated (Fig. II, 34, 5)

Shallow carinated bowl with raised handle, outwardly sloping concave walls, decorated (Fig. II, 34, 4)

Shallow carinated bowl with raised handle, wider at the carination, decorated (Fig. II, 34, 2)

Shallow carinated bowl with raised handle, wider at the carination, quite narrow, decorated (Fig. II, 34, 3)

Fairly deep carinated bowl with raised handle, vertical straight walls, very large (Fig. II, 34, 8)

Fairly deep carinated bowl with raised handle, slightly everted rim, wider at the carination, decorated (Fig. II, 34, 6)

Fairly deep carinated bowl with raised handle, wider at the carination, quite narrow (Fig. II, 34, 7)

Carinated bowl with concave walls, without handles, wider at the carination (Fig. II, 34, 14)

Large carinated cup with straight vertical walls, high carination and concave belly (Fig. II, 34, 9)

Large carinated cup with inwardly sloping straight walls and high carination (Fig. II, 34, 10)

Deep large bowl with axe handle (Fig. II, 34, 11)

Deep large bowl with everted rim (Fig. II, 34, 12)

Miniature bowl with slightly outwardly sloping walls (Fig. II, 32, 9)

Miniature biconical vessel (Fig. II, 32, 8)

Dagger with simple hafting, short and thick blade (Fig. II, 32, 2)

Dagger with simple hafting and slight side narrowings (Fig. II, 32, 1)

Pin with coiling head and body quadrangular in section (Fig. II, 32, 3)

Pin with swollen and perforated neck, Monte Lonato type, with flattened head (Fig. II, 32, 4)

BM2-BM3a (Long duration)

Isolone type cup without rim or foot, undecorated (Fig. II, 36, 10)

Carinated bowl with concave walls and no handle, high carination, wider at the rim (Fig. II, 36, 4)

Large carinated cup with vertical straight walls, high carination and convex belly (Fig. II, 36, 3)

Hemispherical bowl with raised vertical handle round in section (Fig. II, 36, 6)

Deep hemispherical bowl with raised vertical handle round in section (Fig. II, 36, 8)

Hemispherical bowl with raised handle with short cylindrical knob (Fig. II, 36, 6)

Hemispherical bowl with caniculated handle on the rim (Fig. II, 36, 5)

Hemispherical bowl with plastic decoration (Fig. II, 36, 9)

Miniature hemispherical bowl (Fig. II, 36, 11)

Miniature bowl with outwardly sloping convex walls, decorated with small bosses under the rim (Fig. II, 36, 13)

Miniature hemispherical bowls with inturned rim (Fig. II, 36, 12)

Miniature deep cylindrical vessels (Fig. II, 36, 14)

Sauerbrunn type sword with simple hafting (Fig. II, 35, 1)

Flanged hilt sword, Castions di Strada type (Fig. II, 35, 2)

Flanged hilt sword, Casier type (Fig. II, 35, 3)

Flanged hilt sword, Sacile type (Fig. II, 35, 4)

Winged axe with short wings, with sides meeting in the butt, without shoulders (Fig. II, 35, 5)

Dagger with trapezoidal hafting, triangular blade and two nail holes (Fig. II, 35, 9)

Pin with ring head and swollen neck (Fig. II, 35, 7)

Pin with triple ring head (Fig. II, 35, 11)

Pin with crutch shaped head (Fig. II, 35, 12)

Pin with perforated neck and troncoconic head (Fig. II, 35, 6)

Pin with maul-shaped head (Fig. II, 35, 8)

Redù type pin (Fig. II, 35, 13)

MB3 (traditionally the 14th century B.C)

MB3a

Ovoid urn with short neck and distinct shoulder (Fig. II, 37, 12)

Barrel shaped urn decorated with a band of horizontal cordons (Fig. II, 37, 9)

Isolone type cup, with everted rim and no foot (Fig. II, 37, 3)

Isolone type cup, with everted rim and wide foot, undecorated (Fig. II, 37, 5)

Shallow carinated bowl, with caniculated handle from rim to carination, decorated concave walls, middle carination and decorated interior (Fig. II, 37, 6)

Carinated bowl with concave walls, no handles, low carination and equal diameters at rim and carination (Fig. II, 37, 11)

Carinated bowl with concave walls, no handles, middle carination and outwardly sloping shoulder walls, diameter wider at the rim (Fig. II, 37, 10)

Carinated bowl with concave walls, no handles, high carination and diameter wider at the carination (Fig. II, 37, 8)

Dagger with rounded hafting with two nail holes and long triangular blade (Fig. II, 37, 1)

Mt. Lonato type pin with tall and narrow head (Fig. II, 37, 7)

Pin with seal-shaped and perforated head type Montata (Fig. II, 37, 2)

Pin with seal-shaped head with perforated neck type Pieve S. Giacomo (Fig. II, 37, 3)

Pin with seal-shaped head Nogara type, (Fig. II, 37, 4)

MB3a-MB3b

Biconical vessels with short neck and round belly (Fig. II, 38, 4)

Carinated bowl with concave walls, no handles, outwardly sloping walls and high carination (Fig. II, 38, 5)

Pin with piston shaped head (Fig. II, 38, 1)

Razor type Castellaro di Gottolengo (Fig. II, 38, 2)

Razor type Pieve S. Giacomo (Fig. II, 38, 3)

MB3b

Ovoid urn with short neck and tubular handle (Fig. II, 39, 7)

Barrel shaped urn, undecorated, or decorated with false halfmoon handles, or with large bosses (Fig. II, 39, 4,8,10)

Biconical urn, undecorated (Fig. II, 39, 9)

Biconical urn with fluting under the rim and squashed profile (Fig. II, 39, 12)

Biconical urn with sharply angled form (Fig. II, 40, 1)

Shallow carinated bowl, with caniculated handle from rim to carination, decorated concave shoulder and belly (Fig. II, 40, 2)

Not very deep carinated bowl, with raised handle, diameter almost equal at rim and shoulder, large (Fig. II, 40, 6)

Fairly deep carinated bowl with raised handle, concave walls and slightly everted rim, wider at the carination, undecorated (Fig. II, 40, 11)

Carinated bowl without handles, and with concave walls which are inwardly sloping, high carination (Fig. II, 40, 5)

Large carinated cup with high concave walls, low carination (Fig. II, 40, 8)

Large carinated cup with high concave walls, high carination, biconical shape and grooving on the walls (Fig. II, 40, 9)

Large carinated cup with high concave walls, high carination, vertical ring handle (Fig. II, 40, 4)

Large biconical cup with vertical ring handle (Fig. II, 40, 3)

Carinated cup with concave walls, high carination and vertical ring handle (Fig. II, 40, 7)

Hemispherical bowl, undecorated (Fig. II, 40, 10)

Hemispherical bowl with caniculated handle (Fig. II, 39, 11; Fig. II, 40, 12)

Dagger with simple hafting, three nail holes and triangular blade (Fig. II, 39, 1)

Dagger with triangular hafting and ricasso separating the blade from the hilt (Fig. II, 39, 2-3)

BM3b-LBA1 (Long duration)

Ovoid urn with short distinct neck, decorated with bosses or large bosses (Fig. II,

41, 1)

Barrel shaped urn with grooves under the rim (Fig. II, 41, 2)

Small globular urn (Fig. II, 41, 4)

Ovoid large pot with slightly everted rim (Fig. II, 41, 5)

Cylindrical jar with inner ledge (milk-boilers?) (Fig. II, 41, 6)

Fairly deep carinated bowl with raised horned handle, concave walls, equal diameter at rim and shoulder, decorated (Fig. II, 41, 7)

Carinated bowl with concave walls, no handle, equal diameter at rim and shoulder (Fig. II, 41, 8)

Large carinated cup with vertical straight walls, middle carination (Fig. II, 41, 9)

Carinated cup with short inwardly sloping concave walls, high carination (Fig. II, 41, 12)

Hemispherical bowl with incipient rim and horned handle (Fig. II, 41, 10)

Hemispherical bowl with projecting perpendicular rim, not very deep (Fig. II, 41, 13)

Globular cup with no rim (Fig. II, 41, 11)

Large bowl with angular profile (Fig. II, 41, 14)

LBA1 (traditionally the 13th century B.C.)

LBA1

Biconical vessel with flat rim projecting both towards the inside and the outside (Fig. II, 43, 1)

Ovoid-biconical vessel (Fig. II, 42, 11)

Biconical urn decorated with large bosses (Fig. II, 42, 12)

Biconical urn undecorated, with squashed profile (Fig. II, 42, 13)

Ovoid large pot with short neck (Fig. II, 42, 15)

Fairly deep carinated bowl with raised vertical handle round in section modelled with a small ridge, concave walls, diameter equal at rim and shoulder (Fig. II, 43, 2)

Hemispherical bowl with incipient rim and lobulated handle (Fig. II, 43, 8)

Hemispherical bowl with inturned rim and tubular handle with central knob (Fig. II, 43, 7)

Hemispherical bowl with everted rim (Fig. II, 43, 9-10)

Hemispherical bowl with everted rim, vertical ring or caniculated handle, deep (Fig. II, 42, 14,16)

Globular cup with distinct rim (Fig. II, 43, 3)

Hemispherical large bowl with vertical ring handle (Fig. II, 43, 6)

Hemispherical bowl with indistinct or slightly inturned rim, with horned handle (Fig. II, 43, 4-5)

Double spiral pin, Peschiera type (Fig. II, 42, 1-3)

Cà del Lago type pin (Fig. II, 42, 6)

Perforated pin of Boccatura del Mincio type (Fig. II, 42, 7)

Pin of Franzine Nouve type (Fig. II, 42, 5)

Barrel shaped amber beads (Fig. II, 42, 4)

LBA1-LBA2 (Long duration)

Large ovoid-cylindrical pot (Fig. II, 44, 8)

Large pot with cordon decoration (Fig. II, 44, 9-10)

Vessel with inner ledge and narrow neck (milk boiler?) (Fig. II, 44, 13)

Fairly deep carinated bowl with raised horned handle, with vertical straight walls and slightly everted rim cut in the inside (Fig. II, 45, 1)

Carinated bowl with concave walls, no handles, middle carination, diameter equal at rim and shoulder, wall decorated with grooves (Fig. II, 45, 2)

Carinated cup with high concave walls, low carination, undecorated (Fig. II, 45, 4)

Carinated cup with concave walls, high carination, raised handle (Fig. II, 45, 3)

Hemispherical bowl with coarse horned handle (Fig. II, 45, 10)

Hemispherical bowl with raised handle round in section (Fig. II, 45, 7)

Hemispherical bowl with raised tongue handle (Fig. II, 45, 12)

Hemispherical bowl with everted rim and slightly convex wall immediately underneath it (Fig. II, 45, 6)

Deep hemispherical bowl with slightly everted rim (Fig. II, 45, 5)

Deep hemispherical bowl with projecting perpendicular rim (Fig. II, 45, 13)

Deep bowl with swollen and flat rim (Fig. II, 45, 11)

Large hemispherical bowl with slightly distinct rim (Fig. II, 45, 8-9)

Plate with low straight walls (Fig. II, 44, 12)

Miniature deep bowl with outwardly sloping walls (Fig. II, 44, 11)

Tanged hilt sword Arco type (Fig. II, 44, 1)

Tanged hilt sword Terontola type (Fig. II, 44, 2)

Flanged hilt knife, Baierdoff type (Fig. II, 44, 3)

Knife with swallow-tail flanged hilt and with rounded shoulders (Fig. II, 44, 5)

Knife with swallow-tail flanged hilt and with distinct blade shoulders (Fig. II, 44, 4)

Spearhead with tubular hafting and wings (Fig. II, 44, 6)

LBA2 (traditionally the 1st half 12th century B.C.)

Ovoid cooking pot with everted rim forming a sharp inner angle (Fig. II, 47, 6-8)

Ovoid cooking pot with everted rim forming a sharp inner angle and cordon decoration (Fig. II, 47, 10-13)

Ovoid cooking pot with everted rim forming a sharp inner angle and corresponding swelling of the wall (Fig. II, 47, 9)

Ovoid cooking pot with projecting perpendicular rim (Fig. II, 47, 14)

Ovoid cooking pot with rounded belly and everted rim forming a sharp inner angle (Fig. II, 47, 5)

Ovoid cooking pot with cordon decoration (Fig. II, 48, 1)

Barrel shaped cooking pot with flat distinct rim, and cordon decoration (Fig. II, 48, 6)

Barrel shaped cooking pot with distinct rim forming a sharp inner angle, and cordon decoration (Fig. II, 48, 7)

Barrel shaped vessel with inner ledge and cordon decoration (milk boiler?) (Fig. II, 48, 16)

Carinated bowl with concave walls, no handles, low carination, diameter wider at the rim (Fig. II, 48, 8)

Carinated bowl with outwardly sloping concave walls, no handles, middle carination (Fig. II, 48, 12)

Carinated bowl with concave walls, no handles, high carination, diameter equal at rim and carination (Fig. II, 48, 9-10)

Carinated cup with strongly outwardly sloping concave walls, middle carination (Fig. II, 48, 11)

Hemispherical bowl with slightly raised handle round in section (Fig. II, 48, 2,5)

Hemispherical bowl with inturned rim and raised tongue handle (Fig. II, 48, 3-4)

Hemispherical bowl with everted rim and deep belly (Fig. II, 48, 13)

Bowl with everted rim and slightly convex walls immediately underneath it (Fig. II, 48, 15)

Large hemispherical bowl without rim and with cordon decoration (Fig. II, 48, 14)

Carinated cup with tall walls and incipient distinction between neck and shoulders (Fig. II, 47, 3)

Flanged hilt knife Matrei type (Fig. II, 46, 1)

Tanged hilt knife Breguzzo type (Fig. II, 46, 2)

Winged axe with broad wings, leaf-shaped profile and distinct butt (Fig. II, 46, 3)

Winged axe with broad wings, V-shaped profile and distinct butt (Fig. II, 46, 6)

Winged axe with medium wings, distinct butt and incipient shoulders (Fig. II, 46, 7)

Tanged hilt dagger with distinct blade (Fig. II, 46, 8-9)

Spearhead with tubular hafting and wings (Fig. II, 46, 22)

Flanged hilt sickle with one rib along the upper edge of the blade (Fig. II, 47, 1-2)

Flanged hilt sickle with double ribbing (Fig. II, 47, 4)

Pins with troncoconic head and swollen neck (Fig. II, 46, 4)

Pins with swollen neck of the Canegrate type (Fig. II, 46, 5)

Vidolasco type pin (Fig. II, 46, 21)

Iseo type pin (Fig. II, 46, 14)

Pin with seal shaped head (Fig. II, 46, 10)

Pin with ovoidal and ribbed head (Fig. II, 46, 11)

Mezzocorona type pin (Fig. II, 46, 19)

Tragno type pin (Fig. II, 46, 15)

Pin with large and flat poppy-shaped head (Fig. II, 46, 12)

Pin with straight neck Barche di Solferino type (Fig. II, 46, 16-17)

Pin with globular head (Fig. II, 46, 18)

Violin bow fibula with twisted arc (Fig. II, 46, 24)

Violin bow fibula decorated with incisions (Fig. II, 46, 25)

Violin bow fibula with two nodules (Fig. II, 46, 26)

Cogozzo type pin (Fig. II, 46, 20)

S. Ambrogio type pin (Fig. II, 46, 13)

LBA2-FBA1: (Long duration) (Fig. II, 49)

Large caniculated handle (7)

Large boss with or without semicircular grooving above it (9)

Hemispherical cup with elevated ring handle (8)

Lug handle of a very large jar with plastic cordon decoration (3)

Bowl with outwardly sloping straight walls and projecting rim (13)

Axe handle with pseudohorns (4)

Bowl with inturned rim, convex body, and small caniculated handle under the rim

(2)

Raised strap handle round in section (15)

Decorative motif of nail impressions on the clay

FBA1: (traditionally the 2nd half 12th century B.C.) (Fig. II, 50)

First signs of protovillanovan influences can be seen in this period, as well as many elements which show cultural continuity with the previous period.

Decorative motif made up of a plain horizontal cordon from which two others stem at an angle and converge (94)

Decorative motif made up of a series of horizontal grooves under the projecting rim (25)

Spool-shaped lug handle (5)

Decorative motif of festooned combed grooves, done with a comb with wide spacing (28)

Lug handle with vertical hole (14)

Decorative motif of horizontally undulating combed grooves, done with a comb with wide spaces (27)

Lobulated handle ending, with or without a middle hole (variant achieved by an increase in the thickness of the ending in the inner part of the cup) (24)

Horned strap handle round in section (17)

Spout on the wall (16)

Raised ending of handle (1)

Horizontal semicircular or ring handle round in section (19)

(Fig. II, 51):

Ovoid cooking pot with swollen but flat rim (22)

Decorative motif of a single line of dimples (32)

Decorative motif of lines of crossing combed grooves, done with a comb with wide spacing (21)

Winged axe Pertosa type (1)

Dagger with ring hilt, Mirandolo B type

Double edge razor of Bismantova type (6)

Violin bow fibula with assymmetrical arc decorated by two nodules (5)

Sover type pin (8)

Gualdo Tadino type tweezers (10)

FBA1-FBA2: (Long duration) (Fig. II, 52)

Spindle whorl with squashed profile and middle hole (47)

Decorative motif of bands of opposing oblique grooves over the top side of projecting rims (var. over the flat edge of the rim) (31)

Large trapezoidal lug placed over the carination (41)

Cooking pot with outwardly sloping straight walls and cordon plastic decoration on the upper body (34)

Fontanella type jug (48)

Ring-shaped lug (40)

Large ring-shaped object (42)

Horizontal handle a bastoncello with modelled sides (50)

Tirinto type amber beads (12)

Verrucchio type pin (11)

FBA1-FBA3: (Long duration) (Fig. II, 53)

Small clay ball (46)

Strainer in the shape of a one-handle cup (43)

Thickening of the carination in biconical vessels and large bowls, which almost becomes an added ledge often impressed with a plat motif under bands of grooving (33)

Twisted horizontal strap handle, round in section (45)

FBA2: (traditionally the 2nd half 11th to first half 10th centuries B.C.) (Fig. II, 54)

Clay pinhead (54)

Decorative motif of line of roller-stamping with a toothed wheel (68)

Large arc fibula with nodule decoration (1)

Arc fibula with incised alternating decoration (2)

Arc fibula with swelling of the central arc and two side nodules (3)

Arc fibula with double fold and with two groups of opposing nodules (4)

Arc fibula with leaf-shaped arc and two nodules, Castellace type (22)

Arc fibula with squashed leaf-shaped central part (24)

Bracelet ending in conical spirals (9)

Bracelet of Monte Primo type (10)

Nail-head pins (11)

Pin of Ala type (12)

Pin S. Giacomo di Riva type (14)

Double edge razor Croson di Bovolone type (19)

(Fig. II, 55):

Fontanella type flanged hilt knife (13)

Winged axe with short shoulders Monte Primo type (5)

Winged axe Grotte St. Stefano A type with oblique shoulders (20)

Winged axe Ponte S. Giovanni type (7)

Javelin-head with lozenge-shaped blade (18)

Sickle with flanged hilt with elongated pointed ends (21)

FBA2-FBA3: (Long duration) (Fig. II, 56-58)

Biconical urn with squashed profile (49)

Bowl with inturned rim, angular profile, decorated with a band of horizontal grooving immediately below the rim (30)

Decorative motif of bands of zig-zag grooving with dimples enclosed by the angles (44)

Large cooking pot with outwadly sloping straight shoulder walls, slightly convex base and marked narrowing of the body which is accentuated by a horizontal plastic cordon (53)

Irregularly distributed black glazing in the outside of vessels such as cups, bowls with plain inturned rims and biconical urns (65)

Bowl with plain inturned rim and angular profile, undecorated (38)

Flanged hilt swords Castellace type (3)

Double edge razor Terni type (1)

Amber bead with transversal grooves (2)

Tolfa type tweezers (4)

Fontanella-Vidolasco type tweezers (5)

Pin with pinhead Narce type (10)

Tanged hilt knife, Bismantova type (8)

Twisted arc fibula (9)

Arc fibula with slender arc which has a double fold (12)

Large arc fibula with incised decoration on the arc and the foot (13)

Winged axe, Silea type (14)

Winged axe, Monte Rovello type (15)

Winged axe Monte Primo type with oblique shoulders (16)

Spearhead Contigliano type (18)

Spearhead S. Francesco type (23)

Javelin head with leaf-shaped blade, Monte Primo type (20)

Bracelet with open ends (21)

Sickle with flanged hilt type Casalecchio (24)

Sickle with flanged hilt type Poggio Berni (25)

FBA3: (traditionally the 2nd half 10th to first half 9th centuries B.C.) (Fig. II, 59-63)

Small cup with conical body (52)

Large subcylindrical vessels, normally with short everted rim, decorated with plastic cordons (69)

Large cup with conical body with cordon decoration (this form is most probably a lid) (63)

Decorative motifs of associated horizontal grooving and oblique fluting (36)

Spool with small flat ends, with or without transversal hole in the point where the body is narrower (60)

Decorative motif of associated grooving and dimples (37)

Bowl with plain inturned rim and convex body, with decoration of horizontal grooves on the rim (56)

Small ovoidal cooking pot with slightly evrted rim, normally the upper body is decorated with horizontal series of notches (58)

Meandering plastic cordon (57)

Small anfora with situla shape (59)

One-handled cup with angular profile tending to become an s-profile (77)

Round-shaped attachment in vertical handles (66)

Swastika decorative motif (67)

Cup with squashed profile and concave shoulder decorated by grooving and oblique fluting (72)

Large footed cup (82)

Small triangular lug on the shoulder (39)

Impressed cord decoration (61)

Cup with s-profile, decorated by oblique fluting at the point of maximum expansion (80)

Bowl with plain inturned rim and angular profile, decorated with horizontal grooves under the rim and oblique fluting on the carination (79)

Large ovoid cooking pot with marked narrowing under the flared rim accentuated by a horizontal plastic cordon (85)

Decorative motif of bands of zig-zag grooving with dimples over the angles (71)

Turban decoration (100)

Antler pinhead decorated with circular sequence of incised concentric circles (120)

Bands of superposed meandering grooves (88)

Biconical urn with convex-concave body and with no rim (76)

Fiavè type pin (123)

Large isolated dimple (62)

Bands of meandering grooves (74)

Arc fibula with twisted bow and long foot (142)

Bowl with outwardly sloping straight walls and horizontal square strap handle (90)

Groups of short vertical grooves in horizontal arrangement (70)

Jug with long body (84)

Small bronze spiral (121)

Cup with distinct neck decorated with vertical grooves at the point of maximum expansion of the body (114)

Small cup with outwardly sloping straight walls (92)

Biconical urn with wide conical neck and distinct convex belly (55)

(Fig. II, 63):

Flanged hilt sword type Contigliano (2)

Sarreano type pin (4)

Torri d'Arcugnano type pin (6)

Marco type pin (8)

Semilunated razor Fontanella type (23)

(Fig. II, 64):

Winged axe type Tolfa (9)

Winged axe type Campese (12)

Winged axe type Gabbro (14)

Shaft hole axe type Chiusi (10)

Shaft hole axe type Cerchiara (13)

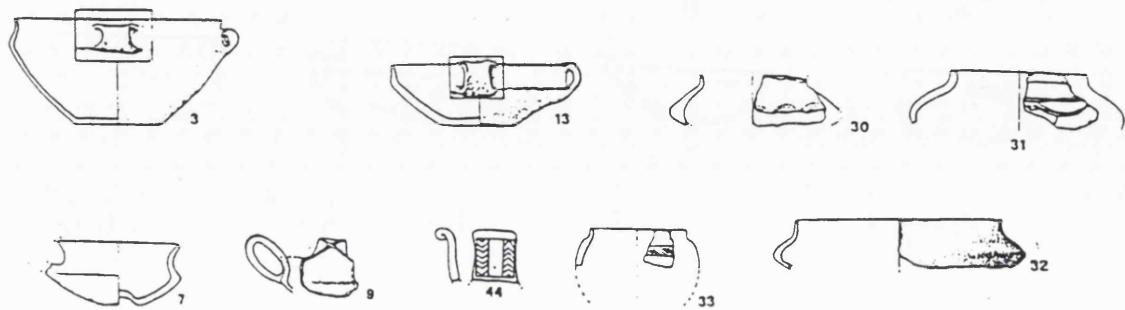


Fig. II, 1: Pottery types characteristic of the MB1 in Central Italy. Scale: ca. 1/9.

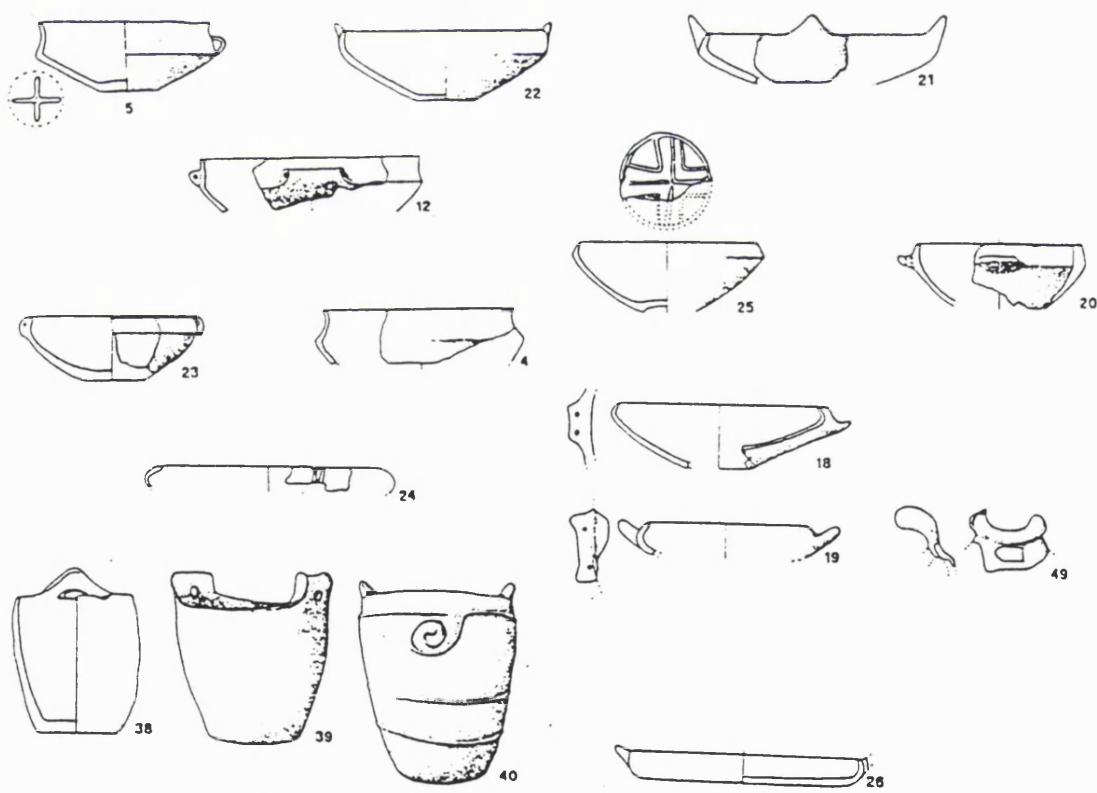


Fig. II, 2: Pottery types characteristic of the MB2 in Central Italy. After Cocchi Genick et al. 1991/92). Scale: ca. 1/9.

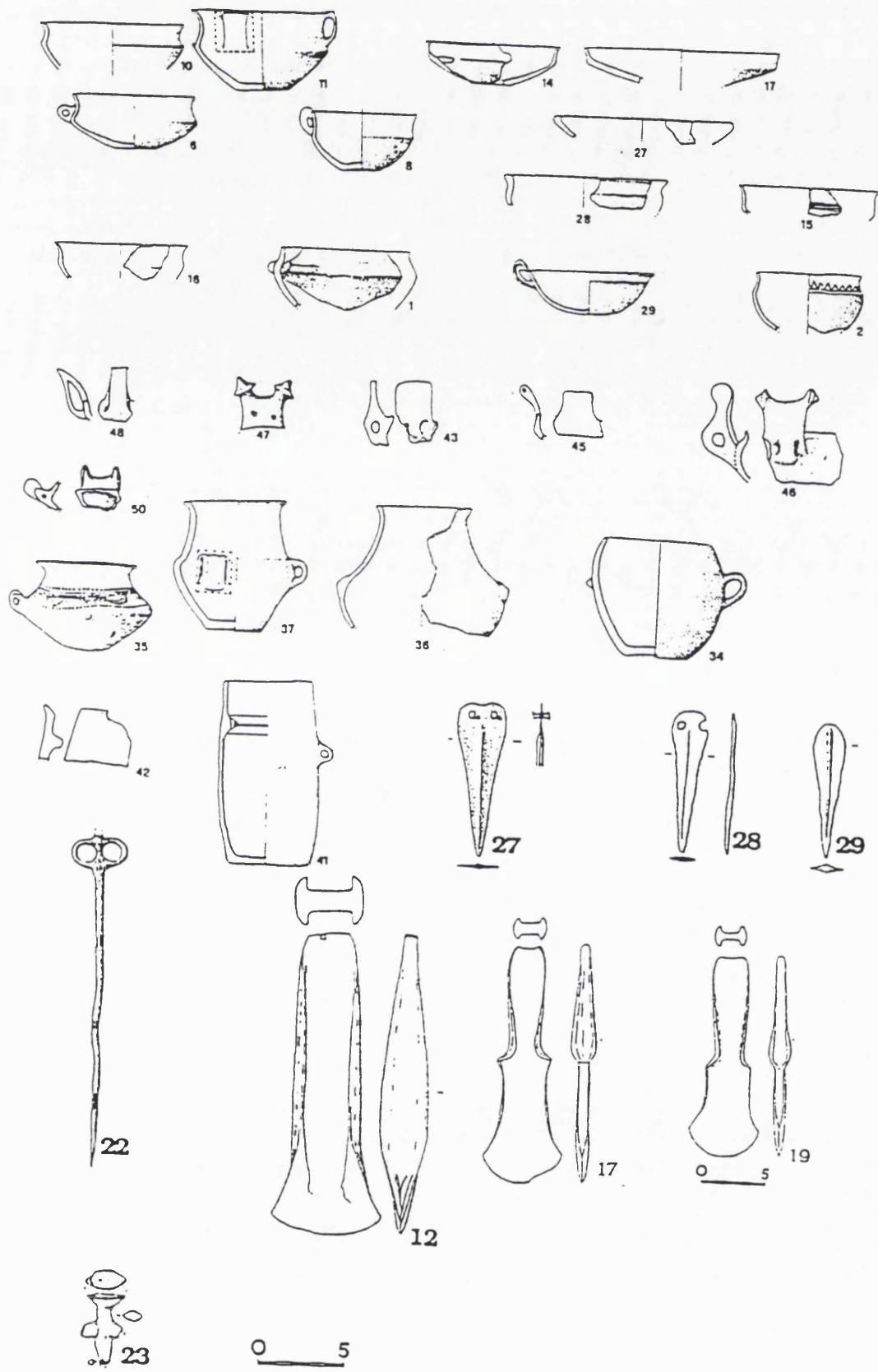


Fig. II, 3: Pottery and bronze types characteristic of the MB1/2 in Central Italy (after Cocchi Genick et al. 1991/92 and Carancini 1992). Scale: pottery ca. 1/9; bronzes as indicated.

