THE NEOLITHIC AND COPPER AGE OF THE ABRUZZO-MARCHE REGION, CENTRAL ITALY

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Volume 1 (Chapters 1-3)

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ABSTRACT

The Neolithic and Copper Age of the Abruzzo-Marche region, central Italy

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This is a regional synthesis, which draws together a wide range of data concerning the Neolithic and Copper Age in the Abruzzo-Marche region (c. 5750-2050 Cal. BC), and examines it in the light of contemporary archaeological methods and theories and current topics of debate within Mediterranean prehistory. In Chapter 1 a new chronological framework is established, using radiocarbon, stratigraphic and typological dating methods. Five main chronological phases are defined, namely the early, middle and late Neolithic, the final Neolithic/early Copper Age, and the middle-late Copper Age. Chapter 2 provides a generalized reconstruction of the Neothermal environment, and changes in it, based upon present-day and prehistoric data from central Italy. An increasingly unstable ecological situation may have developed on the coastal lowlands during the Copper Age. In Chapter 3 changing patterns of settlement and subsistence are examined within four major geographical zones. These patterns remain similar to those previously identified by Barker, although new details and interpretations are provided, concerning, for example, colonization, settlement infilling and cattle breeding. Chapter 4 examines changes in the nature, scale and direction of networks of communication and exchange. The emergence of certain sites as regional nodes of production, consumption and exchange is charted, and developments in long-distance ceremonial gift-exchange and alliance systems are also proposed. Chapter 5 considers mortuary practices, which were performed in residential sites, caves and special-purpose burial sites. Neolithic rites may have expressed concern over group unity, structural divisions in society and the threats of death and economic misfortune, whereas Copper Age transformations might be understood in terms of growing social advertisement. In Chapter 6 these different themes are drawn together, along with a greater emphasis upon social factors and intra-regional variation. The development of certain sites as social and economic centres is, in particular, given further consideration. Suggestions for future research are made throughout the thesis, with reference to limitations in the existing body of data.

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PREFACE

a) The thesis

This thesis can be described as a regional synthesis, which is broadly intended to draw together a wide range of pre-existing data concerning a particular period and region, and to examine and discuss it in the light of recent archaeological methods and theories. Similar types of theses have been produced for different parts of the Mediterranean (eg. Barker 1973b; J. Chapman 1981), and, although perhaps less fashionable these days, they still serve as useful works of reference for archaeologists operating both within and outside the region.

The period and region covered by this thesis can be clearly defined, if the reader wants them to be. I would prefer, however, to consider their boundaries simply as general guidelines, to be transgressed where necessary. Chronologically, the thesis is primarily concerned with the Neolithic and Copper Age, which in east-central Italy cover a time-span of almost four millennia (c. 5750-2050 Cal. BC). However, the preceding Mesolithic (8500-6500 BP) is also discussed in some detail, particularly in Chapter 3 with respect to the Mesolithic/Neolithic transition, and the following Apennine Bronze Age (c. 2050-1300 Cal. BC) is briefly mentioned throughout. This period is often chosen by prehistorians for works of synthesis on a European scale (eg. Whittle 1985; Hodder 1990), although in Italy it has been more common to cover a longer time-span, extending from the Palaeolithic to the Iron Age (eg. Trump 1966; Barfield 1971; Barker 1981a). Spatially, the thesis focusses upon the Abruzzo-Marche region. As in most other studies of Italian prehistory (eg. Radmilli ed. 1978), this equates specifically with the modern political regions of Abruzzo and Marche, rather than with any particular geographical features or prehistoric cultural groupings. It does, however, comprise a broadly defined geographical unity, being bounded to the east by the Adriatic Sea, to the west by the watershed of the Apennine mountains, to the north-west by the Po plain and to the south by the Tavoliere plain. (The lowland provinces of Forli and Ravenna in Emilia-Romagna and the whole of the Molise region might also have been included in this region of study, but were not, mainly due to the relative scarcity of published archaeological reports for those areas.) A certain degree of cultural unity also appears to have existed within the region during the Neolithic and Copper Age, particularly during the early Neolithic with the spread of Adriatic Impressed Ware, although this point should not be over-emphasized, for intra-regional variations can also be clearly identified. Some archaeological comparisons are made between this region and neighbouring ones in Italy and Dalmatia, and broader-scale discussions also refer to the central Mediterranean and European contexts.

Three main sources of archaeological data have been used in this thesis: published articles (and personal communications) concerning fieldwork and finds in the region; published and unpublished museum collections of artefacts found in the region; and the sites themselves. These data were studied during various trips to Italy made between October 1986 and October 1989, and the following three years were spent writing-up. I would like to think that I have read every published article concerning the Neolithic and Copper Age in the Abruzzo-Marche region, although I may have missed a few obscure nineteenth century references and have not included any primary data published after 1990. I believe that I have visited the majority of national and local museums in Italy that contain relevant material from the region, although in one (Ancona) I was mainly only given access to published material. I have also visited about half of the known Neolithic and Copper Age sites in the region. This sample is fully representative of the totality of sites, both in terms of the variety of sites and their geographical distribution.

The major themes that I have chosen to discuss in relation to these data (ie. chronology, the Neothermal environment, subsistence and settlement, communication and exchange, and mortuary practices) tie in closely with those previously examined during the early and middle years of the 1980's in major works of synthesis on the Neolithic and Copper Age in Italy (eg. Barker 1981a; Malone 1986) and the Mediterranean (eg. R. Chapman 1985). These themes are discussed in turn in Chapters 1-5, and this has tended to lead to their compartmentalization in this thesis. However, in Chapter 6 (the conclusion), they are drawn together along with a greater emphasis upon social factors. I have also tried to contribute, throughout this thesis, to some of the new topics of debate which have emerged during the second half of the 1980's and the early 1990's, including John Chapman's (1988) discussion of social and ceramic differentiation in the central Mediterranean, and to introduce some elements of contemporary post-processualist theory which have so far received little attention in the region.

The structure employed in the various chapters in this thesis is fairly standardized. Each chapter carries its own introduction (and so there is no introductory chapter in the thesis). These provide definitions of the themes being examined; they summarize, and in some cases criticize, the methods and theories employed and the results obtained by a selection of previous studies; and they consider the quality of the existing data from the Abruzzo-Marche region. Their length may appear somewhat daunting, but the details that they contain are necessary, particularly because method and theory have, until recently, tended to be taken for granted in Italian prehistory. There follows a data section in which the relevant data from the region are presented, either briefly (in Chapter 3), or more fully (in Chapters 1-2 and 4-5). Detailed summaries of sites and data are provided in Appendices 1-4. Patterns in these data are then identified and discussed for different chronological phases, in relation both to methods and theories set out in the introduction, and to current research questions.

b) Glossary of terms and abbreviations used

altopiano -	high plateau
AN -	Ancona province
AP -	Ascoli Piceno province
AQ -	L'Aquila province
caverna -	cavern/cave
CH -	Chieti province
figulina -	fine buff pottery fabric
grafitti decoration -	scratch incised decoration
grotta -	cave
m asl -	metres above sea level
MC -	Macerata province
PE -	Pescara province
PO -	Pesaro-Urbino province
riparo -	rock-shelter
SCA -	site catchment analysis
scaled decoration -	applied surface decoration comprising overlapping layers of clay
SMP -	Square Mouthed Pottery
TE -	Teramo province
tremolo -	wavy line

CHAPTER 1. CHRONOLOGY

The purpose of this chapter is to reassess the chronology of the Neolithic and Copper Age in the Abruzzo-Marche region. No apology need be made for the choice of such a well-worn topic. The establishment of a reliable chronological framework is an essential prerequisite for a regional scale study of prehistory, where concepts such as contemporaneity and change are constantly employed. Because chronological schemes are so necessary, we should think more about how we create them, and we must be aware of the difficulties involved. The uses and problems of radiocarbon, stratigraphic, and typological dating will therefore be discussed below, before turning in detail to the chronology of the Abruzzo-Marche region.

1. Methodological and theoretical approaches

a) Radiocarbon dating

Radiocarbon dating has made a number of major contributions to archaeology, especially now that sucessful calibration has been achieved (see, for example: Renfrew 1973a; Burleigh 1980; Waterbolk 1983). However, during the 1980's specialists became increasingly aware of the limitations of the method. Of particular concern are: sample selection, laboratory precision, and the interpretation of dates.

Studies of archaeological formation processes (eg. Schiffer 1976, 1987) have encouraged radiocarbon specialists to assess the quality of their sample material. According to Balaam (1989), "The selection of good sample material is the essence of obtaining a satisfactory date for a site or activity. There has, in the past, been so great an enthusiasm for obtaining radiocarbon dates that insufficient attention has been paid to the context and the nature of the sample itself." For example, the majority of the Abruzzo-Marche samples were of wood charcoal, but unfortunately more detailed identifications were not recorded. It is important to distinguish between short-lived twigs, branches of up to about 20 years, and timber with its relatively long life history of up to 200 years or even more of growth, as well as its probable seasoning before use and its possible re-use. Charcoal from mixed or unknown parts and species should really be assigned an age-span of about 200 years (Balaam 1989). In addition, few of the Abruzzo-Marche dates have detailed context references (the exceptions being Pi-101 from Villaggio Leopardi, and R-878 and F-30 from Fossacesia). Ideally, a sample should be taken from a sealed, undisturbed, context, such as charcoal immobilized within the baked clay of an ancient fireplace (Gowlett 1989), and should also relate to the event for which the date is required. Normally however, as in the case of Abruzzo-Marche, there is great variation in the degree of certainty with which a sample is associated with the archaeological material it is intended to date (Waterbolk 1971: 15).

Until recently, most laboratories have not been rigorous enough in estimating all the possible sources of error in the counting statistics, which are expressed in the standard deviation for each determination (Scott et al. 1983). There is now a consensus that a figure of between ±70 and ±80 years is a reliable minimum estimate of counting error (Whittle 1988: 19; Baillie 1989). Looking at the standard deviations given for the Abruzzo-Marche dates: the Rome laboratory (R) stands out as too optimistic, with most standard deviation estimates ranging between ±55 and ±85; Pisa (Pi) and the British Museum (BM) fall in the middle, with ±105 to ±135 and ±130 to ±170 respectively; and Florence is the most cautious with a range from ±180 to ±210.

Significant discrepancies can exist both within and between laboratories, which seem to be caused by three different factors: systematic errors, possible specific errors, and general differences between laboratories which may or may not be due to errors. A systematic error, for example, giving dates that were too young by varying amounts, was identified through quality control tests carried out in the British Museum Laboratory, and affected measurements made between approximately mid 1980 and the end of 1984 (Tite et al. 1987). The three dates from Villaggio Rossi (Marcianese) belong to this group and have now been revised. Laboratory error multipliers have been proposed to even out the problems of inter-laboratory comparability, but these are of limited use because they can only help in the case of systematic errors; if laboratories have had lax or erratic procedures, or have changed procedures over the years, these multipliers cannot help (Scott et al. 1989; R. Whitehouse pers. comm. 1990).

C14 dates are often misinterpreted. Uncalibrated C14 dates are sometimes considered as single dates, with little reference to the ± error margin. They should be regarded, however, as a band-width of radiocarbon years (Pearson 1987: 100). In addition, the majority of C14 dates are quoted, used and interpreted at one standard deviation, despite unanimous calls from the specialists to use the 2-sigma or 95% confidence level (eg. Baillie and Pilcher 1983: 60). <u>All C14 dates referred to in this text will be quoted at the Cal. BC 2-sigma level, unless stated otherwise</u>. On the positive side, Whittle (1988: 19) states that no difference can be claimed between laboratories' results at the 2-sigma level, which brings some hope to the problem outlined in the paragraph above. On the other hand, for a standard calibrated date, Pearson (1987: 103) says that "a good laboratory ... will only measure to a precision that gives a 95% band-width of c. 500 years unless you ask for something better". In other words, most C14 dates can only be used to date an event to the nearest half millennium. This is certainly the case with the dates produced for Abruzzo-Marche, which, at the 2-sigma level, have an average band width of 609 years.

There is a clear need to re-examine, individually, the heritage of C14 determinations achieved so far, in order to discard the so called 'junk' dates. However, dates should be rejected according to sound critera, and not just because they do not fit into the established C14 sequence (Needham 1989). I should like to state the case for rejecting one of the Abruzzo-Marche dates, and treating with caution another. The charcoal sample, F-93 (4231-3109 Cal. BC) from Catignano (Azzi et al. 1977) was taken from a particularly unsuitable context, structure 59, which, according to the excavator, "is reduced to a simple residual limb by the ploughing that has almost totally disturbed it" (Tozzi 1978: 100). It has a large laboratory error margin: ±210. It appears to be much too recent, because Catignano style painted and incised pottery sherds were stratified (in spits 20 to 18) <u>beneath</u> Ripoli style painted pottery in the Grotta dei Piccioni sequence, and the latter has been dated at the type site to 4715-4340 Cal. BC (R-664), and at Fonti di San Callisto to 4470-4165 Cal. BC (R1386α). Sample BM-2252R from Marcianese should be treated with some caution, particularly when compared to the two other samples from this site: BM-2250R and BM-2251R. The latter two measurements were carried out on charcoal collected from specific levels in the central hut and had error margins of ±130 and ±140 respectively, whereas BM-2252R, oddly defined as a 'control sample', was carried out on collagen taken from human and animal bone of no recorded provenance, and with a larger error margin of ±170. BM-2252R should therefore not be taken into consideration in any discussion of the important stratigraphic sequence of material found in the central hut, although it is unneccessary to reject it entirely with reference to the history of activity at the site as a whole.

Combining C14 dates is useful where the same object has been dated by different samples, and provided the dates agree in either a Normal test (where the number of samples is 2) or a Chi-squared test (when there are over 2 samples) (Bowman and Leese 1989). Samples R-598 and R-598α from Ripabianca agreed statistically in a Normal test and can therefore be combined. Using the CALIB computer program, they produce a combined date of 5240-4946 Cal. BC (see Appendix 3).

Calibration of C14 dates is now essential, for, basically, uncalibrated dates are wrong dates. Calibration is necessary, from the physicist's point of view, because when Libby established the method of radiocarbon dating he assumed that the amount of C14 present in the environment had remained constant, but it has now been shown empirically that the level of C14 production varied in the past, hence the need for calibration (Pilcher 1983). C14 dates should never have been uncalibrated and left to the non-specialist to calibrate (Pilcher 1989: 2). From the prehistorian's point of view it matters, both in the interpretation of the duration of events or phases, such as the length of utilization of a site, and in the interpretation of groups of dates suggesting contemporaneity of events.

The C14 dates used in this thesis were calibrated using Stuiver and Reimer's (1986) computer program CALIB, which is recommended by Pearson (1987: 102) and Housley (pers. comm. 1989). File 2 was used, which contains a 20 year radiocarbon age dataset to 7210 Cal. BC, built up from various sources. The results for peninsular Italy and the eastern Adriatic, which are listed in Appendix 2B, were calculated using both the standard intercept method and the probability method. The latter provides an estimate of the importance of the one and two sigma age ranges (Reimer 1989: 2, 12), and archaeologists are advised to become more familiar with the use of probabilities in the interpretation of C14 dates (Needham 1989). However, there is currently a lack of agreement on this probability method, which produces slightly different results to the intercept method (Leese 1989), and so it has not been relied upon greatly in this thesis. Uncalibrated dates are referred to as BP, and calibrated dates as Cal. BC, in accordance with the internationally agreed practice (Leese 1989).

Appendix 2 lists a total of 319 C14 dates for the Neolithic and Copper Age of peninsular Italy (excluding Sicily and Sardinia). More possibly exist, but they are difficult to track down due to their dispersed publication. Some lack essential basic associated data in the initial publications, such as: the standard deviation, laboratory reference number, and sample description. Others are quoted incorrectly in secondary sources, such as Pi-101 in Barker's appendix of dates (1981a: 236).

The first Neolithic/Copper Age C14 date for Italy was produced in 1959, and over the next three decades the total number of dates rose steadily from 59 in 1969, to 167 in 1979, and 287 in 1989.

Regionally, 53% of the dates come from northern Italy, in contrast to 25% from central Italy (including Emilia-Romagna), and 22% from southern Italy (including Molise) (Figs. 1-2). The most dates are from Liguria (53), and the least from Lipari/the Aeolian Islands (3), followed, unfortunately for this thesis, by Marche (5). These five published dates for Marche were all produced by the Rome laboratory, and were published between 1965 and 1970. Abruzzo, with its 16 dates, falls on the average number of dates per Italian region, and these dates were produced by 4 laboratories between 1959 and 1987. This imbalance in the number and type of C14 dates between Abruzzo and Marche naturally leads to an unavoidable emphasis upon the C14 chronology of Abruzzo in this thesis. Both Abruzzo and Marche lack sites such as Riparo l'Arma di Nasino with its 19 dates, and Molino Casarotto with 35, which are outstandingly well provided for, although quantity is no substitute for quality.

Chronologically, the Neolithic in Abruzzo-Marche is well enough covered, but the Copper Age is very poorly provided for. The latter has just three dates: Pi-50 from the Grotta dei Piccioni; F-32, a mixed sample from different areas of the large site of Ortucchio; and the date from Acquatina, without a lab. number or a standard deviation. Nor are there sufficient C14 dates for the Mesolithic and Bronze Age in this area.

Radiocarbon dating has been accepted and used to varying degrees by prehistorians working in Italy. Italian radiocarbon specialists, such as Allegri et. al. (1987), show awareness of the problems of their data, but have basically used C14 dates to illustrate the established pottery-based chronology. Of the Italian prehistorians, too many, such as Radmilli (1987), make little use of C14 dates, and this is generally the case in Abruzzo-Marche. Uncalibrated dates are still employed, which sometimes leads to misdirected interpretations. For example, Radi (1986-7: 161) has suggested that the C14 date, R-1386α, from Fonti di S. Callisto is too early, because the uncalibrated figure is closer to the early dates from Ripoli (R-664 and R-665), rather than the later dates from cavities 21 and 3 at Ripoli (F-31 and the Pisa date), with which the pottery has its closest typological links. However, when the 2-sigma calibrated dates are compared, the Fonti di S. Callisto date can be seen to overlap neatly with both the earlier and later dates from Ripoli. Pioneering work has been carried out by Ruth Whitehouse, both in the promotion of the British Museum Research Laboratory's Italian prehistory programme (Whitehouse 1985: 35), and in the discussion of Italian C14 dates (eg. Whitehouse 1978). British prehistorians in general, however, in my opinion, have been too optimistic about the primacy of radiocarbon dating in Italy over the more traditional approaches to chronology (eg. Sargent 1985: 31).

Looking to the future, the following suggestions can be made for Italy: radiocarbon dating must be more widely accepted; there should be better sample selection; measurements should be published in more detail and in more accessible publications; and calibrated dates must be employed in discussions of radiocarbon chronologies.

b) Stratigraphic dating

Stratigraphic dating is essential to archaeology (see, for example, Harris 1975). Stratigraphy can be used as an independent method for establishing the relative chronology of cultural activities and their material remains at a site. It also provides an important check upon both radiocarbon sequences and typo-chronological sequences of artefacts. There are, however, problems involved in its use.

The clear definition of stratigraphic units and their interfaces are theoretically essential, but in practice, during excavation, they are often extremely difficult to define, particularly on prehistoric sites with a lack of obvious features. Perhaps one cannot therefore entirely criticize some Italian archaeologists for excavating caves in spits. However, 'arbitrary' excavation of this kind clearly has a lesser stratigraphic validity than stratigraphic excavation (Harris 1979: 20), and should only be used as a last resort rather than as a standard method for excavating a site.

Detailed recording and publication are important. Ideally, artefacts and stratigraphic units should be recorded three-dimensionally. Only a few sites from Abruzzo and Marche have been recorded and published in sufficient detail to reinterpret their stratigraphies and the dating of artefacts within them. For example, it has been possible to establish the existence of a middle Neolithic (or Catignano) phase in the stratigraphy of the Grotta dei Piccioni, based upon the detailed information provided by Cremonesi's (1976) excavation report. Frequently artefacts from different stratigraphic units or spits are lumped together in publications (eg. Grifoni and Radmilli 1964), making the chronological comparison of different sites' stratigraphies particularly difficult.

Considering the variety of complex, specialized, and localized natural, as well as cultural, factors that affect cave sediments, the comparison of stratigraphies from different sites should be carried out with caution, especially when establishing regional sequences (Schmid 1969; Farrand 1985; Stein 1985). Referring to Quaternary cave sediments, for example, Collcutt (1979: 296) states that: "It should be noted that there is no intrinsic reason why units should be of an identical nature, or contemporaneous, over large geographic areas". It is particularly worrying, then, that the only published details of the Berbentina stratigraphy (Lollini 1965, 1978: 98) equate it, without further details, to the Aquatina sequence at Attiggio. This was probably due to the invalid assumption that the similarity of the pottery types found in these two contexts meant that they were contemporary (see below, p. 18-19, concerning typological dating).

Stratified deposits have been recorded for a quarter of all excavated Neolithic and Copper Age sites from Abruzzo and Marche (21:84), but these tend to be located in inland areas (Fig. 3). The proportion of cave to open site stratigraphies in Abruzzo/Marche is roughly equal (10 cave : 11 open), which is useful considering the specialized nature of caves and their deposits. Unfortunately, the nature of the sample varies markedly between the Abruzzo and Marche regions. With the exception of Lucciano (which is of little use), Marche's stratified sites are concentrated almost exclusively in the Ancona district, and cover only the period from the final Neolithic onwards. Abruzzo is better served, with eight out of the total of ten stratified caves, a range of sites covering the entire chronological period, and the important Grotta dei Piccioni sequence.

c) Typological dating

The use of typology is essential in the establishment of relative chronologies, but it has often been misused. For example, prehistorians in Italy have traditionally relied heavily upon types of decoration on pottery as chronological indicators, assuming that one decorative style replaced another in straight succession, and that rigid, mutually exclusive chronological phases could be defined. However, stratigraphic sequences and C14 dates emphasize the duration, continuity and overlap of pottery styles during the Neolithic and Copper Age (Whitehouse 1969, 1986). Examination of the Fucino cave sequences, for example, showed that impressed pottery, traditionally used as a type-fossil for the early Neolithic, actually continued in use into the late Neolithic (Grifoni and Radmilli 1964: 120, Cremonesi 1968: 181). Scaled or tiled decoration on pottery ('ceramica a squame/scaglie/embrice') has also been used incorrectly as a type-fossil for the Copper Age (eg. D'Ercole 1987, 1988a: 7). It has been found in Bronze Age ceramic assemblages at sites in Abruzzo-Marche, such as Collecchio near Castel di Lama (Lucentini 1984-6: 471-3), Nidastore (Pigorini 1879: 198), and S. Andrea near Navelli (Mattiocco 1986: 47), and probably continued in use until the final Bronze Age (Lollini et al. 1988, Grifoni Cremonesi 1969: 141).

Similarly, longitudinally pierced clay 'net' weights have often been considered as type-fossils for the late Copper Age 'Ortucchio culture' in Abruzzo. In Grotta Maritza, for example, an occupation phase by people of the 'Ortucchio culture' was suggested purely on the basis of the presence of such weights (Grifoni and Radmilli 1964: 100). However, they have also been found in final Neolithic/early Copper Age contexts, including: level 22 of Grotta Maritza (Grifoni and Radmilli 1964), Piano d'Orta (Di Fraia 1988), and Paterno (Di Fraia 1970), and continue chronologically into the Bronze Age at zone A, Balzone (Irti 1986).

Lithic material, particularly arrowheads and axes, has also fared badly in its typological treatment, with chronological continuity of types being overlooked in studies of field-survey material, and outdated classifications still being applied to museum collections. For example, Pignocchi (1984) assigned the 1971 survey material from the Piano di Fonte Marcosa, Moscosi di Cingoli to the late Neolithic. The bifacially retouched points and arrowheads, which dominated the assemblage (33% of all tools), were compared to specimens from the sites of Donatelli and S. Maria in Selva in terms of form, quality of manufacture and typological variety, and were placed chronologically between them (Pignocchi 1984: 249). However, excavations were carried out in the same area in 1980, and these revealed the remains of a Bronze Age settlement and no traces of a Neolithic level (Percossi and

Silvestrini 1986: 34-5; P. Appignanesi pers. comm. 1989). Similarly, the 42 arrowheads from Piampalente near Castelraimondo in Camerino Museum were automatically labelled as Neolithic in the museum catalogue (Boccanera 1983: 45), despite their numerous typological parallels with Copper Age arrowheads and dissimilarity to Neolithic arrowheads from excavated sites in the surrounding Macerata region, and the Marche region in general. (When compared to dated arrowheads from Macerata, 84% of all the parallels made to the Piampalente sample were with late Copper Age arrowheads from the sites at Colle Montanari, La Svolta and Cava Koch, and the remaining 16% were with arrowheads from the final Neolithic sites at Area Guzzini and S. Maria in Selva. See Appendix 1.)

Despite the ease with which certain misuses of typology can be identified, there still remains debate over its 'correct' use. Recent discussion of classification and typology (eg. Adams 1988; Hodder 1986; Shanks and Tilley 1987b: 79-86; Whittle 1988: 31-35), is unified by its criticism of approaches promoted in the New Archaeology of the 60's and early 70's (eg. Chang 1967; Clarke 1968). The latter, in reaction to earlier normative and intuitive methods, regarded the ideal of classification to be the definition of 'real' categories and types of material culture in the archaeological record (ie. categories perceived by people in the past, not the present); and in order to achieve this objective, they placed great emphasis upon quantification and computerization in the creation and comparison of types, and claimed to employ a rigorous and explicitly scientific methodology. Recent discussion, however, supported by the development of a post-positivist philosophy, has criticized the excessive use of statistical analyses in classification and typology. Whittle's view, for example, is that "Excessive measurement tends to come into play only when there may be no clear patterns in the data anyway" (Whittle 1988: 33). Similarly, it has been pointed out that the emphasis upon measuring similarities, in the creation of groups, masked the equally important, but more difficult, study of diversity. Recent discussion has also highlighted the unsolved problem of how to select the relevant variables (dimensions in variation) and attributes (measurements of those dimensions) for analysis in the first place, granted that it is impossible to incorporate all of the large (or theoretically even infinite) number of possible variables and attributes into a typology. Choosing the relevant scale for analysis has also been recognized as problematic. In practice, we have to accept that our classifications are devised; that classification of types relies upon perceptions - ours not theirs; and that our categories might be arbitrary. Subjectivity should be limited, but it cannot be eliminated.

What then is the way forward? How should one use typology?

One important step is to regard typology as a problem-orientated tool of analysis (Kluckhohn 1960; Perlès 1988: 1080). For example, I use typology below as a tool to help date and compare artefacts and assemblages from Abruzzo and Marche from a strictly chronological point of view. One could also use it in the comparison of artefact functions and site activities, or in relation to inter-regional communication and cultural variation. The purposes for which a typology is to be employed should be explicitly defined, for in each case these will influence the variables and attributes to be considered in the creation and comparison of types. Types cannot simply be defined by 'convention', so one should bring one's meanings out into the open rather than apply them covertly. A typology can also then be judged by its utility in relation to the purposes it is supposed to serve.

Although many typologies do work well for more than one purpose, "An ubiquitous error in archaeological classification is the assumption that there is a single 'right' classification, equally useful for all purposes" (Adams 1988: 52). Alternative typological schemes can be tried out. Adams (1988), for example, constructed and dismantled more than six different classifications over twenty-five years of work in Nubia.

The testing of typologies is also important. Hodder suggests that "classifications can be tested for correlations with other variables, with the aim of letting the data contribute to the choice of an appropriate typology" (Hodder 1986: 133-4). To a certain extent this already happens, in the form of typologies standing the test of time. The most useful typologies are those which are simple, flexible and open enough to accept the addition of new data; and those which have stood the test of time have evolved through sucessive elaborations and refinements. In any case, most researchers have to build upon the typologies of others, because the alternative necessitates the restudy of every single artefact. There is nothing wrong in this, as long as it is done explicitly.

For chronological typologies, there has been little debate of the "assumption that similarity equals contemporaneity, and that dissimilarity equals lack of it" (Whittle 1988: 35). It is sometimes valid, for some typologies do work as temporal gauges, and have stood the test of time; but this is not always the case, as we have seen above (p. 18-20) with the examples from Abruzzo-Marche. We must assess the sensitivity of our types as chronological indicators, (as is done for C14 samples with their ± values). Every artefact has a life-history of its own (Schiffer 1976, 1987), and has a time span of its own; and so our types and assemblages, which are the sum of these varied life histories, must also be expected to show chronological variability of different degrees. White and Modjeska's (1978) ethnoarchaeological study of stone axes in the highlands of Papua New Guinea, for example, emphasises the problem of classifying axes due to the fact that a functional stone axe is not a stable type: "whatever the degree of standardization of a quarry's products (and on this there are few data) much of the original morphology will be increasingly obscured the longer a blade is used, broken, re-sharpened and otherwise altered" (White and Modjeska 1978: 28).

We must also take into account the spatial variability of artefact types in our discussion of types as chronological indicators. This variable encourages the use of a range of local chronological schemes in the establishment of regional chronologies, rather than the application of one typology from a type-site, such as Ripoli, to the rest of the region. The problem of the chronological definition of the Marcianese decoration type in southern Abruzzo will be discussed below (p. 76-78).

In this thesis I have made use of typology for the following purposes: to classify and group sherds from overwhelmingly large ceramic assemblages, such as those from Ripoli and the Grotta dei Piccioni; to date pottery assemblages from excavation and survey contexts with little or no associated stratigraphic or radiocarbon data in relation to better dated assemblages; and to date lithic and metal artefacts from survey and museum collections, with very limited contextual data, in relation to examples from more securely dated contexts with associated pottery.

My classification of Neolithic and Copper Age pottery from Abruzzo-Marche is a simplified version of that established by the Italian archaeologists who have worked in this region. I have had little alternative but to do so, because the data are insufficiently published in detail to reclassify and resort the material according to new criteria, and because at the start of my research I did not consider it time- and cost-effective to restudy every single pottery sherd from Abruzzo-Marche in museum collections. I did, however, re-record some of the most important pottery collections, including the painted pottery from Ripoli in the Atri Museum deposit, and pottery from the major sites in Marche in Ancona Museum. For the former, it was possible to simplify slightly Cremonesi's typology, which comprised 27 categories (Cremonesi 1965: 126-9), and to replace it completely in the classification of painted sherds from cavity 12 (see below, p. 59). For the latter, it was possible to add new unpublished types to the limited published descriptions of the pottery, for example, from Pianacci di Genga (Lollini 1964, 1968). This museum work helped me to understand the classificatory schemes of the Italian archaeologists and suggested, as a general approach, but in particular for descriptions of vessel forms, that their typologies should be simplified, rather than elaborated upon. For example, I have combined their bowl ('ciotola') and soup-plate ('scodella') categories in a single type, which I call bowl.

I have only cautiously used the Italian scheme for naming pottery types, which is analogous to the biological system of binomial nomenclature, whereby type names combine a geographical place with a technically descriptive term referring to surface treatment or colour (eg. Ripoli trichrome painted pottery) (Rice 1987: 282). Initially this seems a useful method, but it has encouraged the application of locally defined type names on an inappropriately wide regional scale. The term 'Ripoli' for example, should only have been applied to painted pottery carrying the distinctive band of dots motif, and not to trichrome painted pottery in general from central and northern Italy (eg. Radmilli, ed. 1978; Barfield 1981. See Chapter 4).

I have tried to date more precisely a number of poorly dated pottery assemblages, which come from excavation and survey contexts with little or no associated stratigraphic or radiocarbon data (eg. those from Capo d'Acqua and Settefonti [AQ]), by typologically comparing them with better dated assemblages from sites generally provided with radiocarbon dates and/or stratigraphic sequences. The latter form the backbone of my chronological framework for the region, and are described in detail below (p. 40-72). Table 2 (p. 73) provides a list of all of the sites with chronologically diagnostic pottery assemblages from the region, along with their suggested chronological attributions. (See Appendix 1, however, for full details of pottery assemblages and their chronological atributions.)

Arrowheads are an important source of data in Abruzzo-Marche, and I have tried to use them typologically for dating purposes. They have been collected intensively since the late 19th century: the Bellucci collection, for example, in Perugia Museum, comprises 455 arrowheads from Abruzzo-Marche. Some of these arrowheads are provenanced to specific localities in museum catalogues, and so I wished to use them to amplify distribution maps for the Neolithic and Copper Age in the region. They also frequently occur in late Copper Age - Early Bronze Age burials, which sometimes lack associated pottery for dating them, as at Vescovara (Annibaldi 1951-2). Above all, my arrowhead typology was designed to distinguish Neolithic and Copper Age arrowheads from Bronze Age specimens. The latter certainly do exist (contrary to the belief of many prehistorians in Italy), particularly on early Bronze Age sites in Marche, as in the settlement and with burials at Campo Chileo, Nidastore (Monti 1878, Pigorini 1879, Dall'Osso 1915: 30, Ornella Acanfora 1944-5), although they seem to occur less frequently than in earlier periods.

My assumption is that at least some arrowhead types may vary chronologically in Abruzzo-Marche (cf. Green 1980). This does seem to be supported by well dated specimens. For example, hollow based and oblique/asymmetric arrowheads are found almost exclusively in late and final Neolithic contexts in association with 'figulina' fabric pottery (Figs. 57-60, nos. 2-3, 14-28, 39-40, 42-44, 49, 56-7); transverse arrowheads in final Neolithic/early

Copper Age contexts in association with Lagozza style pottery (Figs. 57-64, nos. 10.2, 58-60, 69, 111), as in northern Italy (Barfield 1971: 51); small triangular headed arrowheads, with straight edges, slightly down-turned barbs, curves at the points where the barbs meet the tang, and a maximum length of between 3.5 and 4.5 cm, in Copper Age contexts (Figs. 57-65, nos. 12, 46, 50, 55, 72, 112, 127, 134); and arrowheads with distinctive pinched or nipple-shaped points in Bronze Age contexts, including the Bronze Age level at Cava Giacometti (Moscoloni 1987: 40, fig. 2), Orciano (Rellini 1909-10, Pigorini Museum catalogue no. 80334), Serralta (Piangatelli 1970: 17, Pascucci collection in S. Severino Museum), and the Bronze Age settlement at Le Conelle (Pigorini 1879, Brizio 1891, Bologna Museum). Leaf-shaped forms have been excluded from my analysis, in order to concentrate upon the more typologically variable forms with barbs and a tang.

Taken that my main purpose for an arrowhead typology was to eliminate Bronze Age arrowheads (and sites) from my thesis, my method was as follows. I compiled a catalogue of all the 'dated' (primarily by association with better dated pottery) arrowheads from Neolithic, Copper and Bronze Age sites in Abruzzo-Marche (Figs. 57-68). There were 176 dated Neolithic and Copper Age arrowheads, from 18 different contexts in Abruzzo and Marche. I treated each of these as a unique type in its own right, rather than classify and sort them into groups, for the reasons stated in the paragraph above. I then compared every 'undated' arrowhead (i.e. without associated better dated pottery) to every dated arrowhead in the catalogue, and noted the 'parallels' which the undated specimens had with the dated ones. I defined these parallels by eye on the basis of closely similar size and outline (base, sides and point). Clearly this involved a degree of subjectivity, which could have been decreased by a more detailed computerized attribute analysis, but I believe that, given my purpose, this degree was acceptable. The chronological range of these parallels was then assessed for each undated site's assemblage of arrowheads, with an emphasis being placed upon parallels to dated arrowheads from nearby sites, in order to decrease the influence of regional differences in shape, which is particularly evident between Abruzzo and Marche. The larger assemblages of undated arrowheads have obviously been dated more securely than sites with just one or two specimens. The results (presented in Appendix 1) are clearly not very precise, and few assemblages of arrowheads have been assigned to chronological spans less general than, for example, late Neolithic - Copper Age, but it does at least allow this previously ignored category of data to make some contribution to the subject of this thesis.

A similar approach was tried for <u>ground stone tools</u>, which are also found in large numbers in museum collections. Ethnoarchaeological studies (eg. White and Modjeska 1978) and examples from dated contexts in Abruzzo-Marche suggest that they are likely to be much less precise as chronological indicators than arrowheads. There was also a much smaller number of well dated and illustrated examples to form a catalogue from, 42 Neolithic and Copper Age examples to be precise (Figs. 69-74). However, some forms do seem to be chronologically significant. Pebbles modified simply by notches on the two long sides are characteristic of the Neolithic (nos. 3, 9, 14-15); and simple hammer-axes with a central drill hole and curved broad end are of Copper Age date (nos. 26-29, 32-39). The latter become flatter at the broad end in the Bronze Age, as can be seen with dated examples from Busciara (Mattiocco 1981: table VIII.1), Pie' di Santo (Mattiocco 1986: fig. 18.i), Torre dei Passeri (De Pompeis and Di Fraia 1981: fig. 6.11), the Bronze Age level in the Grotta dei Piccioni (Cremonesi 1976: fig. 79.6), and the Bronze Age settlement at Conelle (Ornella Acanfora 1944-5: table VI.5). More elaborate forms, such as the knob-ended stone battle-axe, for example, either date to the late Copper Age or Bronze Age. One from Senigallia (Pigorini 1881: 130, Colini 1892: 170, British Museum) and another from Moie di Jesi (Puglisi 1959) find parallels with late Copper Age Rinaldone group specimens from outside the Abruzzo-Marche region, in the cemeteries of Rinaldone (Colini 1903: table XIII.1, Barker 1981a: fig. 23), Ponte S. Pietro (Radmilli, ed. 1978: table XXXIV.2), and Cumarola (Barfield 1971: 58); but they are also similar to a broken example found between Pianagallo and Gabbiano in the Vibrata valley (Colini 1908: 210 and table XIV.11), which probably dates to the Bronze Age. (The results of the parallels drawn for each undated ground stone tool are presented in Appendix 1.)

Assemblages from Marche containing <u>arrowheads in association with large numbers of bladelets</u> can probably be dated, using a similar method, either to the final Neolithic/early Copper Age or to the middle-late Copper Age. Better dated sites from Marche with such an association include: the final Neolithic/early Copper Age assemblages from Colle Appeso [MC], Colle Morico [MC], Aquatina's stratum 6 [AN], Donatelli [AN], and S. Biagio [PO], and the middle-late Copper Age ditch at Le Conelle [AN]. Such an association does not seem to continue into the Bronze Age. Undated lithic assemblages with both arrowheads and many bladelets include: Acquafresca, Campilunghi, Casone, Colle Argento, Rangore, and Rochetta in the Macerata province; Col d'Api, Pianello stratum IV, and Pianetti in the Ancona province; and possibly Turrivalignani in Abruzzo.

<u>Long retouched blades</u> found in Abruzzo probably date from the final Neolithic/early Copper Age to the Bronze Age. Better dated examples include: a 12cm long blade from the late Neolithic - final Neolithic/early Copper Age levels in the Grotta dei Piccioni [PE] (Fig. 75.1); two broken specimens from the late Neolithic - final Neolithic/early Copper Age transition site at Fossacesia [CH] (Fig. 75.4-5); 7.5 and 11 cm examples from the final Neolithic/early Copper Age cavities 11 and 9 at Ripoli [TE] (Fig. 75.2); a 14 cm long example from late Copper Age Ortucchio [AQ] (Fig. 75.6); and a 14 cm long example from the Bronze Age site at Piane [TE] (Fig. 75.7) (Rosa 1871).

Undated examples have been found in the following localities in Abruzzo: Luco - Trasacco and Massa d'Albe in the L'Aquila province; and Civitella, Colle, Mindoli, and Scendella in the Teramo province.

Notched flint daggers are particularly difficult to date, for they are generally found in burial contexts without associated pottery, or as stray finds in museum collections. They are sometimes associated with the earliest large copper artefacts in central Italy, as at Salle [CH] (Figs. 76.1 and 77.2), and are often regarded as stone copies of copper originals (Barker 1981a: 83). Flint daggers, in general, first appear in northern Italy during the Copper Age, at the same time as the first copper examples, but they also continue into the Early Bronze Age (Barfield 1987b: 236). The best dated central Italian example was found in spit 10 in Grotta dei Piccioni [PE] (Cremonesi 1976: 229, Fig. 58.7), which dates to the middle Copper Age. Another was found in a grave at Cantalupo Mandela in Lazio (Colini 1898, 1899), in association with what is regarded as a typical Rinaldone assemblage (Negroni Catacchio 1988: 352). C14 dates for the Rinaldone group from level 10 in Riparo la Romita (Pi-100) and Tre Erici (St-2043, St-2042, and St-1343) correspond closely with those for the Copper Age in Abruzzo, and cover a period from the last quarter of the fourth millennium Cal. BC to the end of the third millennium Cal. BC. The poorly dated examples from Abruzzo and Marche can therefore best be placed chronologically either in the Copper Age or the

Bronze Age. These include examples from: Salle [CH] (Fig. 76.1), the Sulmona basin [AQ] (Fig. 76.4), and Villa Ripa [TE] (Fig. 76.3) in Abruzzo, and others from S. Lazzaro [AP], Gaglianovo [MC] (Fig. 76.2), and tomb 1 at Vescovara [AN] (Fig. 76.5) in Marche.

Bone adzes with shaft-holes probably date from the final Neolithic/early Copper age to the Early Bronze Age. An undated example comes from the tomb at Camerata [AQ], and can be compared to dated examples from the following sites: late Neolithic to late Copper Age contexts at Fossacesia [CH], Colle Morico [MC], the ditch at Le Conelle [AN], Ortucchio [AQ]; and the Bronze Age settlements at Le Conelle and Filottrano [AN]. The two examples from Filottrano had square shaft holes, whereas all of the earlier examples had round holes.

A clay spindle-whorl with incised decoration from Acquafresca [MC] in Marche probably dates to between the end of the late Neolithic and the end of the Copper Age. Similar examples were found at the late Neolithic - final Neolithic/early Copper Age transition site at Fossacesia [CH], in the final Neolithic/early Copper Age settlement at La Lagozza di Besnate in northern Italy (Radmilli, ed. 1978: Tav. XXX), and in the Copper Age ditch at Le Conelle [AN] (Cazzella 1987: 50).

Large and simple copper axes and daggers from Abruzzo and Marche can probably be placed chronologically between the middle Copper Age and the Early Bronze Age. Poorly dated examples include: flat axes from the burials at Camerata [AQ] (Fig. 77.4) and S. Rocco [AN] (Fig. 77.3), a thin dagger with notches from Salle [AQ] (Fig. 77.2), and a small axe with slightly raised edges found near to the site of S. Biagio [PO]. Well dated copper finds from Abruzzo and Marche occur in final Neolithic/early Copper Age contexts, at Fossacesia [CH] (Fig. 77.1), Aquatina's stratum 6 [AN], and S. Maria in Selva [MC], and in Copper Age contexts in the Grotta dei Baffoni's stratum E [AN] and in the ditch at Conelle [AN]. However, all of these specimens are small, and the large copper artefacts may be more recent in date than these. The earliest dated large copper artefact from Abruzzo-Marche is the simple axe from the Bronze Age settlement at Delfico in the Vibrata valley [TE] (Rosa 1872a: 396-7; D'Ercole 1988a), and the first well dated evidence for the manufacture of large copper artefacts in Abruzzo-Marche comes from the Bronze Age levels in Grotta a Male [AQ], where a flanged axe mould was found. It seems safest to place the poorly dated examples of large copper artefacts in an unspecified position somewhere between the middle Copper Age and the Early Bronze Age, particularly as Barker and Slater's (1971: 191-2) chemical analysis of simple Early Bronze Age axes from Abruzzo and Marche indicate that Copper Age technological traditions of copper-working continued into the Bronze Age.

<u>Isolated human burials without pottery grave goods</u> are particularly difficult to date, and must in general be

assigned to between the middle Copper Age and the Bronze Age. The burial found with goods in a rock-cut tomb at Camerata [AQ] can probably be dated slightly more precisely to between the late Copper Age and the Early Bronze Age. Rock-cut tombs are known in Italy from the final Neolithic to the Bronze Age (Whitehouse 1981a), and bone adzes date to a similar period; the arrowheads date typologically to the late Copper Age, and their positioning in a crown around the skull is paralleled at the Early Bronze Age cemetery at Assergi [AQ] (where a badly preserved bronze tool was found); and the simple copper flat axe dates typoplogically to between the Copper Age and Early Bronze Age. The burial with lithic artefacts and a copper axe at S. Rocco [AN] dates typologically to between the middle Copper Age and the Bronze Age. The arrowheads find parallels from the late Neolithic to late Copper Age, but the 17cm long blade and the copper flat axe date typologically from the middle Copper Age to the Early Bronze Age. Grave 1 at Vescovara [AN], with its notched flint dagger and knobbed hammer-axe, seems to date to between the late Copper Age and Early Bronze Age; but grave 4 from the same cemetery, with a fragmentory bone comb, seems more likely to be of Bronze Age date, for similar combs are found in Bronze Age contexts in northern Italy (Radmilli 1978, ed.: Tavs. XLIV and XLVII). The poorly recorded burials with lithic artefacts from Fiori [PO] and Porta Cavour [PO] in Urbino also probably date to between the Copper Age and Early Bronze Age.

It seems possible that these burials without pottery grave goods, but with lithic and copper artefacts, might in general be slightly later in date than those graves with pottery vessels, such as the one from the middle Copper Age settlement at Area Guzzini East [MC], although this contrast could reflect contemporary spatial or symbolic differences (Cazzella and Moscoloni 1988: 364-6). The presence of pottery vessels in the Early Bronze Age graves at Assergi [AQ], in association with flint arrowheads and a bronze tool, seems to favour the latter hypothesis.

2. The chronological framework

Chronological frameworks for prehistory can never be regarded as entirely independent or objective. Chronologies of human activities are based upon radiocarbon samples, stratigraphies, and artefacts, which have all been affected by those activities. In addition, we are probably imposing a modern Western value of measured, chronometric time onto the past (Shanks and Tilley 1987 a and b). Periodization and phasing can also be subjective and misleading, particularly when applied rigidly, where they can create false groupings and divisions of material remains and events. For example, I have fairly rigidly excluded Bronze Age material remains from this thesis, due to limitations of research time and money, but ideally the early Bronze Age should have been included, because materially and culturally it exhibits close relations with the preceding late Copper Age. Periods and phases are, however, necessary to this thesis, where relatively few radiocarbon dates are available, and where the closest possible chronological precision is required.

My chronological framework is divided into five major phases: early Neolithic, middle Neolithic, late Neolithic, final Neolithic/early Copper Age, and middle-late Copper Age. These phases were defined on the basis of typological changes in pottery and the recurrent stratigraphic relations of those pottery types at sites. Radiocarbon dating shows that the phases vary in duration, and typologically they exhibit a strong degree of continuity (see Table 1, p. 39).

Below, for each phase, the pottery, C14 dates and stratigraphies from the major 'type-sites', which form the backbone of my chronological framework, are described in detail. These sites are generally characterized by the presence of large and well published pottery assemblages, reliable C14 dates, and/or well defined stratigraphic sequences. Ideally, with equally well dated sites dispersed throughout the region, this 'type-site' approach could be dispensed with, but, unfortunately, it remains a necessity at present.

Table 1. General and simplified chronological framework for the Neolithic and Copper Age in Abruzzo-Marche

CalBC	Phase	Pottery decoration	Key chronological sites
2050			
	LCu	Conelle-Ortucchio white-filled point impressed and incised	Ortucchio and Le Conelle C-A
2850			
	MCu	Applied pastilles, finger impr. rims/ cordons, grafitti	Grotta dei Piccioni spits 10-9 and Le Conelle ditch phases E-D
3250			
	FN/ECu	Red painted and plain figulina, late Serra d'Alto, red monochrome Diana, and grafitti decorated dark burnished ware (Lagozza)	- Aquatina 6 - Grotta dei Piccioni spits 13-12 - Ripoli 3
4200			Fossacesia
	L Neo	Bichrome, Ripoli and Serra d'Alto painted	- Fonti di S. Callisto and Grotta la Punta 9-8 - Ripoli cavity 12 - Gr. dei Piccioni 17-16
4700			
	M Neo	Catignano painted	Catignano & Gr Picc 20-18
4850			
	EN2	Early painted with Abruzzo-Marche and Guadone Impressed and Incised Ware	Grotta dei Piccioni spits 26-21 and Ripabianca
5350			
	EN1	Abruzzo-Marche and Guadone Impressed and Incised Ware	Villaggio Leopardi, Villaggio Rossi & La Maddalena
5750			

a) Early Neolithic

Fonterossi (CH)

A C14 sample, OxA-1958 (Hedges et al. 1990: 212), of human bone belonging to the incomplete skeleton of a woman which was found in a cavity situated below the Neolithic and Copper Age settlement deposits, provides a date range of 5630-5248 Cal. BC. No pottery was directly associated with this burial, but coarseware decorated with simple finger impressions and incisions was found in the settlement deposits which might partially be attributable to the early Neolithic (Radmilli 1981: 284).

Villaggio Leopardi (PE)

A C14 sample, Pi-101 (Ferrara et al. 1961), of charcoal from the central hearth provides a date range of 5730-5240 Cal. BC.

A total of 4187 sherds were recovered. Coarse (8%), fine red (74%) and brown-black (16%), and yellow 'figulina' fabrics were found. The latter only comprised 2% of the total number of sherds, and had slightly rough and porous surfaces, in contrast to later Neolithic 'figulina'.

Impressed decoration predominated. There were: fingernail impressions (Fig. 5.5-7), large oval and round finger impressions (Fig. 5.8) and large and small round point impressions (Fig. 5.9). These were applied to smoothed coarsewares, and were sometimes organized in parallel lines. One, out of the total of 104 decorated sherds, carried a vertically incised herring-bone motif, which incorporated a small lug, and was bordered by two slightly diverging lines (Fig. 5.10). Rims sometimes undulated with vertical lugs (Fig. 5.4-5), and one rim was notched (Fig. 5.7).

Bowls were predominantly truncoconical in form (Fig. 6.2), but also hemispherical (Fig. 6.3-5), and carinated in the fine brown-black fabric (Fig. 6.6). A few were small sized, and a few stood on low flat pedestal bases (Fig. 6.1). There were also large beakers or jars (Fig. 6.7), one of which carried a ring handle; high necks from flasks, which ranged from cylindrical and straight (Fig. 6.9-10) to slightly flared (Fig. 5.1); and a possible strainer fragment with small irregular holes (Fig. 6.8). Ring handles were most commonly found (Fig. 5.2), but there was also a pierced lug handle (Fig. 5.3), a small semicircular strap handle, and there were round and pinched lugs. Drill holes were found on a few sherds (Fig. 6.2), and one of these can be considered as a repair hole, because it was filled with bitumen along with an adjacent crack. (Cremonesi 1967; Radmilli 1981: 277-80.)

La Maddalena (MC)

A C14 sample, R-643α (Alessio et al. 1970), of charcoal from spits 4 and 5 in cavity 5, gives a date range of 5640-5340 Cal. BC.

Pottery fabrics were especially coarse, but there was some fineware, and there were a few sherds of a very fine black or brown burnished ware.

Impressed decoration predominated, with the use of fingernail impressions (Fig. 7.1), large and small, round and oval, impressions (Fig. 7.2), and round point impressions (Fig. 7.3-4). These were sometimes organized in parallel lines. Incised lines were less frequent. A reconstructed beaker, with an oval body, a small internal ledge handle, and a flat heeled base, was covered by parallel incised lines which formed herring-bone and V motifs (Fig. 7.5).

Other forms included: high necked flasks (Fig. 7.6), carinated vessels (Fig. 7.7), and a small bowl. There were also lugs, and rare little 'stick' handles. (Lollini 1965: 309.)

Villaggio Rossi (CH)

Area IA, the central cavity, produced stratified deposits which were divided by the excavator into five levels. They basically showed a succession of fireplaces and compacted soil layers. The lowest level, V, cut into the natural sandy soil. It contained a central fireplace, which was surrounded by large stones, and overlay a compacted area of soil. It was covered by a dark soil layer. Other areas of compacted and mixed soil were defined, and a little pit dug into the natural sandy soil contained human remains. There was a gradual transition to level IV. Again there was a fireplace, compacted areas, and human remains. Post-holes were also discovered. In level III there was some change in the general structure of the cavity, but there was a similar fireplace covered by dark soil and a compacted mass of calcareous material, and human remains were found. In level II a fireplace, dark soil, and a compacted area were found. Finally, in level I, there was another fireplace, black soil, a surface of compacted soil with stones impressed into it, a series of post-holes, and human remains.

Levels V-III (lower levels)

A C14 sample, BM-2250R (Ambers et al. 1987; Bowman et al. 1990), of charcoal from all three levels produced a date range of 5730 - 5242 Cal. BC.

About 2000 pottery sherds were recovered. Coarser (41%) and finer (59%) fabrics were present.

Impressed and incised decoration were equally represented. There were small fine fingernail impressions (Fig. 8.1), round finger impressions in parallel lines (Fig. 8.2), round point impressions (Fig. 8.3), and fine triangular stab-and-drag impressions which in one case covered a handle (Fig. 8.4). There were also short parallel incised slashes (Fig. 8.5), and groups of parallel incised lines meeting at angles (Fig. 8.7), some forming V motifs (Fig. 8.6).

Forms included: high necked flasks (Fig. 8.8), one of which had a ring handle; shorter necked vessels (Fig. 8.10); a bowl with a flat pedestal base (Fig. 8.9); hemispherical and cylindrical vessels (Fig. 9.1-2); and heeled bases (Fig. 9.3). There were ribbon (Fig. 9.4-5) and ring (Fig. 9.6-7) handles. One sherd carried a drill hole (Fig. 8.2).

Levels II-I (upper levels)

A C14 sample, BM-2251R (Ambers et al. 1987; Bowman et al. 1990), of charcoal from both levels provides a date range of 5730-5240 Cal. BC.

About 1400 sherds of pottery were found. Fabrics continued with coarser (44%) and finer (66%) categories.

Small fine fingernail impressions continued (Fig. 11.1), but there were new shell impressions of parallel 'tremolo' lines, some of which were bordered by an incised line (Fig. 10.2), micro-rocker lines (Fig. 10.3), and impressions with a shell 'peristoma' (Fig. 10.4). Incised slashes (Fig. 10.5) and parallel lines in angular V motifs

(Fig. 10.6) continued, but there were also new incised ladder filled triangles (Fig. 10.7), herring-bone filled triangles (Fig. 10.8), ladder filled rectangles (Fig. 10.9-10), and red filled incisions, which on one example comprised ladders forming a herring-bone motif with a central spine (Fig. 10.11).

A similar, but slightly wider, range of forms were represented. There were: large beakers (Figs. 10.1 and 10.1); hemispherical round and flat based bowls (Fig. 11.2-4); carinated bowls (Figs. 10.11 and 12.9); flasks (Fig. 11.5); vessels with everted (Fig. 11.6) and inverted necks (Fig. 12.1); and concave and flat pedestal bases (Fig. 12.2-3). There were also ring handles (Fig. 12.4), ribbon handles (Fig. 12.5), small pierced lug handles (Fig. 12.6-8), and a variety of lugs: triangular (Fig. 12.9), tongue (Fig. 12.10) and round (Fig. 12.11). Some were placed vertically on the rim.

<u>The site in general</u>

A mixed 'control' C14 sample, (BM-2252R), of collagen from human and animal bone, produced a date range of 5550-4844 Cal. BC. The contexts of the bones were not recorded. This date can therefore only be cautiously applied to the site in general (see above, p. 10-11).

The group of cavities adjacent to the central cavity, IA, contained pottery which was typologically indistinguishable from that found in IA. Area IIIA, however, which was located about six meters away, contained pottery which the excavator believed to be chronologically earlier. This was based upon his interpretation of the relative quantities of coarser ware (30%) and finer pottery (70%). Typologically, however, this material seems similar to the pottery from the upper levels of cavity IA. One sherd was decorated with pairs of impressions in a herring-bone pattern; another with two grafitti bands, the upper containing oblique hatching and a central triangle, and the lower with cross-hatching forming diamonds; and a third sherd was decorated with five parallel incised lines.One sherd of plain 'figulina' was also found. (Geniola 1982a and b.)

<u>Grotta dei Piccioni (PE), spits 26 - 21</u>

Stratum G (spit 26 and below) overlay the bedrock in trenches TO and I. It comprised culturally sterile stones and soil, and abundant microfauna. The skeleton of a child lay on the surface of this stratum in trench TO. Stratum F (spits 26-22) overlay G, and comprised: enormous stone blocks, which had probably fallen from the cave roof; stones; a greyish pebbly soil; and a succession of fireplaces. Stratum E (spits 21-12) overlay F. The enormous stone blocks were now covered over, but otherwise the nature of the deposits continued, with stones, a brown and grey soil, and an almost continuous series of fireplaces, with ashes and charcoal, and pits.

A C14 sample, Pi-46 (Ferrara et al. 1961), on charcoal from the lowest fireplace in one of the deepest spits of stratum F in trench TR, produced a date range of 5480-4858 Cal. BC.

There were coarse (47%) and fine burnished (45%) pottery fabrics, a fine yellow fabric sometimes with scaly surfaces (4%), and a hard, yellow and burnished fabric (4%) which can be regarded as true 'figulina'.

Nine percent of sherds were decorated, particularly the coarseware. Impressions (36% of the 45 decorated sherds) comprised: fingernail impressions, which were small and large, and shallow and deep (Fig. 13.1); small and large point impressions (Fig. 13.2); and two examples of a micro-rocker band made with a shell (Fig. 13.3). There were two sherds with a combination of fingernail impressions and incised lines (Fig. 13.4). Incisions (36%) comprised: short segments (Fig. 13.5), slightly longer slashes (Fig. 13.6), parallel and intersecting lines (Fig. 13.7-9), and zig-zag motifs (Fig. 13.10). There were also two 'figulina' sherds from the uppermost spits, 22 and 21, with traces of red colouring.

Vessel forms included: large deep truncoconical bowls (Fig. 14.1), hemispherical bowls (Fig. 14.2-5), carinated bowls in fineware (Fig. 14.6-7), a ladle (Fig. 14.8), large flasks with high cylindrical necks (Fig. 14.9), a beaker with a heeled and concave pedestal base (Fig. 13.10), and a fragment of a possible strainer with three small holes. There were also vertical and horizontal handles (Fig. 14.9-11), pierced lug handles (Fig. 14.12), and conical lugs (Fig. 14.3 and 5). (Cremonesi 1976.)

Ripabianca (AN)

Three C14 samples of charcoal were taken from the largest and deepest cavity found on the site (Alessio et al. 1970). R-599α, which came from the bottom, produced a date range of 5380-4947 Cal. BC. R-598 and R-598α came from the upper part and produced date ranges of 5330-4940 Cal. BC and 5240-4902 Cal. BC respectively, which can be combined (see above, p. 11) to give a range of 5240-4946 Cal. BC.

Of the pottery, there were coarsewares, fine dark grey burnished fabrics, and a coarse version of yellow 'figulina'.

There was much impressed and incised decoration, although less of the latter, and these were found especially on the coarseware. There were shallow and deep fingernail impressions, which were placed either without order, or horizontally, vertically, or obliquely in relation to the rim (Figs. 15.1-2, 16.3); and small point impressions placed in an angular zone (Fig. 15.3). Incisions included: notches on rims; slashes (Fig. 15.4); and lines. Incised lines formed: areas of multiple shallow or deep incised lines (Fig. 15.5), a zigzag band running around the vessel (Fig. 15.6), bordered zones filled by slashes or a herring-bone pattern of lines (Fig. 15.7-9), a simple ladder (Fig. 15.10), and a double herring-bone band (Fig. 15.11). There was also one sherd of 'figulina' with simple red painted bands (Fig. 15.12).

Forms included: beakers with flat heeled bases (Fig. 16.1 and 3), a carinated vessel (Fig. 16.2), a flask with an everted neck and rim (Fig. 16.4), and a cup with a small and narrow handle (Fig. 16.5). Ring handles predominated, but a spool handle was reported, and there were simple lugs (Fig. 16.1). (De Sanctis 1961; Broglio and Lollini 1963; Lollini 1965: 310; unpublished pottery in Fano Civic Museum.)

b) Middle Neolithic

Grotta dei Piccioni (PE), spits 20-18

Stratum E (spits 21-12) contained a brown and grey soil, stones, an almost continuous series of fireplaces, with associated ashes and charcoal, and pits containing grey soil and frequent stones towards the bottom.

A total of 239 pottery sherds were recorded from these three spits. Fabrics divided into coarsewares (50%), finewares (38%), fine yellow pottery (1%), and 'figulina' (11%). These exhibited strong similarities to the fabrics from the underlying levels.

21% of the sherds were decorated. Coarseware carried: shallow and deep finger impressions (Fig. 19.1); incised segments and slashes (Fig. 19.3); and incised lines, in simple, intersecting, and zigzag patterns (Fig. 19.4). Incised lines were also found on a brown fineware vessel, which was carinated and necked (Fig. 19.2). A wide band, containing obliquely converging groups of five parallel lines, ran horizontally around the carination; an oblique group of four parallel lines departed from this band towards the base of the vessel, and three similar lines left it towards the neck. Oblique groups of parallel lines and hatched bands also ran around the neck of the vessel. Burnished red and black painted decoration was found on the 'figulina'. The neck of a flask was painted on the inside with irregular parallel bands, and on the outside a lug was painted with an oval patch (Fig. 19.5). The interior of one bowl carried an oblique broad band and lines (Fig. 19.6). There were also: wide horizontal bands, one with a tapering band which hung from it (Fig. 19.11); sherds painted on both surfaces (Fig. 19.7); bands flanked by fine fringes of parallel lines (Fig. 19.8-9); a fringed line (Fig. 19.10); and a few sherds with painted areas containing oval unpainted patches, created by a negative technique, similar to that seen on pottery from Grotta Scaloria Bassa in Apulia (see Novelli 1980).

Forms included: hemispherical bowls (Figs. 19.6, 20.1-2); large, deep, truncoconical bowls; carinated bowls (Fig. 20.3); large flasks, with high necks (Fig. 19.5); oval bodied ollas with low necks (Fig. 20.4-5); an ellipsoidal bodied vessel with a rounded carination and a neck (Fig. 19.2); convex walled vessels (Fig. 20.6-7); a ladle; and a heeled pedestal base (Fig. 20.8). There were also: ribbon and ring handles (Fig. 20.10); pierced hemispherical lug handles (Fig. 20.7); and lugs placed on and under rims (Figs. 20.9, 19.5, 20.6). (Cremonesi 1976.)

Grotta S. Angelo (TE)

The spits containing early Neolithic pottery, decorated predominantly with impressions, and the later Neolithic spits, containing Ripoli style painted pottery, were separated by two spits. These contained pottery decorated with impressions and red painted bands, and also a sherd painted with a red band that was bordered by brown lines which had been made by a negative technique (Pitti and Tozzi 1976: 105-6).

Catignano (PE)

The C14 sample from structure 59, F-93 (Azzi et al. 1977), which gives a date range of 4231-3109 Cal. BC, should be rejected (see above, p. 10). Pottery fabrics included: coarsewares (21%), which were between 7 and 20 mm thick; finewares (62%), which were sometimes burnished and measured between 3 and 11 mm in thickness; and light yellow 'figulina'(17%), a very fine, homogeneous, and well fired fabric, which was light, sometimes burnished, and measured between 3 and 10 mm in thickness.

Coarsewares were undecorated. Incised and finer shallow grafitti decoration was characteristically found on the finewares. Incised motifs, sometimes red-filled, often comprised curvilinear or angular bands, which contained nearly parallel groups of lines. The latter were laid out in various patterns: parallel to the trend of the band (Fig. 21.1,6), obliquely (Fig. 21.2), intersecting each other at right-angles (Fig. 21.5), and as herring-bones (Fig. 21.8). Other motifs included: a group of diverging lines (Fig. 21.3); short incisions placed around a narrow vertical lug to suggest the eyes, nostrils, and mouth of a face (Fig. 21.4); intersecting parallel lines incised either side of a handle (Fig. 21.9); unbordered angular areas filled by short incisions (Fig. 21.7); and triangles and rectangles which contained oblique lines (Fig. 21.10). Grafitti motifs, sometimes white-filled, included the following: two triangles meeting at the vertices (Fig. 22.1); angular groups of lines (Fig. 22.2); bands containing empty and hatched triangles (Fig. 22.3-4); a band made up of a group of lines; and ladders. Some brown fineware vessels were also decorated with brown paint; and one 'figulina' vessel carried a broad horizontal groove (Fig. 22.5).

Painted decoration was found, particularly on 'figulina' fabrics. There was much red bichrome painting, on vessel exteriors and some interiors, in a great variety of motifs and combinations. Curvilinear and straight broad bands were the most recurrent element. Most simply, these were applied perhaps singly to the exterior of vessels (Fig. 22.7-8). More often they met or intersected each other forming angular motifs (Figs. 22.6,12 and 23.1). One vessel carried an exterior decoration of broad bands, which met each other at right-angles, and an interior wavy band which ran around the rim, above three oblique parallel lines (Fig. 22.10). One bowl had an external group of three parallel bands which ran in chevrons around the rim of the vessel; and internally, broader bands in a similar motif of chevrons, which were also separated by thin lines that divided the vessel into four segments (Fig. 22.11). Another vessel was decorated with a zigzag band which ran around it, and a triangle hanging from the rim (Fig. 23.3). The handles on two vessels were covered by large circular patches. One of these also had an interior shark's fin decoration around its rim (Fig. 22.9), and the other had tapering bands hanging from a horizontal band (Fig. 23.2).

There were fewer examples of red and brown-black trichrome painted decoration. Band motifs were again typical, but often red bands were bordered by fringes of numerous thin brown lines (Fig. 24.1-3). Areas of paint containing unpainted dots obtained by a negative technique were also characteristic (Fig. 24.2). One sherd carried a combination of negative technique dots and broad bands on the outside, and on the inside there were painted notches around the rim, from which hung a narrow wiggling band (Fig. 24.4).

Large beakers, with lug handles and pedestal bases which were sometimes concave, were the only recognized coarseware form (Fig. 25.1-4). Other forms included: handled flasks (Figs. 21.1-2, 22.6, 23.2), with a variety of necks (e.g. Fig. 25.6); convex bowls (Fig. 22.7 and 11); straight sided bowls (Fig. 25.10-11); and weakly carinated bowls (Fig. 25.7); deep, and often round based, vessels with handles (Figs. 22.9-10, 23.1 and 3, 24.5); truncoconical vessels (Figs. 22.5, 24.1, 25.9); an oval vessel standing on a pedestal base with a pair of lugs (Fig. 25.8); an oval olla with a low neck (Fig. 25.5); and sightly closed globular vessels (Fig. 22.1-2 and 8). Handles were generally few and small, and included ring, ribbon and strap forms (Figs. 22.6,9 and 10, 23.1-3, 24.5). Vertical ledge handles with small holes were found especially on vessels in fine black fabrics (Fig. 21.1-2). Conical and pinched tongue lugs were also present, particularly on the coarseware beakers (Figs. 21.4, 25.1-4,8-9). (Pitti and Tozzi 1976; Tozzi 1977, 1978, 1982; Radmilli 1981.)

c) Late Neolithic

Grotta dei Piccioni (PE), spits 17-14

These spits lay stratigraphically in stratum E (spits 21-12), which contained brown and grey soil with pebbles and stones, an almost continuous series of fireplaces, and a few pits.

Spits 17-16

Pottery fabrics comprised coarsewares, finewares, and 'figulina' (20%). There was much red or brown bichrome painted decoration, either covering the surface of vessels, or in bands of varying width meeting at angles. There were also finger impressions; curvilinear grooves; irregularly incised lines; and grafitti incisions, which on a flat based truncoconical cup formed a band of hatched triangles and curvilinear ladder bands.

Vessel forms comprised: spherical, hemispherical, truncoconical, and carinated bowls; flat based cups, including a semi-oval example, and a truncoconical example with a small pierced lug handle; high cylindrical necks from flasks; a large two-handled olla; a deep truncoconical vessel with a flat base and two handles; an oval vessel, with a short neck, a flat base, and two pierced lug handles; an oval vessel with a handle; a squashed ellipsoidal vessel, with a flat base, a short neck, and a handle; a large cylindrical vessel; a convex vessel; a funnel; and a ladle. There were also ribbon handles, some with raised edges; strap handles; plug attachments for joining handles to vessel walls; and conical lugs, sometimes placed in pairs.

Spits 15-14

Pottery fabrics continued, but with a decrease in the quantity of 'figulina' to 13%. Painted decoration shows notable developments. The red or brown bichrome painted motifs continued, with bands of varying width meeting at angles, but they now also included: bands of parallel straight and wavy lines; a circular patch from out of which radiated three irregular segments; a chequerboard; and triangular motifs. A few red and brown trichrome painted sherds now appeared. One depicted a row of brown dots, which was bordered by red lines and a brown band, on the outside of which there were obliquely parallel brown lines. Incised lines and bands of parallel lines continued; as did grafitti incisions, which, on a truncoconical vessel, were again organized in a band of hatched triangles. There were also new notched and point impressed rims; cordons; and rows of applied little discs or pastilles, placed directly below rims.

Vessel forms continued in general, but there were some new shapes, which included: small, slightly convex, bowls; a semi-oval bowl with a round base; a high neck with a wide everted rim; a semi-circular spout; spherical vessels, some with a short neck, two handles, and a flat base, one with a cylindrical neck and a handle, and another with a short neck and a tubular Serra d'Alto style handle; and spool shaped lugs. (Cremonesi 1976.)

Grotta la Punta (AQ), spits 12-8

The late Neolithic levels (spits 12-8) overlay a layer of culturally sterile brown soil, which contained scarce stones, and large stone blocks from a rock fall (spits 20-13). The brown soil and scarce stones continued into spits 12-10, but fireplaces were now also found. Spit 12 was overlain, only on the right hand side of the deposits, by a culturally sterile layer of stones, which measured 20 cm in depth. Spits 9-5 then contained a sucession of layers of ashes from fireplaces, which was interrupted in a few places by a rock fall. The percentage of organic material in the deposits rose from 3% in spits 12-10, to 5% in spits 9-5.

Spits 12-10

Pottery fabrics were divided into coarsewares (25%), finewares, and 'figulina' (20%). There was red or brown bichrome decoration, forming lines and bands, and angular hatched areas; and red and brown bichrome painting, of red bands bordered by brown lines. Impressed decoration included: finger impressions, placed in a row under the rim, or irregularly over the surface of vessels; bands of fingernail impressions, placed in pairs forming parallel rows, which sometimes intersected each another at angles; and small point impressions placed on or directly under the rim. There were also notched rims.

Vessel forms included: convex walled and truncoconical bowls; a cup, with a slightly convex wall and a handle; ollas, with oval bodies and everted necks; flasks; heeled pedestal bases; ring handles, one with a large groove on its summit; and conical lugs.

Spits 9-8

Coarsewares increased in quantity to 39%, finewares continued (56%), but there was a new fine red burnished fabric (3%), three sherds of a new very fine orange fabric, and one 'figulina' sherd. Painted decoration changed to a brown or black bichrome, and motifs included: brown lines on the three orange fineware sherds, a brown chequerboard on the 'figulina' sherd, and little black points on the inside surface of a fineware vessel. Rows of finger impressions and notches continued.

Bowls, handled cups, ollas, and flasks continued, but there were a number of new forms, which included: flasks with inverted necks; a round based bowl with spool shaped lugs attached to the rim; globular and convex vessels; spool handles with raised ends, one of which was decorated with four excised elongated triangles; semi-cylindrical lugs with two holes; a squashed circular lug; and large quadrangular lugs. (Cremonesi 1968.)

Ripoli (TE), cavity 12

A C14 sample of charcoal, R-664 (Alessio et al. 1971), produced a date range of 4715-4340 Cal. BC. Pottery fabrics were divided into coarse (36%), fine (2%), and 'figulina' (62%).

Painted decoration was particularly common, and was characterized by trichrome motifs. It is possible to define a recurrent general organizational scheme on larger sherds, with decorated zones bordered by a band containing a row of dots, itself bordered by a broader red band (e.g. Fig. 27.1). Painted motifs can be divided into the following: obliquely hatched and empty squares (Fig. 27.1-2); obliquely hatched and empty half squares (Fig. 27.3); obliquely hatched and empty triangles and diamonds (Fig. 27.4 and 6); filled and empty half-squares and oblique cross-hatching (Fig. 27.5); bands of filled triangles (Fig. 28.1); parallel lines filling triangles, squares and rhomboids, and empty spaces (Figs. 28.4, 29.1, 30.2); groups of parallel lines meeting similar lines obliquely in geometric areas (Figs. 28.2, 29.2, 30.1); parallel bands of lines, running in straight, zigzag, and rectilinear trends (Figs. 28.3, 28.5, 31.6). A handle was deeply incised by parallel lines (Fig. 31.9). There were also cordons, impressions, and applied discs (Fig. 31.10).

Vessel forms included the following: flasks (Figs. 27.1 and 31.1); ollas (Figs. 30.2 and 31.2); straight-sided beakers, with handles and pedestal bases (Figs. 30.1 and 31.3); globular vessels (Fig. 31.4); ladles, one with a semi-circular spout (Fig. 31.5); cups with handles (Figs. 29.1-2 and 31.6); and truncoconical bowls. There were numerous ring handles (Fig. 31.3) and some ribbon handles (Fig. 31.9). There were also handles with appendages, which ranged from simple lugs (Fig. 31.9), to complex zoomorphic heads (Fig. 29.1-2). Oval lugs were found on vessel walls (Fig. 27.5), and were placed vertically on rims (Figs. 31.7-8). (Cremonesi 1965; and unpublished pottery in Atri Museum.)

<u>Ripoli (TE), cavity 6</u>

A C14 sample of charcoal, R-665 (Alessio et al. 1971), produced a date range of 4780-4040 Cal. BC. A small collection of just 38 pottery sherds was described by Cremonesi (1965), and no details of decoration were provided. Pottery fabrics were divided into coarse (50%), fine (12%), and 'figulina' (38%). Vessel forms included: small bowls (Fig. 32.1), and truncoconical vessels. There were ring handles, ribbon handles with raised edges, and lugs. There was also one tubular handle with expanded ends (Fig. 32.2), and a semi-circular strap handle (Fig. 32.3). (Cremonesi 1965.)

Fonti di S. Callisto (PE), lower level

The lower level comprised dark grey soil and occasional stones. It underlay a grey-yellow layer, which was almost entirely without cultural remains. A C14 sample of charcoal, R-1386α (Allegri et al. 1987), produced a date range of 4470-4165 Cal. BC. Pottery fabrics were divided into coarseware (30%), semi-fineware (24%), fineware (22%), and 'figulina' (24%).

Painted decoration comprised 48% of the total of 77 decorated sherds. There was one trichrome painted sherd, with a red band bordered by a black line. The red, brown or black bichrome painted sherds comprised the following range of motifs: single or multiple bands containing a 'tremolo' line (Figs. 33.3-4, 35.2); a ladder band (Fig. 33.5); a row of dots (Fig. 33.6); bands containing a row of dots (Figs. 33.7, 35.8); single lines (Fig. 33.8); meeting and intersecting groups of parallel lines (Figs. 33.9); parallel lines forming a V motif (Fig. 33.10); geometric areas filled with parallel lines, bordered above by a horizontal band containing a 'tremolo' (Fig. 34.1); filled and empty diamonds bordered by two lines (Fig. 34.2); and a chequerboard of filled and empty squares (Fig. 34.3).