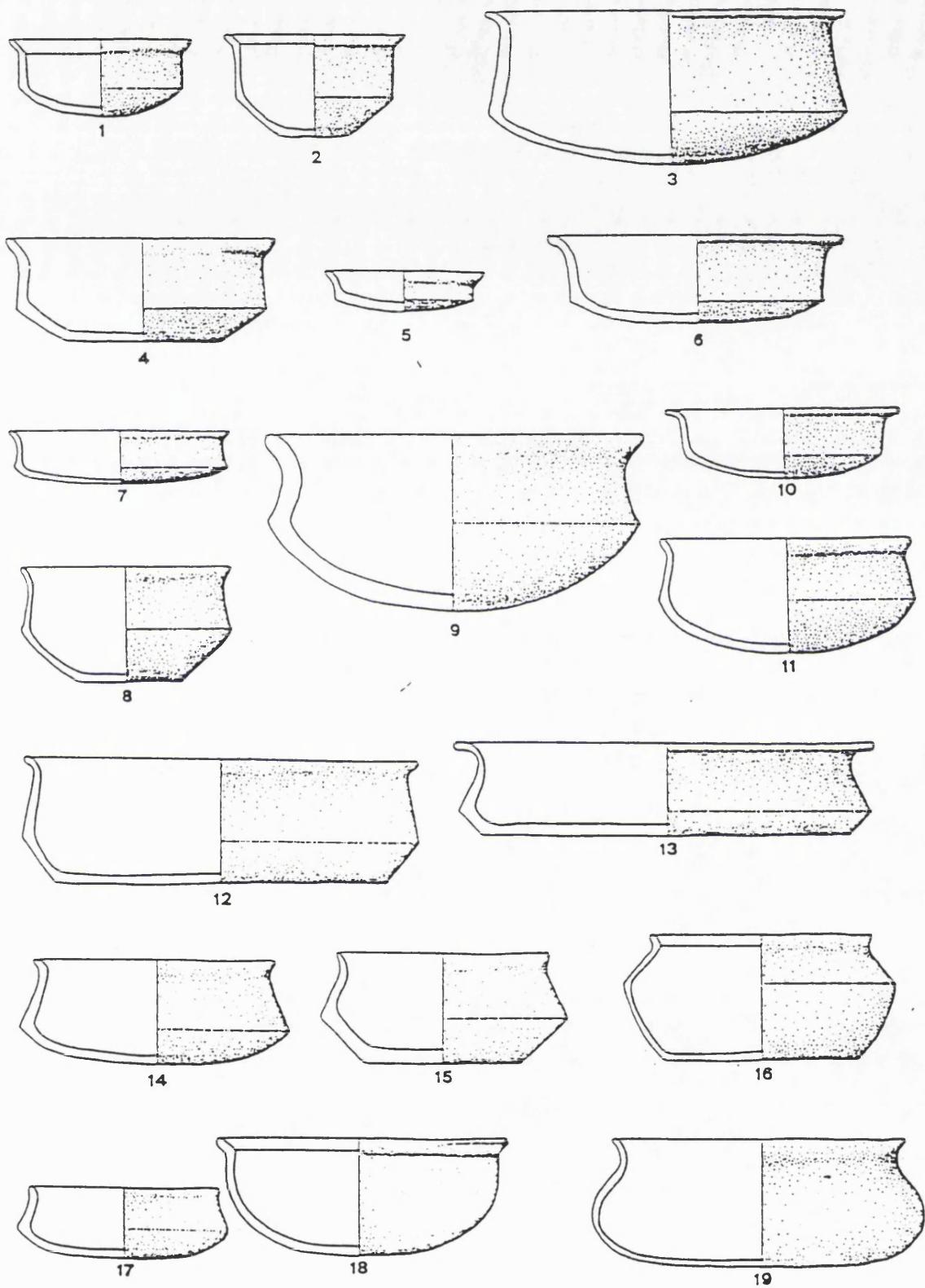


Fig. II, 4: Pottery types characteristic of the MB3a in Central Italy (after Macchiarola 1987). Scale: n.1-17 & 19: 1/4; n.18: 1/8.

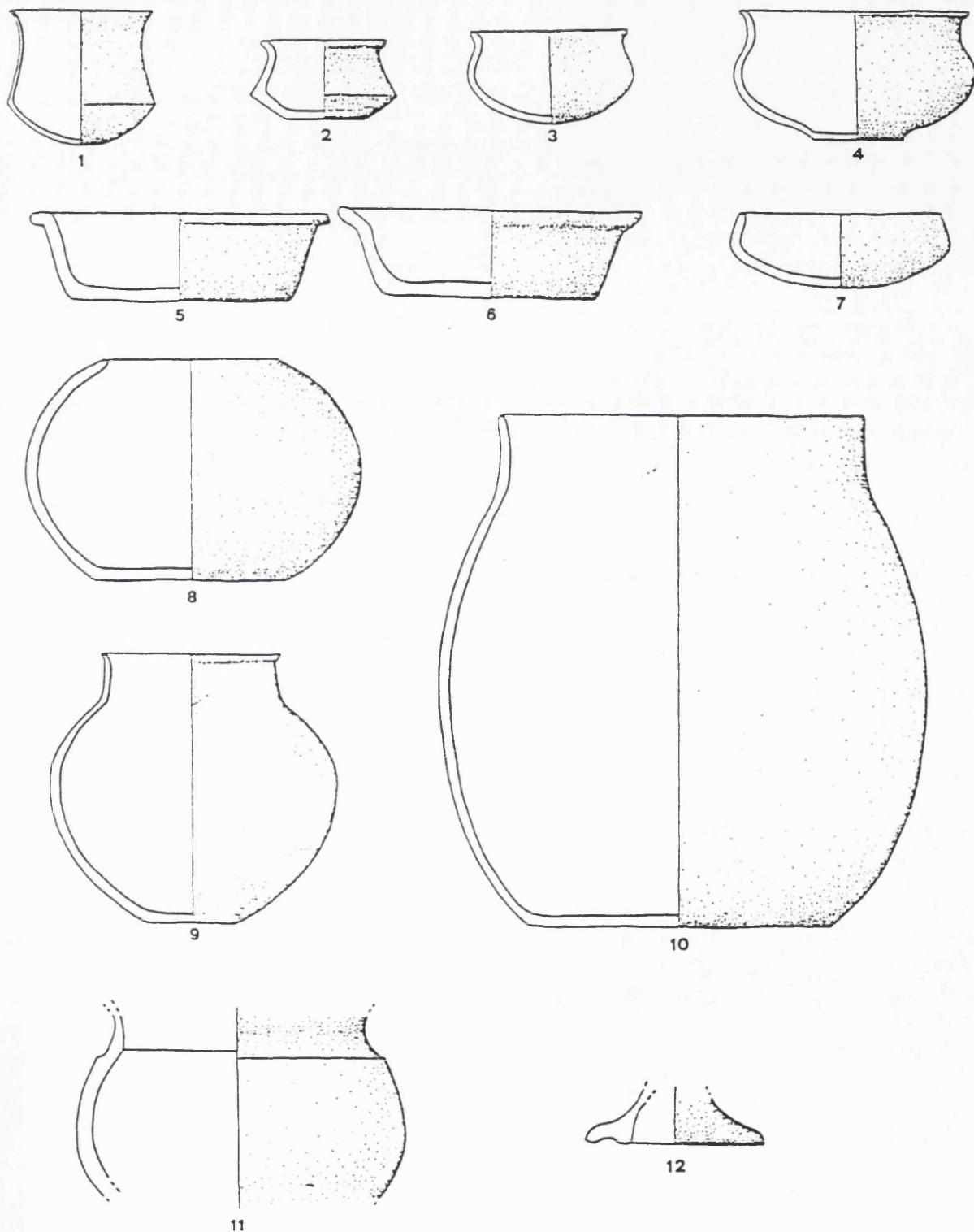


Fig. II, 5: Pottery types characteristic of the MB3a in Central Italy (after Macchiarola 1987). Scale: n.1-2 & 5-12: 1/4; n.3: 1/6; n.4: 1/3.

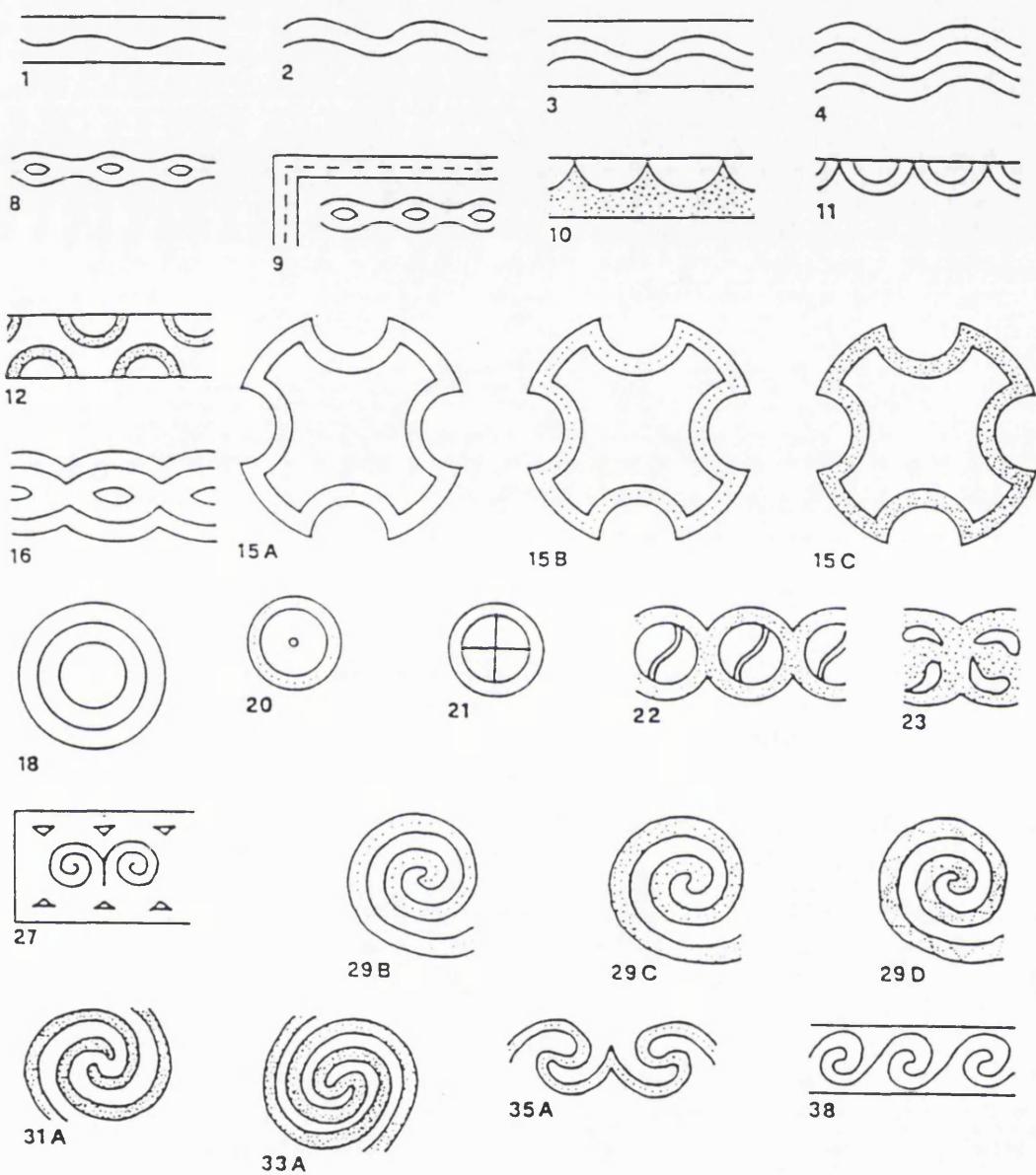


Fig. II, 6: Decorative motifs characteristic of the MB3a in Central Italy (after Macchiarola 1987). Not to scale.

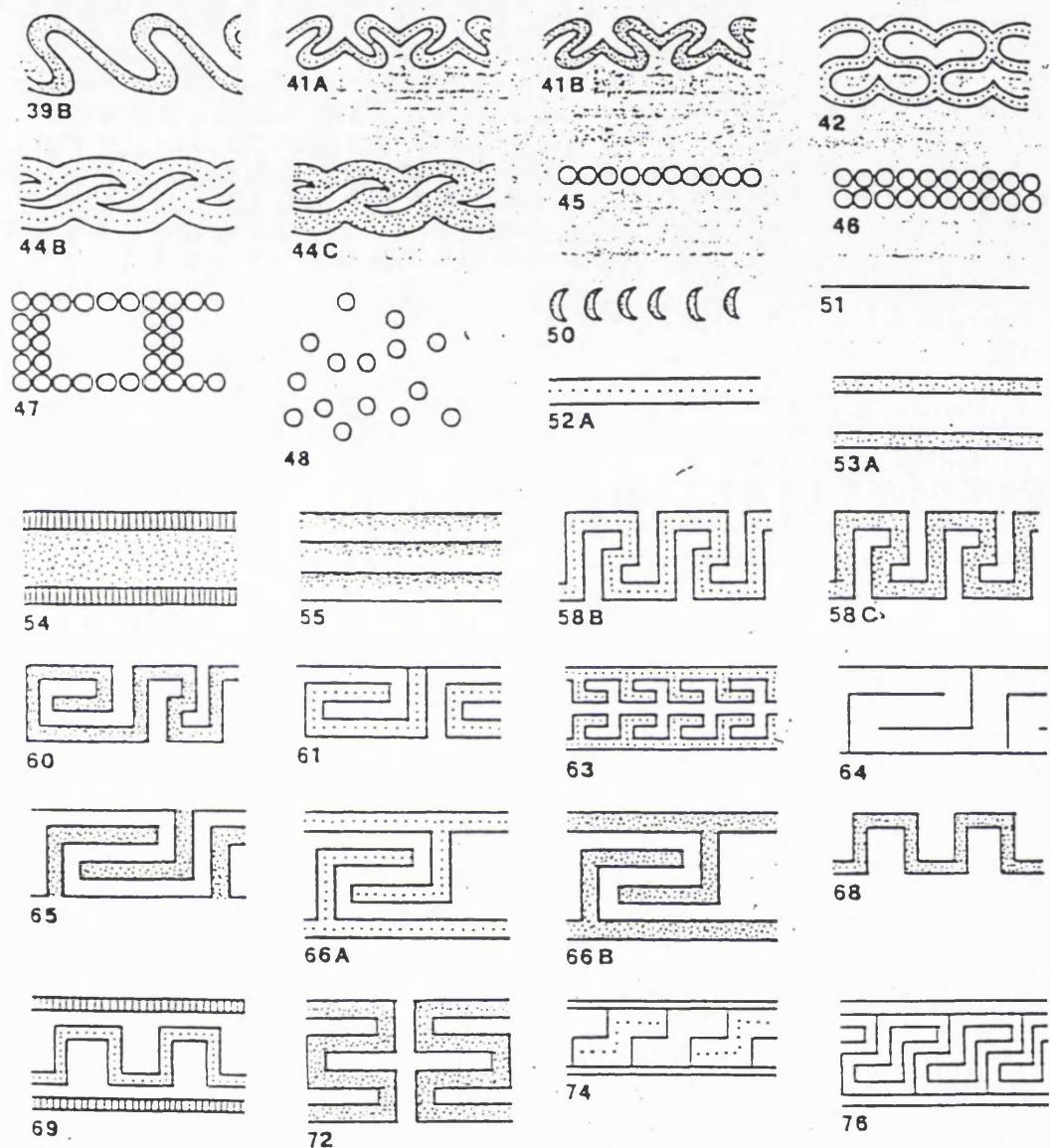


Fig. II, 7: Decorative motifs characteristic of the MB3a in Central Italy (after Macchiarola 1987). Not to scale.

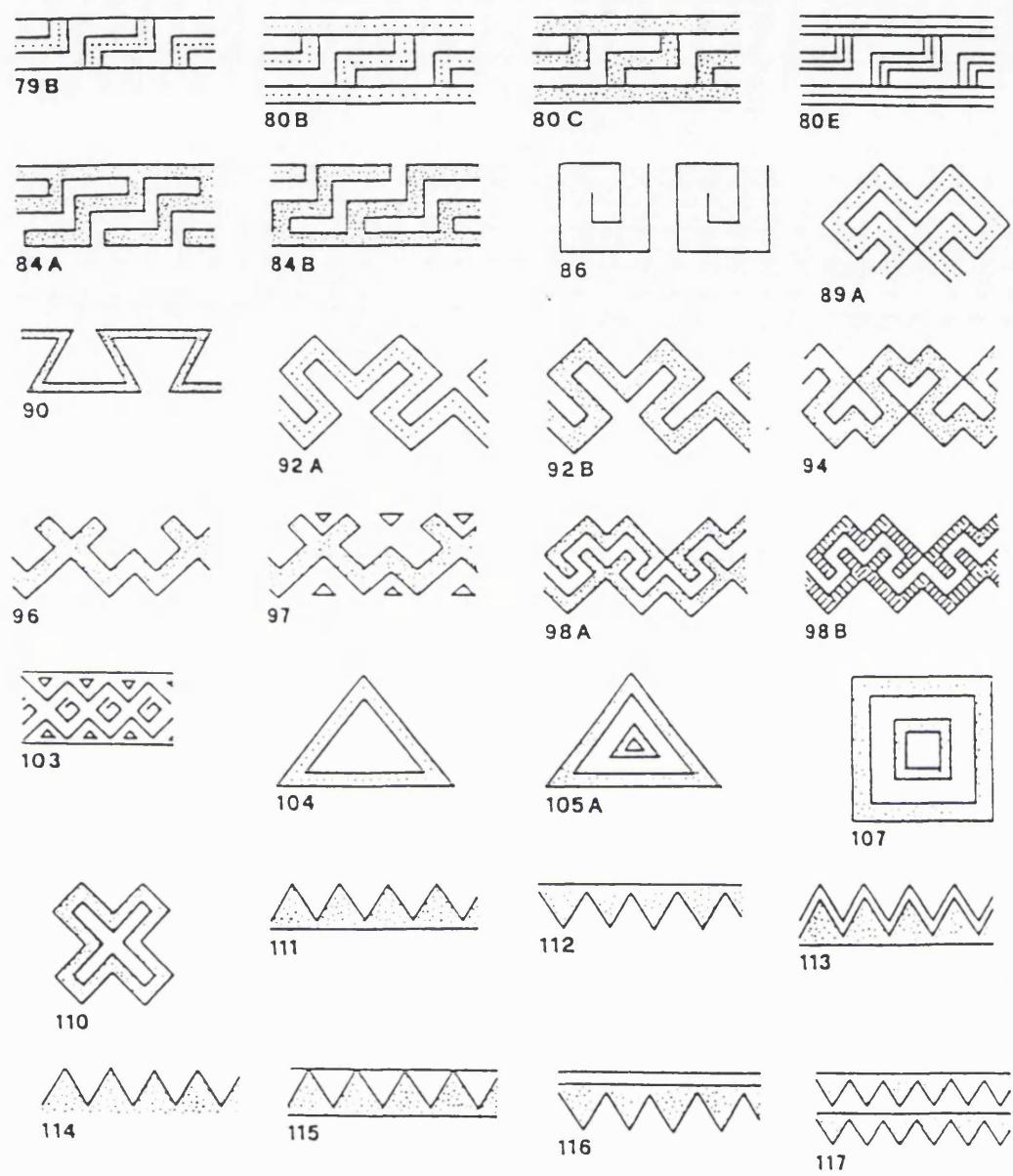


Fig. II, 8: Decorative motifs characteristic of the MB3a in Central Italy (after Macchiarola 1987). Not to scale.

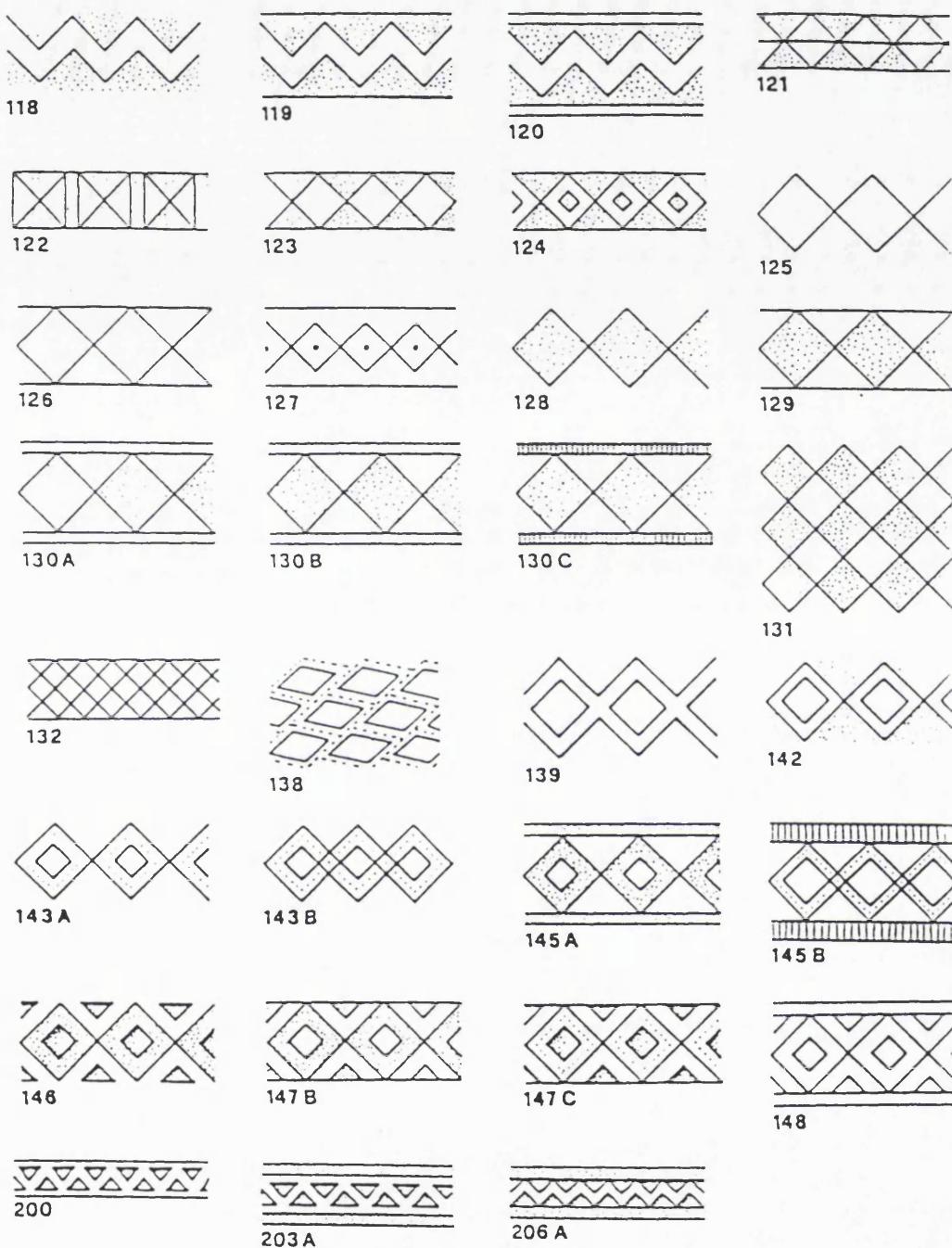


Fig. II, 9: Decorative motifs characteristic of the MB3a in Central Italy (after Macchiarola 1987). Not to scale.

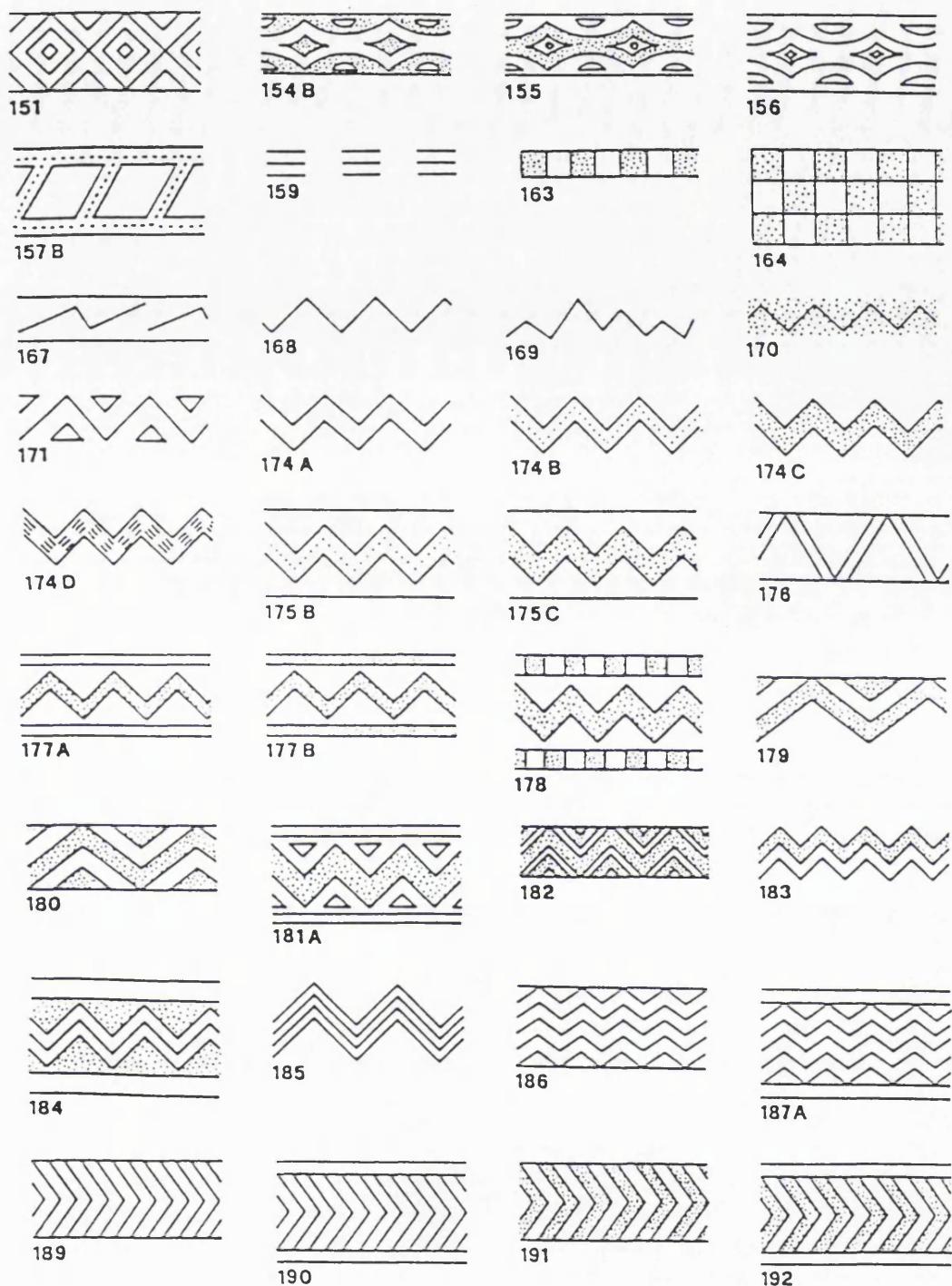


Fig. II, 10: Decorative motifs characteristic of the MB3a in Central Italy (after Macchiarola 1987). Not to scale.