Finger and fingernail impressions were equally common, occuring on 47% of all decorated sherds. They were generally placed either on or directly under the rim, particularly on coarseware vessels (Fig. 33.1-2). There was also a cordon with a triangular section, and three sherds with incised lines (Fig. 34.7).

Vessel forms included: convex-walled bowls (Fig. 34.4-6); flat based bowls (Fig. 33.4 and 9); a slightly carinated bowl (Fig. 34.7); a low sided and flat based dish (Fig. 34.8); a ladle (Fig. 35.1); a large globular vessel (Fig. 34.1); an olla (Fig. 33.1); oval vessels, some with handles (Fig. 35.2-3); possible coarseware beakers (Fig. 33.2); and a variety of necks from flasks (Figs. 33.3, 5 and 8, 34.3, 35.4 and 5-7). Ribbon handles were the most common handle type. Some of these were indented, and one carried a notched appendage. Cylindrical tubular handles, spool handles with expanded ends, and their unpierced lug equivalents, were also common (Fig. 35.9-11). They were placed on or immediately below vessel rims. Two strap handles were found. (Radi 1986-7.)

d) <u>Late Neolithic - final Neolithic/early Copper Age transition</u>

<u>Fossacesia (CH)</u>

Two C14 samples were obtained from cavity 1 at Fossacesia. R-878 (Alessio et al. 1978), which was of charcoal and carbonized earth, and which came from spits 10-9, produced a date range of 4510-4000 Cal. BC. F-30 (Azzi et al. 1973), was of charcoal from spit 1, and gave a range of 4772-3780 Cal. BC. These C14 dates from Fossacesia have generally been regarded as too recent in relation to the typology of the artefacts found at this site, and have been ignored, until recently, by Italian archaeologists. However, there seems to be no good reason for rejecting the samples, and, particularly with the new and similar date from Fonti di S. Callisto (Cremonesi and Tozzi 1987: 247), they gain in credibility.

Pottery fabrics were divided into coarseware, black and reddish grey coloured fineware, which was sometimes burnished, and 'figulina'. Decoration included: an incised line on the interior of a vessel, placed immediately under the rim; incised handles (Fig. 38.7-8); incised obliquely hatched triangles; incised rectangles filled with small impressed points; red filled incisions on a fine black fabric; rows of impressions, placed on or directly under the rim, on coarseware vessels; applied pastilles (little discs), particularly on carinated bowls (Fig. 38.1-3); applied cordons; and red tinted sherds (but no red painted).

Vessel forms included: hemispherical, convex, trunco-conical, and carinated bowls (Fig. 38.2), in fineware and 'figulina'; a circular coarseware strainer (Fig. 38.4); a spherical vessel, with a straight-sided and slightly everted neck, and a small flat base (Fig. 38.5); large truncoconical vessels, in coarseware, with two handles placed on opposite sides; and circular lids and a ladle in coarseware. Ribbon handles were common (Fig. 38.6). Some had raised edges, and there were a few Serra d'Alto style curled-up ribbon types, pierced by two vertical holes, and decorated by incised lines (Fig. 38.7-8). There were also tubular, spool, and ring handles, and conical lugs. (Cremonesi 1973; Radmilli 1981.)

e) Final Neolithic/early Copper Age

Ripoli (TE), cavities 3 and 21

A C14 charcoal sample from cavity 21, F-31 (Azzi et al. 1973), produced a date range of 4360-3382 Cal. BC, but no further details were published concerning the artefacts found in this cavity. A sample from cavity 3 was measured by the Pisa laboratory (Cremonesi 1965: 152), and gives a date range of 4231-3648 Cal. BC.

Pottery fabrics from cavity 3 were divided into coarseware (40%), fineware (42%), and 'figulina' (18%). Decoration included: finger impressions on cordons placed under rims (Fig. 39.1); incised lines, forming motifs such as an obliquely hatched band (Fig. 39.2), bands of parallel lines (Fig. 39.3), short incisions on a rim (Fig. 39.4), and short curvilinear incisions (Fig. 39.5); rows of pastilles; and grooves. Vessel forms included: a small convex sided bowl (Fig. 39.6); truncoconical and carinated bowls; an olla; and truncoconical, globular and oval vessels. There were ribbon handles, some with raised edges, and one with an appendage in the form of a zoomorphic head;

ring handles; and lugs. (Cremonesi 1965.)

Grotta dei Piccioni (PE), spits 13-12

These spits lay stratigraphically in stratum E (spits 21-12), which contained brown and grey soil with pebbles and stones, an almost continuous series of fireplaces, and a few pits. They were overlain by stratum D (spit 11), which comprised a clearly defined layer of white powdery limestone, about 20 to 40 cm thick, which was culturally sterile. A C14 sample of charcoal, Pi-49, was obtained from the "upper horizon of level 5" (Ferrara et al. 1961), which probably corresponds to these two spits (as level 5 equates with spits 17-12). It produced a date range of 3780-3340 Cal. BC.

Pottery fabrics were divided into coarsewares (49%), finewares (39%), and 'figulina' (12%). Decoration included: a band of grafitti incised cross-hatched triangles, placed below the rim on the inside of a small fineware cup (Fig. 40.10); a group of diverging grafitti incised lines (Fig. 41.12); pairs of flattened lugs or pastilles (Figs. 40.3 and 41.13); simple cordons on rims and carinations (Fig. 40.7 and 12); grooves; four sherds with bichrome red or brown painted bands; one sherd with a trichrome red painted band bordered by a narrow brown band; and one sherd with traces of red colouring.

Vessel forms comprised: hemispherical bowls (Fig. 40.1-3); carinated bowls (Fig. 40.4-8); truncoconical bowls (Fig. 40.9); truncoconical cups with handles (Fig. 40.10-11); a wide truncoconical vessel with an out-turned cordon rim (Fig. 40.12); deep vessels with semi-ovoid bodies, and two handles (Fig. 40.13-14); a small spherical vessel with a handle (Fig. 41.1); spherical ollas (Fig. 41.2-3); a small semi-ovoid vessel with a vertical handle (Fig. 41.4); a funnel (Fig. 41.5, shown inverted); high flask necks with small handles (Fig. 41.6-7); flasks with slightly everted and extremely everted necks (Fig. 41.8-11); a vessel with wide sharp shoulders, a straight-sided cylindrical neck, and a flat base (Fig. 41.12); large and small beakers (Fig. 41.13-14); a ladle (Fig. 41.15); and a semi-circular spout (Fig. 41.16). There were ribbon handles (Fig. 40.13), a tubular ribbon handle (Fig. 41.17), pierced lug handles (Fig. 41.7), and conical and flattened lugs. (Cremonesi 1976.)

Aquatina (AN), stratum 6

A C14 sample, published without a standard deviation or laboratory reference by Lollini (1965: 314), was taken from level 6c. With the addition of an average standard deviation of ±125, a date range of 3772-3040 Cal. BC is produced. Pottery fabrics divided into coarsewares and grey-blackish finewares. There was also one fineware vessel with a Diana style monochrome red colouring, which could have been achieved either through firing or by the application of a red slip to the surface of the vessel.

Pottery decoration included: cordons, which were sometimes segmented by deep incisions (Fig. 42.1); segmented undulating ribbon cordons (Fig 42.2); pastilles, often with a central impression, applied in a row under the rim (Fig. 42.3); bands of large finger impressions (Fig. 42.4-5); fingernail impressions on rims (Fig. 42.6); small triangular and round point impressions (Fig. 42.7-8); grafitti incisions, forming a cross-hatched triangle on the exterior of a sherd, and hatched V bands on the interior surface (Fig. 42.9); and horizontal grooves.

Vessel forms included: hemispherical, truncoconical and carinated bowls (Fig. 43.1-4 and 6-8); spherical ollas (Fig. 43.5); and semi-circular spouts (Fig. 43.9). There were a few ribbon handles with small holes, a spool handle (Fig. 43.10), vertically pierced lugs, and conical lugs. (Lollini 1965: 312-3; and unpublished pottery in Ancona Museum.)

f) <u>Middle-late Copper Age</u>

<u>Grotta dei Piccioni (PE), spits 10-9</u>

A charcoal sample, Pi-50 (Ferrara et al. 1961), which was taken from spit 10, produced a date range of 3330-2617 Cal. BC. These spits equated to stratum C1, in which there was dark brown soil, blackened and burnt limestone, a series of fireplaces, and a small clay-lined pit. C1 overlay the culturally sterile stratum D, and underlay the Bronze Age stratum C, in which there was a little grey powdery soil, some pebbles, medium and large sized stones, and ashes and charcoal. It was difficult to distinguish between C1 and C in trench TR, but a clear distinction was noted in trench L.

Pottery fabrics divide into coarseware (57%) and burnished fineware (43%). Decoration included: cordons, which were generally placed near to rims, and which ranged from simple horizontal types (Fig. 46.1), to segmented (Fig. 46.2), and curved (Fig. 46.3); applied pastilles, arranged irregularly (Fig. 46.4), and in up to three rows; large finger and fingernail impressions on vessel walls (Fig. 46.5); rims with large finger impressions or notches; incised and grafitti incised motifs, such as a vertical fish-spine (Fig. 46.6), a star motif, and zigzag lines (Fig. 46.7-8), which were often found on the inside of bowls. Some coarseware vessel surfaces were also intentionally roughened, sometimes in regular directions.

Vessel forms included: relatively low and wide truncoconical bowls (Figs. 46.1,6-7 and 47.1-3); deeper and narrower truncoconical cups, with elongated lug handles (Fig. 47.4-7); deep carinated bowls (Fig. 47.8); jugs, with a high neck, and a wide truncoconical shoulder to which was attached a ribbon handle (Fig. 47.9); a small deep cylindrical vessel with a handle (Fig. 47.10); a miniature carinated vessel with a handle; an irregularly ovoid vessel, with a rounded shoulder, an inverted neck, and a flat base (Fig. 47.11); large and small beakers (Fig. 46.4-5); and a wide semi-ovoid vessel (Fig. 46.2). There were ribbon and strap handles (Fig. 47.9-10); pierced lug handles; semicircular, triangular and quadrangular elongated lug handles (Fig. 47.5-7); and conical lugs (Fig. 47.3), which were sometimes applied in pairs. (Cremonesi 1976.)

Ortucchio (AQ)

The Copper Age deposits produced a mixed C14 sample, F-32 (Azzi et al. 1973), of charcoal taken from different areas of the site, which gave a date range of 3091-2049 Cal. BC. These Copper Age deposits were partially overlain by Bronze Age deposits, and a C14 sample of charcoal, Pi-80 (Ferrara et al. 1961), which was taken from the latter, produced a date range of 2024-1410 Cal BC.

Pottery fabrics were divided into coarseware (84%), semi-fineware (3%), and black burnished fineware (13%). Decoration included: rows of finger impressions, placed on or under rims, and notched rims (Figs. 48.5, 52.5 and 53.1); large circular impressions (Fig. 48.6); many examples of rows of little point impressions, arranged in parallel lines (Fig. 48.7), bordered zones (Fig. 48.8), cross-hatched bands (Fig. 48.9), and angular and rectilinear bands containing up to four dots across (Fig.

49.1-3); bands of white-filled small and larger point impressions (Fig. 49.4-6); a combination of rectilinear bands of small point impressions, bordered by single lines or bands of straight and zigzag incised lines (Figs. 49.10-14 and 53.4); incised lines forming a one-sided fish-spine leading from a drill hole (Fig. 50.1), horizontal bands of parallel lines (Fig. 52.7), zigzag bands of parallel and intersecting lines (Fig. 50.2-3), a zigzag band bordered by straight bands (Figs. 50.4-5), and a zig zag band with zigzag lines in it (Fig. 54.4); grooves (Fig. 52.5); cordons (Fig. 55.1), some of which were segmented, and others of which were decorated with finger impressions (Figs. 48.4 and 54.5) or notches; and pastilles applied to vessel surfaces (Fig. 53.1).

Vessel forms included: large to miniature sized truncoconical bowls (Fig. 51.1-4); a range of carinated bowls (Fig. 52.1-8); a wide range of cups with ribbon handles (Figs. 50.4, 52.9-12 and 53.1); and cups with elongated lug handles (Fig. 53.2-5); convex sided vessels (Fig. 53.6-7); necked jugs with ribbon handles attached to the neck and shoulder (Fig. 54.1-2); globular ollas with short necks (Fig. 54.4); beakers with wide mouths and flat bases (Figs. 54.5 and 55.1); and a large open truncoconical vessel, with a flat and slightly heeled base, and a lug handle (Fig. 55.2). There were large ribbon handles (Figs. 48.1, 49.9, 52.10 and 54.1-2), which sometimes rose up above the rim of cups (Figs. 50.4 and 52.9 and 11-12), and one of which carried a decorated cordon and a lug on its apex (Fig. 48.4); large ring handles (Fig. 53.1); pierced lug handles (Figs. 53.2 and 54.3); and large and elongated lug handles (Figs. 53.4-5 and 55.2), sometimes raised (Fig. 53.2-3), and also with appendages (Fig. 48.2-3). (Puglisi 1965b; Radmilli 1981; Cremonesi 1985.)

Le Conelle (AN), ditch

The Copper Age ditch deposits comprised 11 stratified layers, which were recorded as five main phases. The lowest deposits, phase E, comprised clay, with very few artefacts. Phase D also consisted, above all, of clay, but there was much more cultural material. Phase C contained soil with much less clay. Phase B comprised a rather mixed deposit, and contained much clay. The uppermost deposits, phase A, contained soil with only a little clay, and were disturbed by overlying Bronze Age deposits and modern agricultural work.

Lower levels (phases E-D)

Pottery fabrics can be grouped into coarseware (83%), general fineware (11%), and black burnished fineware (6%). The characteristic type of decoration was applied pastilles, some of which were impressed (rosettes). Finger impressed rims and cordons, and scratch impressions, were also recorded. Characteristic vessel forms included: truncoconical and carinated cups with handles, one raised high above the rim; ovoid vessels with a sharply defined neck; ovoid vessels with handles or lugs; closed 'askoidal' vessels with an asymmetric mouth; and coarseware vessels with semi-circular and cylindrical spouts.

Middle and upper levels (phases C-A)

Coarseware steadily decreased in quantity to 71% in phase A, and black burnished fineware increased to 15% in phase A. The general finewares continued in similar quantities. Point-impressed decoration developed from phase C onwards, with motifs including single rows, straight bands converging at angles, curvilinear bands, triangles and squares. Some of these were bordered by incised lines, and there were rare bands of parallel incised lines found on their own. White-filled point impressions were found. (A pattern-burnished sherd was also found, but its context was not recorded.) Scratched impressions continued. Finger impressed rims and cordons increased, but rosettes decreased greatly in number. A new and wider range of closed vessel forms appeared in phase C. Characteristic vessel forms included: hemispherical bowls, small ollas with wide bodies, globular or piriform ollas with short necks, and wide bodied vessels with a high neck. There were a few truncoconical cups with a wide slab handle with a small hole raised above the rim; ovoid jugs with oblique mouths; and conical lids. Handled cups increased, and lugs decreased. (Puglisi 1959: 36, 1965; Lollini 1964: 307; Cazzella 1987.)

Table 2. Summary of sites with chronologically diagnostic pottery assemblages

(Figs. 4, 26, 36, 44 and 56 show their distribution within the region.)

Listed in alphabetical order and by province for each chronological phase. Key to symbols: * C14 date; ♦ stratified deposits.

Early Neolithic - c. 5750-4850 Cal. BC

Colle Sinello (CH), Crocefisso (CH), Fonterossi * (CH), Villaggio Rossi ***♦ (CH), Colle Maggio (PE), Fontanelle (PE), Grotta dei Piccioni, spits 26-21 *♦ (PE), Villaggio Leopardi * (PE), Capo d'Acqua (AQ), Cellitto, lower stratum ♦ (AQ), Colle S. Stefano (AQ), Grotta Continenza, spits 24-22 ♦ (AQ), La Valle (AQ), Madonna del Soccorso (AQ), Ortucchio, stratum E ♦ (AQ), Colle S. Savino (TE), Grotta S. Angelo, stratum VI ♦ (TE), Campo Sportivo (MC), La Maddalena * (MC), Monte Cappone (AN), Monte Colombo (AN), Ripabianca *** (AN).

Middle Neolithic - ? c. 4850-4700 Cal. BC

Catignano * (AQ), Grotta Oscura (AQ), Grotta di Pescosansonesco (PE), Grotta dei Piccioni ♦ (PE), Villa Badessa (PE), Grotta Continenza (AQ), Grotta S. Nicola, lower part of stratum A2 ♦ (AQ), Grotta S. Angelo ♦ (TE).

Late Neolithic - c. 4700-4200 Cal. BC

Grotta dei Piccioni, spits 17-14 ♦ (PE), Fonti di S. Callisto, lower level *♦ (PE), Grotta di Pescosansonesco (PE), S. Agnese (PE), Cellitto (AQ), Grotta Maritza, spits 28-24 ♦ (AQ), Grotta la Punta, spits 12-8 ♦ (AQ), Settefonti (AQ), Grotta S. Angelo, stratum V ♦ (TE), Pianaccio (TE), Ripoli, cavities 12 and 6 ** (TE), S. Domenico (TE), S. Maria a Vico (TE).
(Late Neolithic - final Neolithic/early Copper Age transition - c. 4200 Cal. BC - Fossacesia ** [CH]).

Final Neolithic/early Copper Age - c. 4200-3250 Cal. BC

Fonterossi (CH), Grotta dei Piccioni, spits 13-12 *♦ (PE), Piano d'Orta (PE), Ripoli, cavities 3 and 21 ** (TE), Cellitto, upper stratum ♦ (AQ), Grotta Cola II (AQ), Grotta Maritza, spits 23-22 ♦ (AQ), Grotta delle Marmitte, cavity AC (AQ), Grotta S. Nicola, upper part of stratum A2 ♦ (AQ), Riparo Monte la Difesa (AQ), Settefonti (AQ), Grotta S. Angelo, stratum V ♦ (TE), Acquedotto (AP), Buscalferri (AP), Ciafone (AP), Colle Appeso (AP), Monte Calvario (AP), Monte Tinello (AP), Sambuco (AP), Villa Panezia (AP), Area

Guzzini west (MC), Colle Morico (MC), Lucciano ♦ (MC), Madonna dell'Ospedale (MC), S. Maria in Selva (MC), Aquatina, stratum 6 *♦ (AN), Berbentina, stratum 2 ♦ (AN), Borgo Tufico (AN), Cava Giacometti, level 7 ♦ (AN), Coppetella (AN), Donatelli (AN), I Fossi, lower level ♦ (AN), Ponte Manarini (AN), Saline (AN), S. Giovanni (AN), S. Biagio (PO).

Middle-late Copper Age - c. 3250-2050 Cal. BC

Fonti di S. Callisto, upper level ♦ (PE), Grotta dei Piccioni, spits 10-9 *♦ (PE), Grotta la Cava (AQ), Grotta a Male ♦ (AQ), Grotta Maritza, spits 21-20 ♦ (AQ), Grotta di Ortucchio, stratum B ♦ (AQ), Grotta la Punta, spits 7-5 ♦ (AQ), Il Mulino (AQ), Ortucchio *♦ (AQ), Crocetta (TE), Grotta S. Angelo, stratum IV ♦ (TE), Area Guzzini east (MC), Cava Koch (MC), Colle Montanari (MC), Via Duomo 109 (MC), Aquatina, stratum 4 ♦ (AN), Cava Giacometti, level 6 ♦ (AN), Grotta dei Baffoni, stratum E ♦ (AN), Grotta del Mezzogiono, stratum I ♦ (AN), I Fossi, central stratum ♦ (AN), Le Conelle ♦ (AN).

3. Discussion

My discussions of the chronology of the Neolithic and Copper Age in the Abruzzo-Marche region lead on from the stage reached by both Italian and British archaeologists at the end of the 1970's, which is reflected in the major syntheses of Lollini (1978), Radmilli (1981), and Barker (1981a). Much new information was obtained during the 1980's, particularly from newly excavated sites, such as Villaggio Rossi and Fonti di S. Callisto, but also from new publications of old excavations at sites such as Le Conelle and Cava Giacometti (Moscoloni 1987, Cazzella 1987). New topics of debate have also developed, particularly during the recent conferences on the Neolithic and Copper Age in Italy (eg. Cremonesi and Tozzi 1987; Cazzella and Moscoloni 1988; Radi 1987).

a) <u>Early Neolithic</u>

Until about 1985 the chronology of the early Neolithic in the Abruzzo-Marche region appeared to be relatively simple, particularly in comparison with that of south-east Italy (e.g. Cremonesi 1977: 23-24, 1981: 42-45). Early Neolithic pottery assemblages were noted for their homogeneity, and were typified by impressed and incised decoration, arranged in simple motifs, and by a few sherds of 'figulina', occasionally painted with red bands (e.g. Figs. 5, 7, 13 and 15). Uncalibrated radiocarbon dates also tied in with slight typological developments in early Neolithic pottery to suggest the existence of earlier sites (Villaggio Leopardi and La Maddalena), and later sites (Grotta dei Piccioni and Ripabianca).

The pattern of C14 dates remains almost the same when calibrated, and with the addition of the new dates from Villaggio Rossi and Fonterossi. The earlier dates, from Fonterossi, Villaggio Rossi, Villaggio Leopardi, and La Maddalena range from 5730 to 5240 Cal. BC, and the later ones, from Grotta dei Piccioni and Ripabianca, range from 5480 to 4858 Cal. BC. A dividing line can be drawn at about 5330 Cal. BC, particularly when 1-sigma dates are considered (Fig. 18). However, there is no need to regard this as a sharp line, for the date from Fonterossi and the third date from Villaggio Rossi actually overlap both of these sub-phases.

During the second half of the 1980's the chronological picture for Abruzzo-Marche became much more complicated. This was with the publication of recently completed excavations at Villaggio Rossi (Marcianese), Crocefisso (Tricalle), and Fontanelle in the south-east of Abruzzo, and the very recent publication of preliminary reports of excavations at Colle S. Stefano and Madonna del Soccorso in the Aquila province. The standard decorative elements (type 1) of Abruzzo-Marche early Neolithic pottery were present at these sites (Figs. 8.1-3,5-7, 10.1, and 17.1,4,11), but new elements (type 2) were also defined, such as complex incised motifs (Fig. 10.6-11), minute impressions (Fig. 17.2), stab-and-drag impressions (Figs. 8.4, and 17.3,12), and shell impressed rocker and micro-rocker patterns (Figs. 10.2-4, and 17.5-10), which seemed most closely paralleled at sites like Guadone to the south. Two hypotheses were proposed to explain these new elements. Either the newly excavated sites with type 2 elements were chronologically earlier than those early Neolithic sites found previously in Abruzzo-Marche, or they were contemporary with them - with the type 2 elements, which were only found in the south-eastern coastal area, representing a geographical variant in pottery decoration, with links to the Puglian region (Cremonesi and Tozzi 1987).

The recently published C14 sample from levels II-I at Villaggio Rossi, the levels containing the newly defined type 2 decorative elements, produced exactly the same date range as the sample from Villaggio Leopardi, with type 1 elements, and also relates very closely to the samples from the underlying levels V-III and from La Maddelena, with which type 1 decorative elements were associated (see list below). Therefore Cremonesi and Tozzi's (1987) first hypothesis can be rejected. Furthermore, the stratigraphic sequence from the central cavity at Villaggio Rossi, and the slight differences between the C14 date ranges for the lower and upper levels, suggest that these newly defined type 2 decorative elements (particularly shell impressions and complex incised motifs) were adopted, at least at this site, slightly later than the type 1 elements (see list below). In support of this, one can cite the fact that the provenanced sherd with microrocker decoration from the Grotta dei Piccioni came from the uppermost early Neolithic level, 21 (Cremonesi 1976: 38), and overlay pottery with exclusively type 1 decorative motifs.

Villaggio Rossi, levels V-III -	5730 - 5242	(BM-2250R)
levels II-I -	5730 - 5240	(BM-2251R)
Villaggio Leopardi -	5730 - 5240	(Pi-101)
La Maddalena -	5640 - 5340	(R-643α)

Cremonesi and Tożzi's (1987) second hypothesis of geographical variation in the types of decoration on pottery seems more acceptable. However a little too much emphasis has been placed by Cremonesi and Tozzi (1987) and Ducci et al. (1986-7: Fig. 22) upon the sites of Villaggio Rossi, Crocefisso, Fontanelle and Torre Sinello, located along the Adriatic coast of southern Abruzzo, south of the River Pescara. From a reconsideration of all of the early Neolithic pottery from Abruzzo-Marche, it appears that early Neolithic sites from the whole of southern Abruzzo, both inland and coastal, had pottery assemblages which contained elements that differentiated them from sites found further to the north (Grifoni Cremonesi 1988: 23). For example, sherds decorated with shell impressions were found both inland at Cellitto, Colle S. Stefano, Grotta Continenza, and Grotta dei Piccioni (Fig. 13.3), and possibly at Madonna del Soccorso, and near to the coast at Fontanelle and Villaggio Rossi (Figs. 10.2-4, and 17.5-10), (Fig. 4). However, these inland sites only produced one or two of the distinctive type 2 sherds, whereas many more were found on the sites located near to the coast.

Much variation can also be seen between individual sites, particularly in southern Abruzzo, when the details of decorative techniques are compared. For example, possible cord impressions were only found at Capo d'Acqua (Fig. 17.13), and incisions with a red filling were unique to Villaggio Rossi (Fig. 10.11). This local and regional variation in pottery decoration makes it particularly difficult to assign the majority of sites without C14 dates to anything less general chronologically than the early Neolithic. This problem is augmented by the fact that only a quarter of the 16 early Neolithic sites without C14 dates have been published in sufficient detail (ie. Crocefisso, Fontanelle, Capo d'Acqua, and Grotta Continenza).

The presence of painted decoration might, however, be regarded as a chronological indicator of a later phase of the early Neolithic in Abruzzo-Marche. Painted sherds were found only in the radiocarbon dated sites with later C14 date ranges, namely Grotta dei Piccioni and Ripabianca (Fig. 15.12). In addition, painted sherds only began to appear in the uppermost early Neolithic spits in the Grotta dei Piccioni stratigraphy. However we are dealing with a very small number of painted sherds. It should also be remembered that attempts to establish an early Neolithic pure Impressed Ware phase preceding a painted pottery phase in south-east Italy have been justly criticized by Whitehouse (1969). If painted pottery could be relied upon as a chronological indicator in Abruzzo-Marche, then the assemblages at Cellitto, Capo d'Acqua, Grotta S. Angelo, and Fontanelle might all be seen to belong to this later phase of the early Neolithic.

Radmilli (1981: 283) has regarded Capo d'Acqua as the earliest known Neolithic site in Abruzzo. This view was based upon the similarities of the lithic industry and animal bones to those found at a nearby Mesolithic site, and by analogy with a similar assemblage of lithics and bones found at Coppa Nevigata in Apulia, which was then believed to be the earliest Neolithic site in Italy. Dating based purely upon lithic and faunal assemblages is, however, open to serious criticism, particularly in central Italy, where epipalaeolithic industries are noted for their continuity into the Neolithic (Barker 1981a: 111). Coppa Nevigata has also recently been drastically re-dated from the early 7th millennium Cal. BC to the first half of the

6th millennium Cal. BC (Hedges et al. 1989). So the placing of this site in a later phase of the early Neolithic, on the basis of the painted sherd found there, may still be possible.

Torre Sinello and Colle S. Savino can only tentatively be regarded as early Neolithic in date. For the former there are very few details published concerning the pottery, and later Neolithic Serra'd Alto and Diana style pottery sherds were also found there. For the latter no details are available concerning the pottery, and so the accuracy of D'Ercole's (1988: 2) chronological attribution cannot be assessed.

Radmilli (1981) and D'Ercole (1988a: 2) have assigned six more sites to the early Neolithic, due to the presence of impressed decorated pottery, which they consider to be a chronological indicator for that period. However, this assumption can be criticized (see above, p. 18). At Grotta S. Nicola one sherd, with a combination of fingernail impressions and incised lines, was taken as an indication of an early Neolithic phase there. It was found in the lower part of stratum A2 in association with a pottery assemblage that, when taken as a whole, can be assigned to the middle Neolithic. Similarly, the impressed sherds found at Grotta Maritza, Grotta la Punta, and Fonti di S. Callisto can be best assigned to the late Neolithic. Il Larghetto near Caporciano is often considered an early Neolithic site with its few sherds of impressed and incised pottery, but they were found in association with developed tubular and spool handles, and hammer-axes with shaft holes, which are totally out of place in the early Neolithic.

b) Middle Neolithic

The middle Neolithic can only be defined in the Abruzzo region, in the provinces of Pescara, Chieti and Teramo (Fig. 26), where its distinctive bi- and trichrome painted pottery has been found. It was originally defined in the 1970's, during excavations at the type site of Catignano (Pitti and Tozzi 1976). Very similar pottery was then recognized in spits 20-18 of Grotta dei Piccioni. This similarity can be seen in the general vessel forms, decoration with incised lines, painted motifs and the use of a negative technique. Compare, for example, the carinated bowls (Figs. 20.3 and 25.7), and painted bands with fringes (Figs. 19.8-9 and 24.1-3). Its chronological position between the early and later phases of the Neolithic could then be established.

The transition from early to middle Neolithic was gradual and continuous. In the Grotta dei Piccioni, the deposits with fireplaces in spit 20, the uppermost early Neolithic spit, continue unaltered into the middle Neolithic spits (20-18); painted pottery and 'figulina' fabrics, which are first found in the early Neolithic spits, continue and increase in quantity in the middle

Neolithic spits (which is a trend also seen when comparing early and middle Neolithic sites more generally); and impressed decoration continues, but decreases in quantity in the middle Neolithic spits. Pottery from Catiganano is also typologically similar to that from the site at Ripabianca, which belongs to the later phase of the early Neolithic. Incised hatched bands and ledge handles were found at both, as were coarseware beakers, although those at Catignano carry decoration formed by lugs rather than impressions. Pottery from Catignano can also be compared to that from Villaggio Rossi, with its red filled incisions. The line between these two phases should therefore not be drawn sharply.

Cremonesi and Tozzi (1987) imply that the assemblage from Catignano should be regarded as continuing slightly later than, as well as being contemporary with, those from the Grotta dei Piccioni and Grotta S. Angelo. This is because impressed pottery was found in asssociation with the characteristic early Neolithic painted and incised pottery in the two caves, but not on the settlement. The pottery assemblages from Grotta S. Nicola and Grotta Continenza might support this view, for they also contained impressed pottery, and cannot be clearly distinguished typologically from pottery assemblages of the late early Neolithic. However, this could be a matter of geographical, rather than chronological, variation in decoration between caves and settlements. As at Catignano, no impressed pottery was reported from the Villa Badessa settlement site, and impressed pottery, associated with painted and incised pottery, was found in all of the four caves mentioned above.

The pottery found on the surface in Grotta Oscura and Grotta di Pescosansonesco can only be tentatively assigned to the middle Neolithic, on the basis of the briefly published views of the fieldworkers. A few sherds of painted pottery from Grotta la Punta, Fonti di S. Callisto and Settefonti have been linked typologically and chronologically to that of Catignano (eg. Radmilli 1981: 303; D'Ercole 1988a: 3), but all of these sherds were found in association with distinctive Ripoli style pottery, and can therefore be better regarded as late Neolithic in date.

c) Late Neolithic

As with the middle Neolithic, evidence of the late Neolithic seems to be confined to the Abruzzo region (Fig. 36). Defining a late Neolithic in the Marche region is more problematic. None of the Marche stratigraphies seem to cover this period; there are no late Neolithic C14 dates from Marche; and trichrome painted pottery, which is so usefully diagnostic in the late Neolithic of Abruzzo, is absent on sites in Marche. Some of the sites with a 'figulina' pottery fabric from the Ascoli Piceno province in southern Marche may date to the late Neolithic, but, when other typological features of the pottery are considered, they all seem to fit closest into the final

Neolithic/Copper Age (see below, p. 92). A painted sherd from disturbed surface deposits in Caverna di Frasassi, with a wide and curving red band (Rellini 1931b: 224, Tav.XII.1), may also date typologically to the late Neolithic, but fits equally well into the middle Neolithic.

The typological similarities between the pottery of the middle and later phases of the Neolithic in Abruzzo suggest a certain degree of chronological continuity between these two phases. The transition can best be seen in the Grotta dei Piccioni sequence, where the deposits in stratum E continued unaltered, and where middle Neolithic pottery types from the middle Neolithic spits, 20-18, continued and evolved in the overlying late Neolithic spits, 17-16 and 15-14. For example, 'figulina' fabrics continued to increase in quantity in spits 17-16, and then began to decrease in 15-14; finger impressions continued into 17-16, and then disappeared in 15-14; bichrome painted decoration continued into 17-16, and was then joined by trichrome painting in 15-14; and handles increased in number and range in spits 17-16, with forms such as strap handles and ribbon handles with raised edges, and they developed further in 15-14, with a tubular curled Serra d'Alto example, and new spool shaped lugs. Similarities have also been noted between the type-sites of Catignano and Ripoli (cavity 12) by Cremonesi and Tozzi (1987: 244-5), although it seems unnecessary to over-emphasize these, particularly from a chronological point of view. For example, trichrome painted pottery was found at both of these, but with a completely different range of motifs; and although general similarities can be seen in vessel forms, such as the painted flasks, more evolved forms, such as the cups with zoomorphic handles, were also present at Ripoli.

The three available C14 dates for the late Neolithic suggest a maximum time span of 4780 to 4040 Cal. BC for this phase (see list below, and Fig. 37); but, if the wide R-665 measurement is ignored, this time span can be narrowed down slightly to a more acceptable range from 4715 to 4165 Cal. BC.

Ripoli, cavity 6 -	4780 - 4040	(R-665)
Ripoli, cavity 12 -	4715 - 4340	(R-664)
Fonti di S. Callisto, lower level -	4470 - 4165	(R-1386α)

Discussions concerning possible chronological sub-divisions of the late Neolithic of Abruzzo have been dominated by Cremonesi's (1965, 1971-3) tripartite phasing of pottery from the type-site of Ripoli, which has generally been taken as the standard against which to compare pottery found on other sites (e.g. Radi 1986-7; Cremonesi and Tozzi 1987). Cremonesi's phases were based upon variations in the frequencies of pottery types found in the various cavities on the site (1965: 145), and he claimed that "Such differences seem to have a chronological significance, indicating different moments in the development of the Ripoli culture" (1965:150). Pottery from cavities 12, 6 and 3 is characteristic of his phases 1, 2 and 3 respectively. The three relevant C14 dates from

Ripoli (excluding F-31 from cavity 21, for which no information is available concerning the associated artefacts) do actually support the general order of Cremonesi's three phases, with R-664 from cavity 12 (phase 1) measuring 4715-4340 Cal. BC, R-665 from cavity 6 (phase 2) at 4780-4040 Cal. BC, and the Pisa laboratory date from cavity 3 (phase 3) measuring 4231-3648 Cal. BC (Alessio et al. 1971, Azzi et al. 1973, Cremonesi 1965: 152). However, Cremonesi himself cast doubt upon the validity of his second phase, by admitting that pottery belonging to phase 2 had less definite characteristics than that from the other phases (1965: 50). I have therefore chosen to incorporate pottery from phase 2 with that of phase 1. Cremonesi, on the other hand, links it typologically to phase 3, but I prefer to rely tentatively upon the C14 measurements, which show that more of the phase 2 C14 date overlapped with the phase 1 date than with the phase 3 C14 date (a 51% overlap, as opposed to a 26% overlap). (This view is further strengthened when the narrowed down date ranges of the 2-sigma probability method are compared (see Appendix 2), which, at a 96-99% level, show a 100% overlap between the phase 2 and 1 dates, but only a 10% overlap between the phase 2 and 3 dates). I have also therefore transferred Cremonesi's distinctive phase 3 into the final Neolithic/early Copper Age (see above, p. 64).

When it comes to considering the chronological position of other late Neolithic sites in Abruzzo, it seems all the more important to move away from comparisons with this single site, its phases, and its 'culture'. Chronological developments varied greatly from site to site, as can be seen from a comparison of the stratigraphic sequences from Grotta dei Piccioni and Grotta la Punta, where different pottery attributes emerge as diagnostic earlier or later features. It is therefore not possible to establish any clear-cut, and universally applicable, chronological sub-divisions for the late Neolithic in Abruzzo.

However, when all of the radiocarbon, stratigraphic, and typological data are drawn together, it does seem possible to make a few general chronological statements. To begin with, on the basis of their relative C14 dates, the deposits and artefacts found in the lower level at Fonti di S. Callisto are more recent than those in cavity 12 at Ripoli. Next, by comparing the new pottery features which appear in the uppermost late Neolithic spits at Grotta dei Piccioni (spits 15-14), Grotta la Punta (spits 9-8), those which appear in Cremonesi's pottery phase 2 at Ripoli, and the new pottery traits found at Fonti di S. Callisto (in contrast to the phase 1 pottery from cavity 12 at Ripoli), it is possible to suggest that the following general developments took place in the character of late Neolithic pottery in Abruzzo. There was a decrease in the frequency of 'figulina' fabrics; new painted motifs developed, in particular the chequerboard; a new black paint took over from trichrome painting at Grotta la Punta and Fonti di S. Callisto; and new cylindrical handle forms developed, including tubular, spool, and curled Serra d'Alto types, which became even more frequent during the final Neolithic. It also seems possible to state that spits 17-16 in Grotta dei Piccioni are probably the earliest late Neolithic deposits so far excavated in Abruzzo, on the basis of the typological similarities of the pottery found in them to the middle Neolithic pottery found in the deposits directly below; and that spits 9-8 in Grotta la Punta are the most recent, on the basis of the presence of pottery which is typologically similar to that of the final Neolithic/early Copper Age.