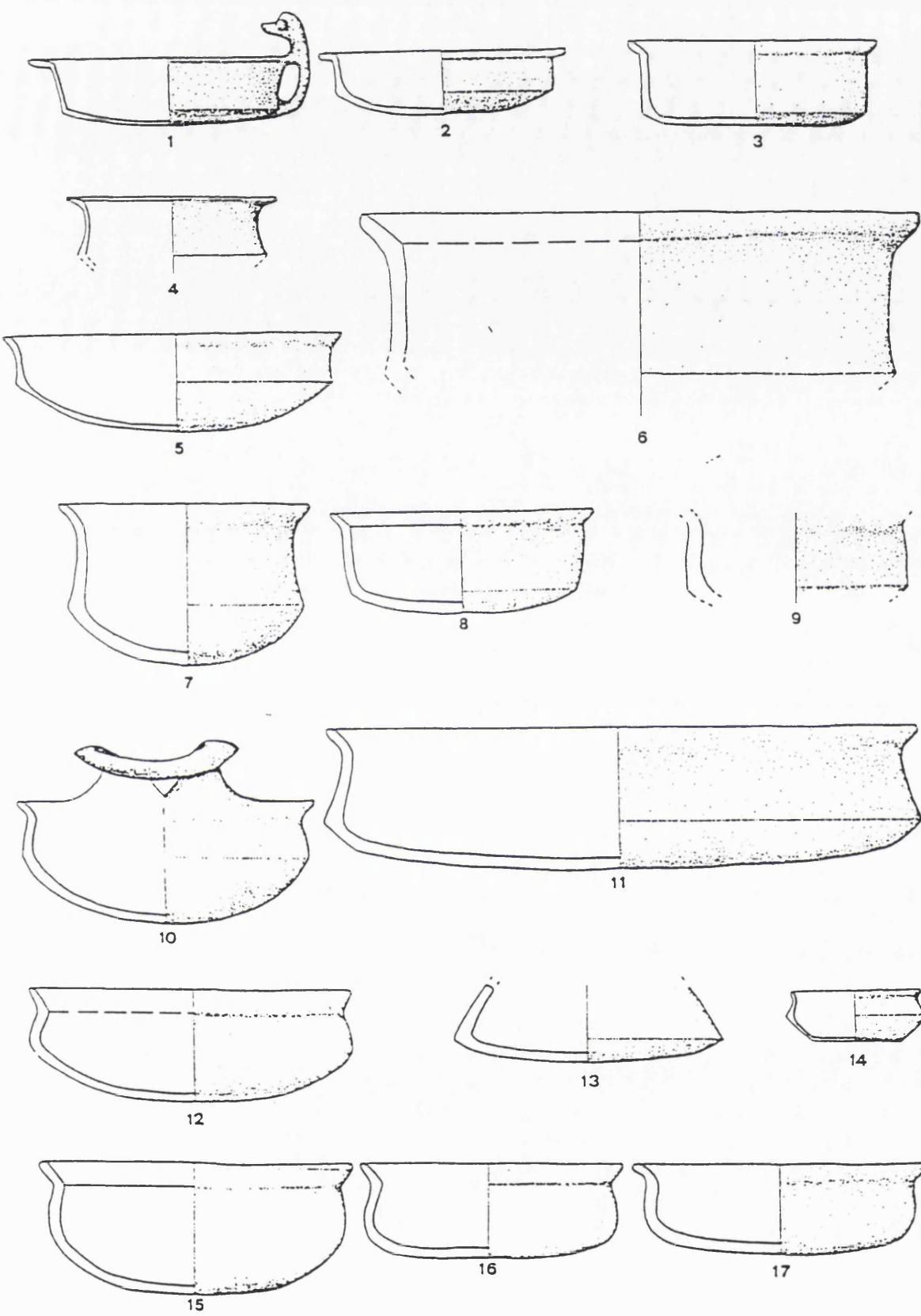
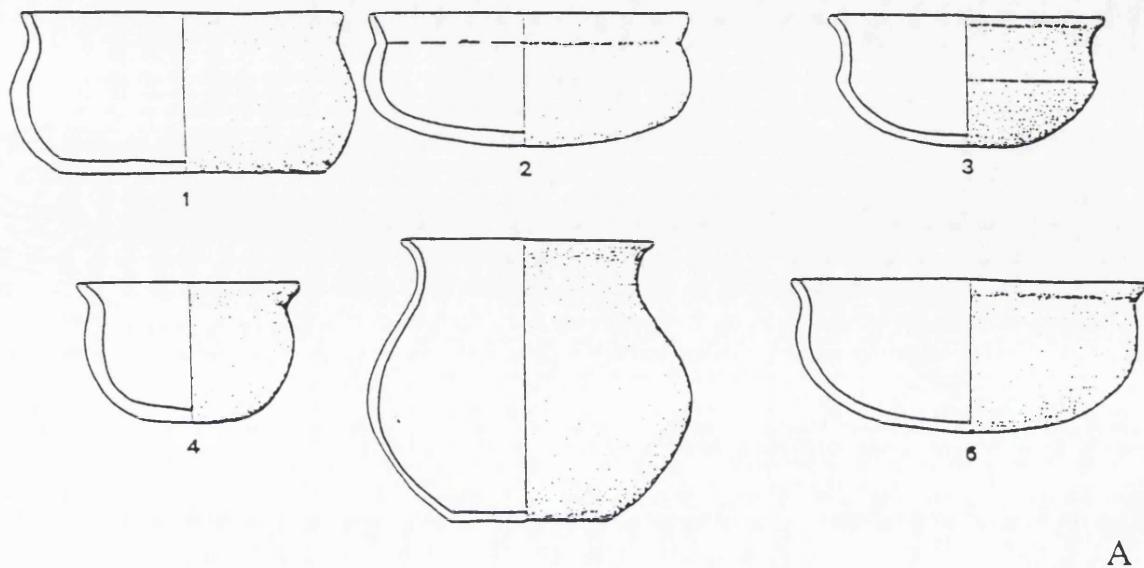
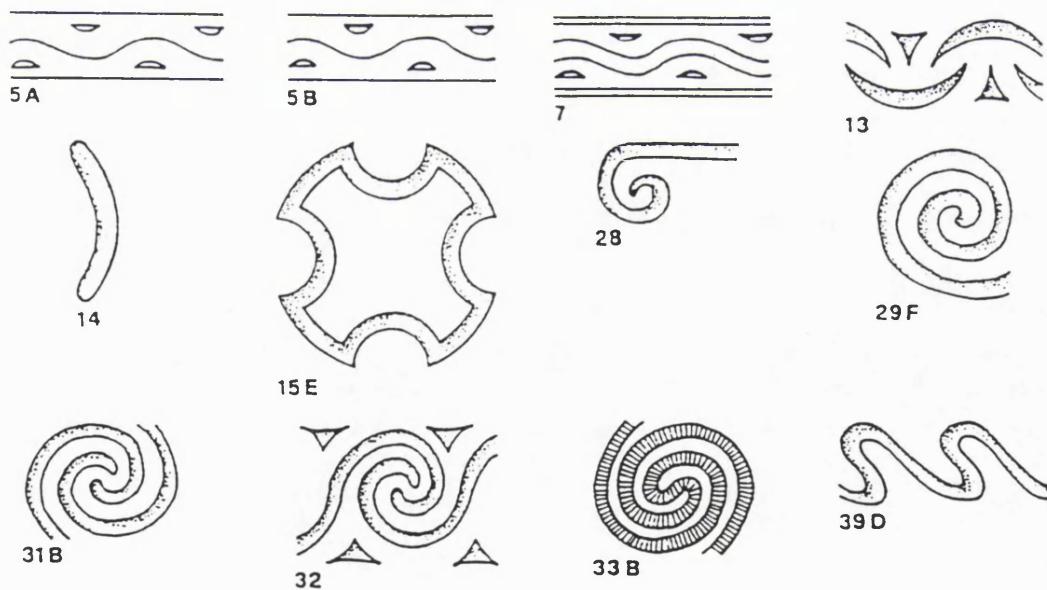


Fig. II, 11: Pottery types characteristic of the MB3b in Central Italy (after Macchiarola 1987). Scale: n.2, 3, 6-8, 10-17: 1/4; n.1 & 5: 1/6; n.4: 1/8.



A

Fig. II, 12 A: Pottery types characteristic of the MB3b in Central Italy (after Macchiarola 1987). Scale: 1/4.



B

Fig. II, 12 B: Decorative motifs characteristic of the MB3b in Central Italy (after Macchiarola 1987). Not to scale.

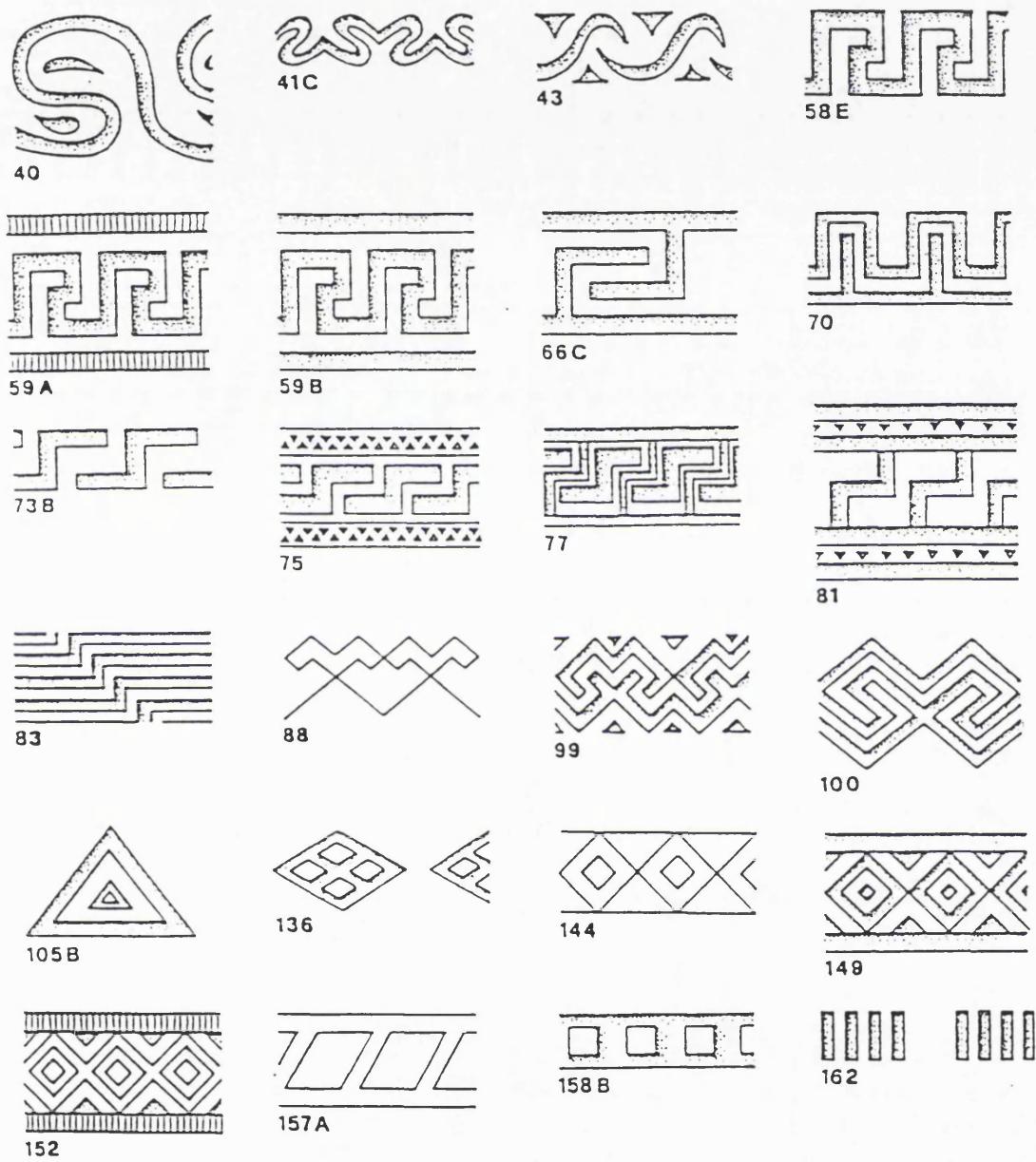


Fig. II, 13: Decorative motifs characteristic of the MB3b in Central Italy (after Macchiarola 1987). Not to scale.

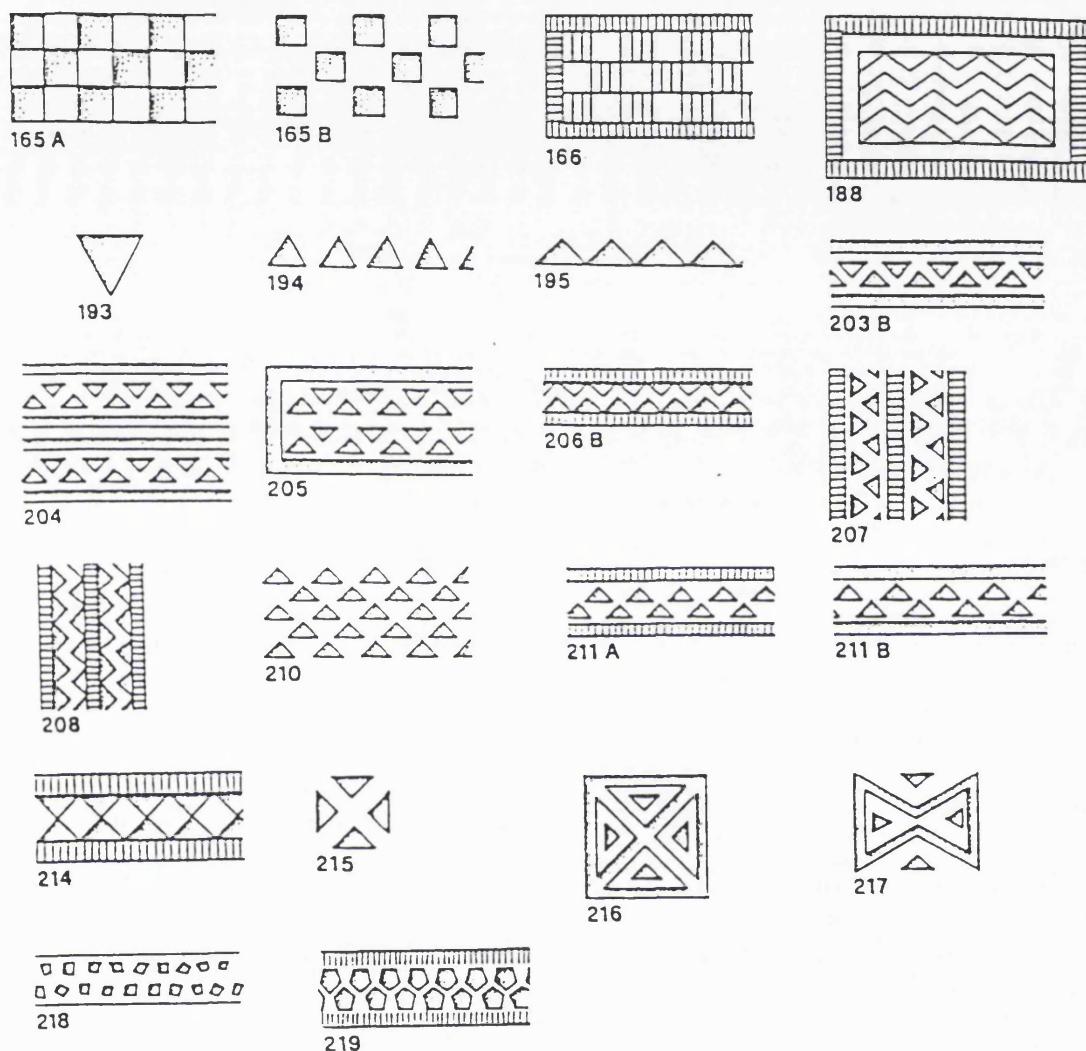


Fig. II, 14: Decorative motifs characteristic of the MB3b in Central Italy (after Macchiarola 1987). Not to scale.

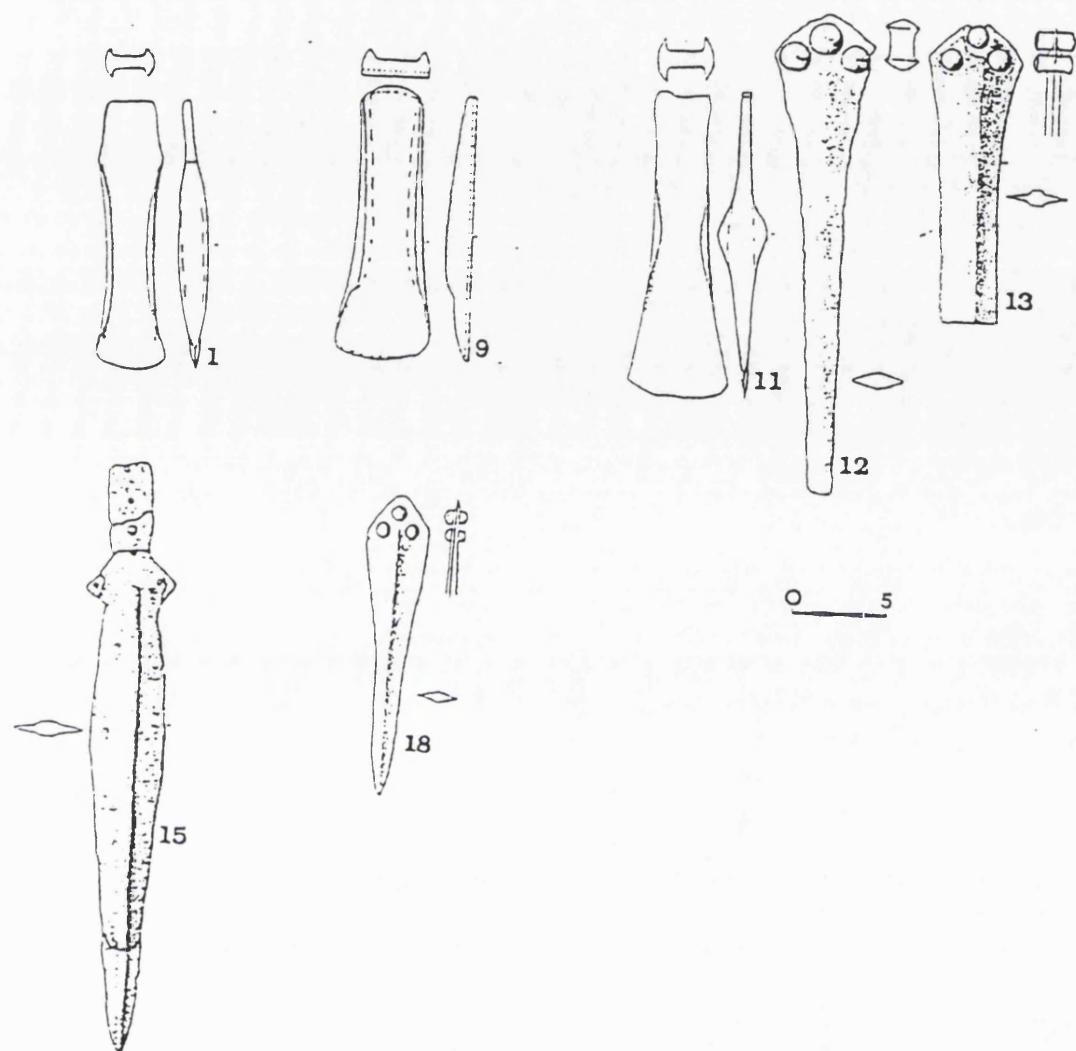


Fig. II, 15: Bronze types characteristic of the MB3 in Central Italy (after Carancini 1992). Scale as shown.

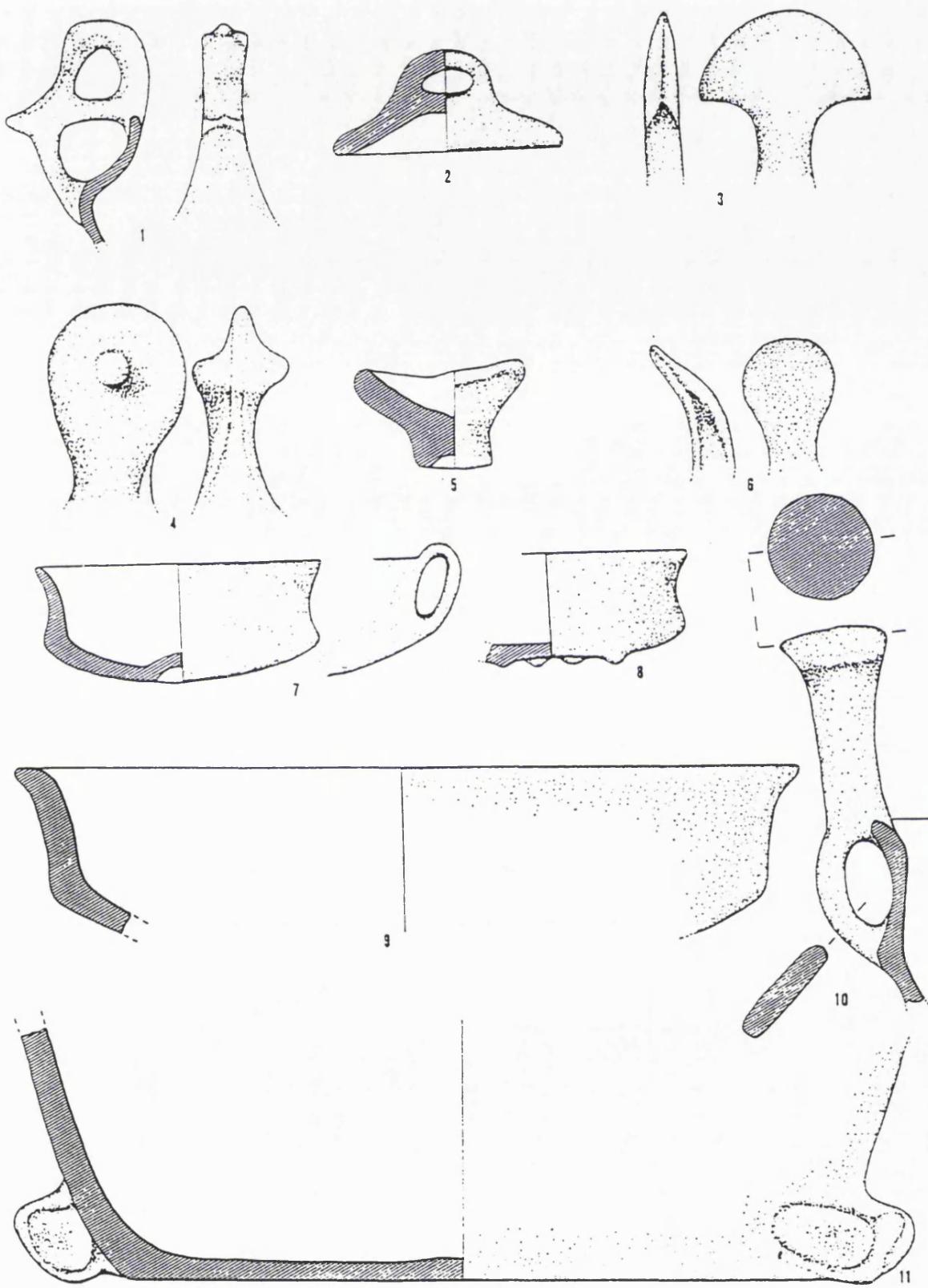


Fig. II, 16: Pottery types characteristic of the LBA in Central Italy (after Fugazzola Delpino 1976). Scale: 1/2.

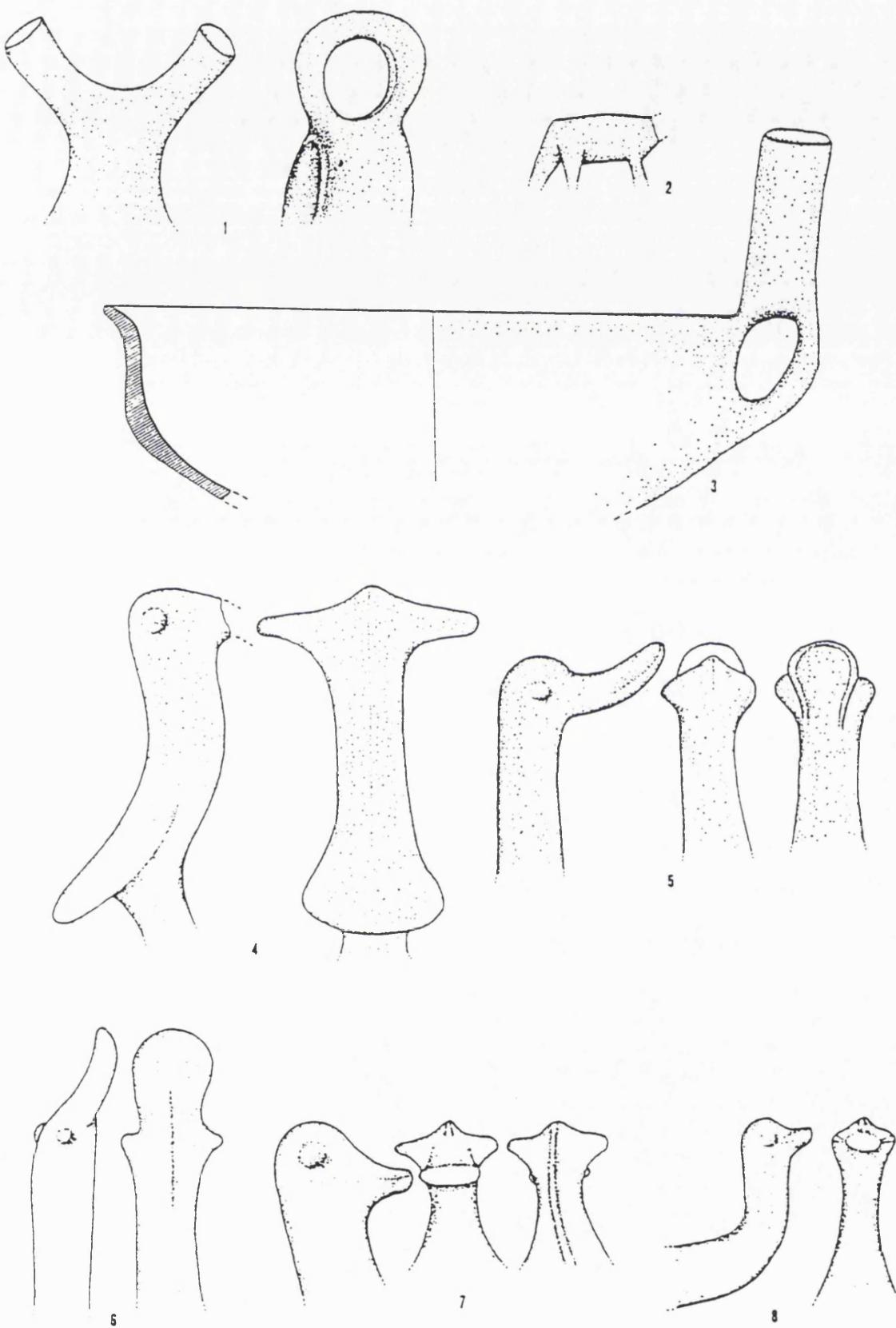


Fig. II, 17: Pottery types characteristic of the LBA in Central Italy (after Fugazzola Delpino 1976). Scale: 1/2.

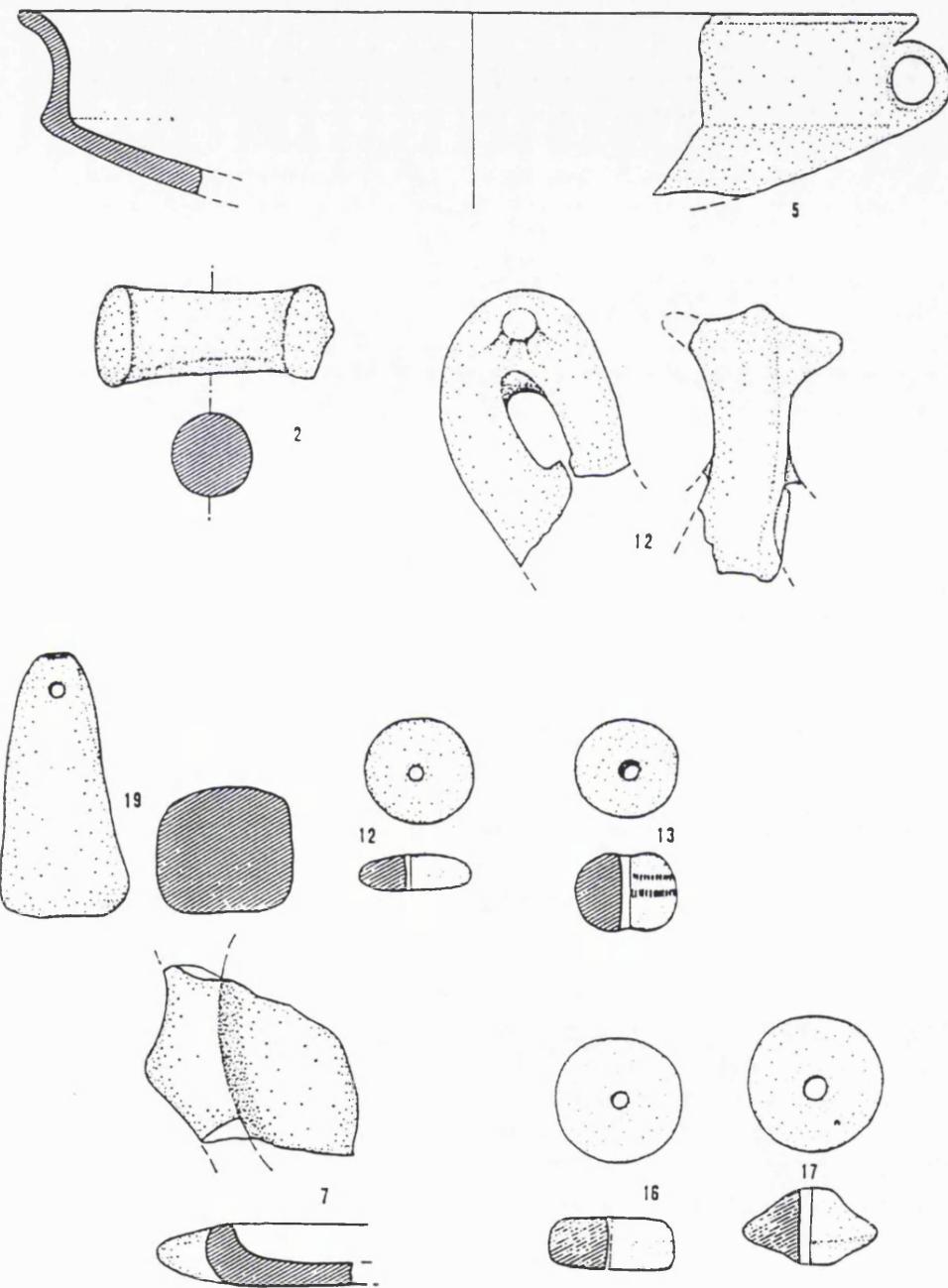


Fig. II, 18: Pottery types characteristic of the LBA in Central Italy (after Fugazzola Delpino 1976). Scale: 1/2.

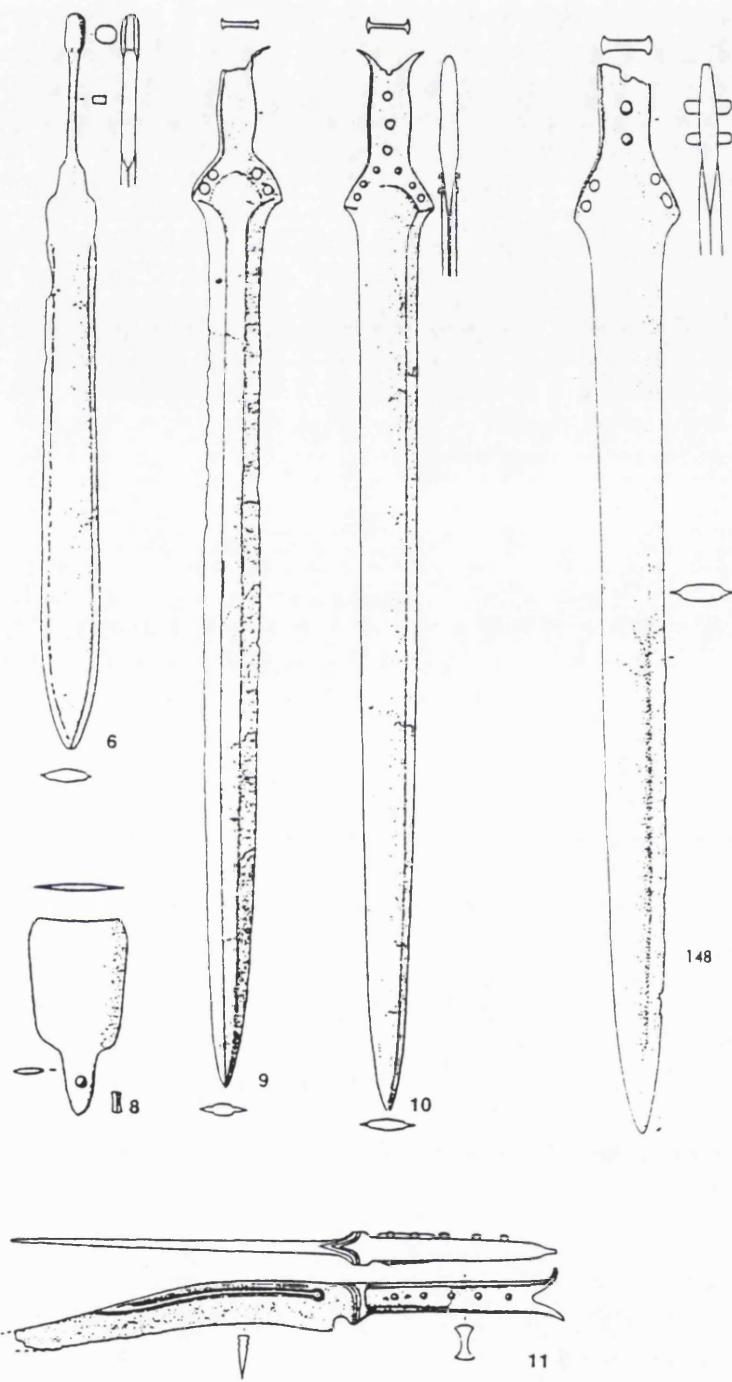


Fig. II, 19: Bronze types characteristic of the LBA in Central Italy (after Peroni 1989 and PBF). Not to scale.

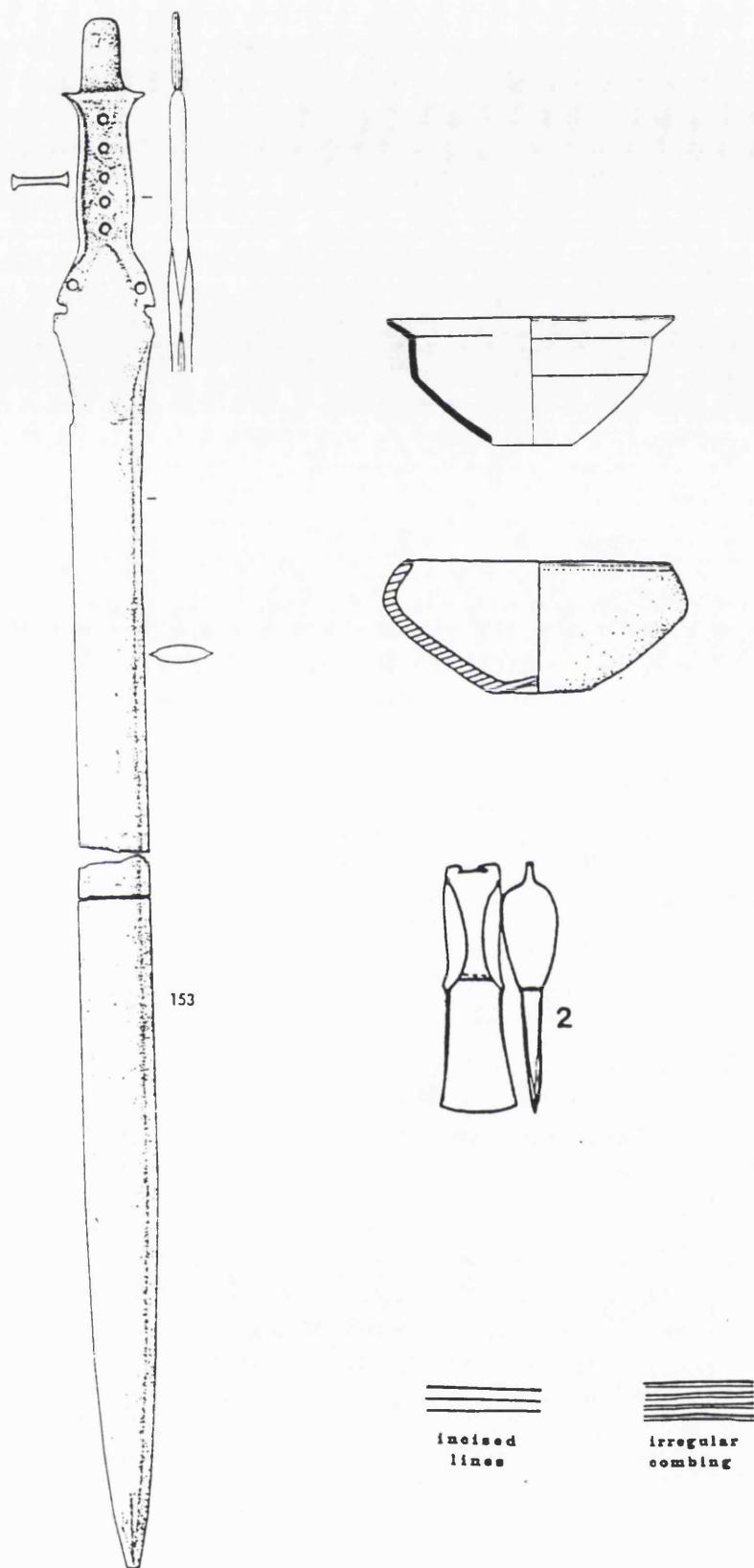
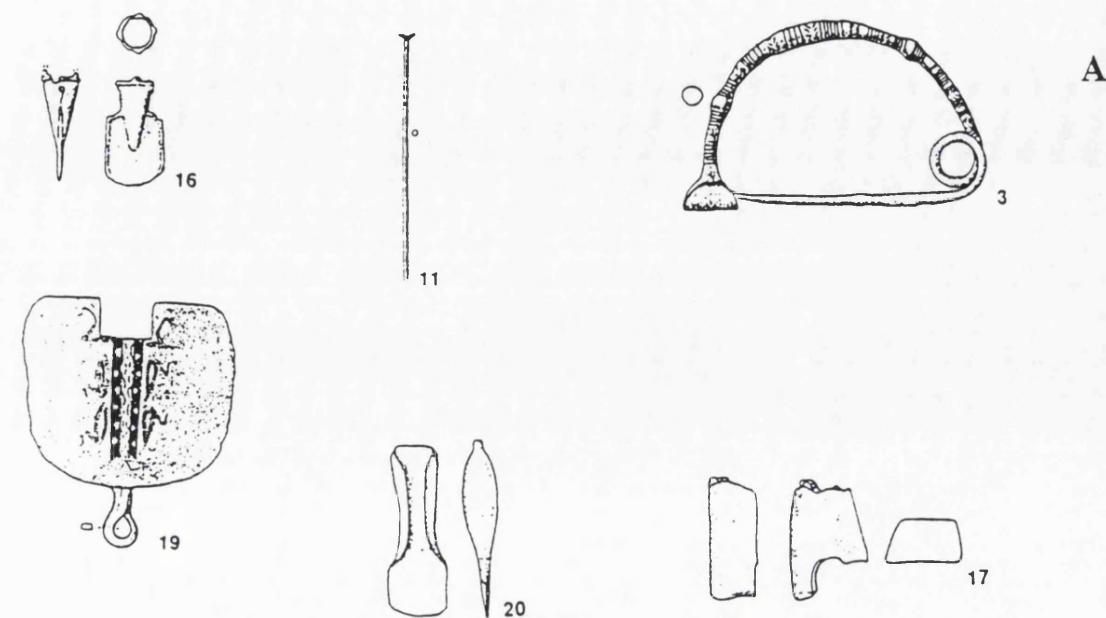


Fig. II, 20: Pottery and bronze types characteristic of the FBA1 in Central Italy (after Müller-Karpe 1959 and Peroni 1989). Not to scale.



B

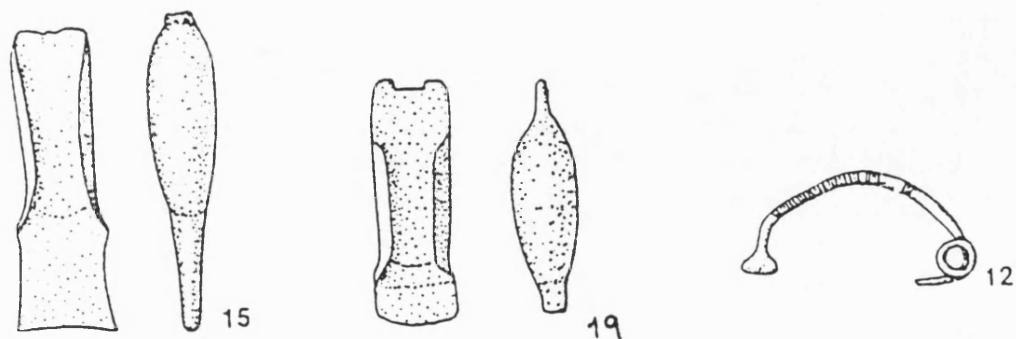
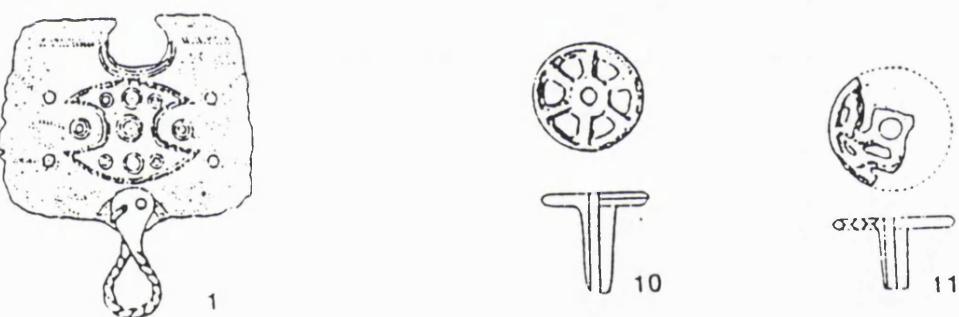


Fig. II, 21 A: Bronze types characteristic of the FBA2 in Central Italy
 21 B: Bronze types characteristic of the FBA2/3 In Central Italy. Not to scale.

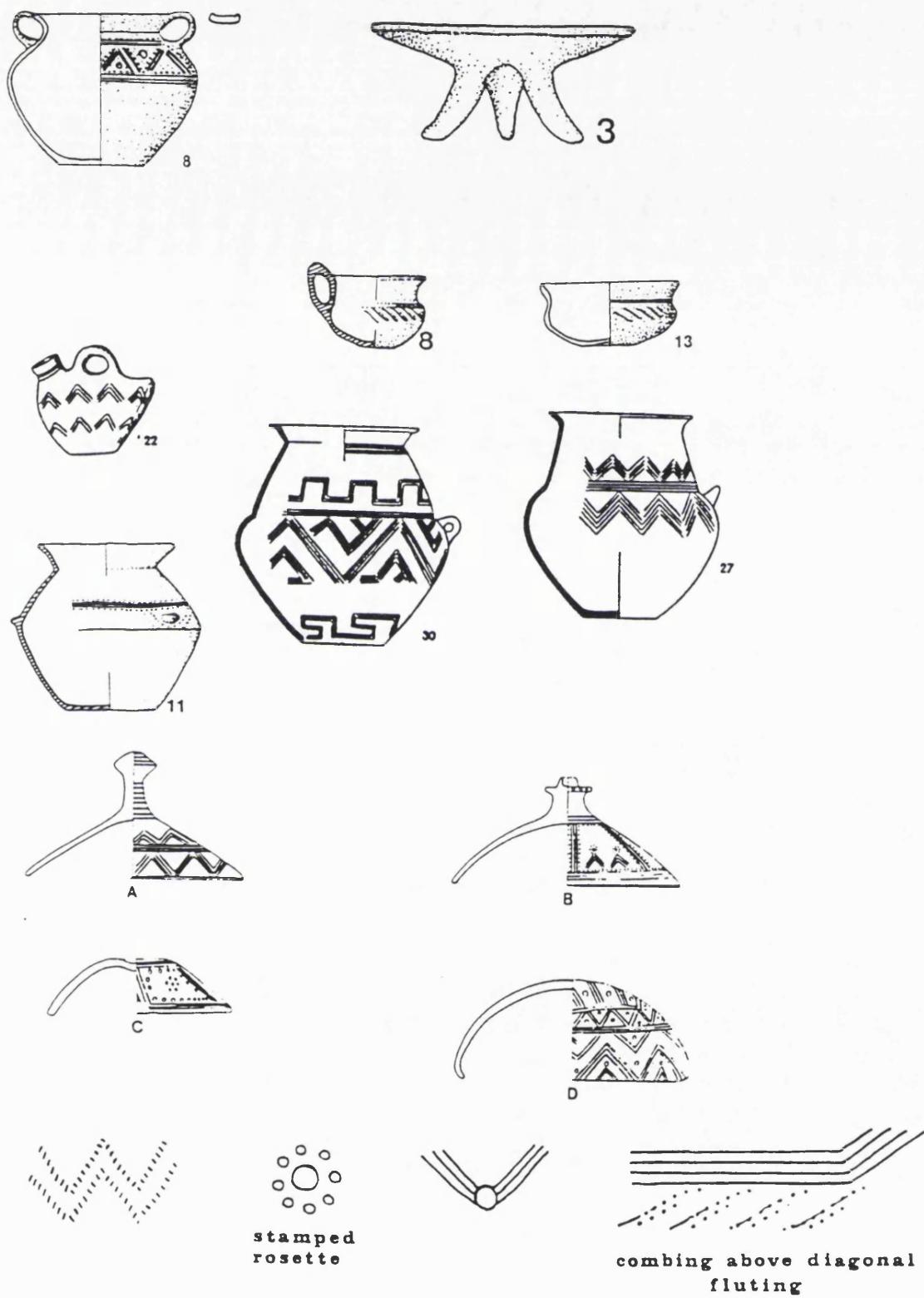


Fig. II, 22: Pottery types characteristic of the FB3 in Central Italy. Not to scale.

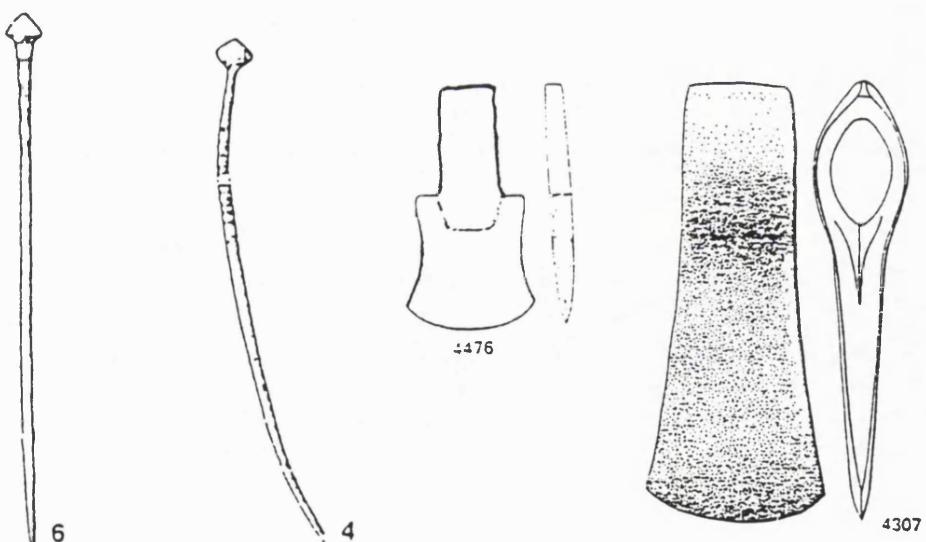
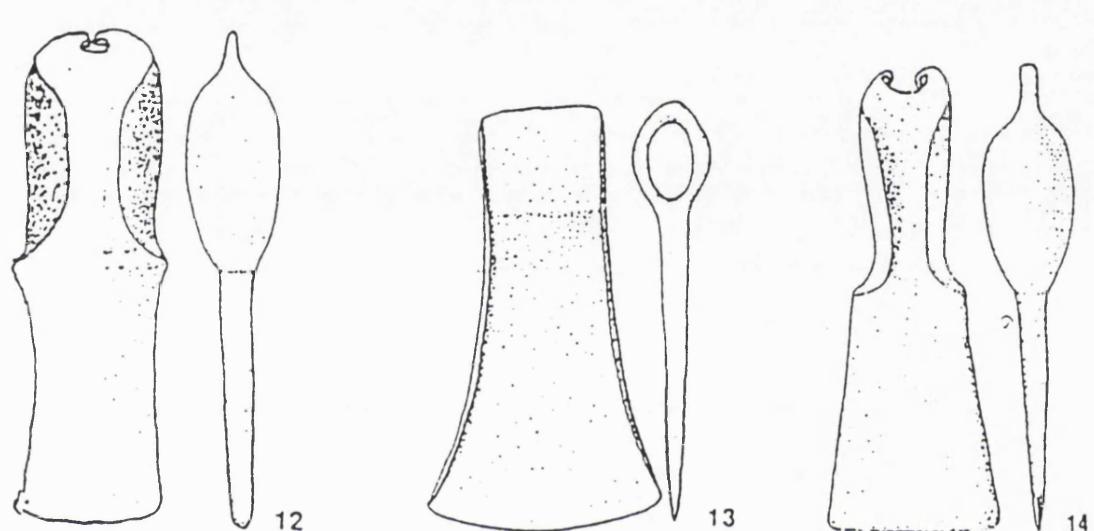
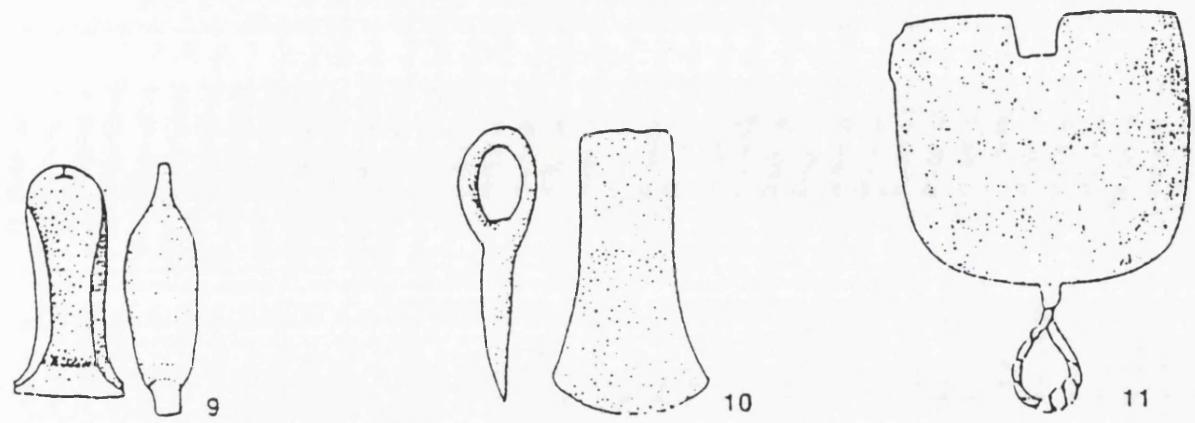
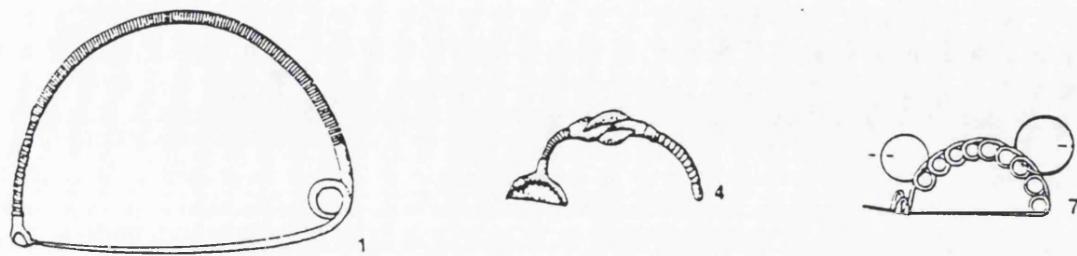


Fig. II, 23: Bronze types characteristic of the FB3 in Central Italy. Not to scale.



SN

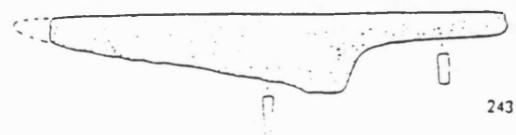
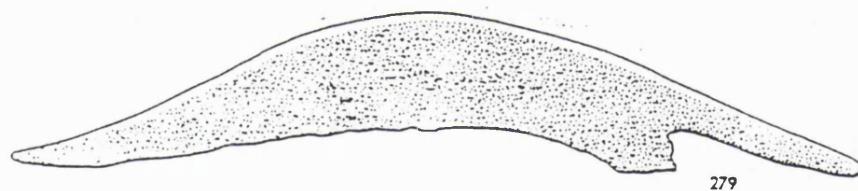
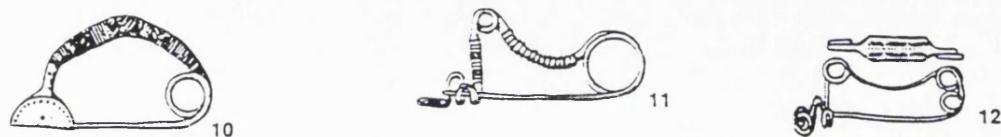


Fig. II, 24: Bronze types characteristic of the FB3 in Central Italy. Not to scale.

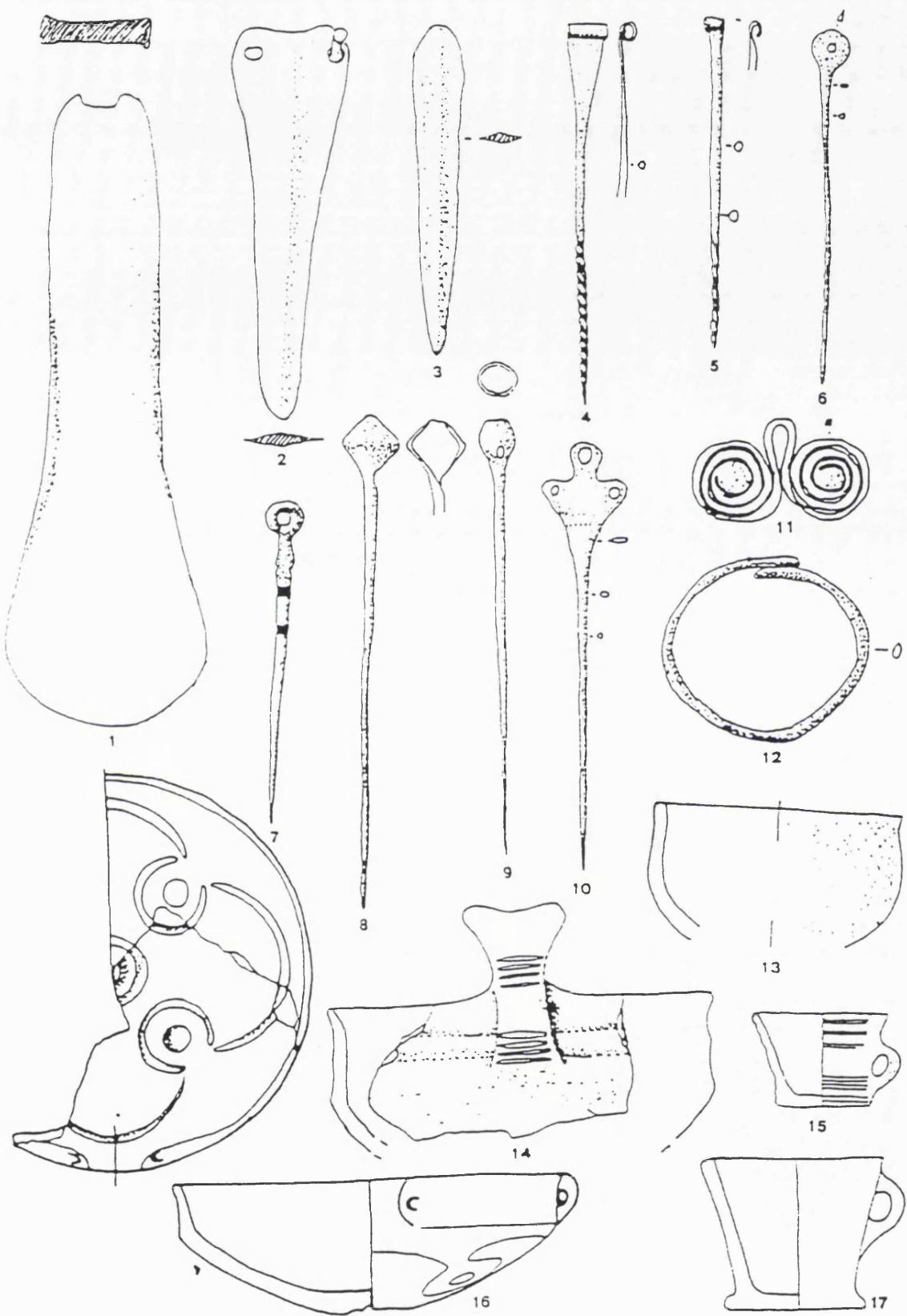


Fig. II, 25: Pottery and bronze types characteristic of the MB1 in Northern Italy.
(After Capoferti 1987) Not to scale.

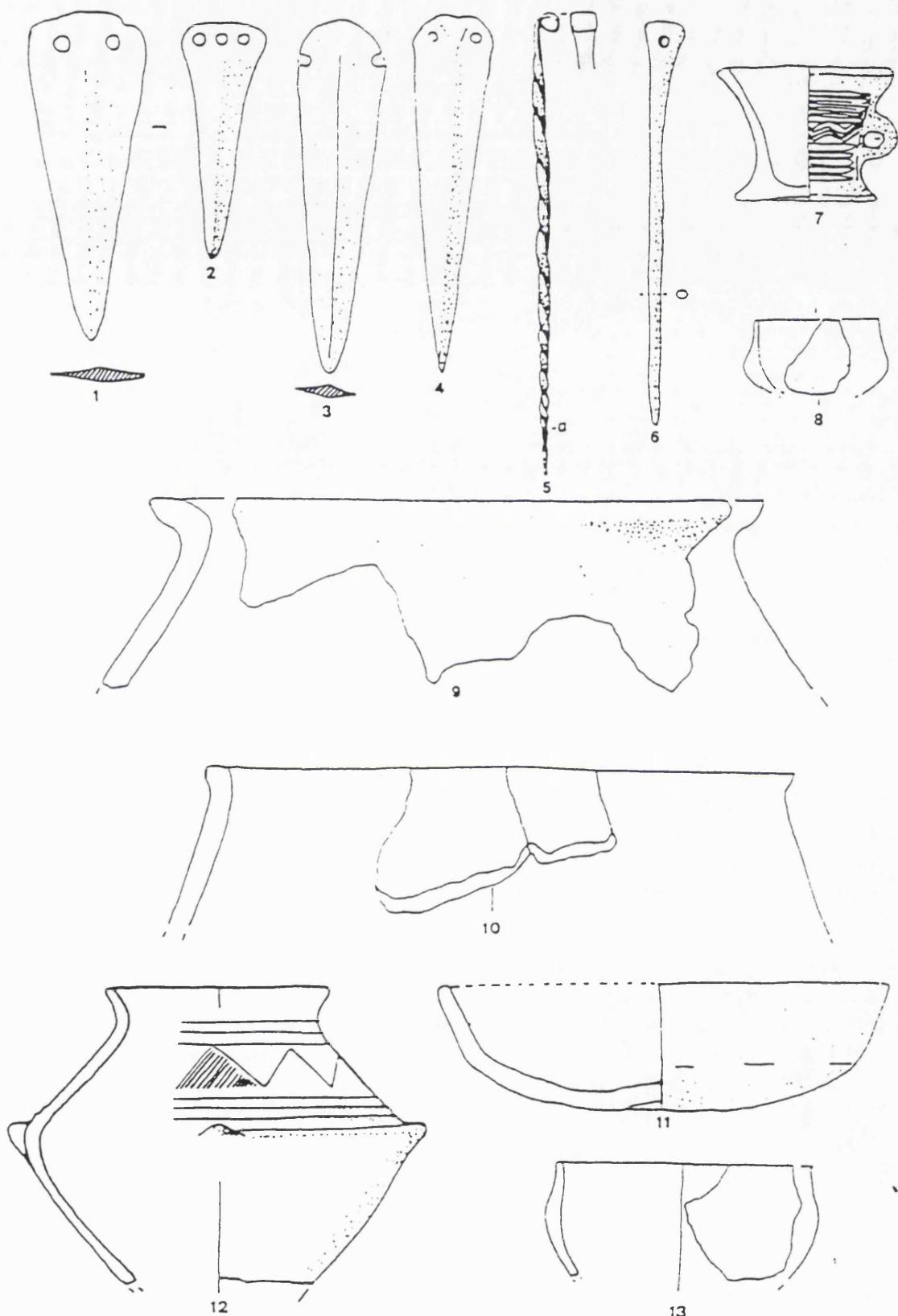


Fig. II, 26: Pottery and bronze types characteristic of the MB1 in Northern Italy.
(After Capoferri 1987) Not to scale.