Nine other sites from Abruzzo can be considered as late Neolithic, on the basis of the typological similarities of their pottery to the more securely dated pottery from above mentioned contexts: Grotta di Pescosansonesco, S. Agnese, Cellitto, spits 28-24 in Grotta Maritza, Settefonti, Grotta S. Angelo, Pianaccio, S. Domenico, and S. Maria a Vico.

d) <u>Late Neolithic - final Neolithic/early Copper Age transition</u>

Typologically, the pottery from Fossacesia, with its black and red burnished fineware, incised decoration, rows of applied pastilles, and lack of fully painted pottery, and the presence of a copper awl, have led to the incorporation of this site into the final Neolithic/early Copper Age of Abruzzo; with comparisons being made with pottery from Cellitto, and with pottery and copper from S. Maria in Selva (e.g. Cremonesi 1971-3, 1973; Radmilli 1981). However, the Fossacesia C14 dates clearly overlap more with dates from late Neolithic contexts (R-664, R-665, R-1386α), than with dates from final Neolithic/early Copper Age contexts (F-31, Pisa date from Ripoli cavity 3; Pi-49; and Aquatina date) (Fig. 37). Also, parallels for most of the 'new' pottery features from Fossacesia can actually be found scattered in late Neolithic contexts. For example, red burnished fineware was present in spits 9-8 at Grotta la Punta; obliquely hatched incised triangles were found in spits 15-14 in Grotta dei Piccioni; and applied pastilles were found in Ripoli's cavity 12 and in spits 15-14 in Grotta dei Piccioni. As a compromise, I have assigned this site to a period of transition between the late Neolithic and the final Neolithic/early Copper Age. This fits well with a comparison between the C14 dates from Fossacesia and the date from the typologically later-late Neolithic site of Fonti di S. Callisto. F-30 and R-878 from Fossacesia fully overlap R-1386α from Fonti di S. Callisto, but they extend slightly more to the recent side, rather than the early side, of the Fonti di S. Callisto date (Fig. 37).

e) <u>Final Neolithic/early Copper Age</u>

This chronological phase was first defined in the Marche region by Puglisi (1959) at the site of Donatelli, and it has recently been recognized the Abruzzo region following excavations at Cellitto by Cremonesi (1983 and

1985). I have incorporated more sites and contexts from Abruzzo into this phase, such as cavities 3 and 21 at Ripoli, Fonterossi, and the upper part of stratum A2 in the Grotta S. Nicola, which were previously poorly defined chronologically. This enables the chronologies of the two regions to be drawn together again, following the difficulties of the middle and late Neolithic phases (Fig. 44). The final Neolithic/early Copper Age phase presents few chronological difficulties, but terminology does cause some problems. It can either be called the 'final Neolithic', following north Italian examples, or the 'early Copper Age', as in southern Italy (Cazzella and Moscoloni 1987: 59, 1988: 309-10). I have opted for a central Italian combination of the two.

Clear typological continuity can be seen with the preceding late Neolithic phase, particularly at the transitional site of Fossacesia (see above, p. 88-89), but also in the Grotta dei Piccioni stratigraphy. At the latter, the deposits in stratum E continued unchanged from the later early Neolithic (spit 21) right up to the end of the final Neolithic/early Copper Age (spit 12). There were also only slight typological changes in the pottery between the uppermost late Neolithic spits, 15-14, and the final Neolithic/early Copper Age spits, 13-12. These included: a further small decrease in the quantity of 'figulina'; a decrease in the quantity of painted pottery, and in tubular and spool handles; and a small increase in the numbers of cordons, and ribbon handles.

The four C14 dates for the final Neolithic/early Copper Age cover a long chronological period, with a maximum time span of 4360 to 3040 Cal. BC (or a more realistic span from 4231 to 3040 Cal. BC); and, despite their overlaps, they seem to fall into a sequence, with the earliest dates coming from Ripoli, then the date from spits 13-12 in Grotta dei Piccioni, and the most recent date coming from stratum 6 at Aquatina (Figs. 37 and 45, and see list below).

Ripoli, cavity 3 -	4231 - 3648 (Pisa lab.)
Ripoli, cavity 21 -	4360 - 3382 (F-31)
Gr. dei Piccioni, spits 13-12 -	3780 - 3340 (Pi-49)
Aquatina, stratum 6 -	3772 - 3040 (Lollini 1965)

However, this long time span, and the sequence of sites indicated by the C14 dates, is hardly reflected in the pottery typology. A very similar range of decorative types and vessel forms was found in Ripoli's cavity 3, spits 13-12 at Grotta dei Piccioni, and in stratum 6 at Aquatina. This included: cordons; incised and grafitti incised decoration, with the characteristic band of hatched triangles; applied pastilles; grooves; various bowls and ollas; semi-circular spouts; ribbon, ring, tubular and spool handles; and conical lugs. Only pottery in Aquatina's stratum 6 shows possible chronological variation, with some similarities to the middle-late Copper Age, such as: a lack of 'figulina', segmented and undulating cordons, rosette type pastilles with central depressions, and point impressions.

Many pottery assemblages from Marche and Abruzzo can be fitted into this chronological phase, on the basis of typological comparisons with the pottery from the C14 dated sites. Some of the eight sites with 'figulina' pottery from the Ascoli Piceno province in southern Marche could belong to the late Neolithic, particularly Monte Tinello with its painted decoration, but in general the pottery types from these sites compare most closely with those of the final Neolithic/early Copper Age.

f) Middle-late Copper Age

A broad chronological continuity between this phase and the preceding one is again suggested by stratigraphic, typological and C14 data; although stratigraphic breaks, more marked typological developments, and shorter overlaps between the C14 dates of both phases are now noticeable (Fig. 45). Stratigraphic continuity from the final Neolithic/early Copper Age is attested in the stratigraphies at Grotta Maritza (spits 23-22 to 21-20), Cava Giacometti (levels 7 to 6), and I Fossi (lower to central strata), but details of the pottery from these contexts are too limited to study typological developments in any detail. In Grotta dei Piccioni, a culturally sterile stratum, D, stratigraphically separated the final Neolithic/early Copper Age and middle Copper Age deposits. Typological continuities in the pottery included the use of: grafitti decoration, pairs of lugs and pastilles, cordons, truncoconical and carinated bowls and cups, ovoid vessels with handles, ribbon and pierced lug handles, and conical lugs. But there were also notable typological developments, such as: an increase in coarseware, applied pastilles, and elongated lug handles; the presence of new grafitti incised motifs, impressed decoration, segmented and curved cordons, roughened vessel surfaces, handled jugs, and strap handles; and an absence of 'figulina' and painted decoration. These typologically developed features of the Copper Age pottery from Grotta dei Piccioni do however correspond to the characteristic features noted on pottery from the most recent final Neolithic/early Copper Age contexts elsewhere in Abruzzo-Marche (see above, p. 131). The C14 dates from the final Neolithic/early Copper Age and middle Copper Age deposits in Grotta dei Piccioni, Pi-49 and Pi-50, do not overlap with each other, but they are only separated by a few years; and Lollini's (1965) date from stratum 6 at Aquatina does overlap partially with the middle Copper Age date, Pi-50, from Grotta dei Piccioni (Fig. 45).

Only two C14 dates are available for the middle-late Copper Age in Abruzzo-Marche, Pi-50 and F-32, and both of these come from sites in the Fucino basin in interior Abruzzo (Fig. 56). They cannot, therefore, be relied upon too heavily in the establishment of an absolute chronology for the whole of the Abruzzo-Marche region, but they are all that we have. They suggest a maximum time span for the period of 3330 to 2049 Cal. BC. The earliest C14 date for the Bronze Age in Abruzzo, Pi-80 from Ortucchio, measures 2024-1410 Cal. BC. This leads on closely from, and seems to support, the late Copper Age date, F-32, taken from the underlying deposits at that site (see Fig.45 & list below).

Grotta dei Piccioni, spits 10-9 -	3330 - 2617	(Pi-50)
Ortucchio, Copper Age deposits -	3091 - 2049	(F-32)
Ortucchio, Bronze Age deposits -	2024 - 1410	(Pi-80)

It does seem possible to distinguish a group of late Copper Age pottery traits for Abruzzo-Marche, on the basis of C14, stratigraphic, and typological data taken from both settlement sites and caves. Abruzzo and Marche are fortunate in this respect, particularly in relation to other Italian regions where sub-phases of the Copper Age are difficult to establish due to the predominance of burial rather than settlement sites (Cremonesi and Vigliardi 1988). New features found in the C14 dated Copper Age deposits at Ortucchio (in comparison with the earlier C14 dated pottery from the spits 10-9 in the Grotta dei Piccioni), and new pottery features found in the middle and upper phases in the Conelle ditch correspond well. They include: the new appearance of rows of point impressed decoration, sometimes with a white fill, and the new appearance of truncoconical cups with handles raised above the rim; an increase in the quantity of black burnished fineware, finger impressed cordons, and handled cups; a development in the motifs formed by bands of parallel lines; and a decrease in the use of conical lugs. This corresponds with Barker's (1981a: 78-80) suggestion that the classic Copper Age pottery assemblages from Conelle and Ortucchio should be regarded as late developments in the Copper Age of Abruzzo-Marche, rather than typical examples of the Copper Age in this region (e.g. Radmilli 1974a; Renfrew and Whitehouse 1974). The pottery assemblages from Grotta la Cava and Grotta di Ortucchio in Abruzzo, and Colle Montanari in Marche, share some of these distinctive typological traits, and can therefore probably also be regarded as late Copper Age in date. There seems to be no evidence to support D'Ercole's (1987, 1988a:7) claims that scale decoration on pottery is a late Copper Age 'type fossil', for it has also been found on numerous Bronze Age sites in Abruzzo and Marche (see above, p. 18). For example, D'Ercole (1988a) places the pottery with scale decoration from Le Castagne (AQ) in the Copper Age, but handle forms from the same ceramic assemblage are clearly Bronze Age types, with close similarities to examples from the Bronze Age levels in Grotta dei Piccioni.

CHAPTER 2. THE NEOTHERMAL ENVIRONMENT

1. Introduction

This chapter is concerned with reconstructing the Neothermal environment of the Abruzzo-Marche region. I hope that, by placing it at this position in my thesis, the information which it contains can be fully integrated into the succeeding chapters (but without running to the extremes of environmental determinism). An intimate relationship existed between prehistoric people and their environment, and environmental evidence is integral to the archaeological record. The environment can be regarded as a constraining influence upon human actions, but human influence and modification of the environment must also be considered. The Mediterranean environment cannot therefore be regarded as the almost timeless and stable constraint upon human behaviour postulated by the Annaliste historical geographer Braudel (1972) (Skeates 1990: 59), and neither should it be seen as entirely natural. We must also look further than the scale of excavated archaeological sites, which comprise a small sample of the full area actually occupied by human groups during the Neolithic and Copper Age in Abruzzo and Marche, and consider the whole landscape as an extension of those archaeological sites (Davidson 1988; Modderman 1988: 62).

Below, to begin with, the problems of reconstructing the Neothermal environment and the nature of the central

Italian data will be discussed briefly. Next, the geology, landforms, and hydrology of modern-day Abruzzo and Marche will be described. This will be followed by a discussion and reconstruction of the Neothermal soils, climate and vegetation in central Italy, and the evidence of human interference with the environment in that region. Finally, the wild plant and faunal remains from Neolithic and Copper Age sites in Abruzzo and Marche will be discussed in relation to this reconstruction.

2. Reconstructing the Neothermal environment: data and problems

During the 1980's there was a significant increase in the quantity of palaeo-environmental data from central Italy, which has encouraged this attempt to reconstruct its Neothermal environment. However, these data are still sporadic, both in quantity and distribution (Fig. 78), and the sample from the Abruzzo-Marche region is particularly poor. This sample is composed of a few wild plant remains and the bones of wild fauna, all of which come from archaeological deposits, and which therefore refer mainly to human choices and selection in the use of the environment. There is now an urgent need for environmentally orientated projects to be undertaken in Abruzzo and Marche.

However extensive the data may be, it is still difficult to build up at a regional scale a full picture of the complex ecosystems in which prehistoric groups participated. One can establish many single elements of the environment, such as plant taxa or soil types, but it is often difficult to correlate those data. At the intra-site scale, as with studies of artefacts, the taxonomy of the environmental samples requires detailed consideration, in order, for example, to distinguish between material from autochthonous and allochthonous sources; and at the regional scale, as Tooley (1981: 2) says, "Correlation is as strong as the quality of the analytical data from each site." Correlating the chronology of environmental changes with that of cultural phases, such as those established in the previous chapter, is also difficult, because of the different types of data used to investigate them. Quantification, although important in such studies, can also be misleading. For example, the differential production of pollen by different plant species, both in terms of quantity and season, makes the relative percentages used on pollen diagrams difficult to interpret.

One basic problem in environmental reconstruction is that we are obliged to rely heavily upon analogies with modern environments to interpret the evidence of past environments, and yet it is likely that the two differ considerably, both in their scale and nature (Tooley 1981). For example, many plant and animal taxa have undergone genetic changes over time, which have altered their ecological ranges and biotic associations, and the present-day agricultural and industrial landscape contains few niches in which plant and animal communities have survived unaltered from the time of the Neothermal. Progressive forest clearance, soil erosion, and alluviation have also greatly modified the environment.

What needs to be established is the degree of change in the environment since the Neothermal. Barker's (1975, 1981a) tacit assumption, particularly in relation to the influence of the Mediterranean climate upon the environment of central Italy, is that little has changed. He had little choice but to assume this during the 1970's, for very little environmental data were then available to him. However, it is now possible to reconsider this assumption in the light of the new environmental data obtained during the 1980's.

3. Geology, landforms, and hydrology

The modern geology and landforms of east central Italy can best be described by reference to four major geographical units: the Adriatic coast and coastal plain; the Pliocene hills and their river valleys; the central Apennine mountains; and the depressions, basins and valleys of the interior. Much useful information concerning these is presented in the Admiralty's Naval Intelligence Division Geographical Handbooks for Italy (Mason, ed. 1944), and additional details can be found in the UTET 'Regioni d'Italia' volumes for Abruzzo (Fondi 1977) and Marche (Bevilacqua 1961).

Adriatic coast

Today, the Adriatic coast of Italy is relatively straight and has few islands compared to the west Italian Tyrrhenian coastline. This contrast can be traced back to the different patterns of subsidence that occurred during the Miocene mountain building period in central Italy. Pleistocene and Holocene alluvial deposits of clay, sand, and gravel line the coast (Fig. 79). The beaches of Abruzzo and Marche are usually sandy and narrow, but at the mouths of rivers they become pebbly and broaden considerably. There is also a broader stretch of beach between Senigallia and Fano, which begins about 25 km north of Ancona. The beaches are in places backed by a narrow coastal plain, but elsewhere the hills come close to the sea, as at Vasto and Ortona, and also between Pesaro and Cattolica in northern Marche, where hills formed by Upper Miocene sandstones and clays approach the shore in low, broken cliffs. Landslips occur along the coastal margin with the Pliocene hills between the Rivers Tesino and Aso, in the Ascoli province of Marche. An imposing headland, sometimes known as the 'footstool of the Apennines', is formed by the Monte Conero massif just south of Ancona. It is composed of limestone, chert, and calcareous marls, and is flanked on the coastal side by precipitous cliffs.

The coastline may have looked noticably different during the Neothermal, but it is particularly difficult to reconstruct this in more than general terms. During the early Neothermal there was a rapid rise in the sea level, and a maximum level was reached by the Flandrian Transgression by about 7000 Cal. BC. By this time the broad Adriatic coastal plains, which had been frequented by Upper Palaeolithic groups, were largely submerged. A regressive phase took place at the time of the Neolithic, during which the sea dropped to a level lower than at any time subsequently. The coastal plain would have increased in width, and new land would have been gained. Following the Neolithic, the sea level began to rise again, but at a slower rate than before (Delano Smith 1979; Shackleton et al. 1984).

What is unclear is by how much the sea level fell and rose. Submerged Neolithic sites in the Mediterranean are rarely found lower than about one or two metres below the present sea level. However, where a shallow sloping sea bed exists, much land could have been lost and gained. It is also difficult to establish the quality of the coastal environment, which in any case is likely to have varied from place to place along the same coastline. The Holocene Asti geological formation, which stretches between Ancona and the northern border of Marche, seems to indicate a shallow marine environment (Dondi et al. 1985), and in this situation there may have been a gradation from mud to marsh to dry land.

Pliocene hills and river valleys

Behind the coastal plain the ground rises sharply to low, tabular, steep-sided hills, with rounded flanks. These in turn rise gradually from about 100 m above sea level in shallow steps up to the foot of the Apennine mountains at about 600 m. The lowland hills are the dissected remnants of Pliocene plateaux. They consist almost entirely of blue-grey Pliocene clays or clayey marls, and often carry a capping of yellowish sand. Upper Miocene clays and sandstones form a second band of hills further inland, outcropping along the border of the Apennines (Fig. 79).

Numerous parallel rivers, flowing at right-angles to the coast, dissect these hills (Figs. 79 and 80). Inland they cut narrow valleys, and landslips can occur in the Upper Miocene clays. Towards the coast, however, the rivers open out and cut into the soft Pliocene hills forming transverse ridges. These are further dissected by streams into minor ridges running parallel to the coast. Landslips occur in the weak rocks forming the sides of these ridges, particularly on the northern slopes of the valleys. The river valleys are characteristically short, straight, wide, and flat bottomed, and they are often flanked by Pleistocene terraces. The main central Italian Adriatic rivers are the Pescara, which connects with the River Aterno inland, the Tronto, and the Metauro.

The lowland river valleys have probably undergone considerable changes since Neothermal times. Vita Finzi's (1969) study of Mediterranean valleys makes the basic point that extensive alluviation has taken place in these valleys in geologically recent times. He dates this 'younger fill' to the post-Classical period, but new palaeoenvironmental evidence (see below, p. 110-11) suggests that the process of valley infilling may have begun at some point between the middle Copper Age and the middle Bronze Age in central Italy as a result of increased deforestation and hillslope erosion. Today there are also great seasonal variations in the flow of the rivers, but this range of variation would have been considerably reduced by the greater vegetation cover of Neothermal times, which would have decreased the speed of run-off. In addition, the artificial constraint of some of the major river channels in recent times, such as the lower stretch of the River Pescara, has reduced the effect of seasonal flooding.

Central Apennines

The outer slopes of the Apennines rise steeply from the lowlands, particularly along the north-eastern sides of the Maiella and Gran Sasso ranges in Abruzzo, forming a relatively clear-cut limit between the hills and the mountains. The central Apennines form the highest and widest part of this mountain range, and the highest peaks, such as the Corno Grande at 2914 m above sea level, are found in interior Abruzzo (Fig. 80). There is a geological contrast between the Apennines of the Marche region and the Abruzzi Apennines. The former are a continuation of the northern Appenines, and are made up of continuous chains which were formed by simple folding processes. Although they contain limestones, there are also extensive clay and sandstone districts here, and the Monti della Laga on the border between Abruzzo and Marche are composed almost entirely of sandstone. The watershed roughly coincides with the highest mountains in this region. In contrast, limestone predominates in the Abruzzi Apennines. These mountains are made up of a series of high limestone blocks, with massive and steep-sided peaks, and semi-enclosed basins between them, which were produced by the geological processes of fracturing, differential uplift, and depression. The Aquila plateau is the largest of these limestone blocks, and includes the Gran Sasso d'Italia mountain range. Further south lie the Morrone and Maiella ranges, and inland are the mountains of Marsica, with their narrow parallel ridges and open valleys. In the Abruzzi Apennines the watershed seldom coincides with the highest mountains, and the upper river valleys tend to be rugged and dissected, with the main rivers often breaking through the outer chain of the Apennines in steep sided valleys or narrow gorges. There are many perennial springs in the limestone areas. The heavy springtime precipitation which falls in the mountains is retained in the limestone, often in underground streams which feed the perennial springs located along the junction of the limestone and impermeable rocks, usually at the foot of the mountains. Numerous natural caves are also found here. Carstic plateaux, called 'altipiani', are also characteristic of the Abruzzi Apennines and are found over about 1000 m above sea level.

Interior depressions, basins, and valleys

An interior depression is found to the north of Camerino, in northern Marche (Fig. 80). It is separated from the Adriatic lowlands by the minor beginnings of the Sibillini mountain chain, and its floor, which comprises soft sand and clays, has been cut into ridges by the upper sections of the Adriatic rivers. Semi-enclosed intermontane basins are characteristic of the Abruzzo region. The major ones are: the Aquila basin, which is an infilled Pliocene lake basin; the Sulmona basin, which contains Pleistocene and Pliocene deposits, and is encircled by steep mountains; and the extensive Fucino basin, which is entirely surrounded by mountains, and contains Pleistocene terraced deposits around its northern side (Figs. 79 and 80). The latter used to hold an important lake, but this was finally drained between 1854 and 1876, following an unsuccessful attempt by the Roman emperor Claudius (Brisse and de Rotrou 1983). A large and deep longitudinal valley joins the Aquila basin to the Aterno valley and the Sulmona basin.

4. Soils and soil erosion

There are unfortunately serious limitations to discussing Neothermal soil types and their distribution in central Italy. Palaeoenvironmental soil studies in Italy are still at a fairly preliminary stage; Neothermal soils seem to have been extensively buried or destroyed, by colluviation, erosion, and deep ploughing, for example; and very little has been published in general on soils in Italy (C. Delano Smith pers. comm. 1986).

Barker (1981a: 18-21) described three major modern soil types for central Italy, which he regarded as relevant to prehistoric farmers: regiosols, lithosols, and alluvial soils. Regiosols are clay based soils, and derive principally from Eocene and Pliocene clays and laminated sands and clays. They are widespread today on the lowlands of Abruzzo and Marche. They are much prone to erosion, and tend to be poor agricultural soils, for they bake and crack in the summer and become cold and waterlogged in the winter. However, there are isolated areas of far more attractive agricultural soils amongst them, particularly on the narrow coastal ridges, where natural drainage is good and a higher sand content enables the soil to be worked more easily. Lithosols are found primarily on limestone formations in the Apennines. They vary greatly from an agricultural point of view, and divide into two main types: rendzinas and 'terra rossa'. The former can be cultivated in parts and provide excellent ground cover for potential summer grazing; but the latter, which is found in depressions in the Apennines surrounded by rocky outcrops, tend to be clayey in texture and poor in humus and therefore marginal for agriculture. The alluvial soils, which vary in age from the Pleistocene to the Holocene, are found as terraces in the river valleys of the Abruzzo-Marche lowlands. They are generally fine textured, poorly drained, and heavy, but they are naturally fertile. The Pleistocene terraces, for example, tend to be heavy, but there are isolated areas on the terrace edges where underlying river cobbles are mixed with the alluvium to form a light and fertile soil. In addition to these three main groups, Bevilacqua (1961: 317) remarks upon the fertile soils formed by the mixing of sandstones and mountainous limestones. These are particularly found in the hilly country to the east of the Monte Sibillini in the Ascoli Piceno province.

Brown soils were identified under the Neolithic settlements at Tricalle and Fontanelle, which were located on the band of Pleistocene hills flanking the southern side of the lower River Pescara valley (Agostini 1986-7a). Brown soils in general have a well developed structure, are fine grained, well drained, easily worked, and are highly productive. At Tricalle they were intersected and had either been reduced or removed by erosion.

Rainwater run-off is a major cause of soil erosion in the Mediterranean, and the speed of this run-off is closely related to the density of vegetation. A dense vegetation decreases the speed of run-off and controls soil erosion, whereas disruption of the vegetation cover increases its speed and enhances hill slope erosion (Delano Smith 1979).

70% vegetation cover is a critical figure, below which soil loss increases dramatically (Thornes 1987: 41). Arable farming tends to deplete organic matter and break down the structure of the soil, thereby rendering soils more vulnerable to erosion. The maintenance of a tilth in areas cleared for cultivation decreases the danger of run-off, because shallow ploughing, hoeing, and manuring encourage the infiltration of surface water. However, such soil conservation requires constant maintenance (Pope and Van Andel 1984). Also, areas cleared in dry places are particularly susceptible to erosion, because vegetation here is slow to grow and regenerate. A critical situation would therefore have existed in places during the Sub-boreal phase in central Italy, with its drier climate and increased Copper and Bronze Age clearance activity in the forests.

However, it is difficult to generalize very far about soil erosion. For example, although we know that vegetation controls soil erosion, the relationship is poorly understood, particularly in relation to the Neothermal environment where so little is known about the vegetation. Studies by Thornes (1987, 1988) in south-east Spain revealed that, despite poor vegetation cover, erosion rates in many areas were unexpectedly low. Also, a complex relationship exists between human interference and valley alluviation. Burrin and Scaife (1988), in discussing landscape sensitivity, detail variations in the patterns of erosion and deposition in different valleys and at different times, which are seen to be the result of not only varying human factors but also varying responses of the natural environmental systems.

Recent palaeoenvironmental studies carried out, in particular, by Hunt (Hunt et al. 1990; Hunt forthcoming; C. Hunt pers. comm. 1988) provide evidence of the development of soil erosion in central Italy in association with early human clearances of the forests. At S. Marco, in the Gubbio basin in Umbria, some quite intense soil erosion was identified in locally cleared areas around the early Neolithic settlement, dated to between the mid sixth and mid fifth millennia Cal. BC (Hunt et al. 1990). A lakeside core taken from Piediluco, on the borders of Umbria and Lazio, also revealed progressive soil erosion (Hunt forthcoming). At a depth of 3.1 meters, possibly dating to between the late Neolithic and early Copper Age, there was a great decrease in the quantity of siliceous and organic walled microfossils. This seems to suggest that the lake was being polluted by an influx of sediment, resulting from the erosion of nearby exposed soils in cleared areas, which were identified in the pollen record. In the section between 3.0 and 2.0 meters, which probably dates to between the middle Copper Age and the middle Bronze Age, there was a further increase in sediment input into the lake. Also, in Molise, at about the time of the Bronze Age, terraces began to build up in the upper River Biferno headwaters, which suggests at least local degradation of the environment, gullying, and erosion, developing as a result of forest clearance (C. Hunt pers. comm. 1988). (This chronological attribution could, however, be too early - G. Barker pers. comm. 1991).

Evidence from northern Italy indicates a similar chronological pattern for soil erosion and environmental degradation. In the Adige valley, for example, Neolithic and Copper Age sites on hillslopes were generally surrounded by a good vegetation cover, which included woodland in places. However, at a few sites, such as Velturno II, there was a progressive thinning and degradation of the vegetation cover, which by the late Copper Age had already led to a fair amount of soil degradation. Following the Copper Age, the Adige valley hill slopes, at least in the vicinity of the settlements, then became intensively degraded (Coltorti and Dal Ri 1985). In the pre-Alpine hill area of the Veneto, between about 100 and 600 m above sea level, there are no traces of geomorphological instability on the hillslopes or in lacustrine deposits before the middle Bronze Age, but again one can begin to see a gradual deterioration in the pedogenetic profiles before that time. During the middle Bronze Age there is then clear evidence for the erosion of soil profiles and resultant colluviation at the foot of the hills (Balista and Leonardi 1985).

The origin of Vita Finzi's (1969) 'younger fill' of alluvium in many Mediterranean valleys (see above, p. 103) can now be reconsidered. Vita Finzi dated the 'younger fill' to the post-Classical period, and he and Bintliff (1975) have regarded climatic changes to be the most important factor in its origin. Wagstaff (1981), however, places a much greater emphasis upon anthropogenic factors, and shifts the start of the alluviation to an earlier period in Greece. In the southern Argolid in southern Greece, for example, humanly initiated deforestation, severe hill slope erosion, and the deposition of the Pikrodafni alluvial unit, took place between about 2700 and 1400 Cal. BC (Pope and Van Andel 1984), and the existence of similar evidence from the Argive plain, Melos, and Thera has led Pope and Van Andel (1984: 302) to suggest that "Early Bronze Age erosion in the Aegean may have been extensive." The limited evidence of soil erosion in central Italy at around this time seems to support the view of an early and humanly initiated development of the 'younger fill' in the Mediterranean.

5. <u>Climate</u>

It is only possible to provide a very general outline of climatic change for central Italy. This is partly because climatic reconstructions rely heavily upon the indirect evidence of the presence or absence of particular plant taxa and their distribution, and although the history of vegetation has been highly influenced by the development of the climate, it cannot be considered to be merely a response to climatic changes. For example, the impact of human activities, edaphic factors, and different plant species' migratory abilities must also be taken into consideration (Beug 1982). The sample of data from central Italy is also fairly limited, especially in its geographical extent. For example, pollen cores from a greater range of altitudinal zones need to be studied before a more detailed regional picture of the climate can be built up. The climatic changes outlined below are consequently based mainly upon Bonatti's (1966) interpretation of pollen diagrams from the lakes Monterosi and Baccano in Lazio. The terminology of the Blytt-Sernander climatic periods has been used below simply for convenience, rather than to establish climatic parallels between the central Mediterranean and northern Europe.

During the 'Boreal' phase there was a gradual improvement in the climate following the end of the last glacial, but conditions remained relatively cool and dry. During the 'Atlantic' phase, from about the last quarter of the seventh millennium Cal. BC or a little later, the climate became warmer and moister. A climatic optimum was reached by about 5400-4900 Cal. BC, with a peak in temperature and a maximum extent of humidity. The earliest Neolithic in Abruzzo and Marche coincided with this climatic optimum. The 'Sub-boreal' phase began to develop from about 3800-3100 Cal. BC, at about the same time as the start of the Copper Age in Abruzzo and Marche, with a slight decrease in temperature and drier conditions. Climatic fluctuations probably occurred, with perhaps rapid and local variations in humidity during the 'Atlantic' phase and cooler fluctuations during the 'Boreal' phase (Beug 1982; Longo and Iannone 1987), but it is not possible to identify these with any degree of certainty in central Italy.

Today, and quite probably during the Neothermal, there is a marked seasonal variation in the Mediterranean climate of Abruzzo and Marche. Such variation is actually thought to have become established in the central Adriatic region by about 2.8 million years ago (Suc 1984). Winters are characteristically mild and summers are hot, and there is a drought in June and July, although in central Italy this lies between the extremes of Sicily, with its major drought, and the Alps of northern Italy, with little sign of one. By comparison with England, there are also long hours of bright sunshine, clear skies, good visibility, and low relative humidity levels.

There are also spatial variations in the climate within east-central Italy today, which broadly coincide with the altitudinal bands running inland from the coast. Again, these are likely to have existed during the Neothermal. Temperatures decrease as altitude increases up into the Apennines, and the annual range of temperatures increases inland, away from the Adriatic Sea, which has a moderating effect on the climate of its immediate surroundings. Precipitation increases irregularly inland during all seasons (Fig. 81). The hills are wetter than the coastal lowland, but also especially more so than the enclosed basins inland. Cloud cover, humidity, and snow are greater in the mountains, with their higher altitudes, and in Marsica snow is present between November and March, but permanent snow is limited to hollows on the Gran Sasso mountain.

The interior enclosed basins of Abruzzo have climates of their own. The Sulmona and Aquila basins are relatively dry compared to the mountains which surround them, and tend to be cold in the winter and abnormally hot in the summer. The Fucino basin, on the other hand, differs from these basins, or at least did so until its drainage (Nardelli 1883). The influence of the extensive lake Fucino encouraged a mild climate, with greater humidity and precipitation than in the other basins, and prevented the winter temperatures from dropping too low. The existence of such a mild climate is reflected by the fact that olives used to be grown well above their normal altitudinal range on the protected sides of the Fucino basin (Mason, ed. 1944: 313).

6. Vegetation

The reconstruction of former vegetation types is based predominantly upon the analysis of fossil pollen assemblages, and so it is important to begin this section by considering some of the problems involved in this method. A complex relationship exists between the pollen frequencies quantified in palaeo-environmental samples and the plant communities and vegetation generating the pollen rain, and the basic assumption that the relative pollen frequencies plotted on pollen diagrams reflect the proportions of species in the regional vegetation at the moment of sedimentation cannot now be sustained. There are variations in the relative pollen productivity of different plant species, which can also change seasonally and annually. For example, Quercus is likely to be over-represented in pollen diagrams, and Tilia and Fraxinus under-represented. There are also variations in the extent of dispersion, deposition, and preservation of pollen grains, due to factors such as: the size of the pollen grains, the nature of the air flow within and above the plant communities, and the structure of the vegetation surrounding the sedimentary site. At a purely statistical level the expression of each pollen taxon as a percentage of the pollen sum adds to these problems, because changes in the number of one pollen taxon will elicit changes in the values of all other taxa. The percentage figures on pollen diagrams should not therefore be relied upon too heavily, and preferably corrected, absolute, pollen frequencies should be calculated. There are also the usual chronological problems in both dating and correlating locally defined pollen zone boundaries, particularly with the analysis of soil pollen, where pollen grains of different ages can become mixed due to earthworm sorting, the leaching of grains through the soil profile, and weathering.

Below, I have provided a general reconstruction of the Neothermal vegetation of the Abruzzo-Marche region, which focuses particularly upon trees. The actual plant species mentioned are the ones found most recurrently in palaeo-environmental samples from central Italy which date to the Neolithic and Copper Age. The following sources of data were used: soil pollen from the final Neolithic site at Neto di Bolasse, near Sesto Fiorentino in Tuscany (Bernabei et al. 1985); from Umbria, soil pollen, snails, and plant remains from S. Marco near Gubbio (Hunt et al. 1990), carbonized plant remains from Grotta Bella near Terni (Longo and Iannone 1987; Longo Marziani et al. 1989), and a pollen core from below a late Bronze Age site located on the edge of Lake Velino at Piedeluco near Rieti (Hunt forthcoming); from Lazio, pollen cores from Lakes Vico, Monterosi, and Bracciano (Frank 1969; Bonatti 1966, 1970), and another core from Mezzaluna (Eisner et al. 1984); and a few carbonized plant remains and impressions from Grotta S. Angelo, Catignano, and Grotta dei Piccioni in Abruzzo (Radmilli 1975; Costantini and Tozzi 1983; Cremonesi 1976) (Fig. 78). It should be borne in mind that there are differences between the vegetation of east and west central Italy (Mason, ed. 1944), but, due to the limited nature of the data from Abruzzo and Marche, it has been necessary to draw upon data from all over central Italy.

The interpretation of these data was aided by Huntley and Birks's (1983) discussions of their European pollen maps (although the maps themselves were too general to be of use), and descriptions of the vegetation of modern Italy (Fenaroli 1984; Mason, ed. 1944). Vegetation in Abruzzo and Marche falls into altitudinal zones, which correspond broadly with the vertical zonation of the climate, and an attempt has been made to reconstruct these. However, local variations in the representation of species according to soil types and relief have not been discussed. Below, reconstructions of the vegetation of the 'Atlantic' and 'Sub-boreal' climatic phases are detailed, and then followed by a discussion of early human interference with the vegetation in central Italy.

'Atlantic' phase vegetation

The warm and humid climate of the 'Atlantic phase' in the Mediterranean was particularly suitable for the growth of plants and vegetation, and this phase would have seen the full establishment of a predominantly forested environment in the Abruzzo-Marche region.

The vegetation of the coastal lowlands, in a restricted zone between sea level and about 200 m above sea level, was probably characterised by a relatively open woodland dominated by *Quercus ilex*, the evergreen or holm oak. This is likely to have been accompanied by: *Carpinus orientalis*, a temperate xerophile hornbeam which grows on calcareous soils at low altitudes; some elm (*Ulmus*); the deciduous oak *Quercus pubescens*; and possibly some coastal pines (*Pinus*).

Between about 500 and 1000 m, there would have existed a mixed deciduous climax forest dominated by deciduous oaks. This forest would have been species-rich, with mixed tree canopies, a variety of understorey shrubs, and a rich and varied herb layer. It would have been dense, both at the canopy level and also in the undergrowth. The main storey would have been dominated by the deciduous oaks _Quercus pubescens_ and _Quercus petraea_, the durmast or sessile oak. These would have been accompanied principally by elm (_Ulmus_), lime (_Tilia_), and hop-hornbeam (_Carpinus betulus_); but also by maple/sycamore (Acer), ash (_Fraxinus_), beech (_Fagus sylvatica_), and the occasional apple tree (_Malus sylvestris_). Along the river banks there would also have grown willow/sallow (_Salix_) and alder (_Alnus_), and a thick vegetation of scrub and marsh plants.

In the mountains, between about 1000 and 1900 m, a more open woodland probably existed, with tree species including especially fir (_Abies_), beech (_Fagus sylvatica_), and spruce (_Picea_), but also pine (_Pinus_) and juniper (_Juniperus_). Above the tree line, at about 1900 meters above sea level, a treeless Alpine type of vegetation would have grown.

'Sub-boreal' phase vegetation

The slight climatic change towards drier conditions in the 'Sub-boreal' phase would have made vegetation on drier terrain, such as limestone and other free-draining ground, ecologically precarious, and especially vulnerable to degradation following clearance. Recently gathered data suggest that such clearance was taking place at this time, and that the influence of human factors upon vegetational change in the 'Sub-boreal' phase has been underestimated in previous reconstructions of the vegetation. (This will be discussed below in greater detail.)