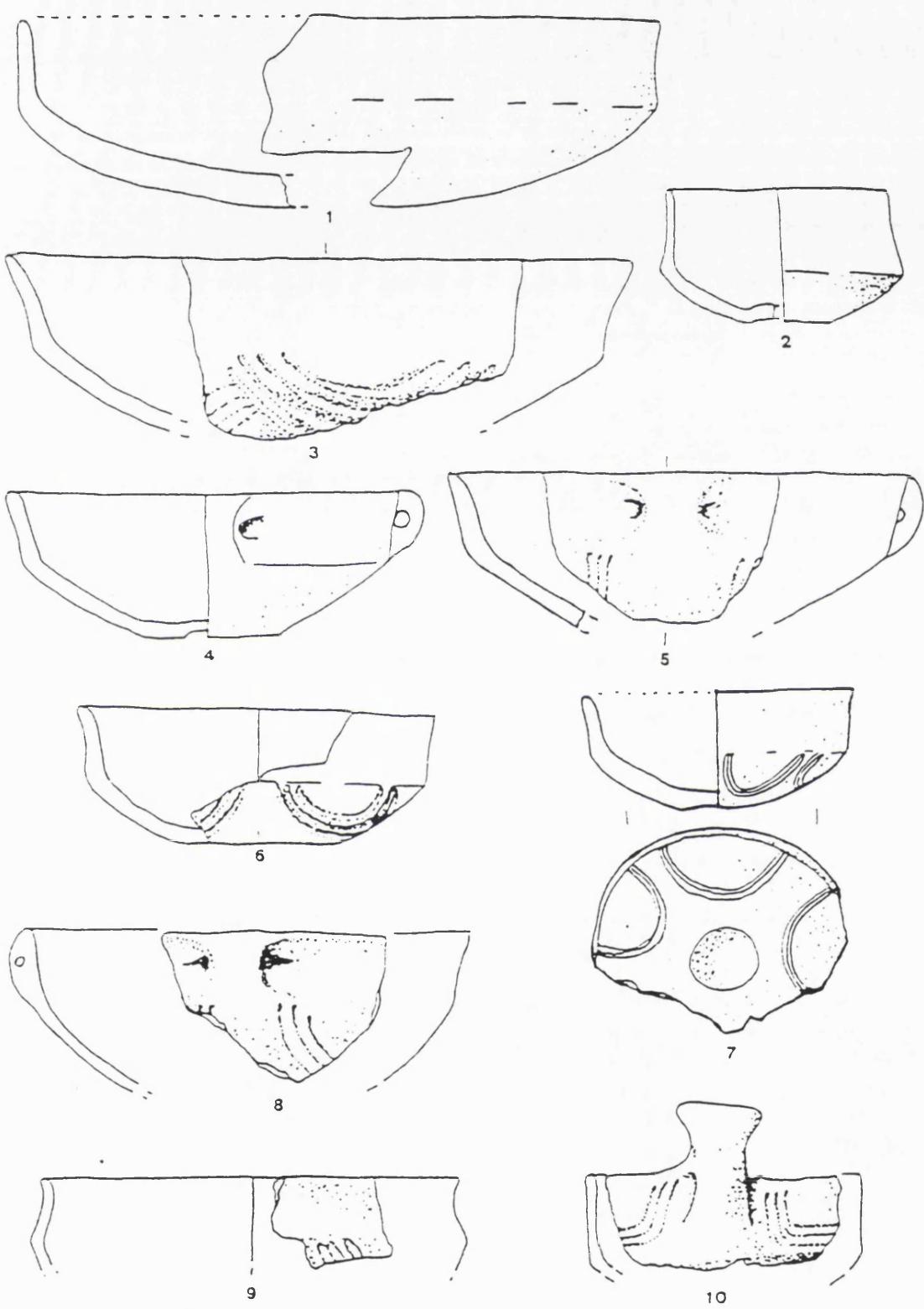


Fig. II, 27: Pottery characteristic of the MB1 in Northern Italy. (After Capoferri 1987) Not to scale.

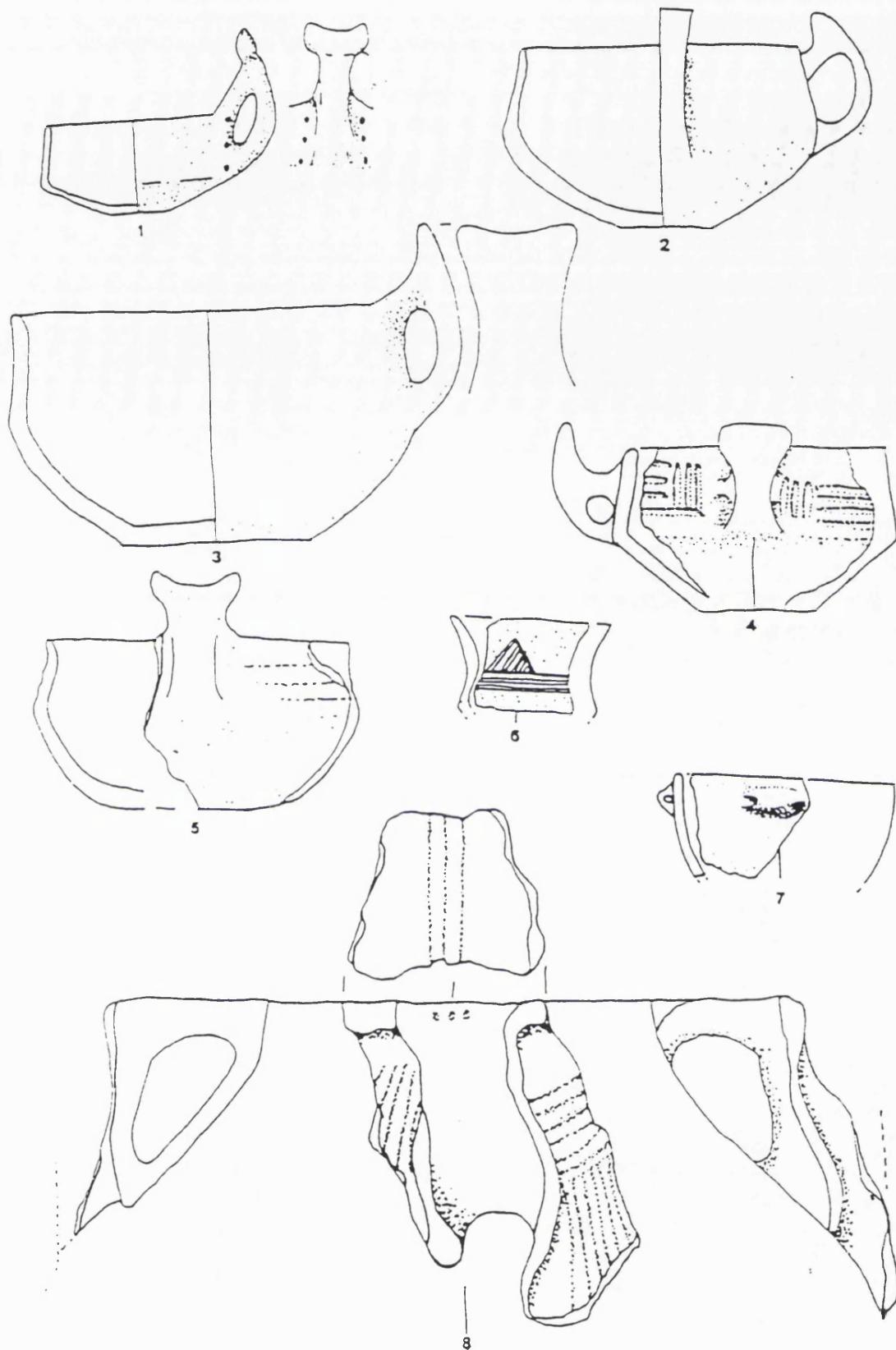


Fig. II, 28: Pottery characteristic of the MB1 in Northern Italy. (After Capoferri 1987) Not to scale.

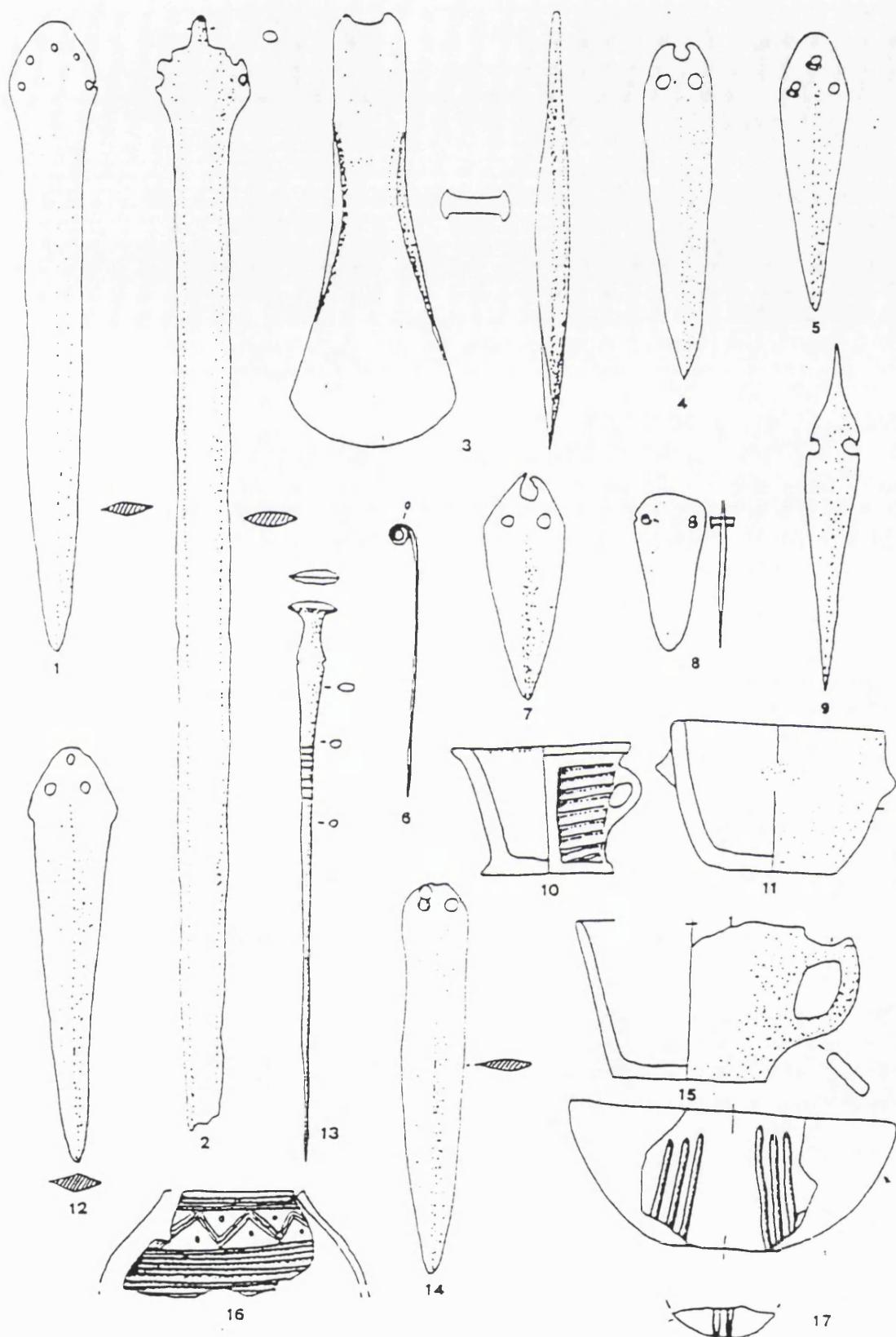


Fig. II, 29: Pottery and bronze types characteristic of the MB1/2 in Northern Italy
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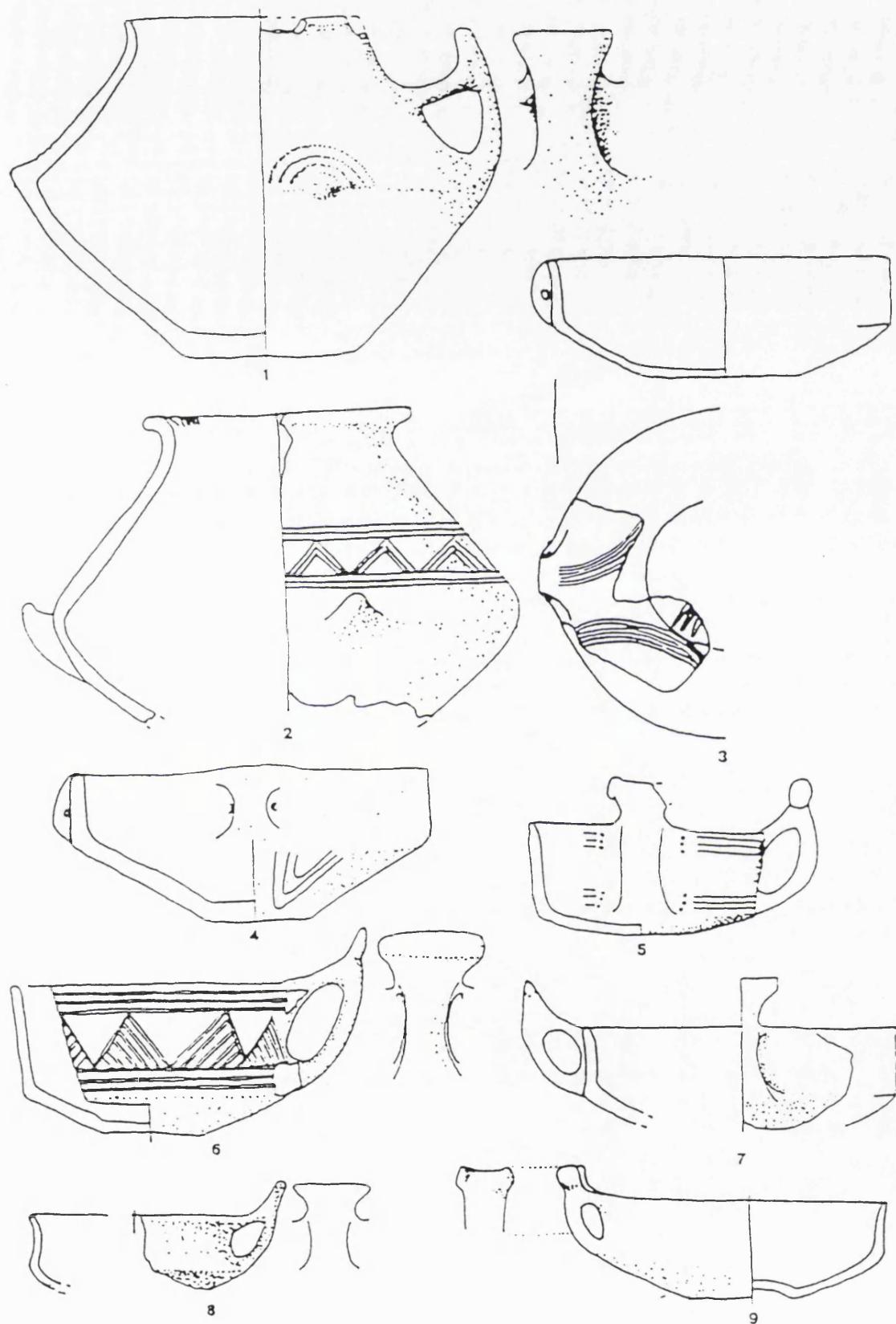


Fig. II, 30: Pottery types characteristic of the MB1/2 in Northern Italy (After Capoferri 1987) Not to scale.

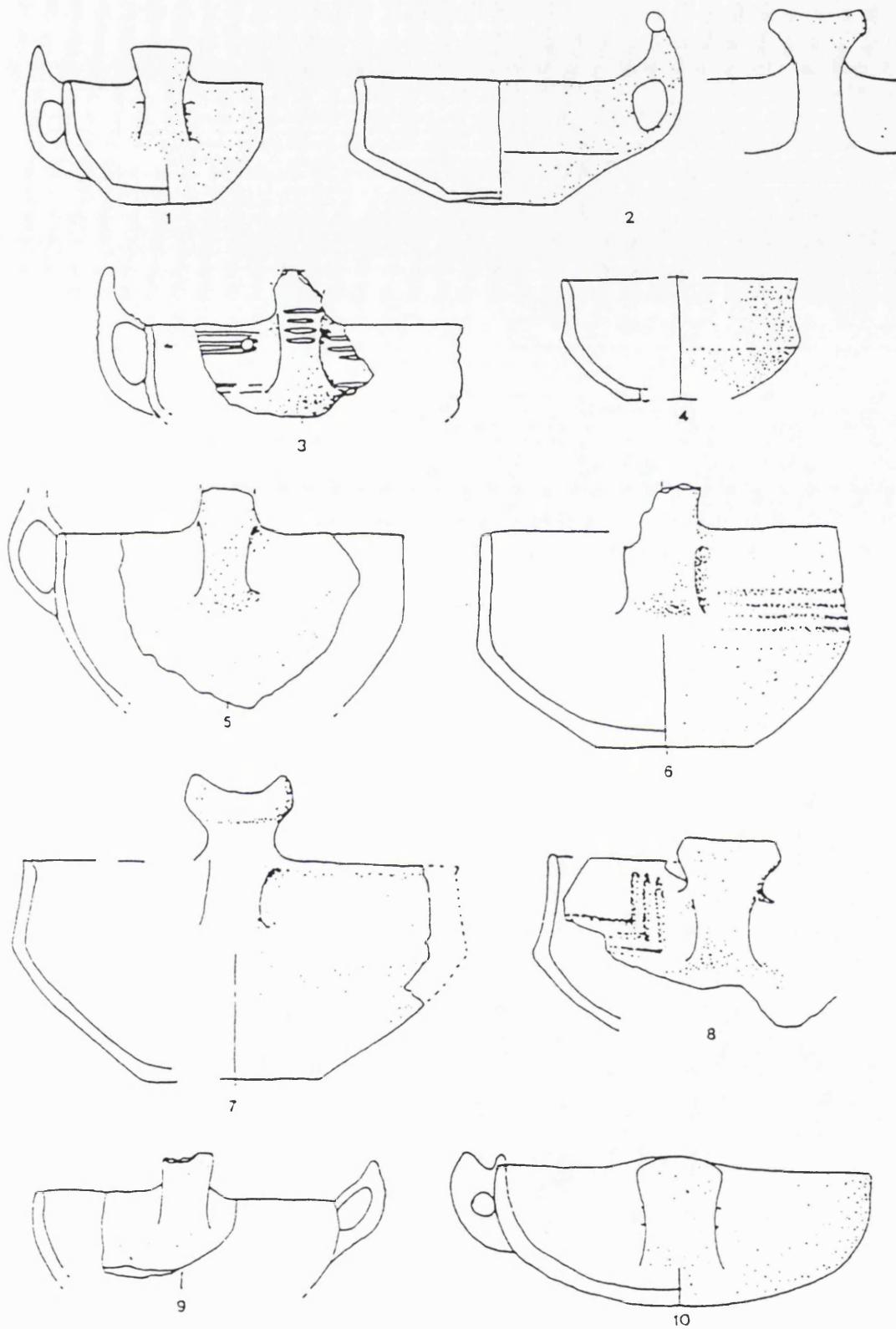


Fig. II, 31: Pottery types characteristic of the MB1/2 in Northern Italy (After Capoferri 1987) Not to scale.

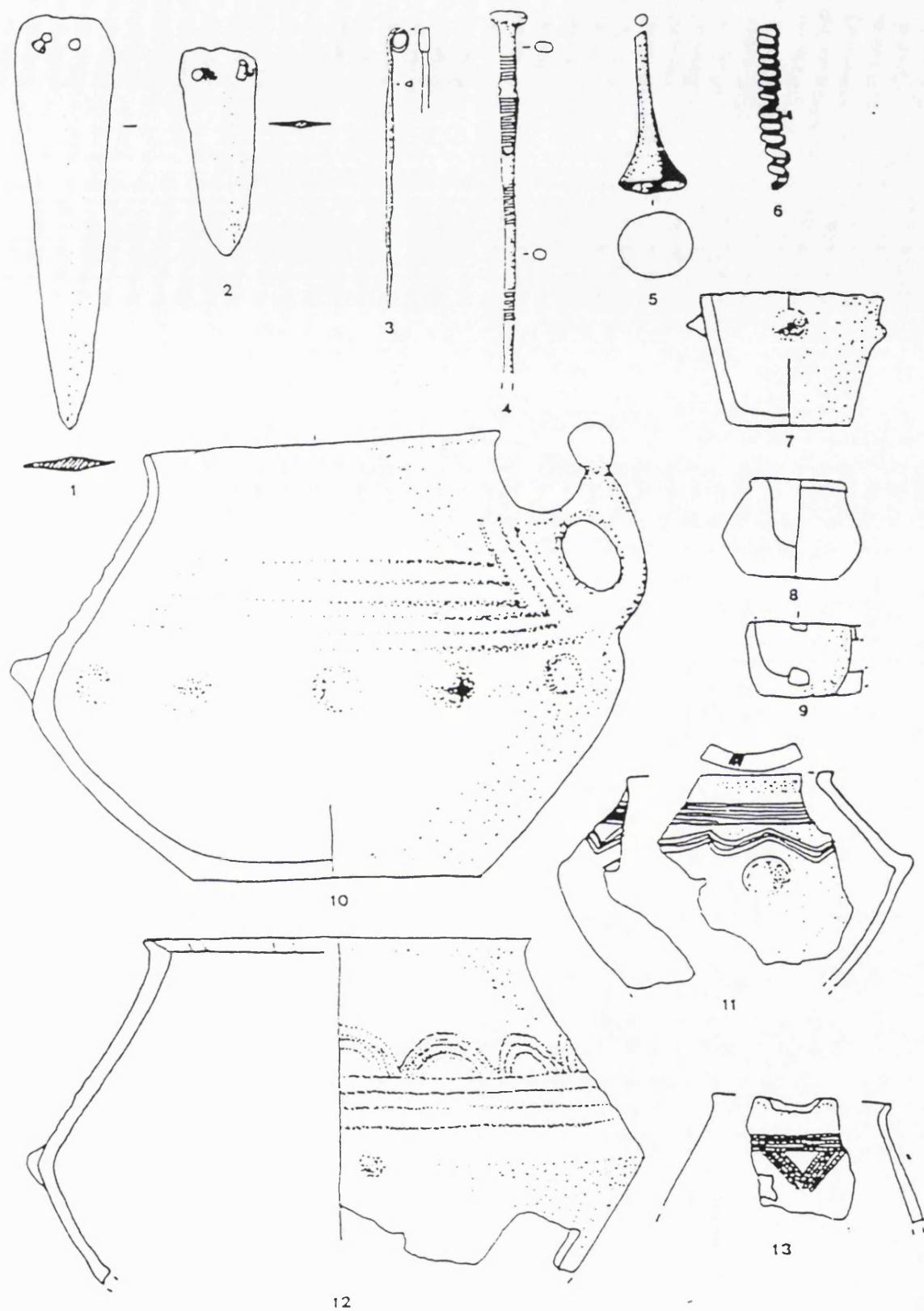


Fig. II, 32: Pottery and bronze types characteristic of the MB2 in Northern Italy
(After Capoferri 1987) Not to scale.

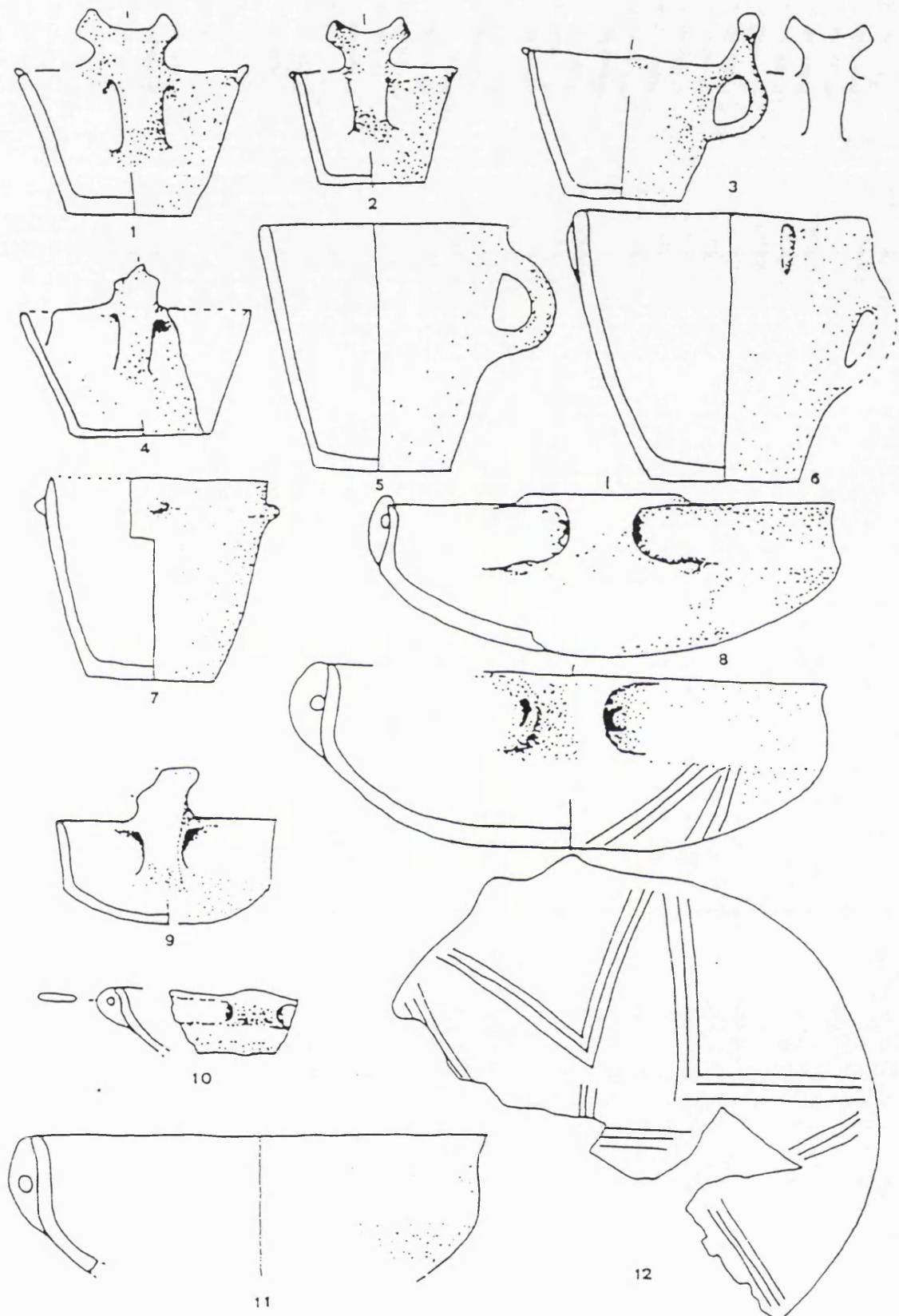


Fig. II, 33: Pottery types characteristic of the MB2 in Northern Italy (After Capoferri 1987) Not to scale.

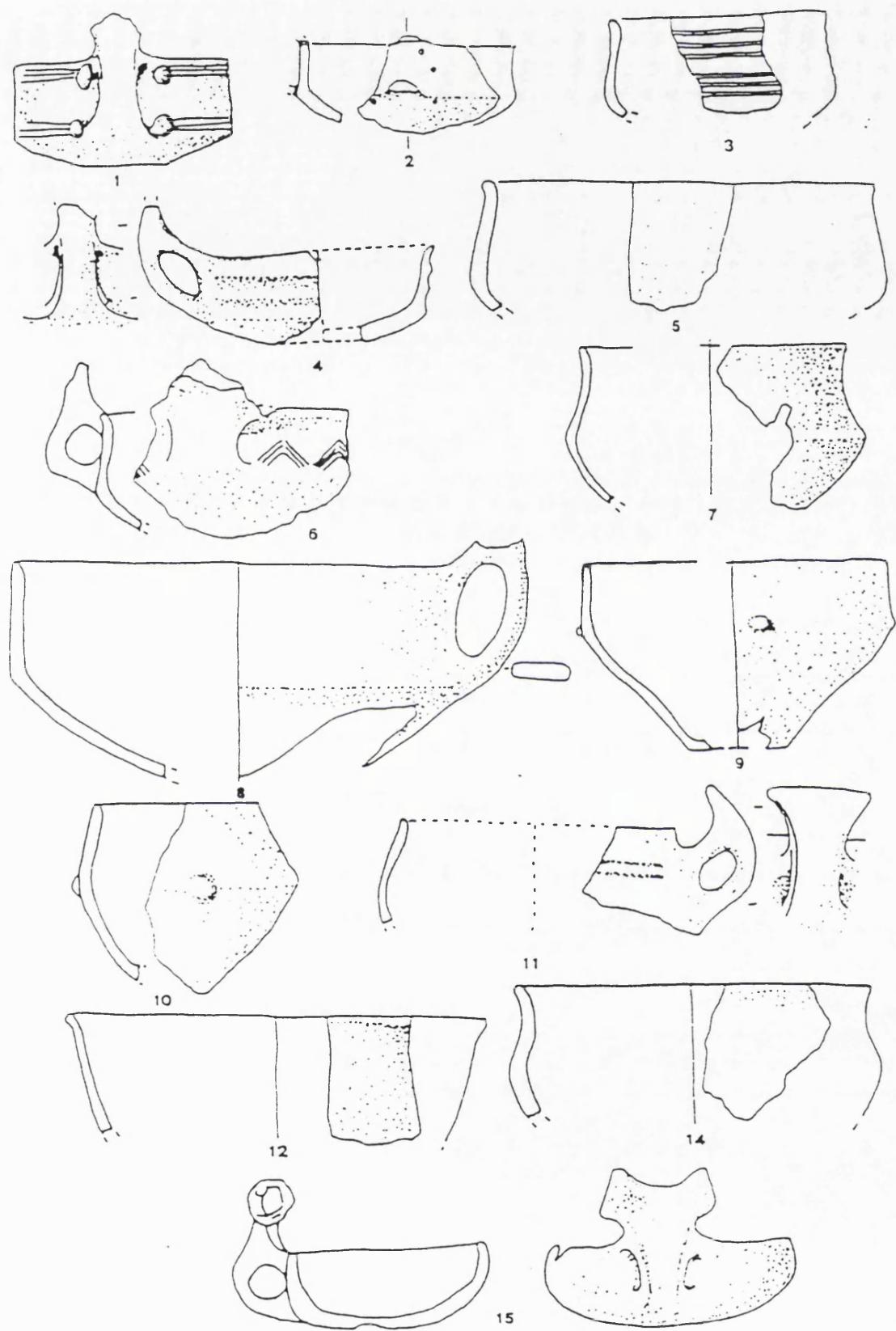


Fig. II, 34: Pottery types characteristic of the MB2 in Northern Italy (After Capoferri 1987) Not to scale.

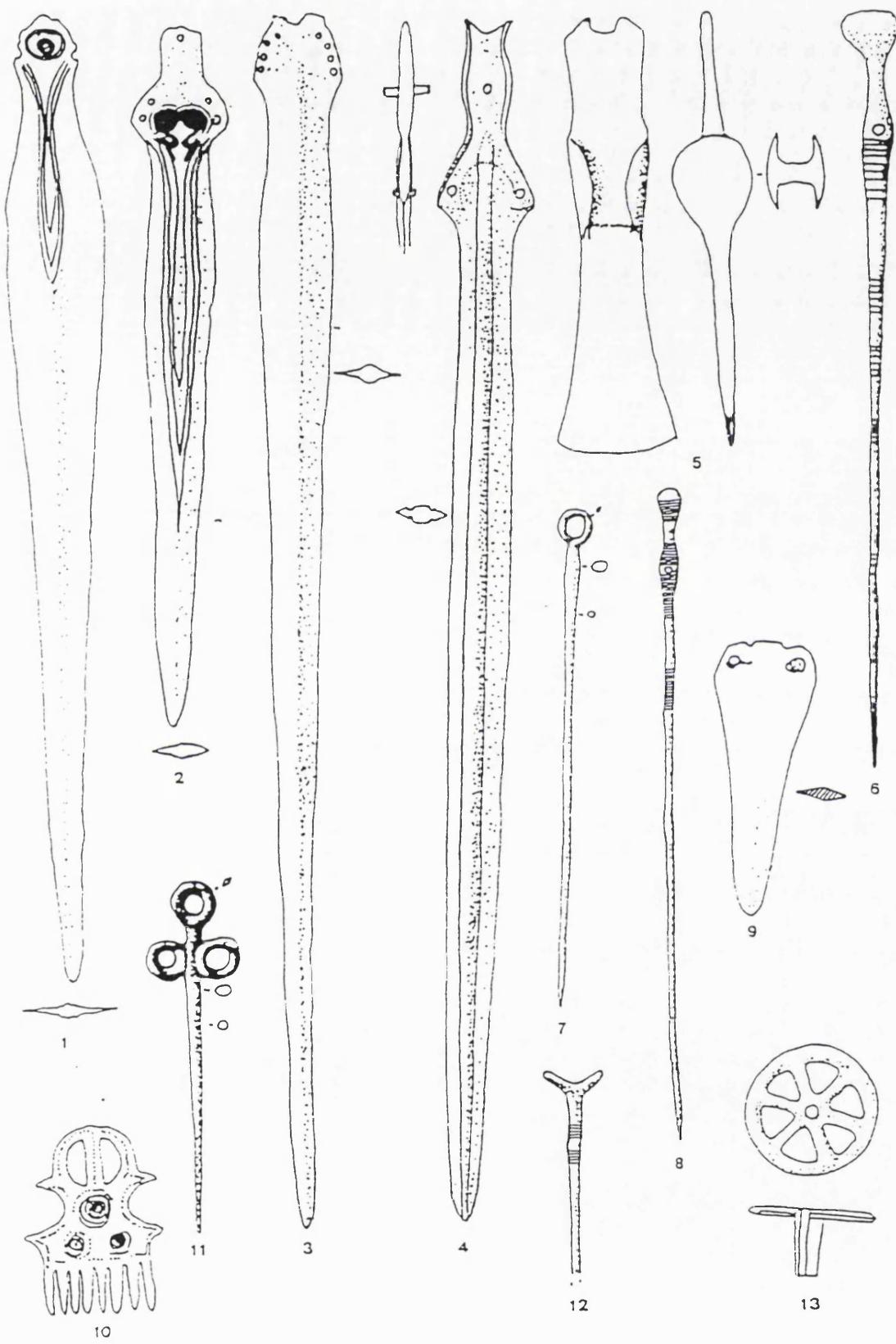


Fig. II, 35: Bronze types characteristic of the MB2/MB3a in Northern Italy (After apoferrri 1987) Not to scale.

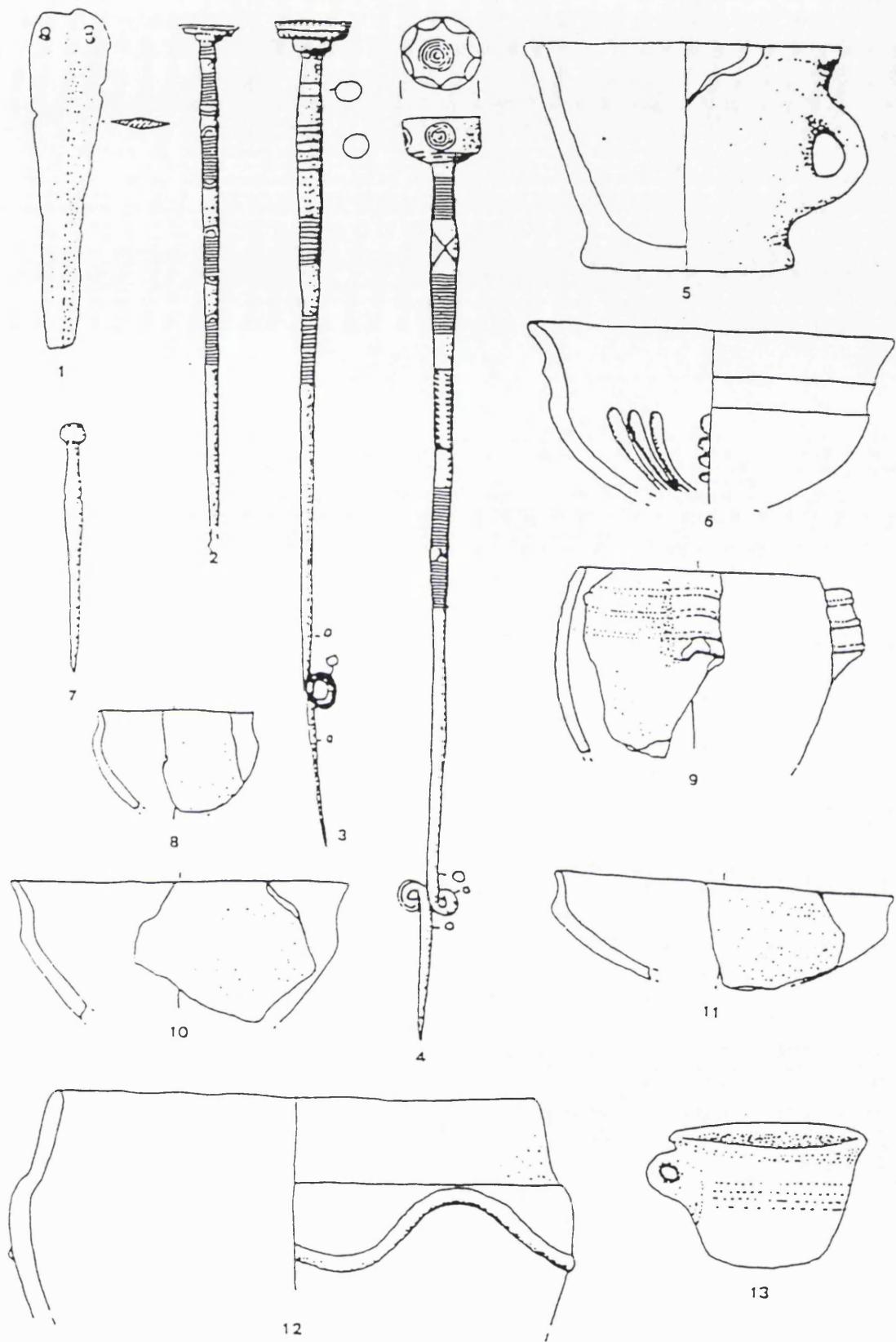


Fig. II, 36: Pottery types characteristic of the MB2/MB3a in Northern Italy (After Capoferti 1987) Not to scale.

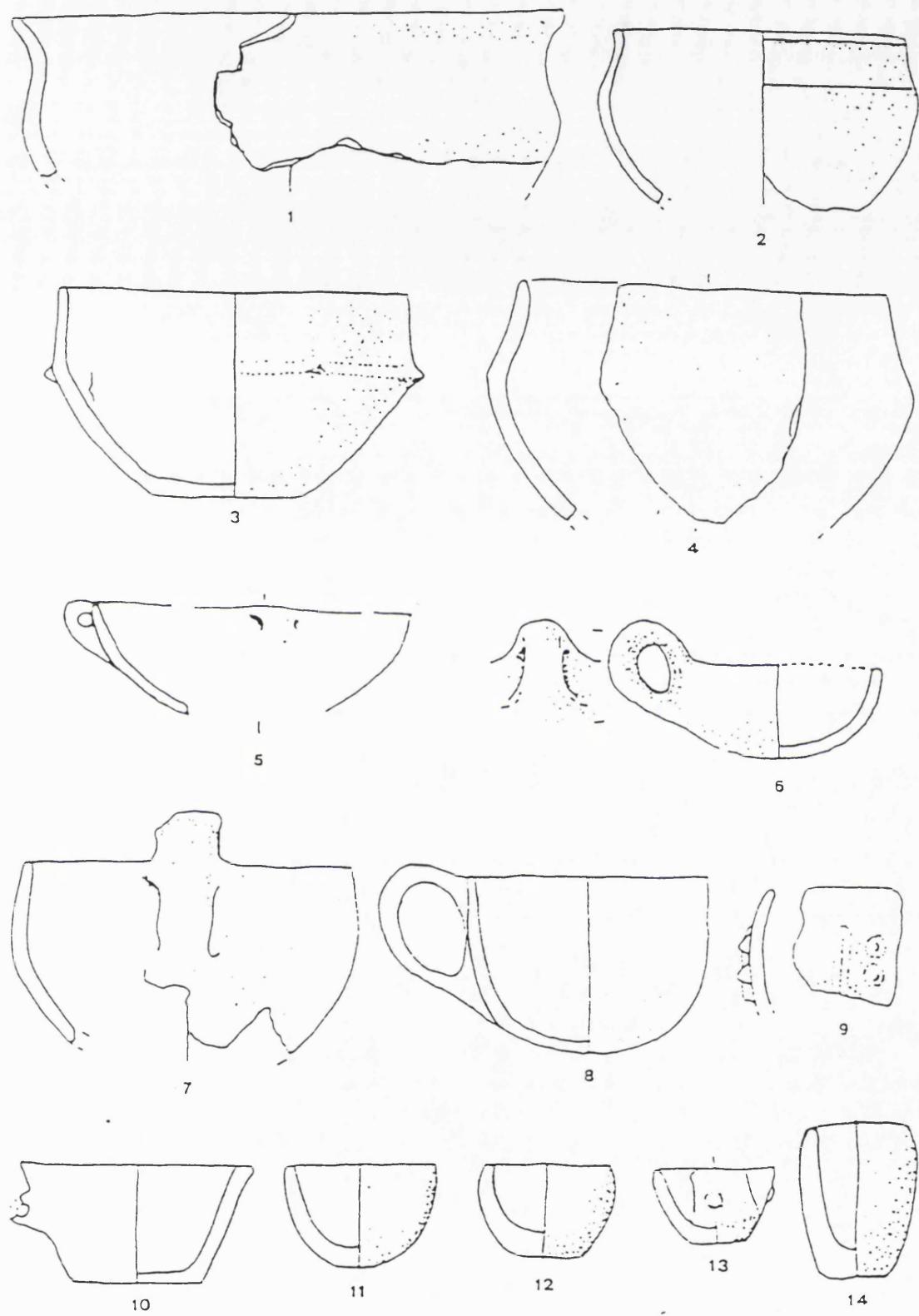


Fig. II, 37: Pottery and bronze types characteristic of the MB3a in Northern Italy
 (After Capoferra 1987) Not to scale.

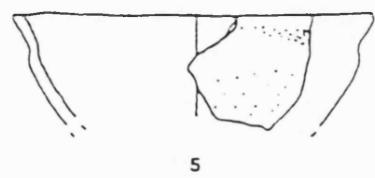
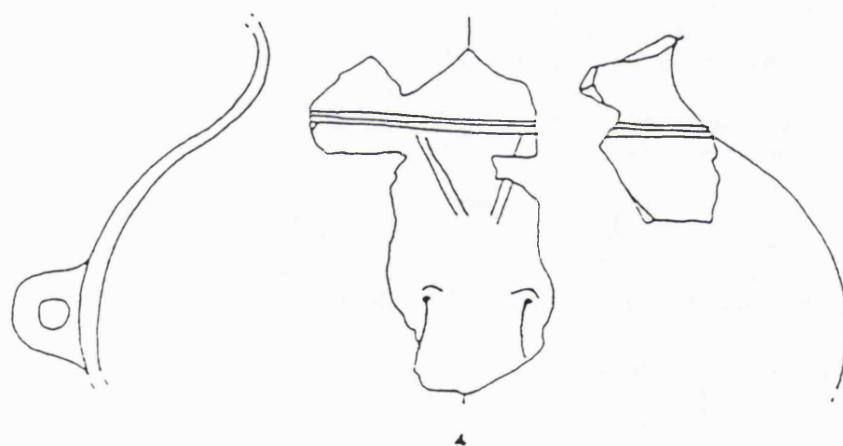
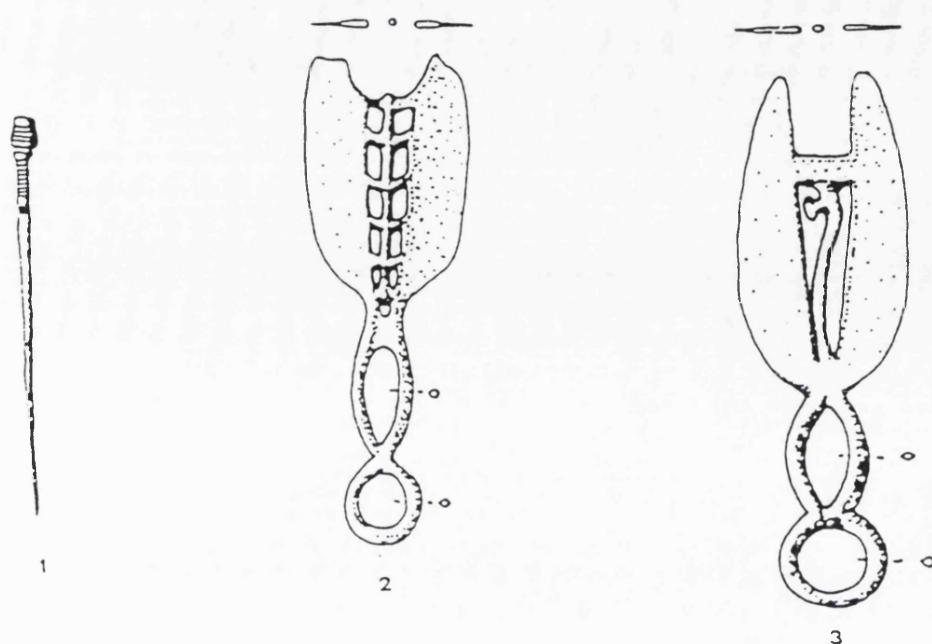


Fig. II, 38: Pottery and bronze types characteristic of the MB3a/MB3b in Northern Italy (After Capoferri 1987) Not to scale.

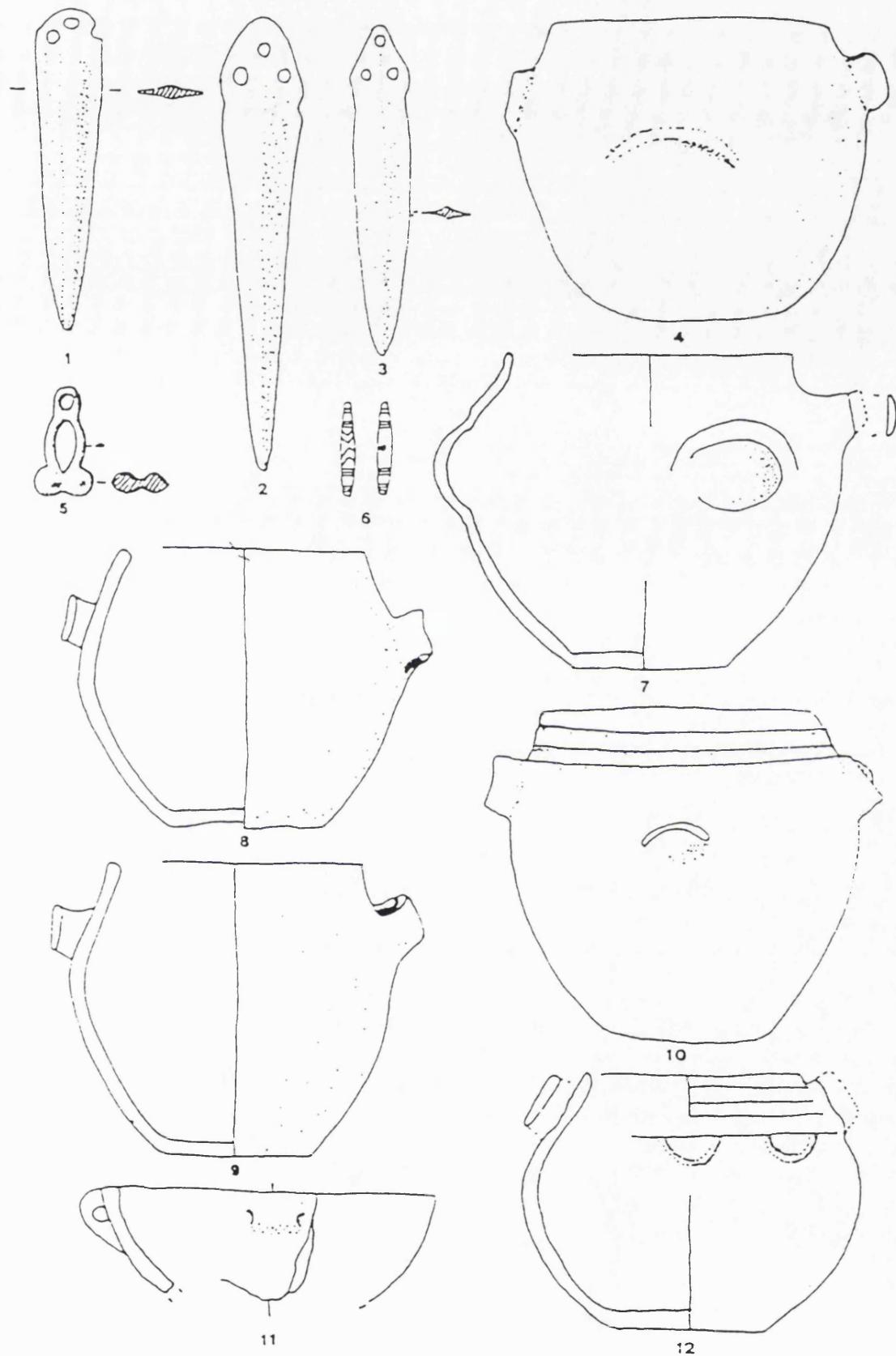


Fig. II, 39: Pottery and bronze types characteristic of the MB3b in Northern Italy
 (After Capoferti 1987) Not to scale.

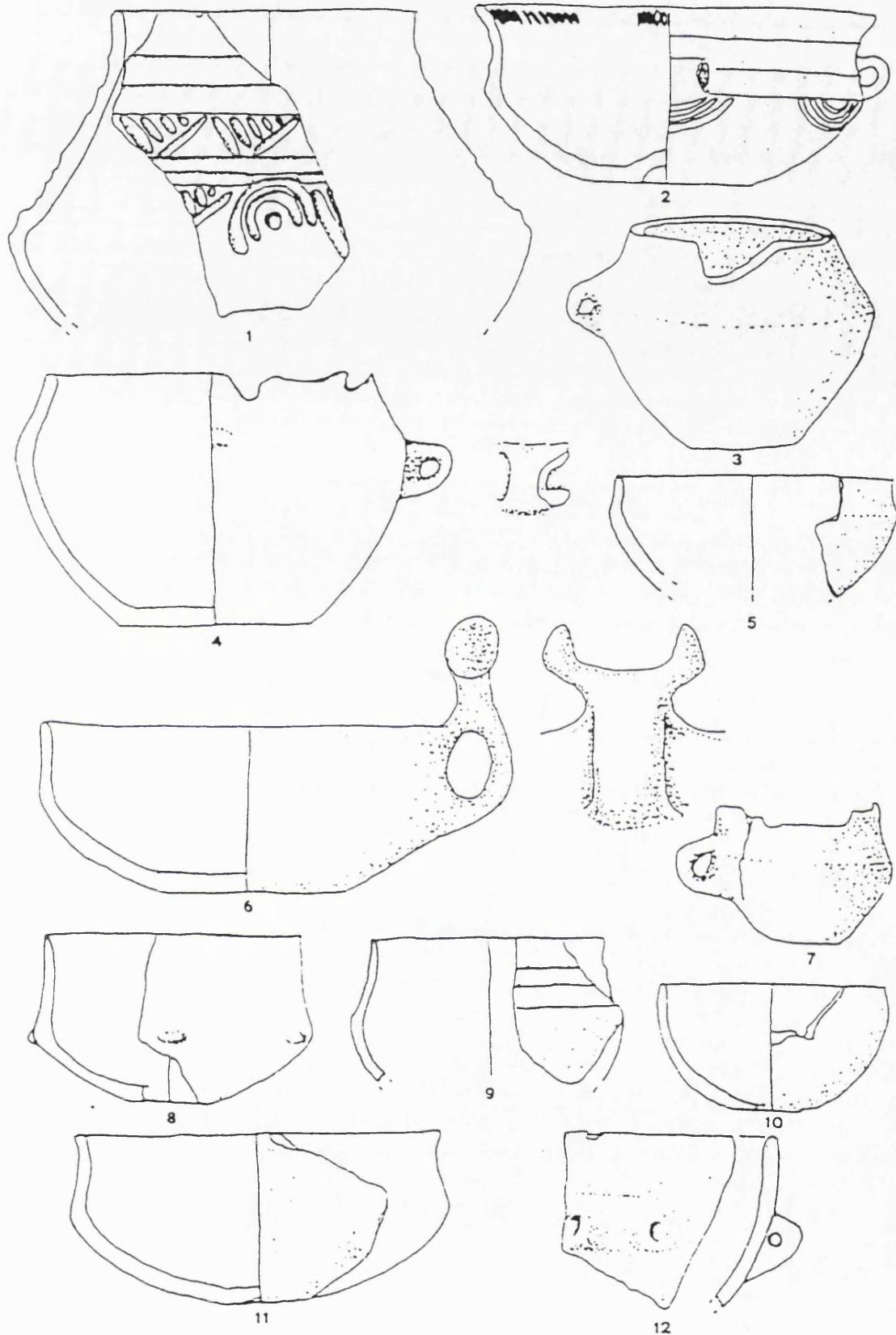


Fig. II, 40: Pottery types characteristic of the MB3b in Northern Italy (After Capoferri 1987) Not to scale.

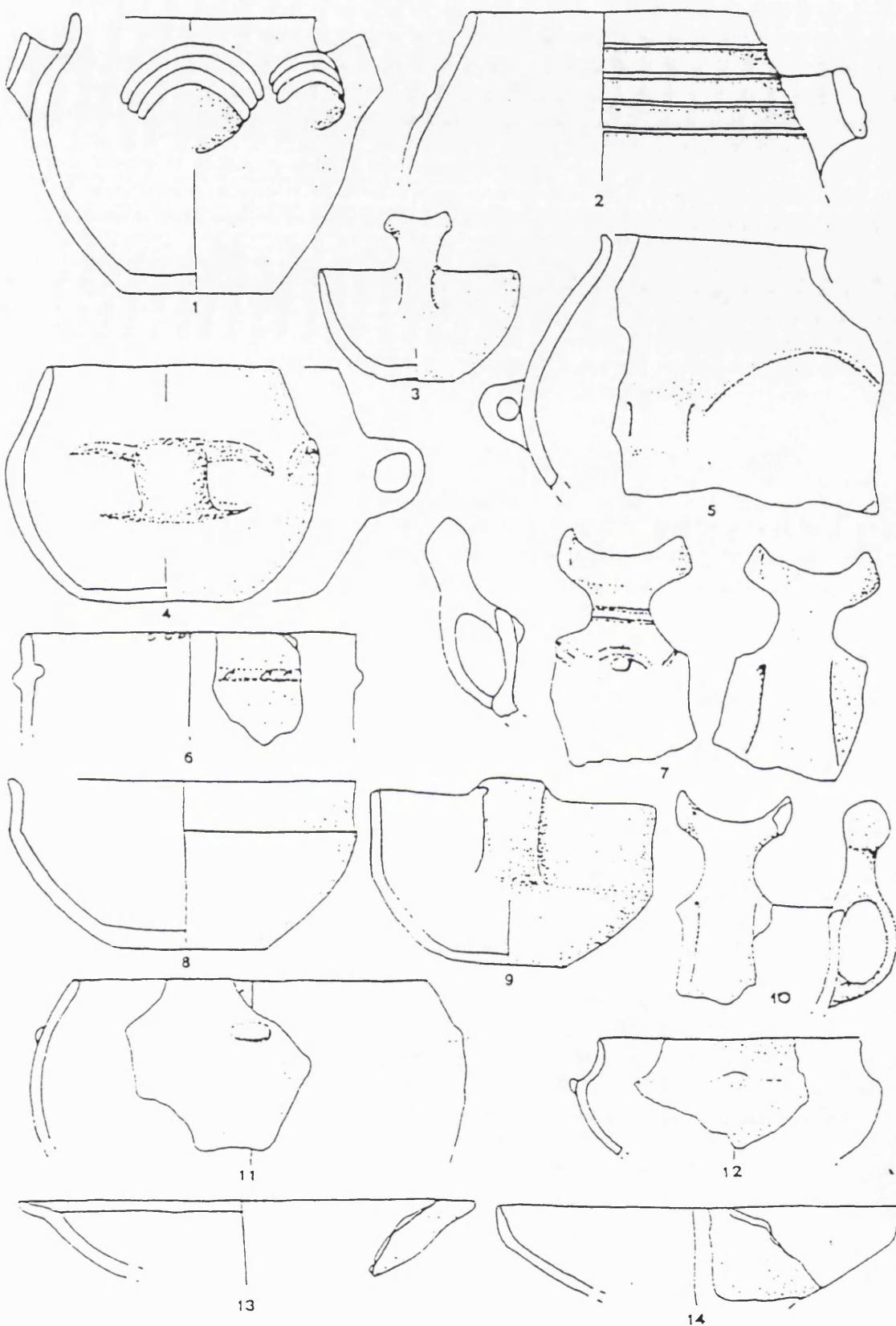


Fig. II, 41: Pottery types characteristic of the MB3b/LBA1 in Northern Italy (After Capoferri 1987) Not to scale.

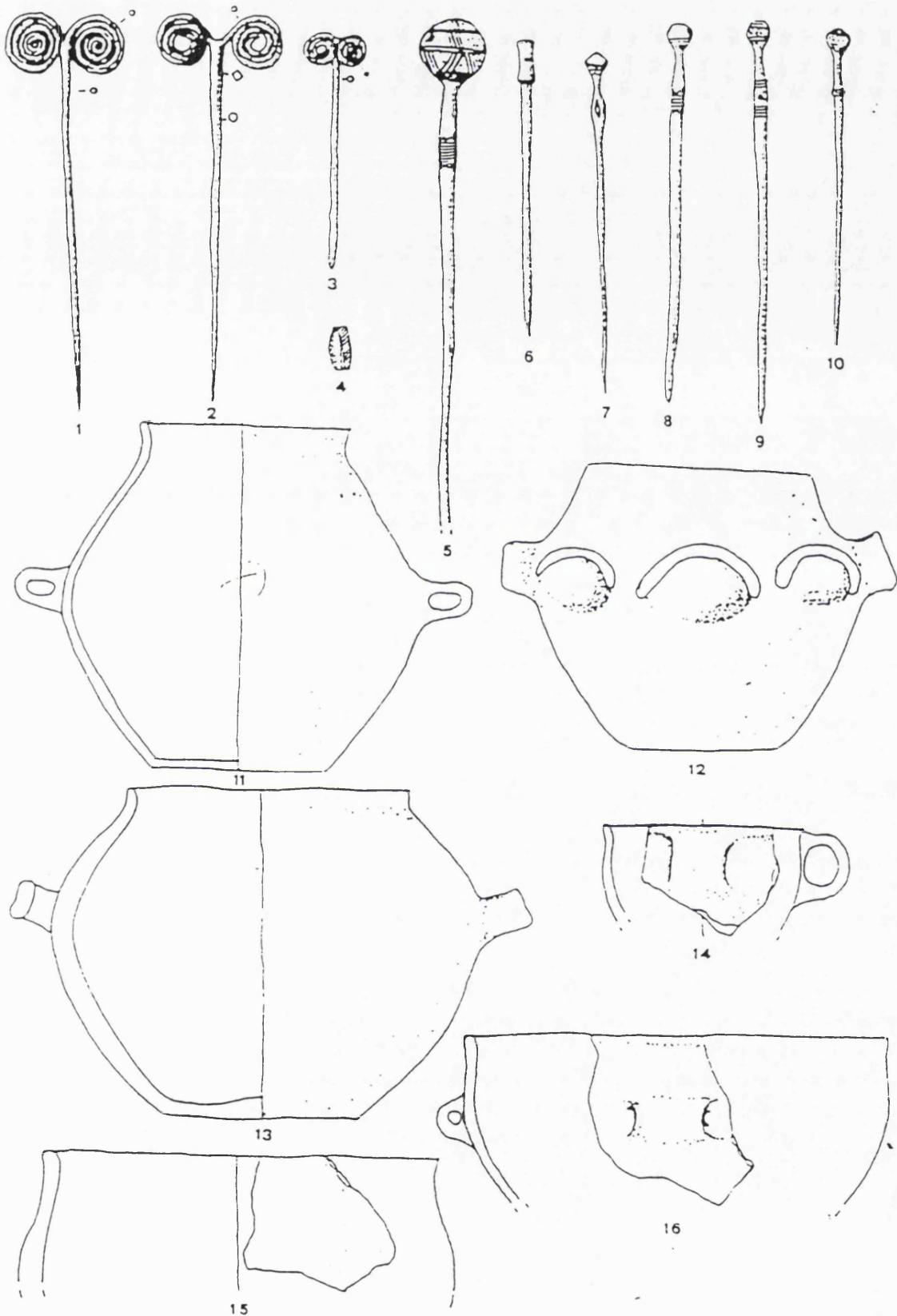


Fig. II, 42: Pottery and bronze types characteristic of the LBA1 in Northern Italy
(After Capoferri 1987) Not to scale.