In the lowlands the evergreen or holm oak, Quercus ilex, became increasingly common and widespread, moving further inland up to about 500 m above sea level. This species is absent in the basal section of the Mezzaluna pollen core on the coastal lowlands of Lazio, which dates to the time of the early Neolithic, appearing for the first time in the core between then and the final Neolithic. It also makes its first appearance in Grotta Bella, inland in Umbria, in the upper part of the Neolithic cave sequence. It then becomes particularly evident from about 2750 Cal. BC onwards in central Italian contexts. Deciduous oaks, however, continued to be a large component of the woodland and forest vegetation. Pine (Pinus) also increased at the same time as the evergreen oaks, and beech (Fagus) began to spread into the lowlands. Not only the climatic shift, but also (and perhaps most importantly) human clearance and animal grazing of the deciduous woodland would have favoured the expansion of these species in the lowlands (Lewthwaite 1981a: 302, 1982a: 225).

Sweet chestnut, Castanea sativa, also increased in quantity from about 2750 Cal. BC onwards. At Piediluco, inland on the border of Umbria and Lazio, it appears for the first time in the upper part of the core, which probably dates to between the middle Copper Age and the middle Bronze Age, and in the Lake Vico pollen sequence it increases significantly in zone H, which corresponds to the upper 'Sub-boreal'. The initial phase of expansion of this species in the Mediterranean is thought to coincide with a period of forest clearance after about 3800 Cal. BC, during which the forest was either selectively felled, leaving the chestnut untouched, or fully cleared, with a following expansion of chestnut (Edwards 1985: 154).

The rapid elm (Ulmus) decline, which began in south-east Europe between about 5800 and 5400 Cal. BC and became widespread in Europe by about 3800 Cal. BC, cannot be clearly identified in central Italy. In the Mezzaluna pollen core, for example, Ulmus does not diminish during the Neolithic.

Early human interference in central Italy

Secure and uncontroversial evidence of early human clearance of vegetation is lacking in central Italy, particularly in relation to the pollen diagrams, which can be variously interpreted. But when a variety of sources of data are combined, as with the Piediluco core, where changes in pollen, sediments, and land snails were studied, some convincing patterns do emerge. Below, the human impact on the vegetation will be examined at the level of individual sites, before a regional scale model of early central Italian forest clearance is proposed.

The Mezzaluna pollen core seems to indicate that increasing deforestation took place on the lowlands of Lazio during the Neolithic and early Copper Age. The core was taken from Holocene peaty and clayey sediments filling a graben formation, located on the inland edge of the Agro Pontino coastal plain, just below the Monti Lepini (Eisner et al. 1984). In the upper part of zone D1, which produced a radiocarbon date range of 5621-5210 Cal. BC (GrN-11226), there was a closed arboreal vegetation consisting mainly of climactic forest species. Then, in the overlying zone D2, which corresponds with the Neolithic in central Italy, a more open vegetation was defined. The climate may have become drier at this stage, which would have encouraged certain vegetational changes, but it seems very likely that human interference was also a factor. The proportion of herbs to trees increased in this zone; areas of macchia-garrigue developed, which could have been caused by the deforestation of areas of evergreen woodland; there were lower oak (Quercus) values; alder (Alnus) was suddenly replaced in the pollen diagram by shield/buckler fern (Dryopteris), which often occurs when alder woods are thinned; and the grape vine (Vitis) appeared for the first time in this zone, and in high concentration values, which suggests that it was domesticated. Finally, in zone D3, whose lower part produced a radiocarbon date range of 3673-3360 Cal. BC (GrN-11305), there was a further strong increase in herbs, especially Asteraceae, and a drop in arboreal pollen.

The lake Vico pollen core also seems to indicate that human interference with the local vegetation took place during the Copper Age. The core was taken from deposits in this volcanic crater lake, which is located at 507 meters above sea level in the Monti Cimini of north-west Lazio (Frank 1969). In zone G, which probably corresponds to the 'Boreal' and 'Atlantic' climatic phases, arboreal pollen increased to about 80% of the count, and a forest of broad-leaved trees dominated the diagram. In the upper part of zone G and the lower part of zone H, which probably correspond to the lower and upper 'Sub-boreal', open vegetation developed, probably as the result of human interference. Also sweet chestnut, Castanea sativa, appeared for the first time at this stage, and increased rapidly to 13.5% of the pollen count in zone H; and pollen from Chenopodiaceae decreased to zero towards zone H, which seems to suggest a non-climatic influence on the vegetation. In zone H non-arboreal pollen increased up to 73.5%, which is indicative of an open vegetation, and it is likely that part of the Gramineae belonged to cultivated cereals.

The Piediluco core also shows localized forest clerance taking place before the late Bronze Age. The core was taken from beneath a late Bronze Age site which was located on the margins of an arm of Lake Velino, in the inland Rieti basin, on the border between Umbria and Lazio (Hunt forthcoming). In the basal sample, which possibly dates to the Neolithic, there were very high indices of tree pollen, and low indices of grasses and herbs, which is indicative of a relatively undisturbed forest environment. The frequent occurrence of algal microfossils in the lake, which points to very slow rates of sediment accumulation, also suggests a largely undisturbed catchment. However, the presence of the shrubs rock-rose (Helianthemum) and sea buckthorn/sallow thorn (Hippophae), which are light-demanding species and typical of open, unstable ground, suggests forest disturbance took place during this phase, although this need not have been anthropogenic in nature.

At 3.1 meters a wide range of data indicate the localized clearance of woodland and the initiation of farming around the lake. There was an increase in pollen from grass (Gramineae) and sedge (Cyperaceae). Salad burnet (Poterium sanguisorba), a typical grassland plant, and goosefoot/fat hen (Chenopodium album), an arable weed, made their first appearances at this time. Hornwort spines (Ceratophyllum) also appeared now, which indicates that the lake floor had come within reach of sufficient light to allow this plant to grow. There was also a marked decrease in the number of siliceous and organic walled microfossils in the deposits, which could suggest pollution of the lake by an influx of sediment from the erosion of newly exposed soils in neighbouring areas. The reoccupation (following the Mesolithic) of the nearby Petescia rock-shelter during the final Neolithic/early Copper Age (Ornella Acanfora 1962-3) might tie in with this new phase of vegetational disturbance around the lake basin.

The pollen grains from between two and three meters again suggest a predominantly wooded environment, but there is greater evidence for areas of pastoral grazing and arable farming land. These deposits lay directly below the late Bronze Age settlement and probably date to between the middle Copper Age and the late Bronze Age. Typical grassland species included: rue (Thalictrum), thrift (Armeria), knapweed (Centaurea), Lady's mantle (Alchemilla), and salad burnet; and arable weeds included: goosefoot/fat hen (Chenopodium album), plantain (Plantago), wormwood (Artemesia), knapweed (Centaurea), chickweed (Stellaria/Cerastium), and sandwort (Minuartis/Arenaria/ Moehringia). Woodland regeneration is however suggested by the presence of the shrubs privet (Ligustrum) and buckthorn (Rhamnus).

Analyses of pollen, molluscs, and soils from the early Neolithic site at S. Marco in the Gubbio basin in northeast Umbria (adjacent to the Marche region) suggest that a human impact was made upon the environment around the settlement (Hunt et al. 1990). Radiocarbon dates from the site range from the middle of the sixth millennium Cal. BC. to the mid fifth millennium Cal. BC (see Appendix 2). Pollen from the ditch fill indicated the growth of a species-rich broad-leaved woodland around the site, which included notably: oak (<u>Quercus</u>), hornbeam (<u>Carpinus</u>), hazel (<u>Corylus</u>), pine (<u>Pinus</u>), and lime (<u>Tilia</u>). Locally cleared areas existed, probably for cereal production, for cereals comprised about eight percent of the pollen count. Molluscs indicated that areas of dry exposed ground were present, and there is also evidence for some quite intense local soil erosion.

Pollen data from the final Neolithic settlement at Neto di Bolasse near Sesto-Fiorentino in Tuscany also seem to indicate human degradation of the vegetation surrounding the site (Bernabei et al. 1985). The site is located at about 45 meters above sea level, on the edge of the alluvial plain which lies between Pistoia and Florence. A single radiocarbon sample from Neto, UD-184, produced a date range of 4350-3770 Cal. BC (Sarti 1985). Three groups of vegetation were reconstructed for the area surrounding the site: a forest formation dominated by oak (<u>Quercus</u>); a marsh edge vegetation with the fern <u>Thelypteris palustris</u> and herb <u>Scheuchzeria palustris</u>; and a herb vegetation, which was described as typical of a mesophile environment in the first stages of degradation. The presence of heaths (<u>Ericaceae</u>), which favour either open woodlands or treeless situations, and the herbs <u>Apiaceae</u>, seem to indicate that areas of cleared woodland existed, possibly for pastoral grazing, as no cultivated plant species were identified here.

Limited palaeoenvironmental work carried out by Chris Hunt (pers. comm. 1988) in the upper Biferno valley in Molise seems to indicate a phase of major woodland clearance at about the time of the Bronze Age. Terraces began to build up in the Biferno headwaters, which implies at least local degradation, gullying, and erosion as a result of clearance.

Unfortunately for this thesis, the majority of these data come from contexts in west central Italy, but it does seem possible to suggest a general clearance model for the whole of central Italy, which can be applied to Abruzzo and Marche. It is possible that there was some Mesolithic disturbance of the vegetation, either by clearance or by hindering the invasion of woody species during the early Neothermal in order to maintain grassland (Bush 1988), although there is no evidence for this as yet. During the Neolithic/'Atlantic' phase only restricted areas of the forest were thinned and cleared around settlements, especially on the coastal lowlands, but also in the inland basins. During the final Neolithic/early Copper Age, at the start of the 'Sub-Boreal' climatic phase, the scale of clearance increased notably, with more extensive areas being cleared both on the lowlands and in the inland basins. Finally, during the middle-late Copper Age and on into the Bronze Age, even greater areas of forest were cleared, particularly now on the inland hills above about 500 m above sea level, but also again in the inland basins; new tree species spread in a phase of secondary colonization, particularly in the lowlands, and were probably encouraged by the existence of previously cleared areas; and there was a greater degradation of the general environment, resulting in the first evidence of major soil erosion.

7. Wild plant and faunal macrofossils from Abruzzo and Marche

In the general reconstructions provided above, it has been necessary to employ data drawn from all over central Italy, but it is now time to mention in more detail the data from the Abruzzo-Marche region. These data do tie in well with the general central Italian models of climate, vegetation, and clearance, but they provide little additional information. The data comprise the following categories: carbonized remains of non-cultivated plants; plant impressions; land snail shells; and bones of animals, birds, and fish. All of these come from Neolithic and Copper Age archaeological deposits, and there is no sign that sampling strategies were employed in their collection. I have assumed that the species identifications are correct, but it seems that some of these might be too specific.

Plants

Impressions and the carbonized remains of non-cultivated plant species were found on a few sites (see

Appendix 3). A hazel nut (Corylus) fragment was found at middle Neolithic Catignano (Tozzi 1982), and the remains of carbonized acorns (Quercus) were abundant in Copper Age fireplaces in the Grotta dei Piccioni (Cremonesi 1976: 16). Both of these species were important components of the Atlantic and Sub-boreal woodland in central Italy. About 100 carbonized apple pips (Malus sylvestris) were found in the bottom of an early Neolithic pit in the Grotta S. Angelo (Radmilli 1975: 177). These are found today between the coastal plain and 1580 meters above sea level in the Apennines, as sporadic elements in and on the margins of woodland (Fenaroli 1984: 163-4). Impressions of bracken (Pteridium aquilinum), were also found on pieces of daub in the Copper Age levels of the Grotta dei Piccioni. Its fronds are characteristically used as a thatching material (Mabberley 1987: 485), which might explain why its impressions were found on daub. Bracken was also found in the final Neolithic settlement at Neto di Bolasse in Tuscany (Bernabei et al. 1985). It is primarily an open woodland plant, but also grows on grasslands and heaths on acidic soils. Its distribution and quantity increased during the late Holocene in the Mediterranean, and anthropogenic disturbance of woodland was probably an important factor in encouraging this (Huntley and Birks 1983: 544).

Snails

Land snails from the Copper Age ditch at Le Conelle indicate a locally dry and open environment (Wilkens 1987: 63). Species included Cernuella virgata, Monacha cartusiana, and Rumina decollata. This seems to correlate with the central Italian 'Sub-boreal' shift to a dry climate during the Copper Age, and the possibility of significant woodland clearance in inland areas at this time. Cyclostoma elegans, which is typically found on calcareous soils (Woodward 1880: 307), and Helix rotundata, were found on the Copper Age site at Casone near Tolentino (Pigorini 1880).

Fauna

The bones of wild animals, birds, and fish have been found on numerous Neolithic and Copper Age sites in Abruzzo and Marche, and are listed in Appendix 4. Individual species rather than sites are discussed below, with descriptions of their sizes and habitats, which were drawn in general from modern Italian data provided by Graf (1968), Heinzel et al. (1974), O'Toole and Losito (1987), and Tassi (1984). (Domesticated faunal remains have not been employed as environmental indicators in this chapter. A discussion of the relationship of the general faunal remains to human subsistence patterns can be found in Chapter 3.)

Large wild animals included: the aurochs, wild pig, ibex, roe and red deer, brown bear, and wolf. The aurochs, Bos primigenius, multiplied greatly during the altithermal of the 'Atlantic' phase, being a warmth loving species. Bulls would have measured up to 170 centimeters at the withers, and females between 150 and 155 centimeters. The aurochs is a browsing and grazing ruminant that characteristically inhabited forests, but it could also flourish in open scrub in the lowlands (Bökönyi 1974). Wild pig, Sus scrofa scrofa, measure up to 150 centimeters long, and up to 100 centimeters high at the shoulder. They live in herds, and are characteristically found in deciduous forests and woodland, especially those with thick undergrowth and acorns, but are also found in boggy or marshy places and in macchia. Great numbers of them were reported in Roman times from the lower altitude woods of Marsica and along the edge of lake Fucino. The ibex, Capra ibex, measures 120 centimeters in length, and between 80 and 100 centimeters in height at the shoulder. Herds of them are found today between the upper fringes of the forests and the snow line, preferring rocky areas near to open dwarf pine woods and high pastures, and grassy strips among rocks. Roe deer, Capreolus capreolus, are the smallest Italian ungulates, measuring 130 centimeters in length, and 75 centimeters high at the hindquarters. They are found in woods with plenty of undergrowth, along woodland margins, and also in open country with standing corn. During the summer they are found in family groups of between 4 and 10, but in the winter they congregate in herds of up to 30. Red deer, Cervus elaphus, measure between 185 and 215 centimeters in length, and between 120 and 150 centimeters high at the shoulder. They love water and humid places, and generally stick to the same haunts. Herds of them are characteristically found in large deciduous woods. However, Straus (1981) emphasizes that they only rely heavily upon woodland browse during the winter, preferring to eat herbs in the spring and summer, and grasses, sedges, and rushes in the autumn, which are more typical of open habitats than forested environments. The brown bear, Ursus arctos, which measures up to 210 centimeters long, and weighs up to 200 kilograms, occurred frequently throughout the Apennines during Roman times. Wolves, Canis lupus, measure 115 centimeters in length and 85 centimeters high at the shoulder. They hunt in packs, and are found in a wide range of environments, from the open plains to the forested mountains.

Medium sized animals from Abruzzo and Marche included: wild cat, European lynx, martens, badger, polecat, brown hare, and fox. The wild cat, Felis sylvetris, measures 70 to 90 centimeters in length, and between 35 and 42 centimeters high at the shoulder. It generally lives alone, characteristically in dark and dense mountainous forests with large coniferous trees, or on the crags of ravines, but can also be found on open hillsides with a 'macchia' scrub vegetation. The European Lynx, Lynx lynx, measures up to 105 centimeters in length, and 75 centimeters high at the shoulder, and is reported to live in dense woods and caves. The pine marten, Martes martes, which measures 45 centimeters in length, is a typical forest animal. It is found in particularly dense and gloomy forests, composed mainly of coniferous tree species, and lives in hollow trees, fissures in rocks, and the adandoned nests of squirrels and birds of prey. In contrast, the similar sized stone beech marten, Martes foina, is found on the edge of woodland in mountain regions, and lives in old walls, heaps of stone or wood, or hollow trees. Badgers, Meles meles, measure up to 75 centimeters in length, and about 30 centimeters in height at the shoulder. They live underground in setts, the distribution of which has been studied by A. and P. Tinelli (1980) at Castelporziano in the lowlands of Lazio. Setts are particularly found in well drained soil and on slight slopes, but in a wide range of vegetational habitats. The polecat, Mustela putorius, measures about 40 centimeters in length. It is typically found in forested regions, and lives during the summer in holes in the earth, and in winter in old walls and buildings. The brown hare, Lepus europaeus, which measures about 67 centimeters in length and 30 centimeters high, is found in a wide range of habitats, from lowland fields to mountain forests, up to about 2000 meters above sea level. Finally, the fox, Vulpes vulpes, which measures up to 80 centimeters in length and 30 centimeters high at the shoulder, is typically found in woodland, clearings, and scrub, and lives underground in an earth.

The remains of small animals were also found and identified on Neolithic and Copper Age sites in Abruzzo and Marche. Species included: wood mice, dormice, voles, moles, red squirrels, toads, and tortoises. The wood mouse/long tailed field mouse, Apodemus sylvaticus, measures up to 9 centimeters long, and lives in and along the edge of deciduous woodland, and also in hedges, scrubby areas, and gardens, in runways above and below the litter. The garden dormouse, Eliomys quercinus, measures about 14 centimeters in length, and is charcteristically found in deciduous and coniferous woods, but in the autumn it is known to enter buildings. The edible or fat dormouse, Glis glis, measures about 16 centimeters in length, and prefers mountainous or hilly country with open deciduous woods or orchards. Vole species included Arvicola italicus, and the water vole, Arvicola terrestris. The latter measures up to 17 centimeters in length, and is found both in watery places, and also on drier ground. Moles, Talpidae, measure up to 15 centimeters in length. The red squirrel, Sciurus vulgaris, measures about 25 centimeters in length, and prefers dry, shady woods, especially coniferous ones. Toads, Bufonidae, measure between 8 and 15 centimeters long. Land or pond tortoises Testudinae were also found, including the species Testudo graeca (the spur-thighed tortoise) and Testudo testudo, along with terrapin, Emys orbicularis. The body of the latter measures 24 centimeters in length. It suns itself on land, but spends much time in stagnant or slow flowing water.

Bird species comprised: ducks, coots, gulls and terns, buzzards, wood pigeons, crows, and starlings. Duck species included Anas boscas, and the goldeneye, Bucephala clangula. The latter is a diving duck, which measures about

50 centimeters in length, and is a winter visitor to both fresh and coastal waters. The coot, Fulica atra, measures about 41 centimeters in length. It is present in central Italy throughout the year, on freshwater ponds and slow-flowing water, usually with overgrown margins. Gulls and terns, Laridae, are sea birds, but some are also found inland by fresh water. The buzzard, Buteo buteo, measures about 50-60 centimeters in length. It is present throughout the year, and is found widely between the rocky coasts and the mountain slopes, but during the winter it frequents more open country. The wood pigeon, Columba palumbus, is the largest of the pigeons. It is found in all types of woodland and on adjacent farmland, and is present in central Italy throughout the year. The grey or hooded crow, Corvus conix, is found between the littoral and the middle altitude mountain forests, and is a year-round resident. Starlings, Sturnidae, have also been found. Fish bones (species not identified) were collected from the Neolithic levels of Grotta S. Nicola on the edge of lake Fucino.

Faunal habitats in Abruzzo and Marche

The modern habitat preferences of the wild fauna from Abruzzo and Marche detailed above, when taken as a whole, correspond well with the vegetational reconstruction based upon pollen and charcoal remains from central Italy. Wild fauna can only be used as general environmental indicators, particularly as a high degree of human selection has influenced their presence in archaeological deposits, but also because of the limitations of the necessary assumption that a species' dietary and climatic preferences today are the same as those of the Neothermal. Despite these limitations, it seems possible to suggest that the faunal species reflect the following eight different habitats of the Neothermal environment of Abruzzo and Marche: coastal waters and sea shore; treeless areas, open farmland, and grassland; scrubland or 'macchia'; open woodland and woodland edges; dense, dark woodland, with plenty of undergrowth, and especially deciduous trees, but also coniferous trees; inland watery places, including lakes, river banks, marshes and bogs, and ponds and slow flowing freshwater with vegetated margins; forests with thick undergrowth; and coniferous woods and high pastures at the upper fringes of the mountain forests. Dense woodland was probably the most commonly favoured habitat type of the animals identified in the archaeological deposits, and open land and scrub may be slightly over-represented, reflecting the modern Italian environment rather than that of the Neothermal.

CHAPTER 3. SETTLEMENT AND SUBSISTENCE

1. Introduction

a) Definitions

This chapter is concerned with the identification and interpretation of patterns of settlement and subsistence during the Neolithic and Copper Age in the Abruzzo-Marche region. I use the term 'settlement' on three levels to include a wide variety of categories of data, ranging from the features and structures found on excavated sites (eg. cavities and houses), to the different types of sites (eg. residential sites and quarry sites), to the spatial distribution of these sites within the region (eg. dispersed and nucleated distributions). It is important to note that, in contrast to a number of other studies of settlement (cf. Tringham 1972; Whittle 1987: 5-6), I include in the second level not only residential sites (generally referred to as 'settlements' in the archaeological literature) but also a number of other categories of site (eg. lithic survey site - see definition on p. 149) which generally receive less attention in archaeological studies but which also contribute to our understanding of settlement. 'Settlement' can then be broadly defined as "the forms and processes of population distribution across the land" (Bullock et al., eds. 1988: 774), and the term 'settlement patterns' can be understood as 'site patterns'. This definition ties in with an 'off-site' approach to archaeology which has been described as "The study of the archaeological record on a regional scale, based on an assumption of underlying spatial continuity of archaeological materials, in the context of both behavioural and geomorphological properties" (Foley 1981: 10; also see Thomas 1975). 'Subsistence' can less ambiguously be defined as the means of supporting life or what one lives on (Sykes, ed. 1976: 1150; Barker and Gamble 1985: xix), and the term is used in this thesis with particular reference to food (rather than, for example, clothing). The management and mobilization of such essential resources can be referred to as the 'subsistence economy' (Barker and Gamble 1985: xix), and more generally the term 'economy' can be taken to mean "the extraction, distribution and use of resources (in the broadest sense of that term) for socially as well as biologically determined purposes" (Bailey and Sheridan 1981: 4).

b) Problems

There is a growing realization that there are formidable problems involved in the study of settlement and subsistence patterns in Neolithic and Copper Age Europe, relating in particular to the nature of archaeological research and the nature of the surviving evidence, and that previous studies may have been too optimistic in their attempts to provide reliable reconstructions and interpretions of these patterns (Whittle 1987, 1988). The Neolithic and Copper Age in the Abruzzo-Marche region is cetainly no exception to this statement, even with the welcome addition of some better quality data over the last decade, including the publication of Mattiocco's survey work in and around the Sulmona basin and Aterno valley (Mattiocco 1981, 1986), the extensive area-excavations at Catignano (Tozzi 1982), Costantini's study of plant remains from Catignano (Costantini and Tozzi 1983), and Wilkens' studies of faunal remains from sites in the Marche region (Wilkens 1987, in press a, b, c, and d). The quality and the representativeness of archaeological data are in particular being questioned, especially those which have been collected with little or no regard for research design or sampling theory (see Binford 1964; Schiffer et al. 1978). Unfortunately the Abruzzo-Marche data can be criticized both in relation to research design and sampling strategies, and some of their problems are therefore discussed in detail below.

The nature and intensity of fieldwork carried out in the Abruzzo-Marche region has varied greatly from province to province, as can be seen from the number of sites discovered so far in each province, the proportion of excavated to unexcavated sites, the proportion of sites which can be located with a six-figure grid reference on a 1:25,000 scale map compared to those for which only general locational details are available, the number of important survey projects carried out in each province, and the proportion of sites found during the three main periods of archaeological research in this region (the late 19thearly 20th centuries, 1950 to the end of the 70's, and the 1980's and early 90's). This remarkable degree of variation, caused by a wide range of localized factors, must be taken into account when considering the representativeness of the existing broad-scale patterns of Neolithic and Copper Age settlement in the Abruzzo-Marche region.

In the Abruzzo region the Chieti province (CH) is the most poorly covered province. Limited fieldwork carried out there has revealed only 11 Neolithic and Copper Age sites. About half of these were discovered during the late 19th century, four of them have been excavated (36%), and only two of them can be precisely located with a six-figure coordinate on a 1: 25,000 scale map. The Pescara province (PE) has been better covered by fieldwork. 21 Neolithic and Copper Age sites have been discovered there, eight (38%) of which have been excavated, and there are 11 (52%) for which six-figure grid references are available. 15 (71%) of these sites were discovered between the 1950's and 70's by Radmilli and his collegues, who carried out a series of field-survey and excavation projects, including one, for example, in the area around Penne which resulted in the discovery of seven of these sites (Radmilli et al. 1953; Radmilli 1956b, 1959: 888). The Aquila province (AQ) is the best covered province in the Abruzzo region. 35 sites have been discovered there, 15 (43%) of which have been excavated, and 20 of which can be precisely located with a six figure map reference. These sites have been steadily discovered since the late 19th century: 14 were found during the late 19th and early 20th centuries, 15 between 1950 and the late 70's, and 11 between the late 70's and the present day. In addition three important projects aimed at discovering prehistoric sites have been carried out in this province by Radmilli and his collegues in the Fucino basin (Sorrentino 1978: 106-8), by Irti also working in the Fucino basin (Irti 1980, 1986), and Mattiocco in and around the Sulmona basin and Aterno valley (Mattiocco 1981, 1986). By comparison, the Teramo province (TE) has not been particularly well covered. Despite our knowledge of a large number of Neolithic and Copper Age sites, the archaeology of the province is still dominated by the survey work of Rosa carried out during the late 19th century (Colini 1906-8), who concentrated in particular on the Vibrata valley. 34 (71%) of the 48 known sites from this province were discovered during the late 19th and early 20th centuries, and only 6 (13%) can now be precisely located. Only 11 (23%) of the sites have been excavated, and most of these were excavated by Rosa during the late 19th century. A new survey and excavation project in the Vibrata valley has been initiated along the Vibrata and Salinello valleys by the Soprintendenza Archeologica of Abruzzo but the results of this work have so far only been published in very limited detail by D'Ercole (1979).

A similar range of variation can be identified in the pattern of fieldwork carried out in the various provinces of the Marche region. The nature of the data from the

Ascoli Piceno province (AP) is comparable to that from the neighbouring Teramo province to the south. 38 Neolithic and Copper Age sites have been discovered in the former, only 8 (21%) of which have been excavated, and 9 (24%) of which have precise locational details. 31 (82%) of the sites were discovered during the late 19th-early 20th centuries period of research, particularly by Allevi in the area around Offida. Two recent field-survey and excavation projects have been carried out by Lucentini and Silvestrini in this province, both concentrating on prehistoric sites situated in the band of interfluvial hills flanking the northern side of the Tronto valley (Lucentini 1984-6; Silvestrini Lavagnoli 1983; M. Silvestrini pers. comm. 1989). In the Macerata province (MC) the situation is slightly better. As many as 57 sites are known, of which 15 (26%) have been excavated, and 20 (35%) of which can be located precisely on a 1: 25,000 scale map. 35 (65%) of these sites were discovered during the late 19th - early 20th century, particularly by Pascucci and Gnoli (Piangatelli 1970; Pigorini and Gnoli 1888), but the rest were discovered during the 1970's and 80's by fieldwork organized by Lollini and Silvestrini of the Soprintendenza Archeologica of Ancona (eg. Lollini 1978: 99-100; Percossi Serenelli and Silvestrini Lavagnoli 1984-6, 1986). Ancona (AN) is the best studied province in the Marche region. 56 Neolithic and Copper Age sites are known here, 24 (43%) of which have been excavated, and 23 (41%) of which can be located with precision. 37 (66%) were discovered during the late 19th and early 20th centuries, particularly by Anselmi, Brizio, and

Rellini (eg. Brizio 1899b; Rellini 1931b), and 26 (36%) were discovered and excavated by Lollini between the 50's and 70's, but only two (4%) new sites have been found here during the 1980's and 90's. The Pesaro-Urbino (PO) province is the worst covered province in the Marche region. Just 17 sites are known, only 2 (12%) of which have been excavated, and there is only one for which a six-figure map reference can be obtained. Almost all of these sites were discovered by survey work carried out during the late 19th and early 20th centuries by Bevilacqua and Rellini (Bevilacqua 1874; Rellini 1909-10).

It is also informative to compare, at a more general level, the patterns of fieldwork for the Abruzzo and Marche regions. A total of 115 sites are known from the Abruzzo region, whereas 168 (or 46% more) sites are known from Marche. This difference is due in particular to the greater amount of fieldwork carried out in Marche during the late 19th and early 20th centuries: in Marche 119 (70%) of the sites were discovered during this period, whereas in Abruzzo only 57 (47%) of sites were discovered then. However, since the 1950's the rate of discovery of sites has been very similar in both regions. Similar proportions of sites can be precisely mapped for each region (Abruzzo 39 [34%], Marche 53 [32%]), and there is a similar range of variation between fieldwork carried out in the four provinces of these two regions.

The nature of the fieldwork carried out in the Abruzzo-Marche region, and the representativeness of its sample of sites in relation to the actual distribution of sites during the Neolithic and Copper Age, can be strongly contrasted to the recent fieldwork carried out in the region of Calabria. The great majority of Neolithic sites now known in Calabria have been discovered over the last 10 years, mainly by one field-survey project carried out by Ammerman and his collegues (Ammerman, ed. 1985, 1987). This has been specifically designed to investigate Neolithic settlement patterns and obsidian exchange networks in Calabria. Over 300 prehistoric sites were discovered in the first five seasons of this fieldwork, and in the Acconia area intensive survey work revealed unexpectedly dense patterns of Neolithic occupation (75 prehistoric sites were found over an area of 10 km^2 during the first four seasons of fieldwork, and 22 of these produced Neolithic pottery) (Ammerman 1985b). The great value of this work is that it has been carried out in a standardized and systematic way, both extensively and intensively, over a short period of time, employing a clearly defined research design and sampling strategy, and so, in contrast to the data from the Abruzzo-Marche region, the representativeness of the settlement pattern from Calabria can be much more easily considered.

Further problems concerning the nature of the data required for the study of settlement patterns in the Abruzzo-Marche region emerge at the site scale. To begin with it is important to consider how and why particular sites were selected for excavation. 31% of all known Neolithic and Copper Age sites in the Abruzzo-Marche region have been excavated (in part), which on first sight appears to be a usefully sized sample. However, this sample was created according to a wide range of localized rescue and research factors, and is biased towards those larger-sized sites where dark soil stains have been identified on the surface and where a range of artefacts including decorated pottery and lithic tools were found, in other words, those sites which were expected to reveal traces of settlement structures and residential activities. Small sized sites where pottery and lithic artefacts have been found, but without signs of surface soil stains, have generally not been excavated (eg. Cardito [PE] and Panicaia [TE]), neither have many sites where a wide range of lithic artefacts have been found but without pottery or surface soil stains (eg. Madonna del Freddo [CH], Colle Argento [MC], Pianetti [AN]), and none of the large number of sites where single artefacts, such as arrowheads or axes, have been found have been excavated. Marginal, non-residential, and special activity sites are therefore greatly under-represented in the sample of excavated sites. In addition, very little excavation work has been carried out in the Pesaro-Urbino province in northern Marche, and the two sites that have been investigated there were excavated in 1892/1908 (S. Biagio) and 1905 (S. Lorenzo in Campo).

It has to be stated that the quality of all of the excavation work carried out at Neolithic and Copper Age sites in the Abruzzo-Marche region has been poor, compared, for example, to the excavations carried out in the Dutch Limburg (eg. at Elsloo and Stein - Modderman 1970) or on the Aldenhovener Platte (eg. at Langweiler 9 - Kuper et al. 1977), or compared to the ideals of excavation proposed by Philip Barker (1982). This limits the degree to which aspects of settlement at the site scale can be considered, including, for the example of a residential site, the layout of structures and features, the size, form, method of construction, and internal organization of individual buildings, the nature and duration of activities carried out in various parts of the site, and the extent and external demarcation of the site. Without wishing to sound too critical of work which, after all, I am prepared to base a thesis upon, it should be noted, for example, that detailed surface mapping of artefacts has not been carried out before excavation work at sites; small areas have generally been excavated rapidly during only short seasons of fieldwork (with the notable exception of the work carried out at Catignano, which has produced the best settlement evidence for the Abruzzo-Marche region); spades rather than trowels or spatulae have often been the preferred excavation tools; involvement of specialists such as soil scientists, archaeobotanists, and archaeozoologists has, until recently, been limited; and the nature of recording of artefact locations and excavated features has only been very general. Publication of the results of excavation work has often lacked sufficient detail, concerning, for example, the precise location of the site, or it has been limited to a brief mention in the list of the year's fieldwork in the Rivista di Scienze Preistoriche (eg. Coppetella [AN] - Lollini 1963: 322).

The visibility and survival of Neolithic and Copper Age sites in the Abruzzo-Marche region have been affected by a variety of post-depositional factors, although it is difficult to establish with much accuracy to what degree these have affected settlement data. The gradual rise in the level of the Mediterranean sea since the Neolithic may have led to the burial of a number of Mesolithic and Neolithic sites located on the Adriatic coastal plains of the region (see Chapter 2). However, the coastal plains in this region are likely to have been affected to a far lesser degree by sea level changes than those located around the northern edge of the Adriatic (see, for example, Shackleton et al. 1984: Figs. 1, 3, and 4). Extensive alluviation may also have occurred in the major river valleys of the Abruzzo-Marche region (see Chapter 2), burying some sites located in the valley bottoms close to river channels. However, it did not hinder the discovery of Neolithic and Copper Age valley-bottom sites such as S. Maria a Vico (TE), Ripabianca (AN), and Campo di Aviazione (PO). Deep ploughing and embankment work have been major destructive factors affecting the survival of the evidence in recent years. At S. Agnese, for example, deep ploughing was found to have disturbed the Neolithic deposits in the area of the excavation pit (De Pompeis 1978), and at Tricalle a rescue excavation had to been undertaken before the Neolithic site was completely destroyed by embankment work. It should be stated, however, that the agent of destruction can also often be considered as the agent of discovery, and that the scale of site destruction in the Abruzzo-Marche region is minimal compared to the massive and unacceptable scale of destruction currently taking place on the Tavoliere plain (Evett 1990).

There are also a number of more general problems relating to the study and interpretation of settlement patterns. There has been much debate, for example, about what constitutes a site, particularly in relation to field-survey data (eg. Plog and Hill 1971: 8; Foley 1981; Cherry 1983: 394-7). Considering the variety of approaches to archaeological fieldwork, and the variability in the nature of archaeological materials in different regions and for different chronological periods, this problem seems unlikely to be resolved. Most definitions of a site appear to be problem-oriented rather than universal. Foley's (1981) definition, for example, which sees a site as a concentration of artefacts and which compares different sites in terms of relative densities of artefacts, seems best suited to his survey data relating to highly mobile Palaeolithic groups in Eastern Africa. What is important, therefore, is not the universal applicability of our definitions of what a site is, but the clear statement of what we ourselves have chosen to call a site for our own problem-oriented purposes. Because I am employing an 'off-site' approach to settlement pattern studies, in which archaeological materials can be seen to be distributed extensively (although not necessarily continuously) across the landscape, and in which interest is focussed not only upon residential activities, but also upon off-site activities such as hunting and chert quarrying, it seems best to regard the individual artefact as the primary unit of spatial analysis rather than the residential site. I therefore define a site as any location where one or more artefacts datable to the Neolithic or Copper Age have been found. The precise definition of such a 'location' varies for different finds. For some sites it is possible to refer to a fairly well defined concentration of surface artefacts and excavated features speading over a specified area in a particular place (surface remains at Pianaccio [TE], for example, extended over an area of 27,000 m^2 which centred upon grid reference 104383 on the 1: 25,000 scale map 133/II/NE Tortoreto), but for other sites it is only possible to indicate a general locality (for example, a small axe-hammer and three arrowheads were found together somewhere in the territory of the modern town of Ancarano [TE]). Using this broad definition it is possible to incorporate the large number of unpublished and imprecisely provenanced 19th and early 20th century surface finds of single artefacts such as arrowheads and axes into my study of settlement patterns (or, more precisely, site patterns) in the Abruzzo-Marche region. My classification of different types of sites is based upon three main factors:

the range of archaeological materials and features found at a site (eg. pottery, lithic artefacts, surface soils stains, and cavities), whether it has been excavated or not, and my limited interpretation of its function (eg. a chert quarrying site). My classification comprises the following five categories of sites:

1. Residential sites - open sites where a wide range of archaeolgical materials has been found, including at least pottery and lithic artefacts. Many of these have been excavated and revealed features such as cavities and post-holes (eg. La Maddalena [MC]). This is a broad category and its members should not be considered as units necessarily of roughly equal status, function, or permanence. However it does seem likely that their use included a significant element of residential behaviour.

2. Lithic survey sites - generally unexcavated open sites where a range of different lithic artefact types has been found on the surface (eg. Madonna del Freddo [CH]). Future excavation at such sites might reveal that they were residential sites, like those in category 1. But for the moment they can perhaps best be considered as an indeterminate group of sites, which perhaps relate also to non-residential activities, such as the quarrying of chert or the manufacture of lithic artefacts.

3. Find-spots - open sites, generally identified during the late 19th and early 20th centuries, where items such as arrowheads, daggers, or ground-stone tools have been found on the surface in varying quantities, probably deposited there during the course of non-residential activities of relatively brief duration, such as hunting, tree-felling or burial (eg. Tignano [PO]).

4. Cave sites - caves or rock-shelters which have produced evidence of occupation during the Neolithic and Copper Age, either through the collection of diagnostic artefacts from the surface of the cave deposits or through excavation (eg. Grotta dei Baffoni [AN]). The activities carried out in these caves seem to have varied, both from site to site and during different periods of time. They should not necessarily be considered as residential sites, and many (but not all) of them have produced evidence of ritual activities.