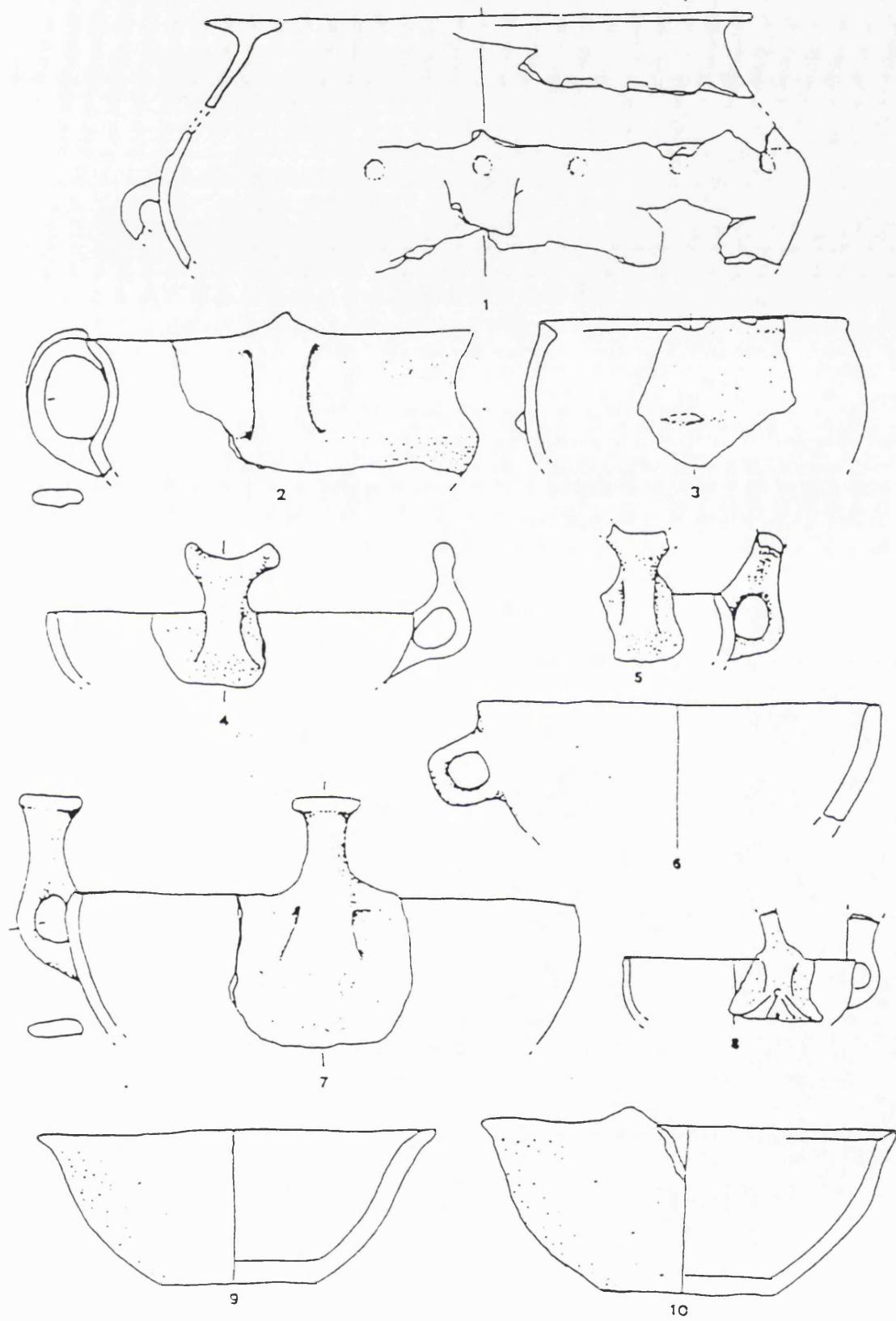


Fig. II, 43: Pottery types characteristic of the LBA1 in Northern Italy (After Capoferri 1987) Not to scale.

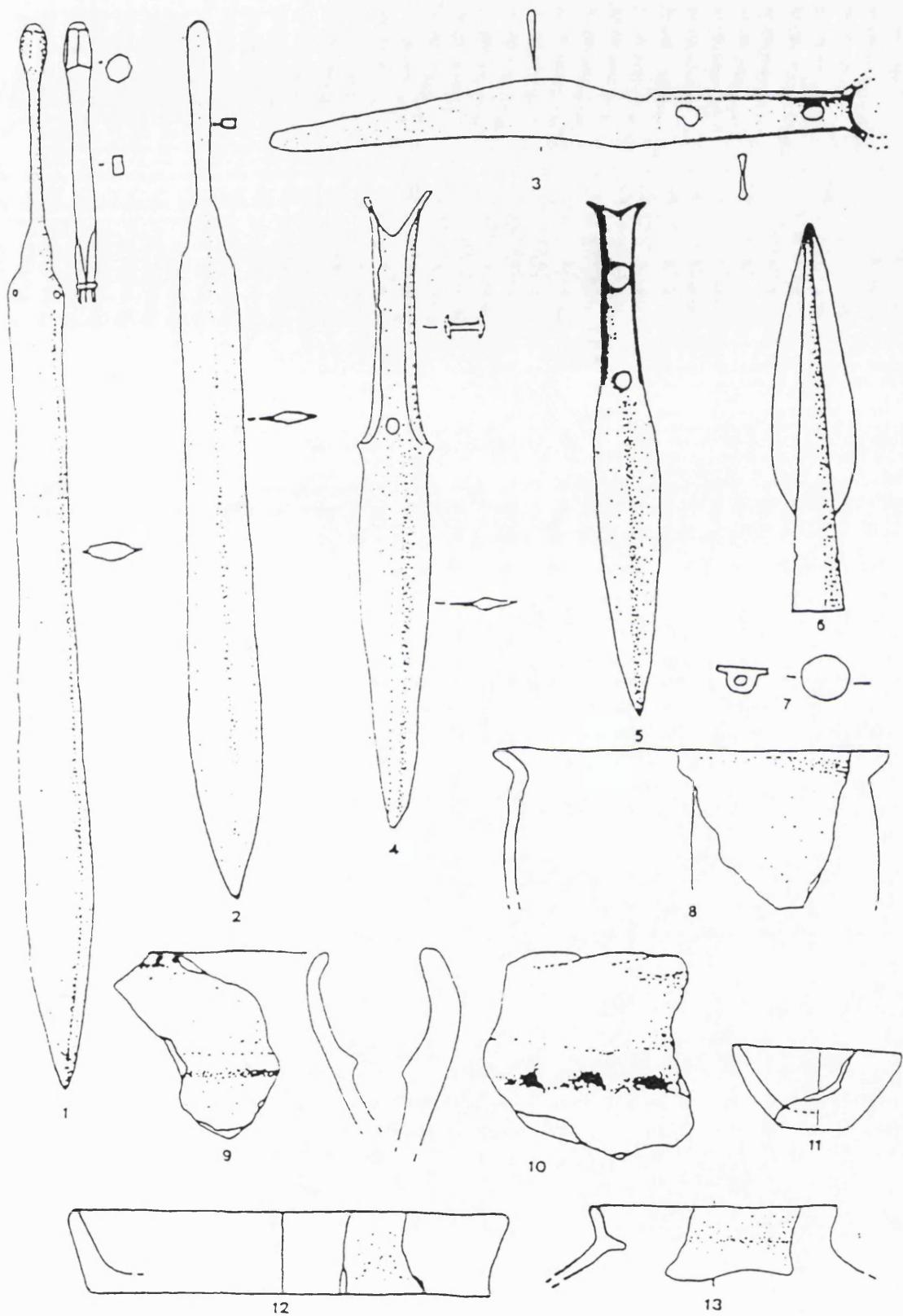


Fig. II, 44: Pottery and bronze types characteristic of the LBA in Northern Italy
(After Capoferri 1987) Not to scale.

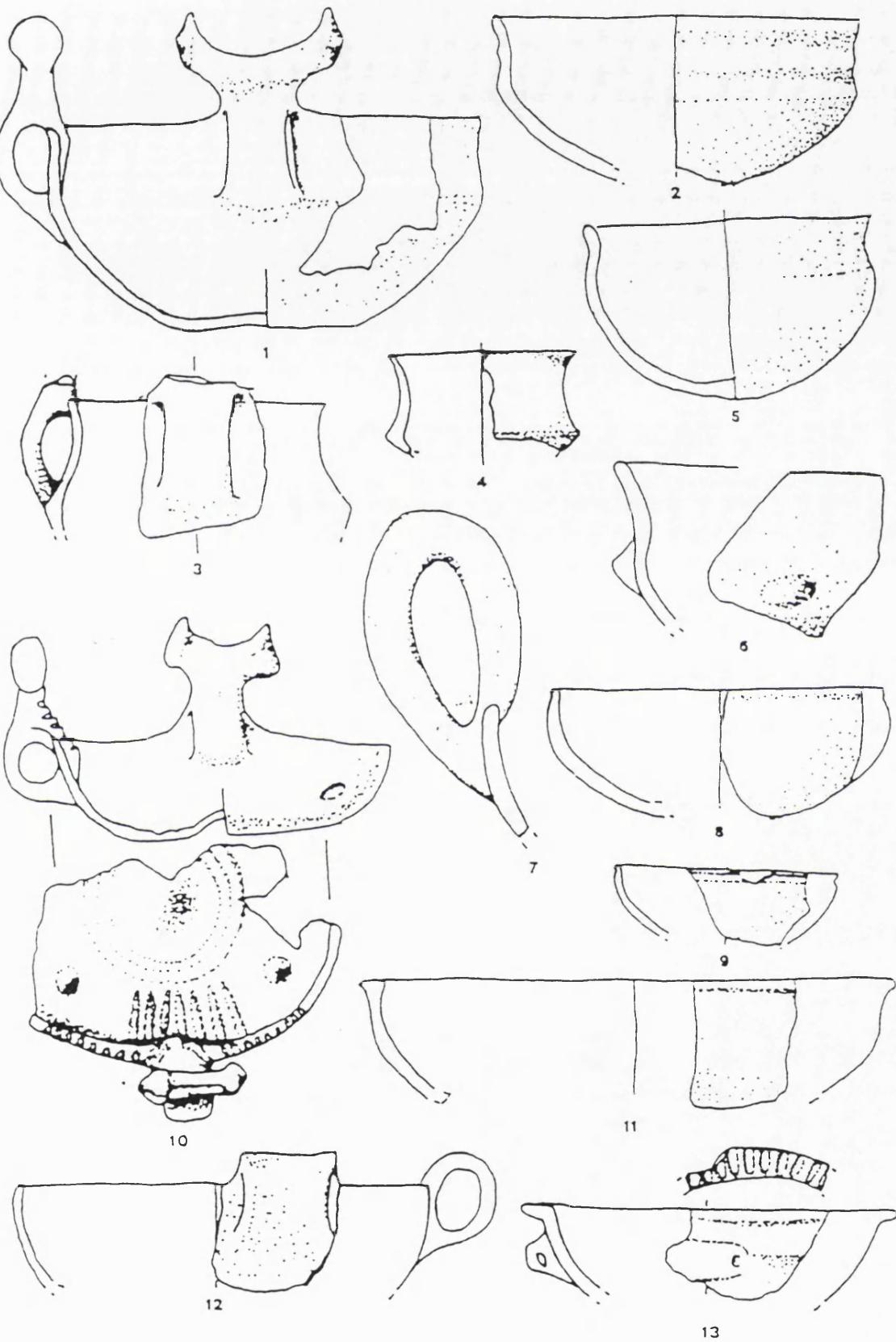


Fig. II, 45: Pottery types characteristic of the LBA in Northern Italy (After Capoferti 1987) Not to scale.

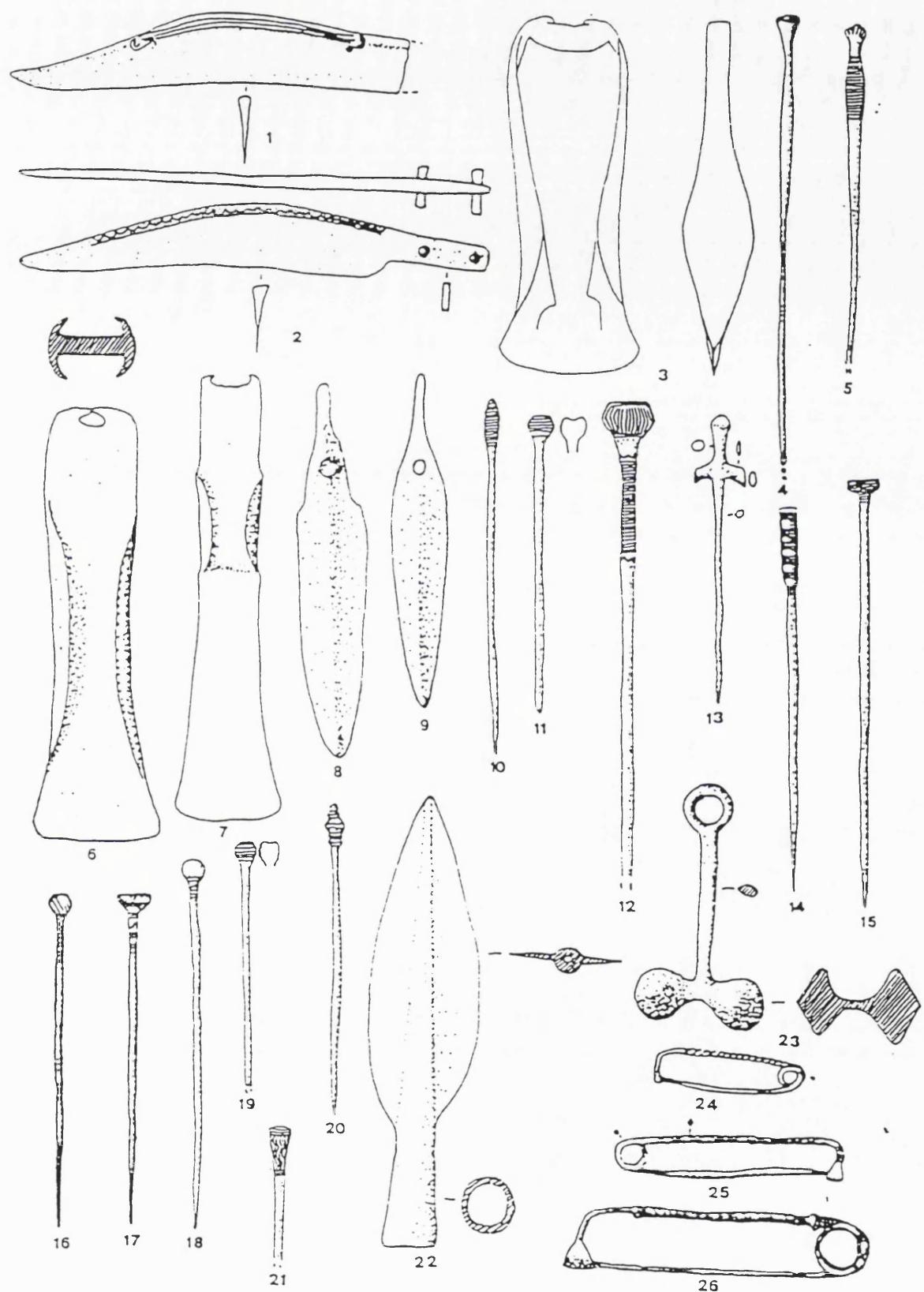


Fig. II, 46: Bronze types characteristic of the LBA2 in Northern Italy (After Capoferri 1987) Not to scale.

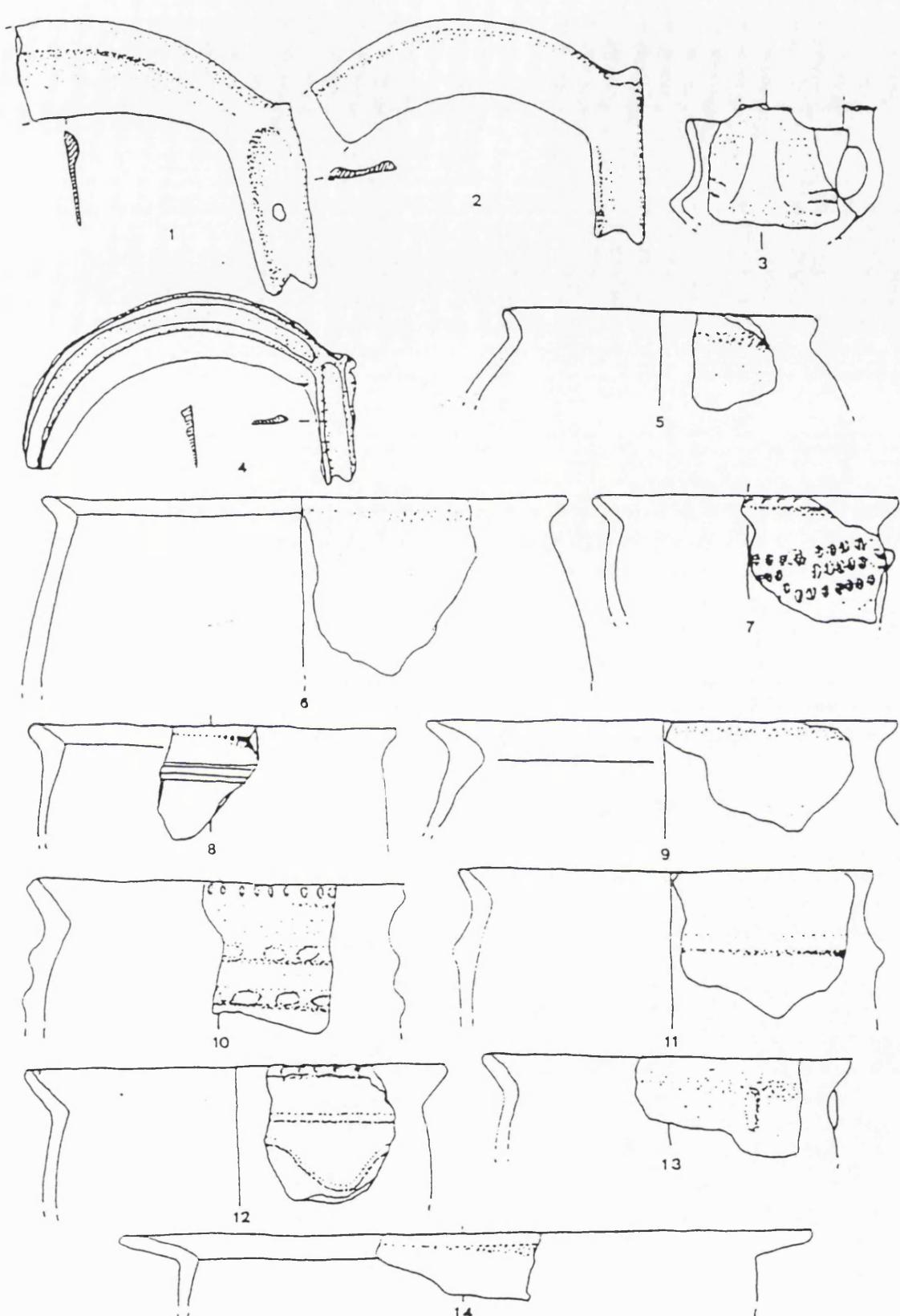


Fig. II, 47: Pottery and bronze types characteristic of the LBA2 in Northern Italy
(After Capoferri 1987) Not to scale.

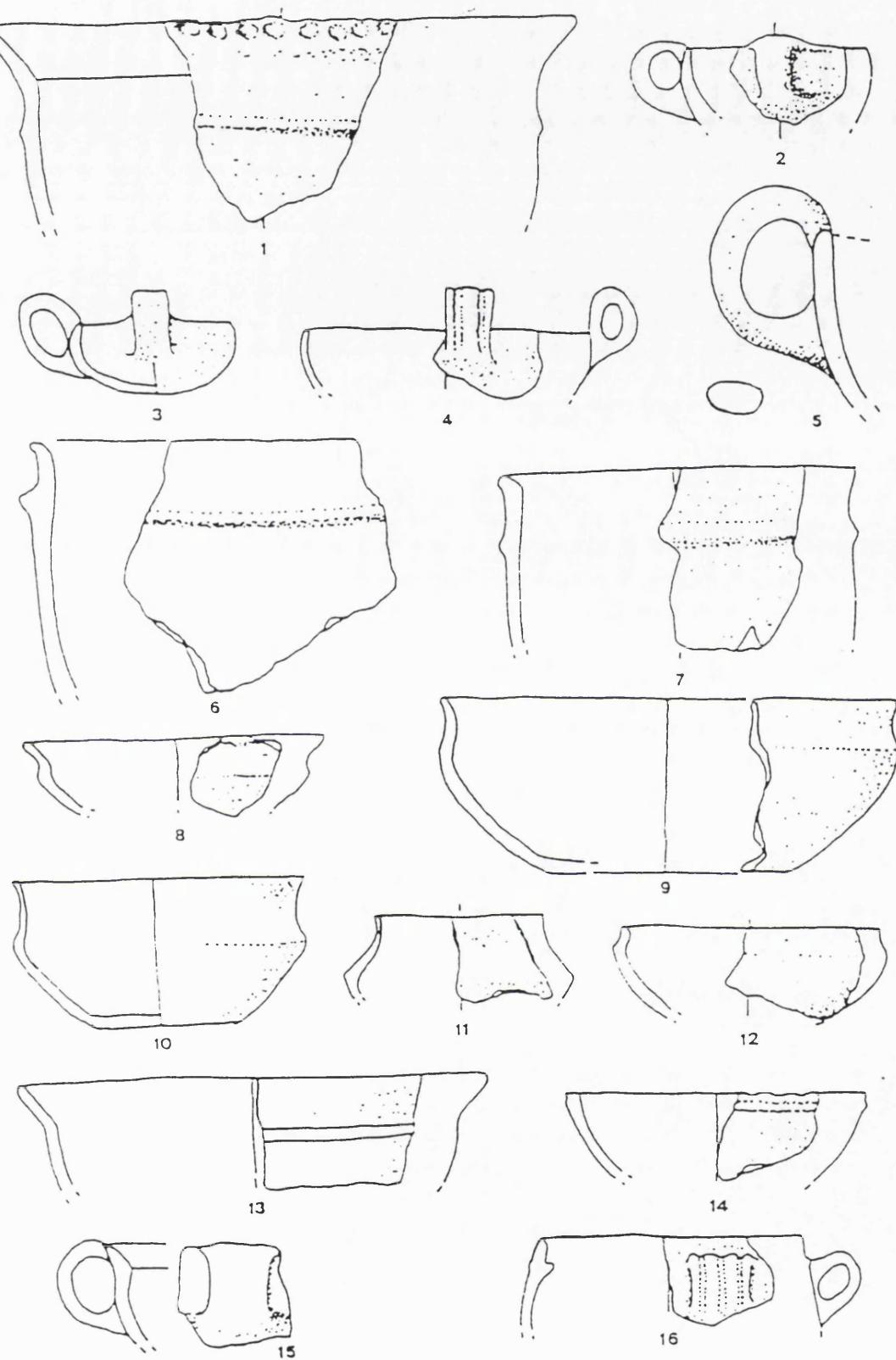
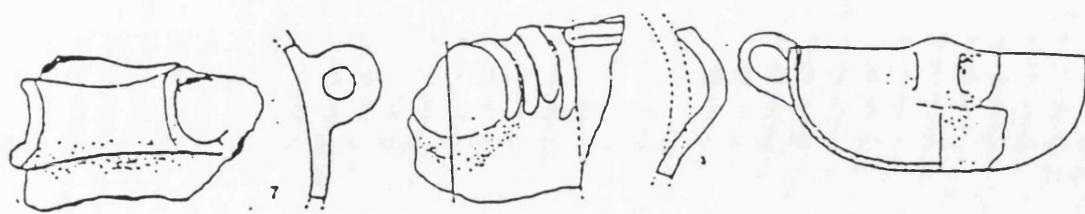


Fig. II, 48: Pottery types characteristic of the LBA2 in Northern Italy (After Capofterri 1987) Not to scale.



T7

T9

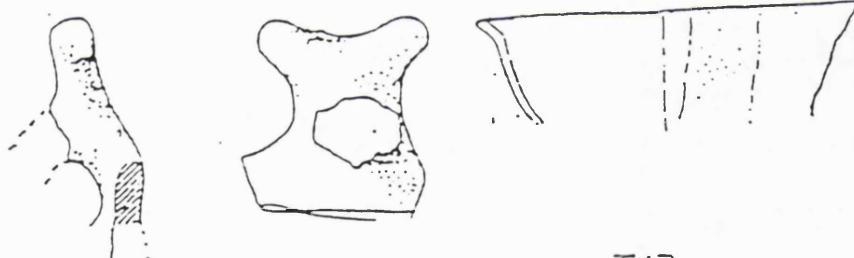
T8



T2

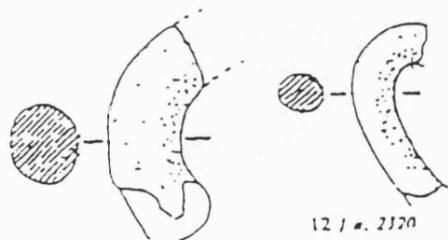


T3



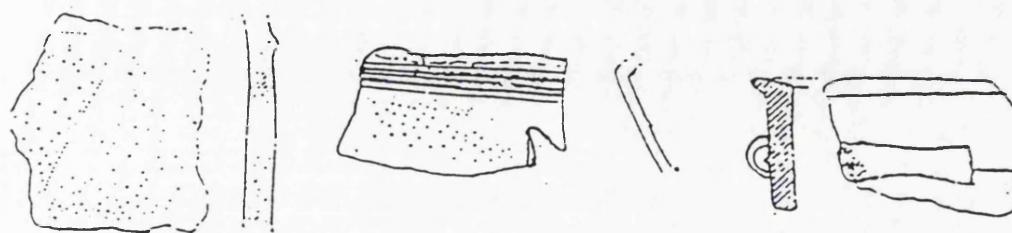
T4

T13



T15

Fig. II, 49: Pottery types characteristic of the FBA1 in Northern Italy (After Bicego 1988-89) Not to scale.



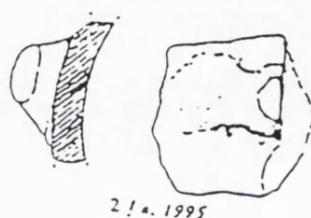
T94

T25

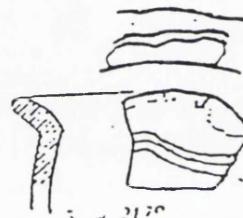
T5



T28



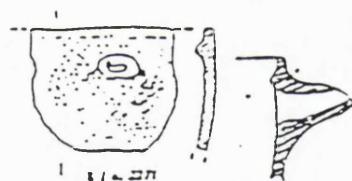
T14



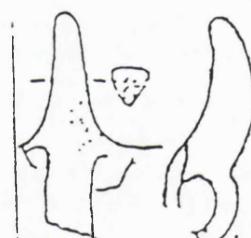
T27



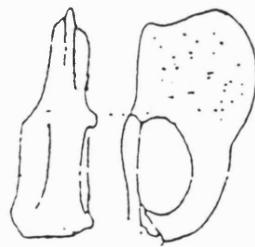
T17



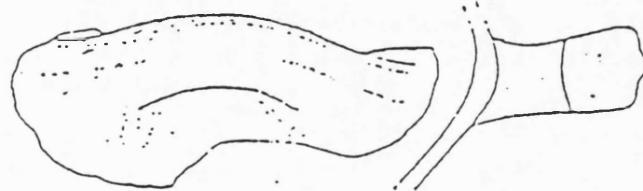
T16



T1



T24



T19

Fig. II, 50: Pottery types characteristic of the FBA1 in Northern Italy (After Bicego 1988-89) Not to scale.

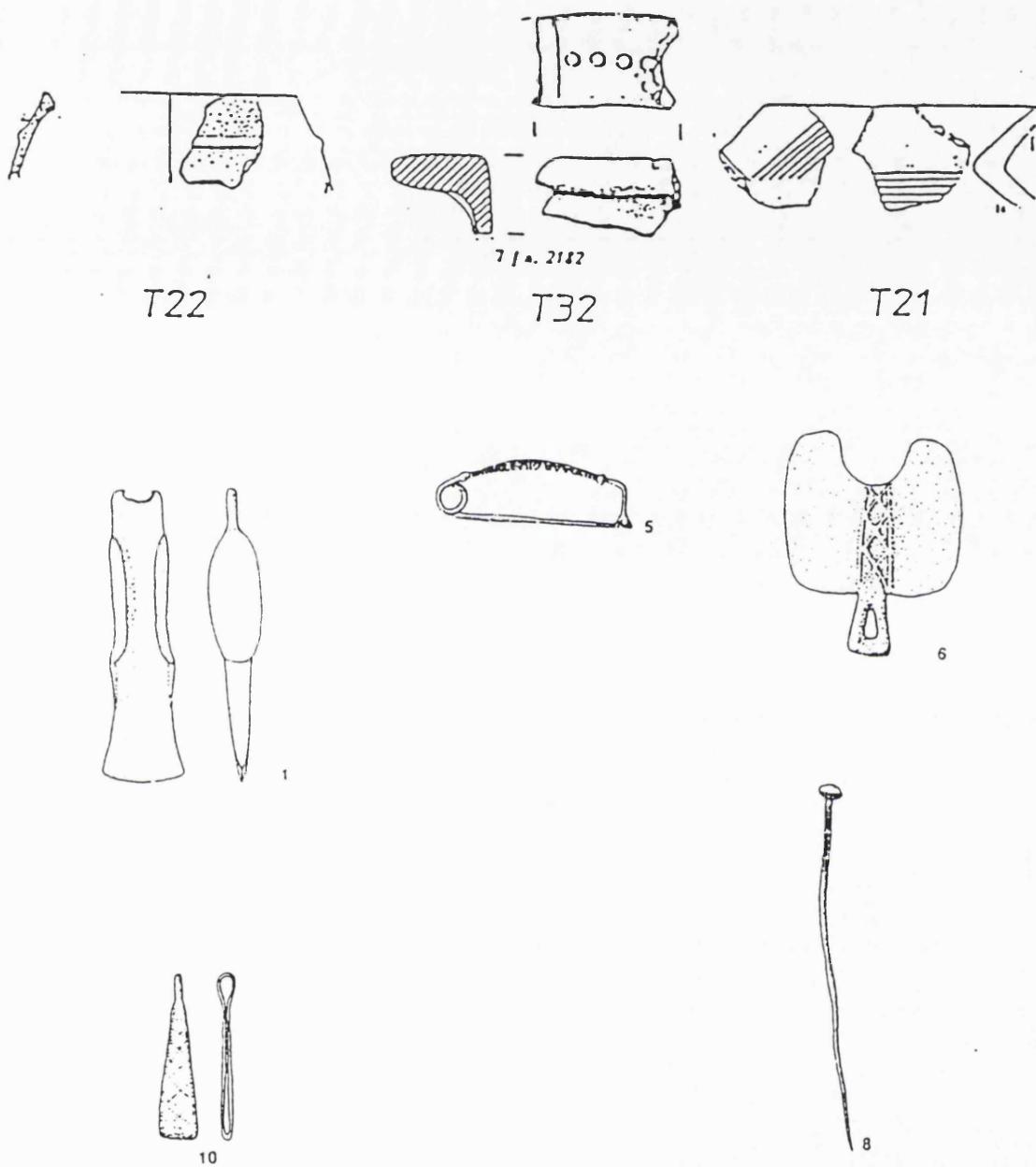


Fig. II, 51: Pottery and bronze types characteristic of the FBA1 in Northern Italy
 (After Bicego 1988-89 and Peroni 1989) Not to scale.

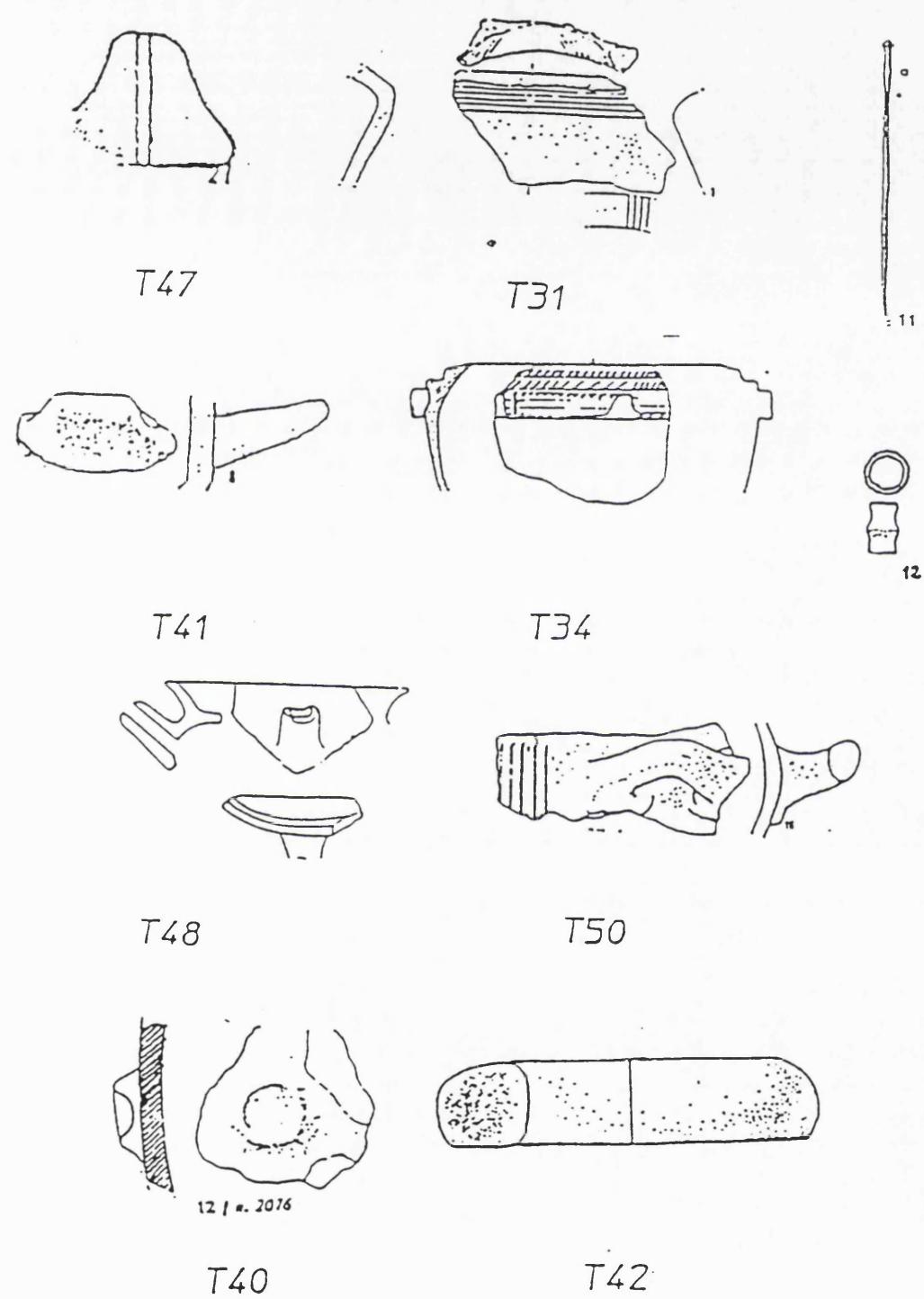
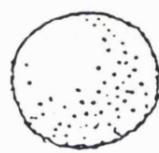
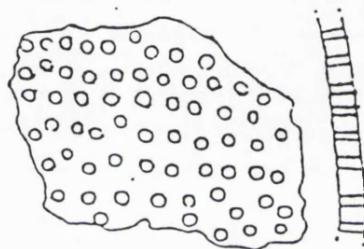


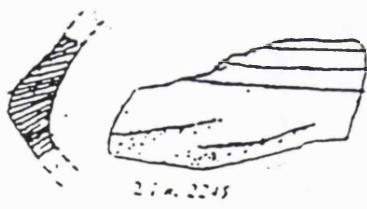
Fig. II, 52: Pottery and bronze types characteristic of the FBA1/FBA2 in Northern Italy (After Bicego 1988-89) Not to scale.



T46



T43

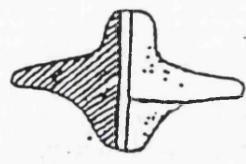


T33



T45

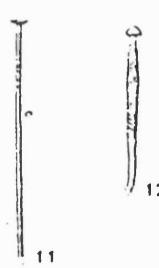
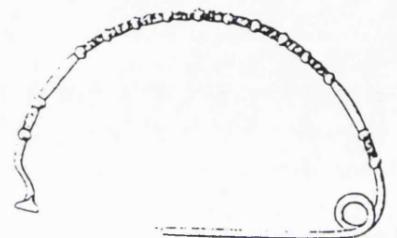
Fig. II, 53: Pottery types characteristic of the FBA1/FBA3 in Northern Italy (After Bicego 1988-89) Not to scale.



T54



T68

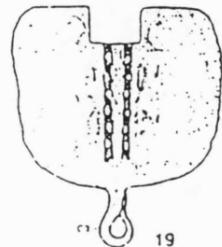


14



11

12



23

Fig. II, 54: Pottery and bronze types characteristic of the FBA2 in Northern Italy
(After Bicego 1988-89 and Peroni 1989) Not to scale.

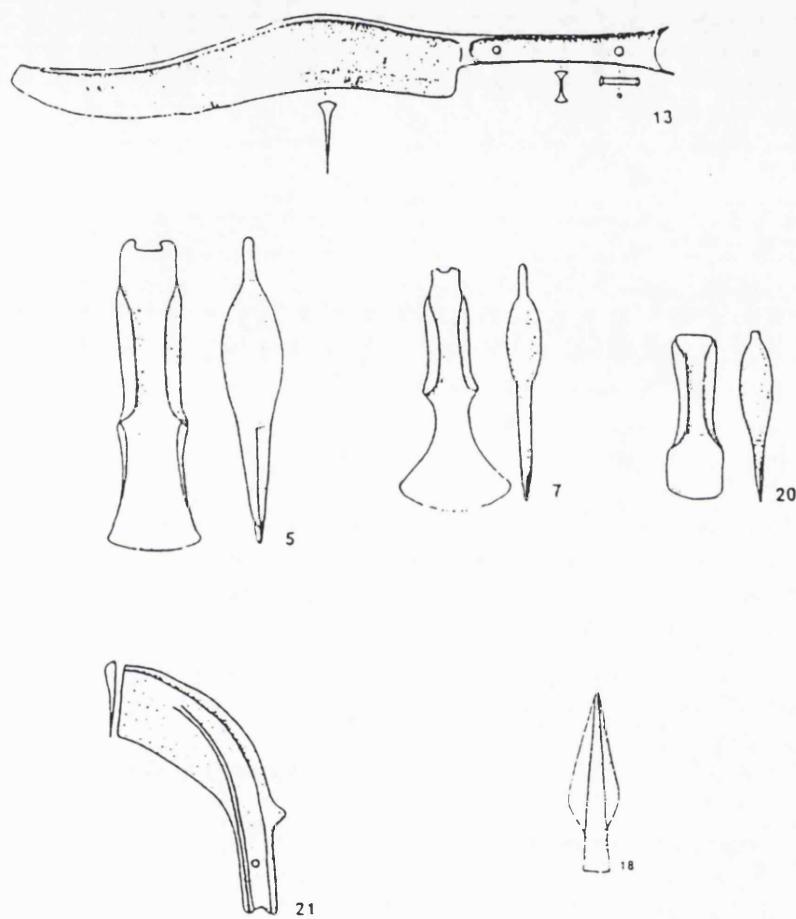


Fig. II, 55: Bronze types characteristic of the FBA2 in Northern Italy (After Peroni 1989) Not to scale.

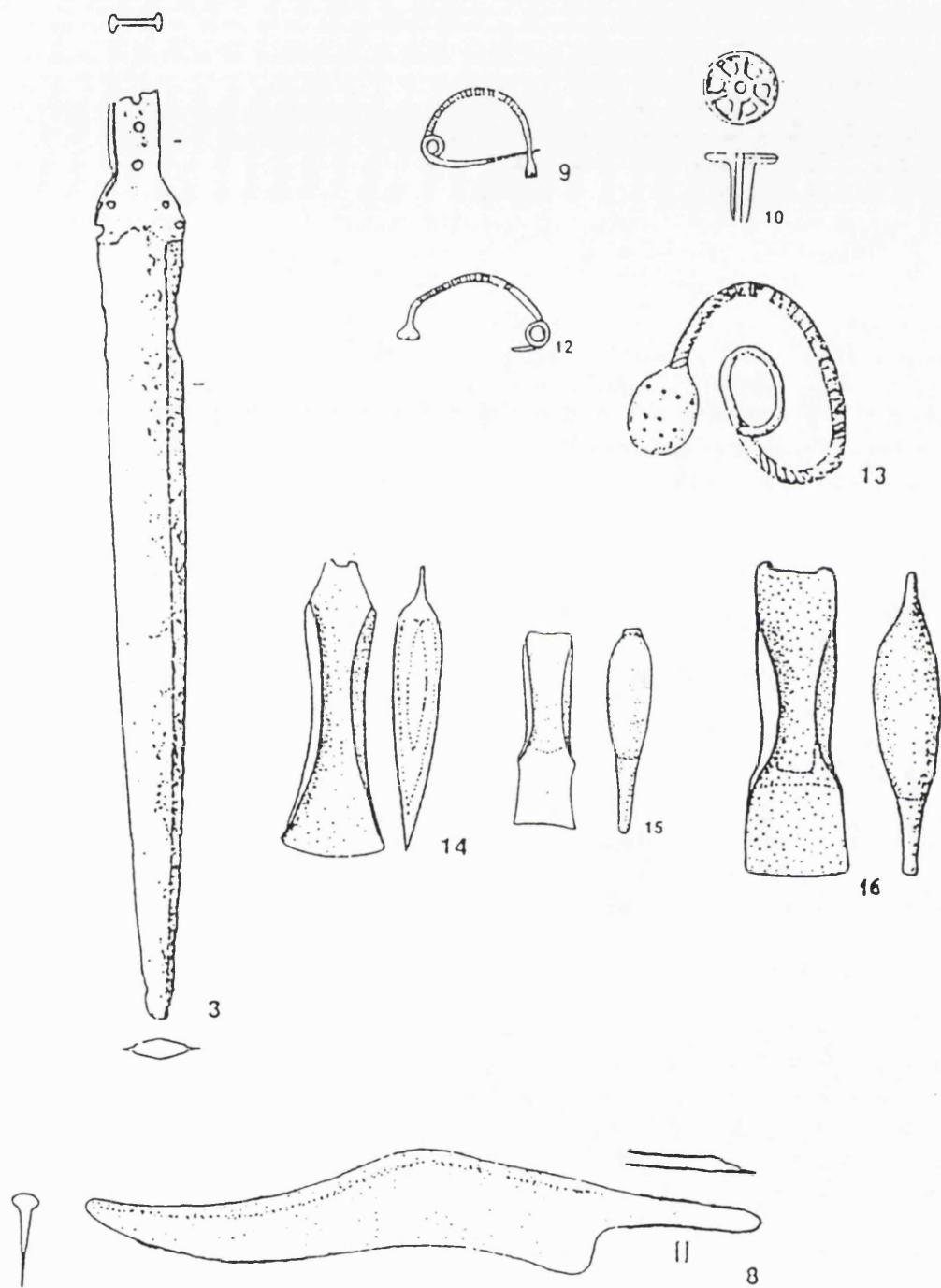
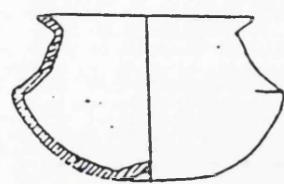
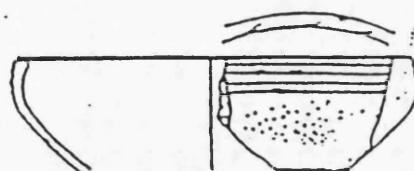


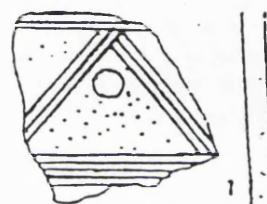
Fig. II, 56: Bronze types characteristic of the FBA2/FBA3 in Northern Italy (After Peroni 1989) Not to scale.



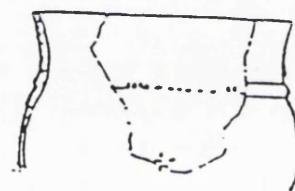
T49



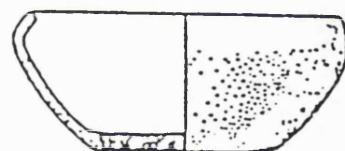
T30



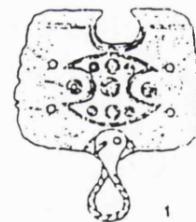
T44



T53



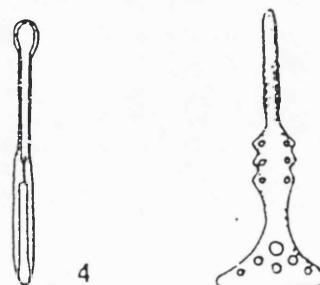
T38



2



4



5

Fig. II, 57: Pottery and bronze types characteristic of the FBA2/FBA3 in Northern Italy (After Bicego 1988-89 and Peroni 1989) Not to scale.

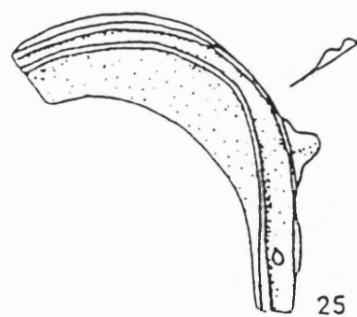
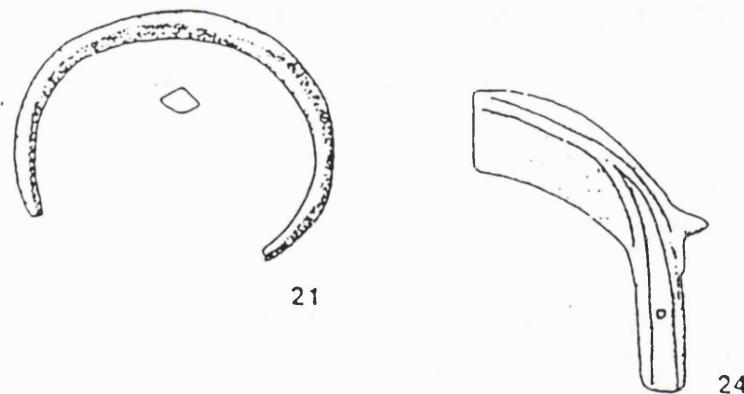
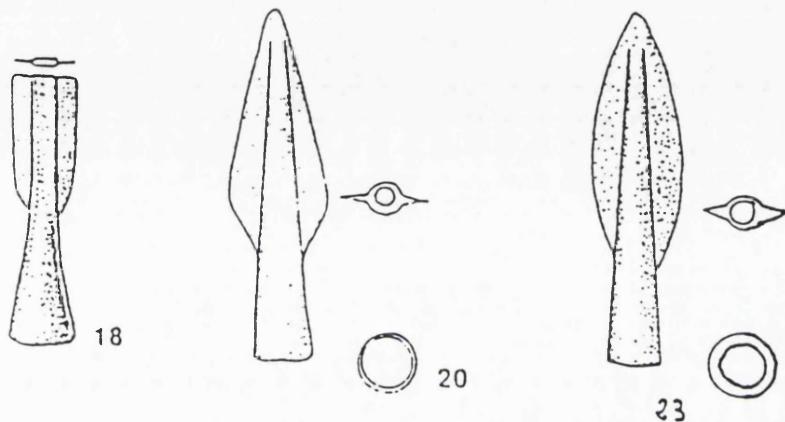
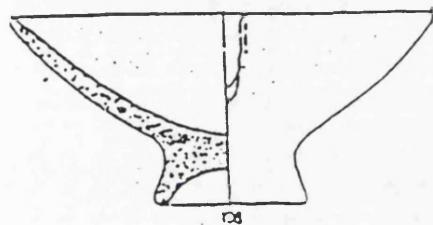
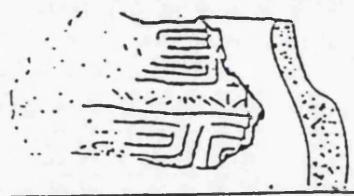


Fig. II, 58: Bronze types characteristic of the FBA2/FBA3 in Northern Italy (After Peroni 1989) Not to scale.



T52



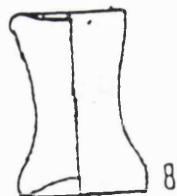
T69



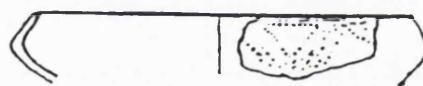
T63



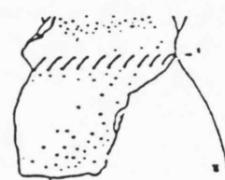
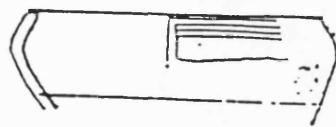
T36



T60



T37



T56

T58

Fig. II, 59: Pottery types characteristic of the FBA3 in Northern Italy. (After Bicego 1988-89) Not to scale.

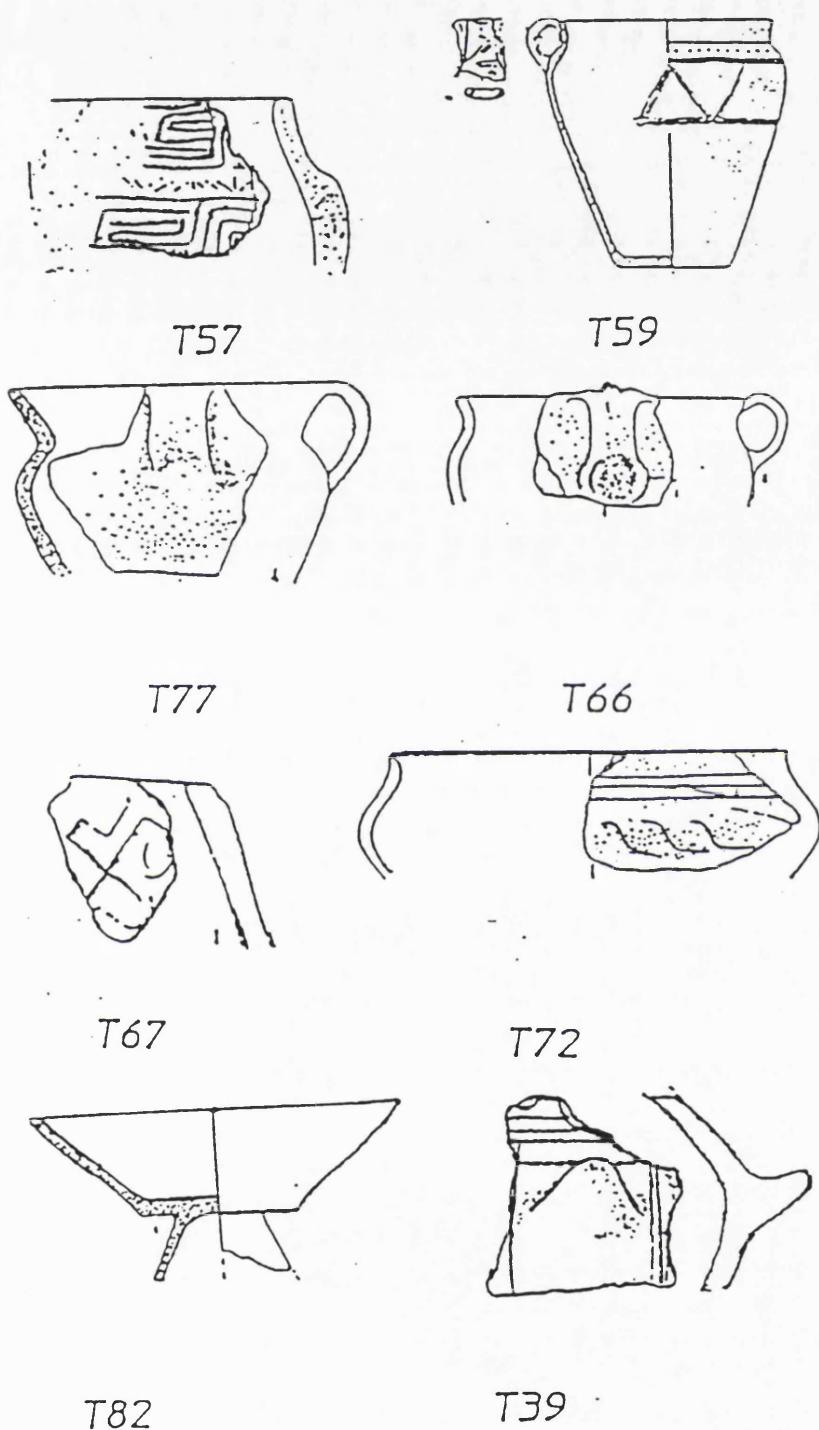


Fig. II, 60: Pottery types characteristic of the FBA3 in Northern Italy. (After Bicego 1988-89) Not to scale.

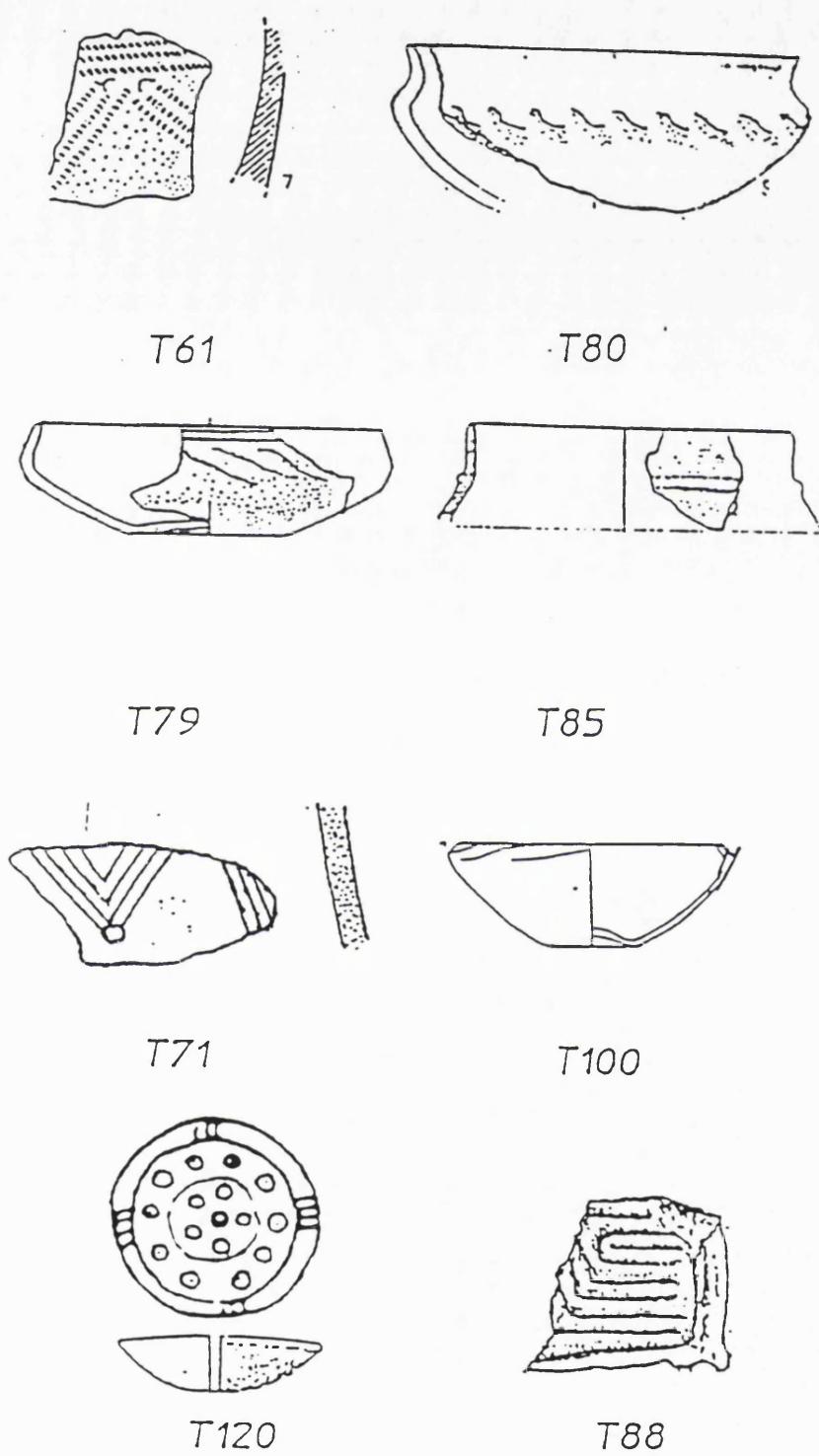


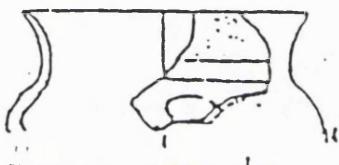
Fig. II, 61: Pottery types characteristic of the FBA3 in Northern Italy. (After Bicego 1988-89) Not to scale.



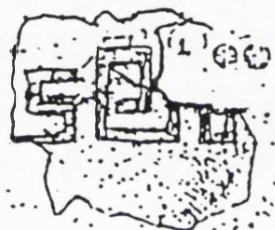
T76



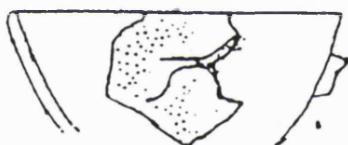
T123



T62



T74



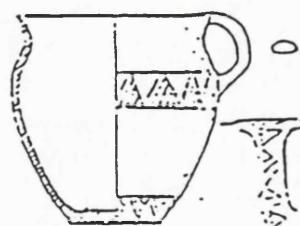
T90



T70

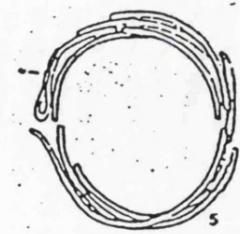


T142

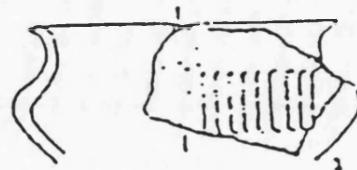


T84

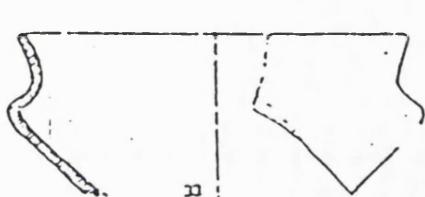
Fig. II, 62: Pottery and bronze types characteristic of the FBA3 in Northern Italy.
(After Bicego 1988-89 and Peroni 1989) Not to scale.



T121



T114



T92

T55



Fig. II, 63: Pottery and bronze types characteristic of the FBA3 in Northern Italy.
(After Bicego 1988-89 and Peroni 1989) Not to scale.

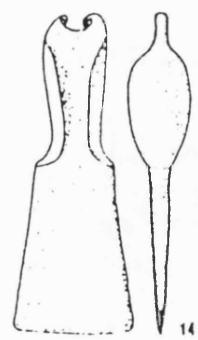
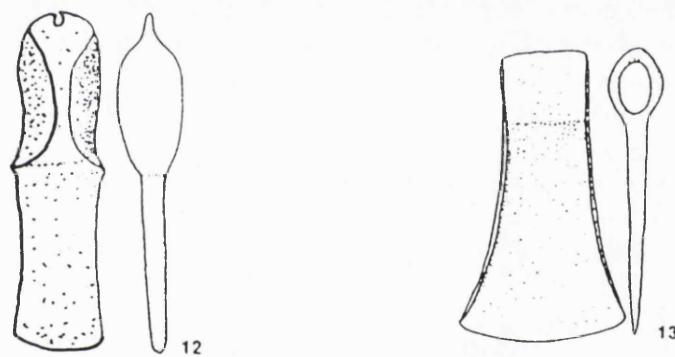
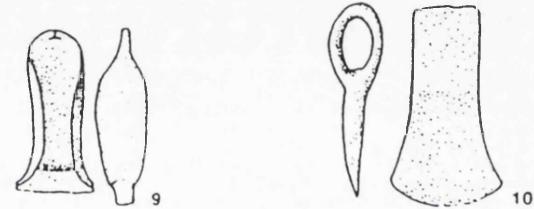


Fig. II, 64: Bronze types characteristic of the FBA3 in Northern Italy. (After Peroni 1989) Not to scale.

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