5. Human burial sites - non-residential open sites dating to the Copper Age which were used in particular for the deposition of human remains (eg. Camerata [AQ]).

It has been possible to assign a large number of sites to one or other of six chronological phases (the Mesolithic, early Neolithic, middle Neolithic, late

Neolithic, final Neolithic/early Copper Age, and middle-late Copper Age), and by this means to investigate long-term changes in patterns of settlement in the Abruzzo-Marche region between the beginning of the 6th millennium Cal. BC and the end of the 3rd millennium Cal. BC. It should not, however, be assumed that sites of the same period were necessarily occupied at the same time. Radiocarbon dates from early Neolithic sites, for example, show that some sites were occupied during an earlier stage (eg. La Maddalena) dating to c. 5700-5300 Cal. BC and others were occupied during a later stage (eg. Ripabianca) dating to c. 5300-4900 Cal. BC (see Chapter 1). This problem cannot be easily resolved. As Whittle says, "It is a question of focus. We must often be content with rather coarse chronological resolution and make the best of it" (Whittle 1988: 14). Another problem involves the assigning of sites to particular chronological phases on the basis of chronologically diagnostic artefact types, such as Catignano painted pottery for the middle Neolithic in the Abruzzo-Marche region. The necessary use of this dating method implies that those sites lacking in such characteristic artefact types are likely to be under-represented in the patterns of settlement compiled for those periods (Renfrew 1972: 384). At an even more precise chronological level, it is extremely difficult to establish the seasons during which particular sites were occupied. This limitation is especially relevant to the Mesolithic sites, for none of them can certainly be regarded as sedentary sites. Inter-site relationships, site densities, residential site hierarchies, and population estimates for individual sites or periods are also extremely difficult to establish using prehistoric data from the Abruzzo-Marche region.

Very few plant remains have so far been recovered from Neolithic and Copper Age sites in the Abruzzo-Marche region (see Appendix 3). The earliest archaeobotanical work in this region was carried out by Evett and Renfrew (1971) who examined the plant remains found in pieces of daub from five different sites: Villaggio Leopardi [PE], Ripoli [TE], La Maddalena [MC], S. Maria in Selva [MC], and Ripabianca [AN]. The number of cereal grains that were identified by this method was small (an average of 6 per site), and detailed species identifications were often limited because only fragments of the glumes and epidermis of the grains remained, and because of the difficulties involved in extracting the fragile plant remains from the hard daub. Following this initial work, two chance finds of carbonized deposits of plant remains were made during the 1970's during the excavation of Grotta dei Piccioni [PE] (Cremonesi 1976: 16 and 227) and Grotta S. Angelo [TE] (Radmilli 1975: 177). The only detailed archaeobotanical study carried out by a specialist in the Abruzzo-Marche region is that of Costantini who examined the plant remains from the middle Neolithic site at Catignano (Costantini and Tozzi 1983). The plant remains were collected here by wet-sieving and flotation of about 20% of the total quantitiy of excavated soil from four sampled contexts which included two bell-shaped pits and a shallow rectangular cavity. Sieve mesh sizes ranged from 2.1 to 0.5 mm. Costantini's precise methods of data collection and analysis might be criticized from a 'purist' archaeobotanical point of view (J. Fitt. pers. comm. 1990), but they are outstanding in the context of archaeobotanical studies in the Abruzzo-Marche region where they have provided much new and useful information, albeit for just one site.

Archaeological formation processes, and in particular preservational factors, must be considered in relation to this sample of plant remains. Chaff and occasionally cereal grains, for example, are sometimes intentionally mixed with clay in the manufacture of daub (Evett and Renfrew 1971). The carbonized deposits of acorns and apples found in Grotta dei Piccioni and Grotta S. Angelo may have been intentionally burnt, either as sacrifices or as the remains of feasts in association with ritual activities in these caves. The carbonized plant remains found in the Catignano pits may have been accidentally burnt, and, if these pits were in fact silos, the wide range of plant species identified in their fill could relate to a number of different harvests, they could include some species not intentionally grown as primary crop plants, and they might not include types of crops stored above ground. Due to factors such as these, we clearly have to be very careful about making inferences from the plant remains found on Neolithic and Copper Age sites in the Abruzzo-Marche region.

Questions concerning specific aspects of cropping systems, such as crop rotation schemes and sowing/growing times, are interesting and relevant to reconstructions of prehistoric subsistence economies, but they are also very complex. Sherratt, for example, in his paper entitled 'Water, soil and seasonality in early cereal cultivation', argues in favour of the predominance of a spring growing-season for early Neolithic crops in the Mediterranean, and the establishment of a winter-growing season in association with the extension of interfluvial cultivation (Sherratt 1980: 319). This view, however, is not universally held (Barker 1985b: 45), and this kind of discussion tends to mask the range of local variation that might have existed, for example, in the choice of precise sowing times within these two seasons. This choice would have been influenced by factors such as the type of crop being grown, the climate (particularly the microclimate), and local soil conditions (Spurr 1986: 42-43). Due to the general lack of detailed botanical data for the Neolithic and Copper Age in Italy complex questions such as these have therefore been avoided in this thesis.

Finds of faunal remains have been reported from 50 excavated Neolithic and Copper Age sites in the Abruzzo-Marche region, but quantified assemblages of animal bones with species-level identifications are available for only 22 of these (see Appendix 4). Samples of identified bones range from 2469 bones at S. Maria in Selva [MC] to four bones at Grotta Cola II [AQ], and the average sample size is 424 identified bones per site. This average can be compared to the much larger one of 3532 bones per site for the list of 21 Iron Age sites with quantified faunal assemblages from Wessex and the Thames valley published by Grant (1984: 117). The majority of the samples from the Abruzzo-Marche region were studied during the 1960's and 70's by Barker, Borzatti von Löwenstern, Capitanio, Siracusano, and Sorrentino. These specialists provided only simple species identifications and relative quantities of bones for different species (the 'shopping list approach'- Barker 1988), and never published details of their methods of analysis. More sophisticated studies have been carried out recently by Wilkens (Wilkens 1987, in press a, b, c, d; Radi and Wilkens 1989) and Bigini (1986-7), using larger samples of bones, and providing more detailed information and estimates concerning the identity of species, body parts present, ages at death, minimum numbers of individuals, meat weights, and their methods of analysis. However, such analyses are still limited in number, with, for example, only seven faunal reports for the Neolithic and Copper Age in the Abruzzo-Marche region providing age data, and only between three and 49 aged pig bones per site. In addition, there is unfortunately still no widespread agreement amongst archaeozoologists concerning their methodology, and so a variety of approaches are still used, for example, in the sorting, measurement, identification, sexing, and ageing of animal bones, and in the representation of minimum numbers of animal bones (Chang and Koster 1986: 107). This may explain the very different results obtained by Barker (1975: 135) and Wilkens (in press b: 3) concerning the proportions of the three major animal species found at Berbentina (AN) (see Appendix 4).

As with studies of plant remains, assemblage formation processes and bone taphonomy must be considered in relation to excavated samples of animal bones. A large amount of work has been carried out in this field and a wide range of potentially influential natural and cultural processes have been identified, including the import of carcasses or parts of them, slaughter patterns, scavenging by dogs, refuse disposal practices, and site erosion (see Gifford 1981; Gilbert and Singer 1982: Table 1; Schiffer 1987). The large numbers of bones belonging to birds, woodmice, and edible dormice found in the lowest level of Grotta dei Piccioni [PE], for example, are more likely to represent the remains of animal predators' meals rather than human meals. Two cultural formation processes in particular have so far only received limited attention in studies of subsistence-exchange and ritual (see Chapters 4 and 5). There is abundant ethnographic evidence of food exchange, and although it is difficult to identify this in the archaeological record, it can certainly be considered on a theoretical level; similarly ethnographic studies suggest that the remains of ordinary meals in archaeological deposits may be quite rare, and that intentional deposition of the remains of feasts may be more commonly represented in the archaeological record (Whittle 1988:91; Grant 1991).

Archaeological sampling and recovery procedures must be considered. The faunal remains from Neolithic and Copper Age sites in the Abruzzo-Marche region were certainly collected without regard for sampling theory, and it is unlikely that sieving was carried out in order to recover small bones. Maltby (1985: 37-8) suggests that the relative quantities of first and second sheep/goat phalanges collected from a site provide a useful indication of the recovery precision achieved during the excavation of that site, for in an ideal collection strategy both should be present in roughly equal numbers, whereas in less precise conditions the first phalanges tend to be found in greater numbers, being significantly larger than the second and hence easier to spot. For the few sites in the Abruzzo-Marche region where phalanges were recovered and recorded at all the results of this test are conclusive: in the Level of the Circles in the Grotta dei Piccioni [PE], which is one of the best excavated and recorded contexts for the Neolithic and Copper Age in the Abruzzo-Marche region, 17 first phalanges belonging to sheep/goat were found, but just one second phalange; at S. Maria in Selva [MC] 14 first phalanges were recovered but no second phalanges; and in stratum 6 at Aquatina [AQ] four first phalanges were found but no second phalanges. Clearly we are dealing here with samples which are biased not only due to the processes of site-formation but also due to excavation techniques. These problems are exacerbated when only a small and not necessarily representative area of a site is excavated, particularly when faunal assemblages collected from different sites are compared (Maltby 1985: 34). In addition, difficulties appear when comparing sites (or periods) in terms of 'changes' in importance of different species. Because each species is given as a percentage of a total number of animal bones in an excavation report, a 'decline' in one species may be only relative, rather than absolute, and may simply be the result of either more animals or other species being kept.

Difficulties are also increasingly being recognized in the attempts to reconstruct animal exploitation and management strategies based upon studies of faunal assemblages, and in particular upon age and sex data. Payne's (1973) attempts to establish model kill-off patterns reflecting three different production strategies- meat, milk, and wool production (Payne 1973: Figs. 1, 2, and 3), and Sherratt's (1981, 1983, 1986) model of the secondary exploitation of animals in the Near East and Europe for products such as milk, wool, and traction-power, have prompted much recent discussion about the interpretation of faunal assemblages and subsistence economies (eg. Chang and Koster 1986; Greenfield 1988; and comments on Greenfield's paper in Current Anthroplogy, volumes 29.4: 587-591 and 29.5: 743-748). In addition to the difficulties mentioned above, one of the basic problems involved with such reconstructions concerns the fact that most ethnographically observed subsistence economies exploit their herds with a mixture of strategies in order to obtain a variety of products, and that these different strategies can produce similar harvest profiles in the archaeological record (Payne 1973: 282; Greenfield 1988).

A few apparently subsistence-related types of artefact and feature, including chert arrowheads and 'sickle blades', stone axes, pottery sieves, clay 'spindle-whorls' and 'net-weights', a bone 'fish-hook', and 'crop-storage' pits are discussed in this chapter. Clearly the functional interpretation of such artefacts and features is open to some doubt, particularly as most of them come from poorly recorded contexts which provide little information concerning their associations to other artefacts or features. However, they do at least provide a supplement to the limited site-locational, botanical, and faunal data in attempting to reconstruct the nature of Neolithic and Copper Age subsistence economies in the Abruzzo-Marche region.

It would be cheering to end this review of the problems involved in the study of settlement and subsistence patterns on a more optimistic note. As Bintliff says, in relation to the study of economic archaeology,

> "All too often archaeology students' essays end as follows: "In conclusion, we really know almost nothing about this subject, and must wait for the results of future, more careful, research" .... Yet it seems to me that we deserve to be thoroughly optimistic about just how much we <u>do</u> know, and about

the way in which modern archaeology is leaping forward in its skill of recovering and interpreting data relevant to this topic." (Bintliff 1981: 35).

Bintliff's optimism may be valid on a European scale (although remember Whittle's [1987, 1988] views), but in considering the current situation in the Abruzzo-Marche region I still favour the hesitant student's point of view. I do believe, however, that a number of fairly clear patterns can be identified in the data from the Abruzzo-Marche region, and that it is therefore my duty to interpret these as best as I can. In addition, it does seem possible to interpret these patterns in a significantly different light from that shed by Graeme Barker's metholodological and theoretical approach, which I shall now discuss.

c) <u>Barker's economic prehistory</u>

The study of Neolithic and Copper Age settlement and subsistence in central Italy has been dominated over the last two decades by the work of Graeme Barker (1973a, 1973b, 1975, 1976a, 1976b, 1981a, 1981b, 1985b, 1991). In reaction against the established view of a succession of simple economic stages in the prehistory of central Italy, which saw a progression from mobile hunter-gathering during the Palaeolithic to a sedentary economy based upon cereal cultivation and stock-keeping during the Neolithic, and to a fully transhumant pastoralist economy during the Apennine

Bronze Age (eg. Radmilli 1974b), Barker has proposed a wide range of new models of cultural and economic change, highlighting above all the diversity of economic systems. He has succeeded in stimulating a growth of interest in the collection and discussion of subsistence data in central Italian archaeology. (As Director of the British School at Rome, he greatly encouraged me in my early years of research as an undergraduate interested in central Italian prehistory. I should therefore like to emphasize that what follows is in no way intended as a personal attack upon him.)

Through the reconsideration of old data, the accumulation of new data, and the recent development of new theoretical approaches, it is now necessary to criticize Barker's work in a number of ways. To begin with, he has repeatedly used the modern climate and environment of central Italy as a starting point in understanding the past environment (eg. Barker 1973a: 360, 1975: 112, 1976a: 65-6, 1981a: 11-23, 1985b: 55-6), paying limited attention to the available (but admittedly not extensive) palaeoenvironmental evidence for central Italy (eg. 1981a: 39-40), and underestimating the extent of changes in the central Italian environment during and since prehistory. For example, he makes the following claim:

> "Between these two periods [50,000 BP and the mid first millennium AD], however, there is little evidence in central Italy - even when a valley has

been studied in great detail, such as the Biferno in Molise - for postglacial alluviation on a large scale. That being so, once classical and post-classical alluviation has been stripped away, the original resource zones around a prehistoric site can be defined in simple terms according to the basic variation in topography, geology and soil distribution in the catchment area." (Barker 1981a: 124).

Recent palaeoenvironmental work in central Italy (see Chapter 2) now suggests that this view is incorrect. Hunt (pers. comm. 1988), for example, suggests that terraces began to build up in the Biferno valley headwaters during the Bronze Age as a result of at least local degredation of the environment, gullying, and erosion related to increased forest clearance, and at Tricalle (CH) the original Neothermal brown soils surrounding the early Neolithic site were found to be intersected and either reduced or removed by erosion (Agostini 1986-7a). Even Barker himself now admits that his own work can be fairly criticized for the limited input of a detailed geomorphological evaluation of the landscape contemporary with the archaeological sites under study (Barker 1985a: 6), and that factors such as changes in the course of rivers, soil erosion, marshland drainage, and the conversion of seasonal grazing land into arable land should be considered.

He has misinterpreted the nature of the mountain environment during the Neothermal period, and has consequently over-emphasized the importance of the mountains in central Italian prehistoric subsistence economies. He states, for example, that "The mountains of central Italy were a major resource for the subsistence systems of the prehistoric communities, for they offered superb summer grazing (as well as woodland for animal pannage and human plant foods such as chestnuts)" (Barker 1981b: 216). Recent research by Halstead strongly contradicts this view:

> "the present summer pastures in the mountains are, to a large extent, not a 'natural' feature of the Mediterranean landscape. Although tree growth may be prevented locally in the mountains by steepness of slope, absence of soil, waterlogging and so on, no Mediterranean mountain is high enough (for its southerly latitude) for extensive alpine meadows to be the inevitable product of harsh winter conditions. On the contrary, tree growth tends to be associated in the mountains of the Mediterranean region with wet, rather than warm topographical situations. .... Most mountain pasture seems to be the product of human interference - either directly through the fire and axe or indirectly through grazing livestock - and, as the decline of the traditional pastoral economies leads to relaxation of grazing pressure, trees are widely recolonizing these areas." (Halstead 1987: 79-80).

In addition, the distribution of prehistoric sites in the Abruzzo-Marche region provides evidence only of the minor importance of the central Italian mountain zone between the Mesolithic and the late Copper Age (see conclusions at the end of this chapter).

Barker's classification of different parts of the central Italian landscape and its resources is limited. For example, he defines the Fucino basin as an upland economic unit, and emphasizes the problems of over-wintering animal flocks here (Barker 1973a: 367), without considering the modifying influence of the original lake (now drained) on the nature of the basin's micro-climate, which would have been as mild during the winter as that of the coastal lowlands (see Chapter 2). His classification of prehistoric resources for the purposes of site catchment analysis is particularly limited. He distinguishes between arable/potentially arable heavy soils, arable/potentially arable light soils, probably summer pasture/rough grazing, and probably winter pasture/rough grazing, on the basis of a simple study of modern soil types and estimates of modern tree cover (Barker 1975: 159 and Tables 4, 5 and 6), both of which are likely to have changed significantly since prehistoric times.

The problems of Barker's environmental reconstructions are augmented by the fact that he places so much emphasis upon the role of the environment in prehistory, sometimes even verging upon large-scale environmental determinism:

"Geology, soil mantle, vegetation, climate - these were not the gentle backcloth of a Giotto or Botticelli, remote from the calm of the human stage; they were the all-powerful forces of a natural world that exerted massive controls on the daily endeavours of prehistoric people." (Barker 1981a: 11).

His emphasis upon 'traditional' Roman, Medieval, and modern rural subsistence economies as a starting (and sometimes ending) point for the discussion and interpretation of prehistoric subsistence, and his emphasis upon their apparent continuity with prehistoric economies, is highly questionable. Three quotations from recent publications by Barker examplify his views:

> "And yet, whatever the contribution of the civilization of Rome and Renaissance Italy to his outlook, the essential character of the central Italian contadino - the hope and despair of his fierce allegiance to his land, his justified suspicion of change, the strength he draws from the traditions of the past - this surely has been moulded far back in his prehistory." (Barker 1981a: 219).

> "There was thus a vicious circle inherent in pre-industrial farming in Europe, of low yields and low manure: 'the evil of small harvests due to insufficient manuring, the lack of manure being in turn the result of small agricultural production

making it impossible to keep more cattle' (Slicher Van Bath, 1963: 10). Exactly the same constraints characterised prehistoric farming." (Barker 1985b: 54).

"in spite of all the changes in agricultural technology and organisation discussed above, one of the most impressive features of the prehistory and history of European farming is the survival of regional agricultural traditions. In the Mediterranean or in the Balkans the prehistoric farmer would still recognise much that is familiar in the everyday life of the small farmer today." (Barker 1985b: 262-3).

The relevance of such analogies between recent 'traditional' Mediterranean economies and prehistoric economies is increasingly being questioned by Mediterranean prehistorians (eg. Lewthwaite 1981b; Ammerman 1985c; Halstead 1987). Such analogies are generally based upon misinterpretations of the prehistoric natural and social environment, and are also closely related to the preconceptions of northern European archaeologists working in the Mediterranean region, which are often based upon a familiarity with classical and historical sources, and romantic attitudes towards contemporary rural lifestyles and economies in the Mediterranean (Lewthwaite 1981b: 57; Halstead 1987: 77). It is interesting to note in relation to this that Barker (1991), in a paper presented to a symposium on 'The contribution of an Annaliste/ structural

History approach to archaeology', should have looked to Levi's (1945) book Christ Stopped at Eboli for inspiration, for Levi, an outsider himself, also stressed the harsh and apparently unchanging lifestyle of the south Italian peasant. Such attitudes can be ultimately related to the romantic movement in Europe (see Russell 1984: 651-659), and more directly to the writings of Vidal de la Blache , Zola, and the first and second generation of Annaliste historical-geographers, including those of Braudel, which can now be criticized for their neglect of the short-term time scale (comprising relatively rapidly changing events, chance occurrences, and individuals), and their emphasis upon the stability and deterministic power of the landscape (Skeates 1990: 59).

Barker's concentration upon mobile economies in prehistoric central Italy should be reconsidered in the light of his strong interest in historically documented transhumance in Italy. He claims that in central Italy "transhumant systems of grazing were a constant part of the agricultural economy" (Barker 1981a: 202), and states, "My main thesis is that, to a greater or lesser degree, mobile economies can be detected in the archaeological record of central Italy from the palaeolithic onwards and were often the dominant component of prehistoric economy in some areas until the latter part of the bronze age" (Barker 1973a: 360). Despite his use of a broad definition of transhumance to include not only long, but also short, and very short distance movements of people and their animals, it is clear that his views have been strongly influenced by his interest in historically documented long-distance transhumance (eg. Barker 1981a: 25-30), and this has been clearly shown by Lewthwaite (1981b) to be an inappropriate analogy for prehistoric herding economies in the Mediterranean. Moreover, ethnoarchaeological studies of highland groups in south-east Europe indicate that the mechanisms of seasonality are much more complex and polyvalent than is usually allowed for in archaeological interpretations (Nandris 1985). Caution is therefore required in the identification of mobile economies in the archaeological record of central Italy.

Site catchment analysis (SCA) features strongly in Barker's work, but it can now be criticized in a number of ways. Detailed critiques of SCA have been published by Roper (1979) and Dennell (1980) and so only a brief review of the method and its problems will be provided here. SCA was originally devised by Vita Finzi and Higgs (1970), and was later formalized to a certain extent (Higgs and Vita Finzi 1972; Jarman 1972a; Higgs, ed. 1975). The method has been employed by a number of British archaeologists working in Italy, both at individual sites and at groups of sites in assessments of regional patterns of settlement (eg. Barker 1975, 1981a; Jarman 1970, 1976; Jarman and Webley 1975). It was developed in reaction against the very general description of the physical setting of archaeological sites, and the lack of consideration given to their immediate vicinities. SCA was primarily intended to focus attention on this latter area and to study the economic potential of the local environment of the sites, in order to formulate hypotheses about the economic function of those sites, their population sizes, and the probable subsistence strategies of their inhabitants. It succeeded in focussing attention upon the local surroundings of prehistoric sites, and in highlighting the environmental diversity of particular site catchments, which had not previously been recognized by ecozonal studies. However, it can be criticized from both theoretical and practical points of view.

To begin with, many of Vita Finzi and Higg's (1970) original assumptions are unsound. Concerning the size of their hypothetical 5 km or 1 hour, and 10 km or 2 hour, catchment areas, for example, ethnographic data indicate that the size of site catchment areas varies considerably among both 'hunter-gathering' and agricultural societies; detailed surveys often indicate that prehistoric communities farmed far smaller areas than five kilometre catchments (Barker 1985: 6); and catchment areas are not static but can fluctuate considerably throughout the year in response to seasonal variations in the abundance of food resources. Some of their other assumptions can be criticized on the grounds that there is no simple division between the mobility of hunter-gatherers and the sedentism of agriculturalists, or indeed between hunter-gatherers and agriculturalists. Similarly, prehistoric sites cannot be regarded as closed, self-sufficient, economic systems: the significance of the subsistence strategies of neighbouring groups and of inter-community social and economic activities such as feasting and exchange must be considered. In other words, "a more open approach is needed which can regard man as more than a bipedal stomach" (Dennell 1980: 8).

Practical problems involve deciding how to classify the resource potential of a catchment area, mapping those resources, and integrating environmental research into fieldwork. References to modern land use are of limited value, for recent technological developments have often radically transformed the economic potential of an area, but classifications according to landforms and soil types are more reliable guides to the resource potential of prehistoric catchment areas, (although even these may have changed over time - see Shiel and Chapman 1988). The use of radial transects to map the resources within a roughly circular catchment area leads to a decreasing sample size with distance from the central site. In addition, there is now general agreement upon the need to identify and assess the extent of environmental changes during and after the occupation of a site, and it is preferable that this should take place before rather than after SCA work is carried out in the field.

SCA has so far only led to the formulation of simple economic hypotheses, including, for example, inferences concerning the subsistence strategy of a site based upon the relative proportions of each resource zone within the catchment area. There remains the problem of evaluating the differential productivities of each resource zone within that catchment. Areas of potentially high agricultural productivity, for example, might have occurred in very restricted areas around certain sites, but that should not necessarily be taken to mean that crop cultivation was unimportant at those sites, especially if the arable land was sufficiently productive in relation to other resources. When the wide range of social, political, and religious factors which might influence the location of sites are considered, then the question of how much one can infer from a site's location becomes even more restricted. To be fair to Barker, he has shown awareness of some of these criticisms of SCA (eg. 1975: 114; 1981a: 124; 1985a: 6-7), but he has still made great use it and this has clearly influenced his interpretations.

A number of less serious, but recurrent, problems can also be identified in Barker's work. The importance of plant resources in prehistoric subsistence economies tends to be under-represented by Barker in favour of animal resources, which are more visible in the archaeological record, and in which Barker has a specialist interest. He also tends to assume, unjustifiably, that resources were optimally exploited. He says, for example, "it is worth remembering that mobile grazing systems have been developed precisely because they make the most efficient use of seasonal pasture and so avoid the necessity of fodder and stalls when local food is unavailable" (Barker 1981a: 30, my emphasis). A 'meliorizing' terminology is more appropriate in the description and modelling of prehistoric economies, in which prehistoric foragers, for instance, should be characterized as 'increasing' rather than 'maximizing' their energy intake, and 'reducing' rather than 'minimizing' risk (Mithen 1989: 488). Barker's assumption that crops were generally not grown on valley floors is also questionable. Referring to an agricultural technology based upon simple hand tools or light wooden crook ards, he states that, "such a technology demands that the prime arable areas would have been light well-drained soils, rather than the heavy clays of the valley floors that, now drained, are such a valuable agricultural resource today in central Italy." (Barker 1981a: 125). Sherratt's (1980) model of water, soil and seasonality, on the other hand, emphasizes the importance of ground- and surface-water and of riverine or spring-side site locations in the earliest stage of cereal cultivation in the western Old World, and distinguishes them from the dry farming and settlement locations which developed at a later stage in interfluvial areas. A reconsideration of Neolithic and Copper Age site locations in the Abruzzo-Marche region also suggests that crop-growing on valley floors should be given greater consideration (see below, this chapter).

Barker's outright dismissal of colonization models in explaining the origins of the Neolithic in Europe appears as a rather extreme viewpoint. He suggests, for example, that,

> "For virtually all of Europe, therefore, it seems to me most likely that the various systems of initial farming which we can discern were developed by the indigenous populations rather than by newcomers, in the context of some kind of pressure or pressures on their established modes of subsistence, making the adoption of the new resources - along with the enormous technological and social changes normally associated with them - preferable or unavoidable." (Barker 1985: 255).

Given the difficulties in firmly establishing either local continuity of groups or the existence of immigrants in the archaeological record, the discussion of Neolithic origins seems prematurely settled by such a view.

Barker also tends to underestimate the role of individuals and social factors in prehistory. Referring to emergent 'Big Men' in the Copper Age in central Italy, he says, "I would therefore view these individuals essentially as the result of a complex series of changes in the total cultural network, rather than as the determinants of the changes in the cultural network that promoted the development of their authority, and so the overall system remains the main focus of investigation for the prehistorian rather than the role of these individuals" (Barker 1981a: 204). More recently, however, he has given slightly more attention to "the social relations which regulate economic activity" (Barker 1985: 262).

Barker's analyses and interpretations of data from specific sites in relation to prehistoric subsistence must also be reassessed. His study of the economy practised at the early Neolithic site at La Maddalena (MC) (Barker 1975: 132-4) serves as an example. He begins by describing the lithic industry, which appears to be partly Epipalaeolithic in nature, but also contains new Neolithic elements, including numerous geometric microliths, polished axes, and obsidian blades. Pottery is also present. He then describes the faunal assemblage, which comprises 50% pig, almost 25% red deer, 15% caprines, and 8% cattle bones, and describes the location of the site in relation to the regional- and local-scale topography and hydrology, showing that it lies on the lowland/highland junction. He presents the results of his site catchment analysis of the area within a 1 km radius of the site, which comprised 35% heavy soils and 65% light soils, both of which he classifies as arable or potentially arable. There are no problems with his presentation of these data. However, he then goes on to note of the farm situated at the site today that, "the farm cattle are taken up onto the lower mountain slopes in summer, but are stalled in winter" (Ibid.: 133). This observation appears later to have unjustifiably influenced his views concerning the seasonality of the Neolithic site. He begins his conclusions about the site's economy with the following environmental reconstruction: "The faunal sample implies that much of the lower ground was wooded" (Ibid.: 133). Environmental reconstructions based upon small samples of bones belonging to large mammals which have accumulated in archaeological deposits through human agency must always be treated with great caution, and clearly cannot be considered to reflect the extent of local woodland around a site. Barker then goes on to interpret the location of the site:

> "The site was ill-placed either for large-scale caprine exploitation or cereal cultivation: the main summer grazing for caprines lies to the west on the hills and the arable hills to the north have much higher cereal yields today than the lower ground by the rivers, which is much heavier and stonier. Furthermore, like the Epipalaeolithic camps before, the Early Neolithic site was located at the end of exit valleys from the hills: like those sites, Maddalena di Muccia may have been selected at least partially to exploit the spring and autumn movements of the deer. Whether or not we are dealing with an intrusive group is for the moment unimportant: the pottery-using group at Maddalena di Muccia selected a site in the same kind of position as the sites used by the Epigravettian bands and manufactured much the same kind of tool-kit; equally, save for the replacement of the ibex by sheep or goat, the animal resources exploited were identical". (Ibid.: 133-4).

Even using Barker's criteria, the site does not seem to have been ill-placed for cereal cultivation: cereals are grown on the site today, and the modern soils found around the site can be classified as 100% arable or potential arable. Barker's conclusions seem to have been influenced by his assumption that crops were not grown in river valleys, and by another assumption that crops were only grown on the most productive soils during the early Neolithic (which were anyway likely to have been densely wooded at that time). There is certainly some degree of continuity from the Mesolithic in the lithic industry and in the location of the site, but some of the tool types found at La Maddalena were new. Also the site is actually located in a slightly but significantly different location to two nearby Mesolithic sites (see Fig. 86), and this might reflect a movement to a more open location where the soils were better suited to crop cultivation. It is also unclear whether the cattle and pig bones found at the site belonged to wild or domestic species. Without further data or discussion, Barker finally concludes that, "Maddalena di Muccia and Ripabianca di Monterado were probably used by mobile or transhumant groups" (Ibid.: 135), as a spring or autumn camp for hunting game and some herding of stock (Ibid.: 159, 160). This sounds very much like the answer he was expecting.

Part of the difference between my approach and that of Barker can be seen in the light of the debate between the protagonists of ecological and of social perpectives in economic archaeology (see Bailey and Sheridan 1981; Bailey 1981). The ecological perspective, and in particular the Higgs school of palaeoecology (eg. Higgs, ed. 1975) to which Barker is allied, can been characterized as follows:

> "[it] offers a framework which draws upon concepts from biology, ethnology, and ecology as a basis for analyzing long-term relationships between the key variables of human population, food resources, and technology. Attention is focussed upon the expoitation strategies used to obtain food supplies. The developments of post-Pleistocene times are, to a large extent, regarded as the record of attempts to feed a growing population within the limits imposed by the natural environment, with the aid of technology. All other aspects of human behaviour, such as settlement location, modes of social organization or belief systems, are seen as determined by, or peripheral to, this central process." (Bailey and Sheridan 1981: 1).

In its favour, one can claim that palaeoecology provides one of the few systematic attempts in recent years in British archaeology to develop a theory and methodology of economic archaeology. It has usefully emphasized the study of relationships, between humans and animals, for example, or domesticated and wild species; its emphasis upon empirical data has encouraged the sophistication of zooarchaeological studies; and it has usefully drawn attention to the _potential_ resources to be found within the environment of a site (Davidson 1981). It can be criticized, however, for underestimating the contribution of factors operating on the short-term time scale, and for over-emphasizing the importance of long-term processes. It also underestimates the contribution of social factors, takes no account of the potential importance of ideological or religious values, and places great and almost exclusive emphasis upon subsistence questions, hence its description by some people as an explanatory framework of 'alimentary determinism', in which 'man' is characterized as _Homo economicus_. Although palaeoecology in this sense (ie. the Higgs school) provides a useful starting point for discussion in this chapter, which is primarily concerned with subsistence and settlement, it cannot therefore be used as an explanatory framework.

In contrast to Barker, I favour a mild version of the social perspective, which has been described as follows:

> "a variety of models inspired by concepts drawn from social anthropology and sociology .... which are united in stressing the impossibility of defining 'economy' without reference to the context of social relations and ideological or cognitive _schemata_ .... Those who adopt such a perspective usually stress the uniqueness of human behaviour - a uniqueness manifested, for example, in man's capacity for symbolic communication - and argue for its partial or

total independence from the ecological forces which appear to dominate the natural world. The 'natural' environment and ecosystem are regarded as being generally of secondary or intermittent importance in determining human behaviour: although they may dictate the range of available subsistence resources, they do not determine the exact subsistence strategies pursued by a group, or its form of social organization, or the attitudes and beliefs of its members. In the definition of 'economy', attention does not focus exclusively on subsistence food production, but ranges from the manufacture or extraction of edible or non-edible consumer goods for exchange." (Bailey and Sheridan 1981: 2).

d) Land classification

At the moment, it is impossible to classify the Neothermal landscape in the Abruzzo-Marche region and sites' locations within it in more than general terms. The previous chapter described the limited evidence that is available for reconstructing the Neothermal environment in the Abruzzo-Marche region, and it should be clear by now that there is a limit to how far one can stretch those data. This means, unfortunately, that a step must be taken back in the direction of the general descriptions of the physical setting of archaeological sites, in which limited consideration is given to their immediate vicinities and against which site catchment analysis justly reacted, until a greater quantity of good quality data is collected.

I have identified four major geographical zones for the Abruzzo-Marche region: (1) the Adriatic coastal lowlands, which extend up to 200 m asl and 25 km inland from the Adriatic coast; (2) the inner lowlands, which lie over 25 km inland from the Adriatic coast, and extend as far inland as the base of the Apennine mountains, which is generally well defined locally by a change to a limestone-based geology and much steeper hillslopes; (3) the inland intermontane basins, valleys, and depressions; and (4) the Apennine mountains. The division of the lowlands into inner and coastal parts is based upon geological differences between these areas (ie. a predominance of Holocene, Pleistocene, and Pliocene deposits in the coastal lowlands, and a predominance of Miocene deposits further inland); upon vegetational differences during the 'Atlantic' phase, with the vegetation characteristic of the coastal lowlands being found below about 200 m above sea level; and upon the distribution of early-late Neolithic open sites in the lowlands, which generally lie below about 200 m asl and within 25 km inland from the Adriatic coast. I favour the term 'inland' rather than 'upland' to describe the sites located in the intermontane basins, valleys, and depressions of the Abruzzo-Marche region, for the floors of some of the intermontane basins in Abruzzo lie at relatively low altitudes. The site at Capo d'Acqua, for example, which is located just 3.75 m away from the peak of Monte Scarafano whose altitude is 1425 m above sea level, lies on the floor of the Ofena basin at about 347 m above sea level.

I have subdivided these four major geographical zones in different ways for different chronological periods, mainly in relation to the known patterns of prehistoric settlement. I have done this in an attempt to move towards an 'emic' classification of the Neothermal landscape of the Abruzzo-Marche region - classifying it in a way that might have been relevant to its human occupants during different stages of the Neolithic and Copper Age. At this geographical level I am concerned with the 'human landscape', which can be defined as those parts of the landscape which were exploited by human groups and in which archaeological remains have been found, rather than the entire landscape of the Abruzzo-Marche region. I have subdivided the early Neolithic coastal lowlands, for example, into (a) the lower sections of major river valleys, and (b) inland tributary rivers and streams. In contrast, the final Neolithic/early Copper Age coastal lowlands can be subdivided on the basis of settlement patterns into (a) the coastal hills, (b) the lower sections of major river valleys, and (c) interfluvial hills.

It is difficult to group site locations further within these sub-zones, due to the scarcity of published details concerning their precise locations, and the almost total lack of local paleoenvironmental data. However, for those sites whose exact locations are known, it is possible to provide certain details on an individual level. These data are presented in Appendix 1 (rather than at length in this chapter). In such cases, geographical details can be provided, such as local geology, height above sea level, distance inland from the Adriatic coast, distance away from and height above the nearest river-bed, and proximity to potential sources of water 'and of chert. It is also possible to estimate their general accessibility from nearby landscape features, and the width and distance of views from and to them. For a few sites it is also possible to estimate the distance of the nearest roughly contemporary site, and to estimate the degree of landscape and land-use change during and since their establishment, the most obvious example being the Fucino basin sites and the drainage of lake Fucino. I have noted the nature of modern land-use for the varied sample of 78 sites that I have visited in the field, and have included the results of Barker's (1975) site catchment analyses of modern soils found within 1 km radii of certain sites. I do not, however, lay much emphasis upon these data, except to demonstrate (in reaction to Barker's views) the potentially wide extent of land suitable for crop-growing in the Abruzzo-Marche region. (Yet it should be noted that even something as general as this is likely to have changed over the long term: see Shiel and Chapman 1988.)

2. Discussion

In the following sections, which correspond to the five chronological phases defined in Chapter 1 (with the addition of the Mesolithic), general patterns of subsistence and settlement are identified and discussed for each phase. The relevant data are presented in full in Appendices 1 and 3-5. Appendix 1, the catalogue of sites, provides a summary of the range of artefacts found at each site, a detailed description of the faunal and plant remains found, and of any features revealed by excavation. It also provides details of their locations. Appendix 3 lists the plant remains found, and Appendix 4 lists the faunal remains. Broad-scale environmental factors are incorporated into the interpretations in this chpater, but other factors, such as population pressure and social stress, which are perhaps even more dificult to define, and which require greater consideration from a long-term point of view, are generally excluded until Chapter 6 (the conclusion). Details of the Mesolithic sites are provided in Appendix 5.

a) Mesolithic

My use of the term 'Mesolithic' is basically a chronological one, referring to the period of time between the late Upper Palaeolithic and the early Neolithic in the Abruzzo-Marche region (c. 8500-6500 BP). (This corresponds with Whittle's [1985: 7] use of the term, but for alternative definitions, see Zvelebil [1986: 5-7]). At sites such as Grotta Continenza in the Fucino basin, Mesolithic deposits containing a characteristically microlithic industry are stratigraphically sandwiched between late upper Palaeolithic (or 'Bertonian' - Radmilli 1983) and early Neolithic deposits (Grifoni Cremonesi 1985, pers. comm. 1986). Late Upper Palaeolithic deposits in the Abruzzo-Marche region have been radiocarbon dated to between about 14,600 BP and 8500 BP (see Appendix 2), and the early Neolithic begins here at about 6600 BP (or, at the earliest, c. 5750 Cal. BC). The term 'Mesolithic' seems to be of particular use in discussing the general phenomenon of the 'Mesolithic-Neolithic transition' in Eurasia (eg. Zvelebil, ed. 1986), and it is also the term used by Italian archaeologists working in the Abruzzo-Marche region (eg. Radmilli 1981). It seems useful, therefore, to continue using 'Mesolithic' as a convenient term. It should be noted, however, that there are certain arguments against the use of this term in Italy (S. Milliken pers. comm. 1990). For example, the fairly strong degree of continuity from the late Upper Palaeolithic to the Mesolithic periods in Italy, which can be seen, for instance, in the choice of particular caves in the Fucino basin, and in the faunal assemblages in these caves (eg. spits 35-20 in Grotta la Punta, and spits 31-26 in Grotta Continenza - Cremonesi 1968; Grifoni Cremonesi 1985), can be used to argue in favour of the term 'final Epigravettian' to cover both the late Upper Palaeolithic and Mesolithic in central and southern Italy.

Eight Mesolithic sites have so far been identified in the Abruzzo-Marche region (Fig. 82), (see Appendix 5 for details). A site was found at Ripoli [TE] which lies on a Pleistocene fluvial terrace flanking the lower section of a major river valley in the coastal lowlands (Radmilli and Cremonesi 1963) (Fig. 83, Plate 27). Three sites have been found in two of the intermontane basins of Abruzzo. In the Ofena basin, a Mesolithic site was excavated at Capo d'Acqua [AQ] (Tozzi 1966) (Plates 16-17); and in the Fucino basin, Mesolithic deposits were found in spits 31-24 in Grotta Continenza [AQ] (Grifoni Cremonesi 1985, 1987-88, pers. comm. 1986) (Fig. 84, Plate 11), and at Ortucchio [AQ] (Cremonesi 1962) (Fig. 84, Plate 9). Three more sites have been found in the inland valleys of the Marche region, located along the edge of the Apennine mountains: Grotta del Prete [AN] (Lollini 1964, 1970; Broglio and Lollini 1981; Bisi et al. 1983) (Fig. 85), Cava Romita [AN] (Broglio and Lollini 1981: 27) (Fig. 85), and Lucciano near Pieve Torina [MC] (Lollini 1979; Broglio and Lollini 1981) (Fig. 86). Another site was found in the Maiella mountains of Abruzzo, on the small 'altopiano' of Campo di Giove [AQ], situated at 1065 m above sea level (Radmilli 1981: 244) (Plate 22).

There are a number of problems in trying to reconstruct Mesolithic subsistence and settlement patterns from the data provided by these sites. The sample of just eight Mesolithic sites from the Abruzzo-Marche region is small and fairly biased. Half of these sites were discovered by chance during the excavation of Neolithic and Copper Age sites, and it is possible that a significant number of Mesolithic coastal sites may have been buried under the Adriatic sea with the rise in its level since the Neolithic period. No specialist studies of seasonality, employing the techniques of archaological science, have been published for the Abruzzo-Marche sites, although such work is reported to have been carried out on the Mesolithic faunal remains from Grotta Continenza (Grifoni Cremonesi pers. comm. 1986). In addition, no plant remains have been recovered from Mesolithic sites in the Abruzzo-Marche region, despite the probable importance of plant foods in Mesolithic diets (Clarke 1976). Recent dietary analyses of human remains by Fornaciari (1982) and Zvelebil and Meiklejohn (1988) have noted an increase of strontium in the bones of Mesolithic skeletons from a few sites in Europe, which seems to suggest a shift towards a diet comprising a greater carbohydrate element, and an increase in the importance of gathered wild plant foods, compared to the Upper Palaeolithic human bones which indicate diets dominated by hunted food. Interestingly, the Mesolithic bones exhibited few signs of poor health and dietary stress.

The Mesolithic sites from the Abruzzo-Marche region can be considered in a number of ways as lying along a continuum: the lithic assemblages suggest a range from specialist to multiple activity sites, the faunal remains suggest a range from specialist large game hunting in classic Upper Palaeolithic style to broad-spectrum hunting and gathering sites in classic Mesolithic style, and the site locations suggest a range from drier to much wetter places. The site at Campo di Giove lies at one end of this continuum. Its location at a high altitude by a small but important mountain lake, and the very restricted range of tool types found there, suggest that this was a specialist hunting camp, frequented during the summer. It can be compared to the upland cave site of Grotta di Peschio Ranaro, located at 800 m above sea level in the pre-Apennines of Lazio, which probably served as a camp for specialist ibex and red deer hunting (Cardini 1969; Barker 1981a: 117). Along the central part of the continuum lie the sites of Capo d'Acqua, Grotta del Prete, and Lucciano, which are located in the Ofena basin and in inland valleys situated along the edge of the Apennines. They can probably be interpreted as semi-specialist, and probably seasonal, hunting and gathering camps. Hunting strategies, for example, seem to have focussed upon red deer and aurochs at Capo d'Acqua, and on red deer, wild pig, and ibex at Grotta del Prete. At the other end of the continuum lie the two Fucino sites, and probably also Ripoli. A fairly wide range of lithic tool types were found at the Fucino sites, and in Grotta Continenza a great variety of both terrestrial and lacustrine faunal species were recovered. The location of the Ortucchio site near to the edge of lake Fucino can probably be interpreted in terms of an economic focus upon the lake's resources, although, as in the Copper Age levels at this site, it is possible that it also served as a base-camp for large game hunting in and around the Fucino basin. A wide range of lithic tool types was found at Ripoli, which may broadly reflect the performance of a fairly wide range of subsistence activities at this site, and the faunal remains indicate that a wide range of animals was hunted, without any particular focus upon one or more species. The location of the Ripoli site adjacent to the potentially marshy lower section of the River Vibrata might also suggest that fishing and fowling were practised by the inhabitants of this site.

The data from the Fucino sites, and probably also those from Ripoli, correspond well with the characteristic features of the Mesolithic in Europe as defined by Douglas Price (1983). European Mesolithic sites are generally located with a coastal, lacustrine, or riverine orientation, and are associated with a greater reliance on aquatic resources than those of the Palaeolithic. Subsistence activities were greatly intensified, by comparison with the Palaeolithic, and resource procurement became more specialized (in the nature, technology, and organization of foraging), and diversified (with much greater numbers and kinds of species and habitats being exploited). There was also a greater variety in the diet, which came especially from the exploitation of lower trophic levels in the food chain, rather than from a change of dietary staples (Douglas Price 1983: 770).

Precisely how sedentary the occupation of the Fucino sites and Ripoli was is difficult to establish. What can be stated, however, on the basis of the faunal remains found in the Mesolithic levels at Grotta Continenza and a consideration of the range of possible seasonal food resources available both in and around Lake Fucino, is that there was certainly a potential for Mesolithic year-round settlement in the Fucino basin (Skeates 1987). Before the drainage of the lake the Fucino basin was characterized by a mild climate, despite its relatively high altitude and intermontane location. Letta (1884: 20), for example, reports that on average minimum winter temperatures did not usually reach below seven degrees centigrade around the lake, and, although winter conditions were still reported as being quite tough, the temperature equals that recorded near Rome, which is regarded as the mildest area of central Italy during the winter (Mason, ed. 1944). Both plant and animal foods would have been fairly abundant in the Fucino basin, and the faunal remains from Grotta Continenza indicate that a seasonally overlapping variety of year-round and migratory species was exploited from a variety of environmental zones, including the freshwater lake and surrounding marshes, the lake margins, and the surrounding hills and mountains. During the summer, however, food resources are likely to have been more abundant elsewhere, such as in the mountains, and, out of the four seasons of the year, the summer seems to be under-represented in the faunal remains from Grotta Continenza. This might suggest, then, that at least a part of the Fucino population would have dispersed during the summer to sites located in other areas, such as the specialist hunting camp at Campo di Giove in the Apennine mountains. Not only would this have alleviated the problems of coping with food shortages, but it would also have acted as a mechanism for resolving social tensions (Bender 1981).

Another problem of interpretation concerns the relations among the various Mesolithic sites in the Abruzzo-Marche region, and in particular the relations between sites located near to the coast, such as Ripoli, and sites located further inland. Barker (1981a) has proposed two models to account for the apparent patterning of Mesolithic sites in Lazio and the Fucino basin, which can be applied to the data from the Abruzzo-Marche region in east-central Italy:

> "In the first model, the annual territory of an epipalaeolithic band in Lazio would normally have encompassed both lowlands and highlands, with an annual subsistence round methodically using a series of sites to exploit a series of resources at the time of their seasonal abundance, in the manner of many hunter-gatherer bands today (Lee and De Vore, 1968; Thomson, 1939). Such a system might involve winter hunting and fishing on the coast, spring and summer hunting and fishing in the Fucine basin, ibex hunting in the early fall as the bad weather began to force them down to lower elevations, deer and cattle hunting

in the middle valleys in the late autumn and early spring. In the second model, the diversity of resources in a few areas such as the coast and inland lake basins was sufficiently rich to enable all-year-round subsistence." (Barker 1981a: 141-2).

As Barker (1981a: 142) states, these two models do not have to be regarded as mutually exclusive. In addition, it is tempting to suggest, as in northern Europe (Douglas Price 1983: 770), that social territories diminished in size during the early Neothermal, and that fairly sedentary coastal groups based at sites such as Ripoli may have become increasingly separated from inland groups based in productive locations such as the Fucino basin. However, the few Mesolithic sites that are known from the Abruzzo-Marche region seem to emphasize, above all, the range of variation in Mesolithic subsistence and settlement practices, and it would be unwise at this stage to generalize further about them.

b) Early Neolithic

i) Sites

Twenty-two early Neolithic sites have been identified in the Abruzzo-Marche region (Fig. 87). (See Appendix 1 for details.) They can be divided geographically into three groups: the first group comprises residential sites located in the lowlands, the second comprises cave sites located in intermediate positions between the lowlands and the inlands, and the third group comprises open and cave sites located in inland intermontane basins, depressions, and valleys.

Ten early Neolithic residential sites have been found in the lowlands of Abruzzo and Marche. They are located between 2 and 21 km inland from the present-day Adriatic coastline, and between 34 and 375 m above present-day sea level. They can be divided into three sub-groups on the basis of their precise locations. The first of these comprises four sites located on Pleistocene hills flanking the lower sections of major river valleys in the Abruzzo region, between one and ten kilometres inland from the Adriatic coast: Colle Sinello [CH] (Ducci et al. 1986-7: 107), Fontanelle [PE] (Ducci et al. 1986-7; Agostini 1986-7a), Crocefisso [CH] (Ducci et al. 1986-7; Agostini 1986-7a), and Colle S. Savino [TE] (D'Ercole 1988b: 2). The second lowland sub-group comprises three sites located on Pleistocene terraces flanking major river valleys in the Marche region, between 2 and 21 km inland from the Adriatic coast: Monte Colombo [AN] (Dall'Osso 1915: 15-17), Ripabianca [AN] (Broglio and Lollini 1963; Evett and Renfrew 1971; Barker 1975), and Monte Cappone [AN] (Lollini 1977). The third lowland sub-group comprises three sites located on Pleistocene and Pliocene hills which flank tributary rivers and streams in the Abruzzo region, and which are situated between 13 and 21 km inland from the Adriatic coast: Villaggio Rossi [CH] (Geniola 1973, 1982b), Villaggio Leopardi [PE] (Cremonesi 1967; Evett and Renfrew 1971) (Plate 4), and Colle Maggio [PE] (M. Costantini pers. comm.).

Two early Neolithic sites fit into the category of caves located in intermediate positions between the lowlands and the mountainous inlands in the Abruzzo region: Grotta dei Piccioni [PE] (Barker 1975; Cremonesi 1976) (Fig. 91, Plates 2 and 3), and Grotta S. Angelo [TE] (Radmilli 1975) (Fig. 92, Plates 23-25).

The third group of early Neolithic sites comprises 10 open and cave sites located in inland intermontane basins, depressions, and valleys in the Abruzzo-Marche region. One site was found at Capo d'Acqua in the Ofena basin [AQ] (Bonuccelli and Faedo 1968; Barker 1975) (Plates 16 and 17). Another site was found at La Valle in the S. Pio-Navelli depression [AQ] (Mattiocco 1986: 31-7) (Plate 18). Four intermontane valley sites are known: Madonna del Soccorso, which lies in a small intermontane valley near to the Aterno valley [AQ] (D'Ercole 1987-8: 406); Fonterossi, which lies along the upper section of the River Aventino, below the Maiella mountains [CH] (Rellini 1914, 1932, Barker 1975); and Campo Sportivo (Lollini 1979: 67) and La Maddalena (Lollini 1965; Evett and Renfrew 1971; Barker 1975: 133; Wilkens 1989: 4) which lie along the upper section of the River Chienti [MC] (Plate 29, Fig. 86).

Three open sites and one cave site dating to the early Neolithic have also been identified in the Fucino basin [AQ] (Fig. 84): Cellitto (Barker 1975; Cremonesi 1985: 721-2) (Plate 15); Colle S. Stefano (Radi 1987-8; Radi and Wilkens 1989) (Plate 14); Ortucchio (Cremonesi 1962: 3) (Plate 9); and Grotta Continenza (Grifoni Cremonesi and Mallegni 1978; Grifoni Cremonesi 1984, 1985, pers. comm. 1986) (Plate 11).

ii) <u>The Mesolithic-Neolithic transition</u>

The earliest Neolithic radiocarbon dates from the Italian regions flanking the Adriatic Sea indicate that there was a chronological 'break' of about 800 years between the start of the Neolithic in the south-east Italian region of Puglia (characterized materially by the use of pottery and domesticates) and its beginning in the east-central Italian regions of Molise, Abruzzo, Marche, and Emilia-Romagna. Cassano (1985: 736-7) has plausibly suggested that this 'break' reflects the establishment of a stable frontier zone between the earliest Neolithic groups in south-east Italy and Mesolithic groups to the north. The north-western edge of the flat and fertile Tavoliere plain may have formed the southern edge of such a frontier zone, which possibly extended over the modern region of Molise (see Chapter 4).

The establishment of this stable frontier can partly be explained from an ecological point of view, following

Lewthwaite's (1982b: 315) colonization model of Austronesian and Bantu populations, in which many of the stages of expansion appear to reflect the ecological tolerance of different crop complexes. The northern edge of the Tavoliere plain and the Molise region may have formed an ecological barrier to the northward spread of the earliest Neolithic crop complex from south-east Italy, which was only overcome by the re-adaptation of those crops to the environmental conditions of central and northern Italy. Samples of the remains of early Neolithic crop plants from Italy provide some support for this suggestion, for in southern Italy wheat predominated strongly over barley, at an average of 4:1 (based upon the fairly well-quantified early Neolithic samples from Villa Comunale, Rendina, Scamuso, Masseria Santa Tecchia, and Coppa Nevigata: Nisbet 1977-82; Follieri 1977-82; Costantini 1987; Sargent 1983b, 1987), whereas in northern Italy the limited botanical evidence seems to indicate a predominance of barley. At Chiozza in Emilia-Romagna, for example, all 15 of the identified cereal grains were of barley (Evett and Renfrew 1971), and at Cecima in Lombardia, all 44 cereal grains were of barley (Nisbet 1982). At Villaggio Leopardi in Abruzzo there were seven grains of barley as opposed to two grains of wheat (Evett and Renfrew 1971), but the sample size here really is very small to feel confident about the validity of these proportions. The significance of barley is that although it is less tolerant of wet soils than emmer wheat, it can generally tolerate a wider range of soils, and, due to its shorter vegetational cycle, it has wide climatic adaptability. It can therefore ripen in a colder climate than wheat, and can be cultivated at a much more northerly latitude (Spurr 1986: 14-15). The chronological 'break' between the beginning of the Neolithic in south-east and central Italy may therefore partly relate to the re-adaptation of the south-east Italian crop complex, dominated by wheat, into one suited to the ecological conditions of central and northern Italy which favoured a complex of crops dominated by barley. (On a European scale, however, wheat was grown in much more northerly and cooler areas than central and northern Italy.)

The role of the indigenous Mesolithic populations in central Italy must also be considered in relation to the origins of the Neolithic in that region. To begin with, it is no longer necessary to think in terms of a small Mesolithic population in Italy (eg. Whitehouse 1968: 354), now that large numbers of Mesolithic sites have been discovered by new fieldwork both in southern and northern Italy. Clusters of Mesolithic/final Epigravettian open sites have been identified, for example, around the coastal lagoons in the Salento peninsula of Puglia (Piccinno and Piccinno 1978; Milliken and Skeates 1989), and in northern Italy great concentrations of late Mesolithic/Castelnovian sites are known from the north-east Alpine region and the Emilian Apennines (Biagi et al. 1985: 272). The broad-spectrum subsistence economy practised by Mesolithic groups in central Italy can be partially regarded as a preadaptation which facilitated the adoption of the new Neolithic elements. However, "there is no evidence to suggest that the mesolithic populations were on the point of developing a farming system of comparable productivity based upon local resources" (Lewthwaite 1986: 64). In addition, it seems likely that the success and stability of the Mesolithic system of subsistence in central Italy contributed to the delayed adoption of early Neolithic crops and domesticated animals there (Barker 1981a; Lewthwaite 1986).

As in the rest of the central Mediterranean, hard data concerning the nature of the Mesolithic-Neolithic transition in the Abruzzo-Marche region are limited, and stratigraphic sequences are generally confusing, but some patterns in site locations can be discerned. The strongest evidence of spatial continuity comes from the sites of Grotta Continenza and Ortucchio in the intermontane Fucino basin in Abruzzo, where early Neolithic deposits actually overlie those of the Mesolithic. However, in Grotta Continenza the Neolithic deposits were separated from those of the Mesolithic by an apparently sterile layer of grey clay (spit 25), and at Ortucchio the dating of the overlying deposits to the early Neolithic is based upon the limited evidence of two Impressed Ware sherds and an obsidian bladelet. Slight shifts in site locations seem to have occurred in other inland places. In the Ofena basin, for example, the Mesolithic and early Neolithic sites at Capo d'Acqua were separated by just a few hundred metres and produced very similar lithic industries, and in the Pieve Torina intermontane valley in Marche the early Neolithic sites at Campo Sportivo and La Maddalena were situated between just 1.4 and 2.75 km away from the Mesolithic site at Lucciano (Fig. 86). In the lowlands there is, at the moment, unfortunately little evidence of either continuity or discontinuity in site locations. Only one Mesolithic site has so far been found in this area, but, given the existence of this one, it seems likely that more will be found in the future. The Mesolithic site at Ripoli is located 6.5 km away from the nearest known early Neolithic site at Colle S. Savino, but it lies on the end of a fluvial terrace in a similar position to that favoured by many Neolithic sites in the lowlands, and was actually overlain by a late Neolithic site. Perhaps the strongest evidence of novelty in site location is provided by Grotta dei Piccioni, which was first occupied during the early Neolithic and which was then filled by an almost uninterrupted sequence of deposits that continued into the Bronze Age.

Many alternative models have been proposed to account for the nature of the Mesolithic-Neolithic transition in the Mediterranean, ranging from those in favour of large-scale maritime colonization by immigrant populations bringing a 'Neolithic package' of domesticated plants and animals, pottery, and ground-stone tools (eg. Ammerman and Cavalli Sforza 1984) to those in favour of an almost entirely indigenous process of change amongst Mesolithic populations who made use of resources that were already present locally (eg. Dennell 1983; Barker 1985b). The most recent advance in this discussion has been made by Lewthwaite (1985, 1986, 1987) who has proposed an 'availability model', following Zvelebil and Rowley Conwy (1984), and a 'Tyrrhenian active filter model' to explain the transition to food production in the central Mediterranean. He emphasizes that the transition from the 'Mesolithic' to the 'Neolithic' in the Mediterranean took place gradually in a number of stages which spanned two or more millennia, and he draws a distinction between the availability of knowledge of the techniques of food production and the actual commitment to agriculture as an economic strategy. He also takes regional variation into account, stating that "no uniformity of pattern can be teased out of the data concerning the regional transition to food production" (Lewthwaite 1986: 54). In his 'availability model' for Italy, he identifies three significant stages of development: an 'availability phase' (6000-4000 BC), in which information was exchanged, particularly though the development of maritime contacts, between agriculturalists in south-east Italy and gatherers in central and northern Italy; a 'subsistitution phase' (4500-3700 BC), in which agriculture (involving variables such as cereals and sheep) was gradually introduced into central and northern Italy, either through the immigration of cultivators, or through its adoptation by the gatherers as a supplement or seasonal complement to their existing subsistence strategies, and which ended with the relegation of gathering to a minor role in the economy; and a long 'consolidation phase' (3700-c.1000 BC), in which cultivation intensified and spread to less fertile, secondary, soils (Lewthwaite 1987). In his 'active filter model', which was developed primarily for the Neolithic of Corsica, he assigns the Tyrrhenian islands of Corsica and Sardinia the role of an active filter, which selectively transmitted certain economic innovations from a donor region, comprising southern Italy and Sicily, to a recipient zone in the south of France (Lewthwaite 1985).

These two models can be adapted for use in the Abruzzo-Marche region. It is important to begin by emphasizing that different processes operated here on various geographical and chronological scales. Differences can be seen, for example, between developments in the coastal lowlands and inland areas in Abruzzo, and between developments in southern Abruzzo and areas to the north. Similarly, although radiocarbon dates from early Neolithic sites in Abruzzo and Marche indicate that pottery and ground-stone tools (but less certainly domesticated animals and plants) spread rapidly throughout the region at about 5750 Cal. BC, the consolidation phase that followed this initial burst of activity lasted at least into the fifth millennium Cal. BC (ie. the late Neolithic).

Pottery decoration and the pattern of early Neolithic radiocardon dates from around the Adriatic suggest that south-east Italy was the donor region which provided the

Abruzzo-Marche region with the set of Neolithic innovations (see Chapter 4). Similarities between pottery from early Neolithic sites in Dalmatia, such as Smilčić or Tinj (Zadar Museum), and early Neolithic sites in southern Abruzzo, such as Crocefisso or Fontanelle (Ducci et al. 1986-7), seem to be only indirectly related through shared contacts with south-east Italy. The Molise region, which may have previously acted as a stable frontier zone between the southern agriculturalists and Mesolithic groups in Abruzzo-Marche, and also the coastal lowlands of southern Abruzzo seem to have acted as a filter zone during the early Neolithic. They absorbed a wide range of Neolithic traits from south-east Italy (most notably the Guadone style of pottery decoration), but only transmited these innovations selectively to the recipient zone of inland and northern Abruzzo and the Marche region.

It is possible that small-scale maritime immigration of agriculturalists took place throughout the early Neolithic between Molise and northern Puglia, and in particular the Tavoliere plain, and the coastal lowlands of southern Abruzzo. This is suggested by the close similarities of the Guadone-style pottery found in these areas, and seems especially possible considering the evidence from aerial photography of a large concentration of population on the Tavoliere plain during the early Neolithic (see, for example, Brown 1989). The distances covered would have been relatively small, and it is unnecessary to imagine anything more than small groups of people settling in the coastal lowlands of Abruzzo, at sites such as Colle Sinello, Crocefisso, and Fontanelle where relatively large quantities of Guadone-style pottery have been found. None of these sites have radiocarbon dates, but, on the basis of the typological analysis of the pottery found at them, it seems quite possible that not all of them date to the earliest stage of the early Neolithic in Abruzzo (see Chapter 1). This would suggest that any immigration which did happen took place gradually throughout the early Neolithic (and possibly also later), perhaps in small waves, and not all in one short burst. The nature of the site locations and archaeological remains from Crocefisso and Fontanelle suggest that a fairly well developed agricultural economy may have been practised at these possible immigrant sites, although it is likely that this was adapted to the ecological conditions of the Abruzzo-Marche region, rather than being precisely the same as that practised in south-east Italy.

The role of indigenous Mesolithic groups in the origins of the Neolithic in the Abruzzo-Marche region should not be underestimated, particularly in the inland areas of southern Abruzzo and in areas further to the north in northern Abruzzo and the Marche region where only a few sherds of south-east Italian Guadone style pottery have been found and where a more indigenous-looking Abruzzo-Marche style of Impressed Ware developed. As in peripheral parts of southern Italy (Whitehouse 1971) and inland parts of Dalmatia (Chapman and Müller 1990: 133), indigenous groups here seem to have only gradually and selectively adopted elements of the Neolithic farming economy from coastal groups and added them to their broad-spectrum subsistence systems. This need not have been as stressful a process as some prehistorians have tended to think (eg. Whitehouse 1971), for it is unlikely that there was much pressure upon land or resources in the Abruzzo-Marche region at this time (especially those used by farmers).

Villaggio Rossi is a particularly interesting site when considered in terms of immigrant and indigenous populations. Only Abruzzo-Marche style Impressed Ware seems to have been found here in the lowest levels of the large cavity in Area IA, but it was found in association with Guadone-style pottery in the upper levels. In addition the site is located in the inner part of the coastal lowlands of southern Abruzzo, 13 km inland from the Adriatic coast and at 346 m above sea level. It is tempting to regard this as a site that was established by an indigenous inland group, but which maintained close links with the immigrant groups on the coastal lowlands. One problem with this view, however, is that it tends to emphasize the differences between 'immigrant' and 'indigenous' populations, which, at least in southern Abruzzo, may not have been particularly distinct.

iii) Early Neolithic subsistence and settlement

It seems possible to begin by stating that crop cultivation was generally an important element in early Neolithic subsistence economies in the Mediterranean region. From an environmental point of view, Halstead (1980: 314) suggests that plant foods, and in particular cereals and pulses, would have dominated the diets of lowland Neolithic groups. This, he argues, would have been due to the impracticalities of maintaining sufficiently large domestic animal herds for meat and/or milk in a predominantly forested environment (see Chapter 2). Wild nuts, seeds, and fruits, he suggests, were probably too limited and scattered a resource to make a significant contribution to the calorie intake of most lowland groups (although they would certainly have provided an element of diversity in the diet), and so cereals and pulses can be considered as the most likely early Neolithic staple food resources. Settlement patterns seem to confirm the importance of crop cultivation in early Neolithic subsistence in the Mediterranean region. A large number (although not all) of early Neolithic sites in this area are located on soils which today have a high arable potential (Jarman et al., eds. 1982: Fig. 48). In Dalmatia, for example, early Neolithic field-survey sites were found to be concentrated on the most fertile modern agricultural soils (Chapman et al. 1987); and in the middle and lower parts of the Ofanto valley, in northern Puglia, 80% of the early Neolithic field-survey sites were located on or very close to brown soils (Cipolloni Sampò 1977-82: 192). Despite the lack of detailed soil maps for the Abruzzo-Marche region, the evidence of early Neolithic settlement in this region does not seem to contradict this pattern: almost all of the 18 early Neolithic open sites are located on soils which are potentially cultivable today, and at Fontanelle and Crocefisso, which are the only sites where detailed geomorphological studies have been carried out, remnants of highly productive and easily worked Neothermal brown soils were found close to the early Neolithic sites (Agostini 1986-7a). Dietary studies of early Neolithic Mediterranean populations suggest that meat became an increasingly important element in human diets from the Neolithic to the Bronze Age (Fornaciari 1982). This, however, was a very gradual, long-term, development which only became particularly evident during the Bronze Age, and it seems likely that the Mesolithic emphasis upon plant foods in the diet continued fairly strongly into the early Neolithic.

Relatively firm evidence of early Neolithic crop cultivation in the Abruzzo-Marche region comes from just one site, Villaggio Leopardi, where impressions of grains of barley and emmer were found in plaster fragments (Evett and Renfrew 1971). A number of other indirect lines of evidence, however, suggest that crop cultivation may have been fairly widespread during the early Neolithic in this region. To begin with, it seems likely that crops were grown around the site at Colle Maggio, which is located on similar (modern) soils and in a very similar location to Villaggio Leopardi. In addition, it seems likely that crops were grown around the other lowland early Neolithic sites in the Abruzzo region, which are all located nearer to the coast, on similarly productive (modern) soils. In the intermontane Gubbio basin in Umbria, a wide range of cereals and a few legumes appear to have been grown around the early Neolithic site at S. Marco (Housely and Giorgi 1987: 6), which suggests that crops may also have been grown around the sites of Cellitto and Colle S. Savino in the intermontane Fucino basin in Abruzzo, both of which are surrounded in part by modern agricultural soils. This suggestion seems to be supported by the evidence of Neolithic forest clearance in central Italy, which, although especially evident on the coastal lowlands, is also represented in the inland basins. In addition, numerous chert 'sickle blades' were found at Colle S. Savino. Finally, despite Barker's (1976a: 69) claim that no cereals were grown in Marche during the earlier Neolithic, straw impressions in plaster identified at Ripabianca and La Maddalena may possibly (although by no means certainly) indicate that, like today, cereals were cultivated at these sites. Although the evidence is tentative and for the most part indirect, it is tempting to suggest that crops were cultivated around the majority of early Neolithic open sites in the Abruzzo-Marche region, especially in the lowlands, but also to a certain extent in the inland intermontane basins, depressions, and valleys.

Early Neolithic crop cultivation is likely to have been small in scale, and concentrated in plots located close to residential sites. This is suggested by the evidence of forest clearance in central Italy (see Chapter 2), which indicates that only restricted areas of the forest were thinned and cleared around Neolithic settlements. Given the possibility of high yields being produced from the cultivation of warm, light, and fertile Mediterranean soils, particularly if seed planting rather than broadcasting was practised, then the area required for cultivation in any one year would only have been very small (Halstead 1980: 318-9). Soils are likely to have been worked by hand at this stage, combining human muscle-power with an agricultural technology of hoes, mattocks, or digging sticks.

A form of fixed plot horticulture is likely to have been practised rather than shifting or swidden cultivaton (Sherratt 1980). The build up of early Neolithic settlement deposits, the digging of large cavities, and the concentration of settlement within relatively limited areas in the landscape, seem to point towards a fair degree of settlement stability and sedentism during the early Neolithic in the Abruzzo-Marche region, and to support Sherratt's suggestion of fixed plot horticulture. Compared to the tropics, the decline in crop yields produced on small, intensively cultivated, fixed plots in the Mediterranean is likely to have been limited and gradual. Leaching of soil fertility is a very slow process in the

Mediterranean, and, due to the high and durable edaphic potential of the soils selected for early agriculture in this region, Halstead (1980: 318-9) claims that it would even have been possible to use the same portion of land continuously without even fertilizing it artificially. The proximity of cultivated plots to settlements, however, is likely to have resulted in the longer-term fertilization of the soil by the dumping of human manure, household refuse, and probably also some animal manure on the fields. The growing of pulses, small numbers of which are regularly represented in early Neolithic plant assemblages in Italy, would also have helped to feed nitrogen back into the soil.

It is possible that crops were grown both on soils which were well-drained and on those with a high water content during the early Neolithic in the Abruzzo-Marche region. In Abruzzo, the lowland open sites tend to be located on Pleistocene hills, in at least two cases on well drained soils, and at the minimum 30 m above the nearest river valley, half way up the hill side (as at Fontanelle), but more frequently between about 130 and 140 m above the river valley, towards or actually on the top of the hill (as at Crocefisso, Villaggio Leopardi, and Villaggio Rossi). This pattern ties in with that observed on the Tavoliere plain in northern Puglia, where early Neolithic sites were repeatedly located on soils that today are light and well-drained and overlying small outcrops of calcium carbonate crosta, on the edge of heavier alluvial valley soils (Jarman and Webley 1975; Sargent 1983a). In Marche, on the other hand, the lowland open sites tend to be located on Pleistocene and Holocene terraces that lie much closer to the bottom of the river valleys. The early Neolithic site at Monte Cappone, for example, is located below the hillslope of the Pleistocene Monte Cappone, on terraced Holocene fluvial deposits situated along the edge of the River Esino valley, just 15 m above, and 1 km away from, the river bed. This pattern ties in more closely with that observed in northern Italy, where the earliest Neolithic settlements are located on flat Holocene fluvial terraces, or on the shores of small intermorainic lakes, or on wide, partly drained, alluvial fans situated along the edge of the Apennines. Grains of emmer and einkorn were found (and probably cultivated), for example, at the early Neolithic site of Campo Ceresole near Vhò, which was located on a very low hill surrounded by swamps and marshy areas, as is suggested by the Neothermal soils from the site which show clear evidence of hydromorphy (Biagi et al. 1985). This north Italian pattern also corresponds well with Sherratt's (1980) ground-water model of European Neolithic horticulture, in which crops were grown on fine-grained, water-retentive, soils. However, during the later stages of the early Neolithic in northern Italy, settlements were increasingly located on well drained soils (Biagi et al. 1985). It is difficult to assess the water content of the soils situated around the potential crop-cultivation sites located further inland in the Abruzzo-Marche region, such as Cellitto or La Maddalena, but, in general, it would seem that these, like the crop-growing site at S. Marco in the Gubbio basin, fit best into the north Italian pattern of high ground-water cultivation.

Five of the 21 early Neolithic sites in the Abruzzo-Marche region are unlikely to have been crop-growing sites. The three cave sites are unlikely to have served as permanent settlements around which crops were cultivated, although Grotta dei Piccioni is situated near to some light and fertile modern soils. Carbonized plant evidence from Grotta S. Angelo indicates, instead, that wild apples may have been gathered near to this site. The location of the open sites at Madonna del Soccorso and Campo Sportivo on relatively unproductive modern soils in fairly narrow intermontane valleys also suggests that crops were not grown at these sites. Such sites might best be compared to the early Neolithic site at Fanignola in northern Italy, where clay-lined pits were found to contain burnt hazel-nut shells and fruit pips, but no cereal grains, and where the faunal remains indicated a predominance of hunted wild animal species (Biagi et al. 1985).

Faunal remains have been found on at least 13 early Neolithic sites in the Abruzzo-Marche region (see Appendix 4), and specialist faunal reports have been published for nine of these: Crocefisso (CH) (Sorrentino 1986-7: 105-6), Fontanelle (PE) (Sorrentino 1986-7: 86), Grotta dei Piccioni, spits 26-21 (PE) (Cremonesi 1976), Villaggio Leopardi (PE) (Cremonesi 1967), Capo d'Acqua (AQ) (Bonuccelli and Faedo 1968), Colle S. Stefano (AQ) (Radi and Wilkens 1989), Grotta S. Angelo ritual pits (TE) (Radmilli 1975: 76-7), La Maddalena (MC) (Barker 1975: 133, Wilkens in press c: 4), and Ripabianca (AN) (Broglio and Lollini 1963: 148; Barker 1975: 134; Wilkens in press c: 3-4).

A few patterns can be discerned from the relative percentages of bones belonging to particular species found on early Neolithic sites in the Abruzzo-Marche region (see tables below).

Table 3. Proportions (%) of domesticated and wild species found on early Neolithic sites located at varying distances inland from the Adriatic coast

Site	Km	SS	Cattle	Sh/g	Pig	Dog	Wild species
262. Ripabianca	9	?	6	64	19	?4	?7
33. Vill. Leopardi	21	156	12	44	43	-	0.5
97. Gr. S. Angelo	27	89	10	51	25	-	14
23. Gr. dei Picc.	34	326	3	21	9	1	66
38. Capo d'Acqua	40	100	?	?	?	?	50+
183. La Maddalena	60	?	8	15	50	2	25
41. Colle S. Stef.	74	366	5	38	12	0.5	44.5

(SS = sample size, ie. total number of identified bones)

Table 4. Proportions (%) of cattle, sheep/goat, and pig on early Neolithic sites located at varying distances inland from the Adriatic coast

Site	Km inland	Cattle	Sheep/goat	Pig
262. Ripabianca	9	8	71	21
33. Vill. Leop.	21	12	44.5	43.5
97. Gr. S. Angelo	27	12	59	29
23. Gr. dei Picc.	34	10	63	27
183. La Maddalena	60	11	20.5	68.5
41. Colle S. Stef.	74	10	68	22
	Average	10.5	54	35

Bones of sheep and goat out-number the bones of other domestic species on almost all of the early Neolithic sites with reliable quantified faunal assemblages in the Abruzzo-Marche region (with the exception of La Maddalena), and average 54% of all domesticated animal bones found on these sites. In addition, sheep bones out-number those of goat by a ratio of about 5:1 at Colle S. Stefano. This pattern can probably be applied to the rest of the region, using the analogy of early Neolithic Greece, where sheep also predominate (Halstead 1980: 324). Ovicaprid bones are particularly important (numerically) on early Neolithic sites located in or on the edge of the lowlands, up to about 30 km inland from the Adriatic coast. At Ripabianca and in the ritual pits at Grotta S. Angelo, for example, they dominate the entire faunal assemblages. Further inland, their importance seems to decline slightly in relation to pig and/or wild species, although at Colle S. Stefano, in the Fucino basin, they still comprise 68% of all domestic animal bones.

These differences in the relative importance of ovicaprids (and in particular sheep) on early Neolithic sites may correspond, to a certain extent, with the existence of relatively open environmental conditions in certain parts of the region, for sheep are well suited to such conditions. In the coastal lowlands, for example, where high proportions of sheep/goat bones were found at Ripabianca (and perhaps also at Crocefisso and Fontanelle), a relatively open woodland is likely to have existed during the 'Atlantic' period (see Chapter 2). Naturally open areas are also likely to have occured along the major river valleys and perhaps around lake Fucino, and other areas would have been cleared artificially for cultivation. Ovicaprids may have been penned close to early Neolithic settlements in these areas, and if this is so, then they would have provided a useful source of manure for maintaining the fertility of the agricultural soils.

Pigs are the second most important domesticated species found on early Neolithic sites, and their bones comprise an average of 35% of all domesticated animal bones found on these sites. Their importance seems to vary from site to site in the Abruzzo-Marche region. They dominate the entire faunal assemblage at La Maddalena, which is located 60 km inland from the Adriatic coast at the foot of the Apennine mountains. This probably relates to the forested conditions which are likely to have existed around this site, to which pigs are well suited. They are also numerically important at Villaggio Leopardi, which is located in the inner lowlands of Abruzzo. Elsewhere, numbers of pig bones drop in relation to those of ovicaprids and/or wild species. Pigs could have been kept as farmyard animals in and around early Neolithic settlements, and/or as relatively free-ranging herds in the oak forests. The latter seems particularly likely for the autumn season, when pigs could have been taken into the forests to forage on acorns, fungi, and truffles (Halstead 1980: 323; Lewthwaite 1982a). Bones of wild pig, <u>Sus scrofa</u>

scrofa, were identified by Wilkens alongside domestic pig at Colle S. Stefano and Ripabianca (Radi and Wilkens 1989; Wilkens in press c). At Colle S. Stefano wild pig bones were out-numbered by those of domesticated pig by a ratio of 1:4.5. However, if pigs were kept in free-ranging herds in the forests, then interbreeding is likely to have have minimized the distinctions between 'domestic', 'feral', and 'wild' pigs.

Cattle are numerically the least important of the domestic species found on early Neolithic sites in the Abruzzo-Marche region, and their bones comprise an average of 10.5% of all domesticated animal bones found on these sites. However, at Colle S. Stefano, their bones comprise 51% of the total meat-weight represented by the assemblage, whereas ovicaprid bones, which are numerically dominant, comprise only 12%. The proportion of cattle to both domesticated and wild species varies little from site to site, although slightly larger quantities of cattle bones were found at Villaggio Leopardi and in the ritual pits at Grotta S. Angelo, both of which lie between 20 and 30 km inland from the Adriatic coast in, or on the edge of, the inner lowlands.

Relative quantities of the bones of wild species found on early Neolithic sites vary notably within the Abruzzo-Marche region. On lowland sites located up to about 30 km inland from the Adriatic coast, their numbers are relatively small, but further inland their numbers increase significantly. At Grotta dei Piccioni, Capo d'Acqua, and Colle S. Stefano, for example, their bones dominated the faunal assemblages in numerical terms. The most common 'wild' species were red and roe deer. At La Maddalena, for example, red deer amounted to almost 25% of the animal bones. Jarman (1970: 258-9) has suggested that red deer may have been herded rather than hunted at the Neolithic site of Molino Casarotto in northern Italy, but morphological studies of red deer bones from central Italy by Barker (1976b) reveal the complexity of the data and the difficulties in reaching clear-cut conclusions about the status of this particular species (also see Wilkens 1989). In addition, the current consensus is that large numbers of red deer continued to exist during the Neothermal, and that there was no need to herd them (Sherratt pers. comm. 1991). Wild cat, red fox, and probably wild pig are also fairly well represented in early Neolithic faunal assemblages. Minor wild species, which were probably hunted, include: brown bear, chamois, hare, badger, marten, and polecat. Red squirrel, edible dormouse, hedgehog, and possibly some microfauna may also have been eaten. The high quantities of microfaunal remains found in Grotta dei Piccioni, particularly in the basal level (spit 26), probably represent the remains of wild predators' meals. Fishing and fowling probably continued during the early Neolithic in the Fucino basin, where bones of brown trout and water birds (notably coot) were identified in the faunal assemblage at Colle S. Stefano.

Age-at-death data from two sites suggest that domestic animals were exploited primarily for their carcasses during the early Neolithic in the Abruzzo-Marche region. Pig bones at Colle S. Stefano were almost exclusively from young animals, and sheep/goat mandibles from Colle S. Stefano and Crocefisso came from animals aged under 2 years. Aged cattle bones from Colle S. Stefano, on the other hand, came from two adults and one young animal. Overall this ties in with a modern pattern of meat exploitation in which the majority of domestic animals are slaughtered at a fairly young age in order to minimize feed costs and maximize meat returns, but the sample of aged bones seems to have been small at these two sites, and the analogy could be misleading. Ethnographic studies of the role of domestic animals in pre-plough societies suggest, anyway, that domestic animals are likely to have been valued as much for ritual as for purely economic reasons, and they may have been eaten especially as sacrifices, and rarely killed purely for meat (Cranstone 1969). Indications of the sacrifice of animals in the Abruzzo-Marche region come from Grotta Continenza, where the intact skeletons of two sheep and a dog were found in the ritual deposits; and feasting is suggested by the predominance of carbonized meat bones of both domestic and wild species in the Grotta S. Angelo ritual pits. In addition, domestic animals may have been kept as commodities of exchange during the early Neolithic (see Chapter 4).

The traditional interpretation of the cavities found during the excavation of most Neolithic settlement sites is that they are the remains of hut floors ('fondi di capanne') or pit-dwellings. This interpretation has a long history and is favoured by many Italian archaeologists (eg. Radmilli 1967b). The main alternative interpretations are that they were dug as quarries for clay daub (although some of them cut into gravel deposits) or as storage pits (Barfield 1976: 13-16), with secondary functions as fire pits, 'rubbish' pits (cf. Hill 1989), and graves. In general it seems unlikely that these Neolithic cavities were sunken hut floors, for the ethnographic record suggests that "men rarely live in underground pits" (Orme 1981: 101), and that even roofed cavities are used for storage (Orme 1981: Fig. 39). The lack of details in excavation reports, however, and the small extent of most excavation areas, makes it difficult to decide upon any particular function for the early Neolithic examples from the Abruzzo-Marche region. Indeed, it is unlikely that they were all dug for the same purpose (Barfield 1976: 13). They can be categorized into three groups on the basis of size: there are two small examples from Villaggio Rossi which measure 0.35-4 m^2; six medium examples from Villaggio Rossi, Villaggio Leopardi, and Crocefisso (the latter was surrounded in part by a small ditch) which measure 10-14.5 m^2; and two large examples from Villaggio Rossi (cavity IA) and Ripabianca which measure 50-56 m^2 (Figs. 88-90). The large examples are as large as northern European Neolithic house plan sizes (Barfield 1976: Fig. 12), but they have irregular outlines, and there is no strong evidence to suggest that they were hut bases.

Hut bases or not, it is a fact that plaster fragments, often with parallel branch impressions (eg. Radmilli 1967b: Fig. 5), have been found in the deposits of at least half of the early Neolithic open sites in the Abruzzo-Marche region, which suggests that some sort of wattle and daub structures did exist at these sites. These may have been similar in construction to the traditional 'pagliari' or 'pulari', made of branches, reeds, or straw and daub, which are still found today in the Abruzzo-Marche region, and which are used for a variety of purposes, including agricultural labourers' and charcoal burners' dwellings, tool storage sheds, and chicken and rabbit sheds (Brigidi and Poeta 1953: 61; Ortolani 1961: 102-3; Close Brooks and Gibson 1966).

Settlements in the Abruzzo-Marche region appear to have been small during the early Neolithic. Surface remains at Fontanelle extended over an area of about 4000 m^2 (Ducci et al. 1986-7: 88), and over an area of about 7000 m^2 or a little more at Colle S. Stefano. In contrast, the early Neolithic sites at Tinj in Dalmatia and Campo Ceresole near Vhò in northern Italy extended over areas of 12,000 m^2 and a minimum of 20,000 m^2 respectively (Chapman et al. 1987; Biagi et al. 1985). (This contrast should not be over-emphasized, however, for the sample of measured sites is small, and different formation processes are likely to have occured on different sites and in different regions.)

The pattern of early Neolithic settlement in the Abruzzo-Marche region corresponds well with Sherratt's (1980) 'phase one' pattern of small residential sites or hamlets distributed within fairly restricted habitats, or 'settlement cells', which were particularly suitable for early farming practices, and which may have been separated by wide uncultivated areas. The sites sometimes form a linear pattern following a particular ecological zone, as is the case with Fontanelle and Crocefisso which were located along the Pleistocene hill slope flanking the south-east side of the River Pescara. They are also often found in pairs (eg. Ortucchio and Colle S. Stefano [AQ], Villaggio Leopardi and Colle Maggio [PE], and La Maddalena and Campo Sportivo [MC]), which might reflect a process of settlement fissioning involving the budding-off of daughter settlements. This may have taken place within a context of growing population levels in the early Neolithic, and might have functioned to avoid or resolve pressure being placed upon local food resources and to avoid or resolve the build up of daily disputes and longer term dominance in residential communities (Bogucki 1988: 114-7; Whittle 1988: 87-8). The proximity of these pairs of sites, which lie at an average of 3.5 km away from each other, could relate to the maintenance of communication and exchange between parent and daughter settlements, and in particular to the exchange of food. It is not possible to establish the rate at which residential sites may have fissioned, but one might possibly expect that certain favourable habitats, such as the Pleistocene hills flanking the lower sections of the major river valleys in the Abruzzo-Marche region, were colonized fairly rapidly during the early Neolithic. Overall, therefore, we should resist too concrete a notion of the early Neolithic settlement pattern (Whittle 1988: 59).

Previous syntheses of central and south Italian Neolithic subsistence and settlement systems (eg. Barker 1975, 1981a; Whitehouse 1968) have rightly emphasized the view that there was no single economy during the Neolithic in Italy, but they have tended to propose simplistic alternatives in which two or three distinct groups practising different modes of subsistence are identified in different parts of a region. Barker (1981a: 143-8), for example, suggests for the Abruzzo-Marche region that a mixed farming group occupied lowland sites in Abruzzo, such as Villaggio Leopardi; that a predominantly pastoral group occupied 'junction' sites in Abruzzo, such as Grotta dei Piccioni and Grotta S. Angelo located along the boundary between the Apennines and the lowlands, and agriculturally 'marginal' lowland sites in Marche, such as Ripabianca; and that groups still living mainly or entirely by hunting, fishing, and gathering, occupied sites located even further inland, in places poorly positioned for either cereal cultivation or sheep/goat husbandry, such as Capo d'Acqua and La Maddalena.

Diversity, which can partly (although not entirely) be understood in terms of adaptation to varying enviromental conditions, appears to have characterized early Neolithic subsistence and settlement in the Abruzzo-Marche region. In the lowlands at least three groups of sites can be identified: predominantly crop-growing and sheep/goat grazing sites in the relatively open coastal lowlands, located either on Pleistocene hill-sides in Abruzzo (eg. Fontanelle and Crocefisso) or on Pleistocene/Holocene terraces on the edges of river valleys in Marche (eg. Ripabianca), and crop growing sites with a greater emphasis on pig-rearing located further inland (eg. Villaggio Leopardi). In the inland areas settlement and subsistence patterns vary almost at a site to site level: with possible agricultural sites located around the Fucino lake basin (eg. Cellitto and Colle S. Stefano), valley sites with limited crop growing and an emphasis on herding and hunting (eg. La Maddalena), non-crop growing sites probably with broad-spectrum herding, hunting, and gathering subsistence located on lake edges (eg. Ortucchio), and more specialized hunting, herding, and gathering sites in intermontane areas (eg. Madonna del Soccero). The cave sites may have functioned as specialist ritual sites where animals were occasionally sacrificed and feasted upon (eg. Grotta Continenza and Grotta S. Angelo). On the other hand, unifying features can also be observed throughout this range of variation. Crop growing, for example, may have been much more widespread in the Abruzzo-Marche region than previous studies have suggested, and sheep/goat seem to be replaced in a gradual and regular way by pig and/or wild animals in faunal assemblages on sites located at increasing distances inland from the coast.

c) Middle Neolithic

Three groups of middle Neolithic sites can be identified in the Abruzzo-Marche region on the basis of their locations (Fig. 93). The first group comprises two lowland residential sites, which are located on the end of Pleistocene terraces in the River Nora valley [PE], between 105 and 205 m above sea level, and between 19 and 22 km inland from the Adriatic coast (Fig. 95). They are: Villa Badessa (Radi 1979), and Catignano (Barker 1975; Pitti and Tozzi 1976; Tozzi 1982; Costantini and Tozzi 1983).

The second group comprises five intermediate cave sites located on the edge of the Apennine mountains and the lowlands. Two are situated along the western side of the Orta gorge [PE] (Fig. 91, Plate 2): Grotta Oscura (Burri 1977), and Grotta dei Piccioni, spits 20-18 (Barker 1975; Cremonesi 1976) (Plate 3). Grotta di Pescosansonesco [PE] lies on the opposite side of the Pescara valley to the Orta gorge, on the eastern side of Monte la Queglia (Radmilli 1980: 15) (Plate 6); Grotta S. Angelo [TE] is located above a gorge cut by the River Salinello at the edge of the Apennine mountains and the lowland hills (Pitti and Tozzi 1976: 105-6) (Fig. 92, Plates 23-25); and Caverna di

Frassasi [AN] lies on the north side of the Sentino gorge, 40 km inland from the Adriatic coast (Rellini 1931b: 171-6, 224-8) (Fig. 85).

The third group of sites comprises two caves located on the edge of Monte Alto on the southern side of the intermontane Fucino lake basin [AQ] (Fig. 84): Grotta Continenza (Grifoni Cremonesi and Mallegni 1978; Grifoni Cremonesi 1984) (Plate 11) and Grotta S. Nicola (Borzatti von Löwenstern 1962b) (Plate 13).

Clearly the sample of just two middle Neolithic residential sites from the Abruzzo-Marche region is limited and biased, as is the proportion of seven cave sites to two open sites. Some interpretations, however, can be made concerning settlement and subsistence, particularly in relation to the early Neolithic patterns.

Lowland settlement appears to have expanded slightly along the inland edge of the early Neolithic settlement area during the middle Neolithic in the Pescara province of Abruzzo. The most inland early Neolithic residential sites in the Pescara province, Colle Maggio and Villaggio Leopardi, were located on Pliocene hills flanking minor river and stream valleys between 16 and 21 km inland from the coast. The middle Neolithic residential sites at Villa Badessa and Catignano were also located along a minor river valley, very slightly further inland, between 19 and 22 km inland from the Adriatic coast, but, in contrast, they were situated on Pleistocene fluvial terraces which lay much closer to the valley bottom, between 15 and 40 m above the river-bed. Despite the abundant evidence of crop cultivation from Catignano, this site and Villa Badessa lie today in an area of relatively secondary agricultural production compared to the areas chosen for early Neolithic settlement, and this may also have been the case during the middle Neolithic.

The location of the middle Neolithic residential sites at Villa Badessa and Catignano just five kilometres away from each other, in almost identical positions on the end of fluvial terraces in the same river valley, and the presence of very similar assemblages of painted pottery at each of them, suggests that these two sites were closely related to each other. It is tempting to regard one of them as being the daughter settlement of the other. This would correspond with Sherratt's (1980: 318) model of population growth for early horticulturalist communities in Europe, in which, to begin with, there was a rapid budding-off and export of population from established settlements, but which was followed by expansion of settlement to smaller and smaller patches of appropriately high-yielding soils within the general settlement area.

The extent of the Catignano surface remains (20,000-30,000 m²) is much greater than that estimated for two early Neolithic sites in the same province (3300 - c. 5000 m²). It is tempting to infer from this that a process of settlement nucleation took place at the end of the early Neolithic, as has been noted for the Tavoliere plain in northern Puglia (Delano Smith pers. comm. in Whitehouse 1981b: 162). A recent study by Brown (1989), combining aerial photographs of ditched enclosure sites with the results of archaeological field-survey and excavation work on the Tavoliere, has clearly identified such a process in the northern half of the Tavoliere plain, where at least three of the large middle Neolithic settlement sites are surrounded by large numbers of small early Neolithic sites. The massive middle Neolithic site at Passo di Corvo, for example, was surrounded by at least 14 small early Neolithic sites. Although the sample of three early Neolithic and two middle Neolithic open sites from the Pescara province is clearly too small to be sure that a similar process of settlement nucleation took place in the Abruzzo region, the increase in settlement size does seem to be real and significant.

Despite the lack of direct settlement continuity at any of the early Neolithic open sites in the Abruzzo-Marche region, the Piccioni and Continenza caves did continue to be frequented during the middle Neolithic, and the stratified pottery assemblages in the Grotta dei Piccioni show a gradual transition from one phase to the other (see Chapter 1, p. 81-2). Other caves in the Orta gorge and the Fucino basin, located at a distance of just 1 km from these two caves, were also frequented during the middle Neolithic, which might possibly relate to an expansion of ritual activities taking place in cave sites at this time.

Further details are provided about the nature of crop cultivation and use during the Neolithic by the large sample of plant remains from the settlement at Catignano. The wide variety of cereal and pulse crop plants identified at this site points strongly towards a system of polyculture. Such a system enables best use to be made of the variety of soil types found in the vicinity of any one site, and the combination of cereals and legumes not only helps to maintain soil fertility, but is also of nutritional importance (Spurr 1986). The mixture of crop species in the seed samples from the Catignano cavities, which has been noted for many other early seed samples in Europe (Dennell 1978: 91-3), may either have resulted from the mixing of the residuals of previous crops with a main crop being grown on the same plot of land in a rotational system, or from the planting and growing together of different crop species at the same time in the same plot of ground.

The Catignano sample can be compared with a very similar range of plants found at the later early Neolithic site at S. Marco in the Gubbio basin in Umbria (Housely and Giorgi 1987). The latter comprised emmer, einkorn, and club wheat, naked barley, peas, vetch, blackberries, and hazel nuts. Bread wheat was also found at S. Marco, as well as wild grapes, figs, plums, and elderberries. The Catignano sample can also be compared with the relatively large plant samples from three sites in southern Italy where middle Neolithic Passo di Corvo painted pottery (to which Catignano painted pottery is linked) has been found: Passo di Corvo (Follieri 1973), Villa Communale (Nisbet 1977-82), and Rendina (Follieri 1977-82). There was a similar predominance of emmer wheat, followed by einkorn wheat, at these three sites. However, more barley was found at Catignano (24% at Catignano, as opposed to an average of 8% from the south Italian sites). The importance of barley in the Abruzzo region, and also further north in Italy during the Neolithic, may relate to its tolerance of colder climatic conditions and a wider range of soils (particularly dry soils) than wheat, which would have enabled it to be successfully cultivated much further north and at higher altitudes than wheat (Spurr 1986: 14-15).

Changes in the composition of faunal assemblages can be seen in the Abruzzo-Marche region between the early and middle phases of the Neolithic. The Catignano assemblage can be compared with that from the early Neolithic site of Villaggio Leopardi, for both sites are located in the Pescara province, between 21 and 22 km inland from the Adriatic coast. The proportion of sheep/goat to other animals remained the same (from 44% to 43%), but pig decreased greatly (43-15%), and cattle increased significantly as a proportion (20-30%). Further inland in the Pescara province, the faunal assemblage found in the middle Neolithic spits (26-21) in the Grotta dei Piccioni can be compared with that from the underlying early

Neolithic spits (20-18). The proportion of sheep/goat increased (46-55%), pig remained constant (19-19%), and cattle increased slightly (7-11%). The decrease of pig and increase of cattle at Catignano, and the increase of sheep/goat and cattle in the Grotta dei Piccioni, might reflect the progressive disturbance of the Neothermal vegetation during the middle Neolithic, in which clearance in the lowlands extended further inland, with relatively open grazing land and, as in Greece (Halstead 1980: 324), lower, more accessible browse developing at the expense of mature woodland.

d) Late Neolithic

Of the 14 known late Neolithic sites in the Abruzzo region, six are residential sites located in the coastal lowlands between 1.5 and 12 km inland from the Adriatic coast and between 12 and 132 m above sea level; three are cave sites located in intermediate positions between the lowlands and the mountains; and five are residential and cave sites located inland in the intermontane basins and depressions (Fig. 96). (See Appendix 1 for details.)

The six coastal lowland sites are all located on Pleistocene or Holocene deposits situated close to river-beds, which lie between 200 and 500 m away from, and between 5 and 40 m below, the sites. They can be divided into three sub-groups. S. Agnese [PE] (De Pompeis 1978) and

Pianaccio [TE] (Radmilli et al. 1953; Rozzi 1953; Rozzi et al. 1955; Radmilli 1959; Barker 1975) (Fig. 83, Plate 28) belong to the first group, and lie on Pleistocene deposits on the edge of river valleys, between 37 and 40 m above the river bed. The second category is formed by Ripoli [TE] (Dall'Osso 1915; Rellini 1934; Cremonesi 1965; Evett and Renfrew 1971; Barker 1975), which lies on a Pleistocene fluvial terrace situated in the middle of the Vibrata river valley (Fig. 83, Plate 27). The third group comprise three sites which lie on Holocene deposits in the bottom of the Vibrata river valley [TE], between 5 and 14 m above the river bed (Fig. 83): S. Donato (Rozzi et al. 1955: 349), S. Domenico (D'Ercole 1988a), and S. Maria a Vico (Rosa 1874: 194).

The three intermediate cave sites all come from the Abruzzo region, and were all previously occupied during earlier stages of the Neolithic (see locational detials above, p. 222 , and Figs. 91-92; Plates 2-3, 6, 23-25). They are: Grotta dei Piccioni [PE] (Cremonesi 1976), Grotta di Pescosansonesco [PE] (Radmilli 1980: 15), and Grotta S. Angelo [TE] (Sorrentino 1978).

Of the five residential and cave sites located inland in the intermontane basins and depressions of the l'Aquila province: Fonti di S. Callisto lies on the edge of the Sulmona basin (Radi 1986-7) (Plate 5); Settefonti lies in the S. Pio - Navelli depression (Mattiocco 1986: 37-8) (Plate 18); and Cellitto (Grifoni Cremonesi 1988) (Plate

15), Grotta la Punta (Cremonesi 1968) (Plate 10), and Grotta Maritza (Grifoni and Radmilli 1964) (Plate 10) lie around the edges of the Fucino lake basin (Fig. 84).

The pattern of late Neolithic settlement locations indicates a fair degree of continuity within settlement zones and a filling out of the pattern of settlement established during the early and middle stages of the Neolithic. Settlement in the coastal lowlands continued to be confined to Pleistocene and Holocene fluvial terraces and hills, and, continuing the trend begun during the middle Neolithic, residential sites were placed closer to the bottom of the major river valleys: during the early Neolithic such sites were located at an average of 58 m above the level of the river-bed, during the middle Neolithic this average decreased to 28 m, and during the late Neolithic it decreased further to 21 m. Although the few plant impressions from Ripoli provide no evidence of changes in crop growing compared to the early and middle stages of the Neolithic, this movement of settlement locations closer towards the floors of river valleys may indicate that cultivation was increasingly being carried out in the wetter river valleys rather than, or as well as, on the drier flanking terraces and hills. This could have been encouraged by a number of possible factors, including soil exhaustion on the previously cultivated middle and upper parts of fluvial terraces and hills, an increasingly dry climate, and developments in agricultural technology enabling cultivation of the heavier alluvial soils of the river valleys.

Further inland there is even stronger evidence of continuity of site locations. All three of the intermediate cave sites frequented during the late Neolithic provided evidence of prior use during the middle Neolithic, and pottery assemblages in Grotta dei Piccioni show only gradual changes from one phase to the other (see Chapter 1, p. 93). The late Neolithic site at Cellitto in the Fucino basin was previously occupied during the early Neolithic, the site of Settefonti was located just 1 km away from the early Neolithic site at La Valle in the S. Pio - Navelli depression, and the late Neolithic Fucino cave sites were located only 4 km along the southern edge of the lake basin from the middle Neolithic Fucino cave sites. No earlier sites have been found near to the late Neolithic site at Fonti di S. Callisto, but its location continues the pattern of settlement in inland intermontane basins, and is comparable in particular to the location of the early Neolithic site at Capo d'Acqua, which was also situated next to an important perennial spring.

The size of residential sites on the lowlands appears to have increased slightly during the late Neolithic: from the 20,000-30,000 m^2 recorded for the middle Neolithic site at Catignano, to a range of between 27,000 and 38,000 m^2 for Pianaccio, Ripoli, and S. Agnese. The spacing of sites along lowland river valleys may also have decreased slightly, from the 5 km between the middle Neolithic sites of Villa Badessa and Catignano, to an average of 3.5 km between the four late Neolithic sites located along the Vibrata valley.

There appears to be a high degree of variability among the six late Neolithic faunal assemblages from Abruzzo which can be used quantitatively (S. Agnese, Pianaccio, Ripoli, Grotta dei Piccioni, Fonti di S. Callisto, and Grotta la Punta - see table below), and so it is difficult to make generalizations about late Neolithic animal exploitation on a regional scale. Looking only at the coastal lowland sites, for example, the Ripoli assemblage is dominated by pig (50%), whereas the S. Agnese assemblage is dominated by cattle (42%) and also by a significant proportion of sheep/goat (37%), and although the Pianaccio assemblage is also dominated by cattle, only a few sheep/goat bones were found there. However, it does seem clear that cattle decrease in relative importance inland from the Adriatic coastal lowlands. They are the dominant species at the coastal lowland sites of S. Agnese (42%) and Pianaccio, which might be considered as lowland cattle breeding centres, although they are less important at Ripoli (17.5%). Inland their relative quantity drops to 10% in Grotta dei Piccioni and 13% at Fonti di S. Callisto, and it drops even further to 5% in Grotta la Punta which is located at the greatest distance inland from the coast. Wild species, on the other hand, generally appear to increase in importance on the inland sites. They comprise just 5% of the animal bones at the coastal lowland site of

S. Agnese, for example, but as much as 25% and 39% in Grotta dei Piccioni and at Fonti di S. Callisto respectively. Hunting activities around Fonti di S. Callisto seem to have focussed upon red deer in particular, which comprise 29% of the animal bones found at that site, and the large number of pig bones found at Ripoli (50%) may include a fair number of wild pig which are likely to have inhabited the nearby marshes of the lower Vibrata river valley. It is interesting to note, in relation to the latter, that a large amount of pig meat was consumed in the wet coastal plains area of the Arno valley and the Pontine marshes, in west central Italy, during Roman times (Frayn 1984).

Table 5. Proportions (%) of bones of domesticated and wild species found on late Neolithic sites located at varying distances inland from the Adriatic coast

Site	SS	Km inland	Cattle	Sh/g	Pig	Dog	Wild species
104.Pianaccio	?	3.5	Most	Few	Few	-	Few
107.Ripoli	199	4	17.5	23	50	-	9.5
27. S. Agnese	133	6	42	37	16	-	5
23. Gr. dei Picc.	427	34	9	41	21	1	28
20. F. S. Call.	221	47	13	21	26	0.5	39.5
51. Gr. la Punta	470	77	5	77	9	0.5	8.5

(SS = sample size, ie. total number of identified bones)

A U-shaped bone fish-hook was also found at Ripoli (Rellini 1934: Fig. 7), and was probably used on the end of a line either in the adjacent River Vibrata or in the nearby sea. The width of the hook opening measures 13 mm and the length of the hook measures 38 mm, although it appears to be broken at at the top. Italian parallels for this artefact come from the middle Neolithic site of Passo di Corvo in Apulia (Tinè, ed. 1983: 175), the early Neolithic Impressed Ware levels of Caverna delle Arene Candide in Liguria (Bernabò Brea 1946: Tav. LIX.G; Tinè 1975: 152, Fig. 198), and the Neolithic levels of Grotta dell'Uzzo in north-west Sicily, where fish bones were also found (Cassoli et al. 1987: Fig. 3.17-20). Their U-shaped bases and barbless points correspond with the standard form of fish-hook used in the European Neolithic (Clark 1948), and the size of the Ripoli fish-hook suggests that it was intended for large fish such as pike, salmon, or European catfish (Brinkhuizen 1983: 14, 35).

Information concerning the body parts of animals is available from two late Neolithic contexts in the Pescara province of Abruzzo: the ritual 'Level of the Circles' in Grotta dei Piccioni, and the residential site at S. Agnese in the coastal lowlands. Some notable and apparently complementary differences can be identified between the two sites. Cattle were the dominant species at S. Agnese (42% of all animal bones), of which there were relatively high numbers of foot bones (50%), whereas in the 'Level of the Circles' cattle were numerically the least important species (12%), and relatively high numbers of their bones were meat bones (46%). Sheep/goat were also a quite important species at S. Agnese (37% of all animal bones), and there were relatively high quantities of their head bones and relatively small quantities of their meat bones (14.5%), whereas in the 'Level of the Circles', where they were numerically the dominant species (41%), there was a slight predominance of their meat parts (38%). Pig were numerically the least important species at S. Agnese (16%), and there were relatively few head bones there (16.5%), whereas in the 'Level of the Circles' pig were numerically more important (27%), and there were especially high numbers of head bones (68%). Of the wild fauna, all body parts were present for hare and red and roe deer in the 'Level of the Circles', but only meat parts for red fox, marten, wild cat, and bear, whereas only single head and foot bones were found for wild species at S. Agnese. These differences suggest that in general there were more meat bones and less head bones for all three domestic species, and more meat bones for all wild species, in the ritual 'Level of the Circles' than at S. Agnese. This seems to indicate a special emphasis upon meat eating and feasting at the former. Similarly, the concentration of sheep/goat bones in Grotta la Punta (360 bones, 77% of all animal bones) can probably be interpreted as the remains of feasting activities carried out in this cave (A. Grant pers. comm. 1989) rather than as an indication of the use of the cave as a herder's camp (cf. Barker 1981a: 147). More tentatively, it is possible that some of the beef eaten in Grotta dei Piccioni was transported in butchered form (rather than as live animals) from other sites such as S. Agnese, which is located on the coastal lowlands and which may have been a cattle breeding centre.

Three pig bones were aged at Fonti di S. Callisto: a scapula with an open caracoidal nucleus, and a humerus with an open distal end were aged to less than 12 months, and a femur with an open distal end was aged to less than three and a half years (Bigini 1986-7). Although this is a very small sized sample, the results do seem to conform generally with the expectation that the majority of pigs would have been slaughtered at a fairly young age, for the importance of a pig is mainly limited to its carcass. Similarly, at the late Neolithic site at Rivoli, in northern Italy, the majority of the sheep/goat bones came from animals aged between two and three years, which was interpreted in terms of a meat producing rather than a wool producing caprine economy (Jarman 1970: 262).

A number of developments in animal exploitation can be identified during the late Neolithic compared to the early and middle stages of the Neolithic. Sheep/goat continued to decrease in importance on the lowlands: they comprised an average of 60% of animal bones in lowland faunal assemblages during the early Neolithic, 43% during the middle Neolithic, and an average of 30% during the late Neolithic. Cattle on the other hand continued to increase significantly at certain lowland sites: they comprised 20% of animal bones at Villaggio Leopardi during the early Neolithic, 30% at Catignano during the middle Neolithic, and 42% at S. Agnese during the late Neolithic. These developments seem to indicate the gradual replacement of sheep/goat by cattle as the most important domestic species in the lowlands. The increased importance of cattle during the middle Neolithic and early part of the late Neolithic has also been noted in northern Italy (Biagi et al. 1985). This increase may partly be explained by the large size of cattle (compared to sheep/goat and pigs), which might have led to their being prized as substantial sources of meat, and also as prestigious possessions, during the late Neolithic, but it also seems possible that the increase indicates that milking began at this time. (Unfortunately there are no age-at-death data available at the moment with which to consider this idea further.) The decrease of sheep/goat on the lowlands and yet their importance in Grotta la Punta, located well inland on the edge of the high Apennines, might indicate that sheep/goat herding shifted inland during the late Neolithic, possibly to exploit grazing land in the mountains. Numbers of pigs on lowland sites generally remained fairly constant (eg. 15% at middle Neolithic Catignano, and 16% at S. Agnese), but they continued to gradually increase in importance on sites located further inland. In the Grotta dei Piccioni sequence, for example, their proportion rises from 10% during the early Neolithic to 16% in the middle Neolithic to 22% during the late Neolithic. The variability identified in late Neolithic faunal assemblages in Abruzzo might be interpreted in terms of the development of a certain degree of economic specialization on some sites at this time: cattle breeding centres developed further in the coastal lowlands, pig exploitation was particularly important at Ripoli, red deer hunting was important at Fonti di S. Callisto, and sheep/goat herding may have been important at certain inland sites located on the edge of the mountains.

e) <u>Final Neolithic/early Copper Age</u>

Locational details are available for 65 final Neolithic/early Copper Age sites in the Abruzzo-Marche region. These include residential sites, lithic survey sites, arrowhead find-spots, and cave sites. They have been found in four major geographical units: the coastal lowlands; the inner lowlands; the inland intermontane valleys, depressions, basins; and the mountains (Fig. 100). (See Appendix 1 for details of these sites.)

Twenty-two sites have been found in the <u>coastal lowlands</u>, below an altitude of 200 m above sea level and up to 20 km inland from the coast. The locations can be subdivided into three geographical sub-groups: the coastal hills, the terraces and hills flanking the lower sections of major river valleys, and the higher interfluvial hills.

Four of these sites have been found close to the Adriatic coast. Their locations have in general not been recorded precisely, but at least two of them lie on hills flanking the coast rather than on the narrow coastal plain. They include: S. Silvestro [PE] (D'Ercole 1981: 339-340), Pedaso [AP] (unpublished material in Perugia Museum), Ponte Manarini [AN] (Lollini 1976: 310), and Saline [AN] (Lollini 1963: 322; Barker 1975).

Ten sites in the coastal lowlands are located on Pleistocene hills, Pleistocene terraces, or Holocene terraces flanking the lower sections of major rivers. They lie at heights of up to about 100 m above sea level, and at distances of up to 20 km inland from the Adriatic coast. They include: Colle Sinello [CH] (Ducci et al. 1986-7: 107); Fossacesia [CH] (Cremonesi 1973; Barker 1975); Mindoli [TE] (Rosa 1871, 1872a, 1874); Ripoli [TE] (Cremonesi 1965) (Fig. 83, Plate 27), Viale Kennedy [TE] (D'Ercole 1988a), Colli del Tronto [AP] (unpublished material in the Pigorini Museum), Sambuco [AP] (Lucentini 1984-6: 467), Villa Panezia [AP] (Lucentini 1984-6: 474), Area Guzzini West [MC] (Percossi Serenelli and Silvestrini Lavagnoli 1988) (Fig. 101), and Coppetella [AN] (Lollini 1963: 322; Barker 1975). One further site, Casoli [TE] (Rosa 1874: 201), lies on a Pliocene hill on the edge of the lower section of a major river valley.

Seven sites have been found in the group of relatively high Pleistocene (and in one case Pliocene) interfluvial hills flanking the lowland River Tronto valley. They lie between about 100 and 200 m above sea level, and at distances of up to 20 km inland from the Adriatic coast. They include: Controguerra [TE] (Rosa 1871: 503, 1872a: 393); Monte Tinello [AP] (Silvestrini Lavagnoli 1983); Colle Appeso [AP] (Lucentini 1984-6: 454-5); Acquedotto [AP] (Lucentini 1984-6: 457-8); Ciafone [AP] (Lollini 1954-5: 337; Lucentini 1984-6: 489-490); Buscalferri [AP] (Lucentini 1984-6: 477); and Valle S. Martino [AP] (Lucentini 1984-6: 474).

Twelve sites are known from the <u>inner lowlands</u>, which lie over a distance of about 20 km inland from the Adriatic coast. They can be divided into three geographical groups: open sites lying along the middle sections of major river valleys, open sites located by streams in the interfluvial hills, and cave sites located near to the point of transition between the lowlands and the mountains.

Eight sites lie in varying positions on Pliocene and Miocene hills (and in one case on Pleistocene travertine) flanking the middle sections of major river valleys. They are situated at heights of between 135 and about 400 m above sea level, and at distances of between 24 and 35 km inland from the coast. They include: Turrivalignani [PE] (Radmilli 1981: 337); Piano d'Orta [PE] (Di Fraia 1988; Sorrentino 1988) (Fig. 91, Plate 1); Rocciano [TE] (unpublished material in the Pigorini Museum); Monte Calvario [AP] (unpublished material in Ancona Museum); S. Maria in Selva [MC] (Lollini 1965; Evett and Renfrew 1971; Barker 1975; Wilkens in press c); Mummuiola [MC] (unpublished material in Cingoli Museum); Fienili [AN] (unpublished material in the Pigorini Museum); and Serripola [MC] (unpublished material in S. Severino Museum).

Two inner lowland sites are located by minor rivers and streams in the interfluvial hills which flank the middle sections of major river valleys in Marche: Madonna dell'Ospedale [MC] (Silvestrini 1984: 345), and Colle

Morico [MC] (Pigorini 1902).

Two caves in Abruzzo which are located in transitional positions between the inner lowlands and the Apennine mountains continued to be frequented during the final Neolithic/early Copper Age: Grotta dei Piccioni [PE] (Cremonesi 1976), and Grotta S. Angelo [TE] (Sorrentino 1978). The former is located above the Orta gorge (Fig. 91, Plates 2-3), and the latter lies above the Salinello gorge on the edge of the Montagna dei Fiori (Fig. 92, Plates 23-25).

Twenty-four final Neolithic/early Copper Age sites have been found in <u>intermontane valleys, depressions, and basins</u> in the Abruzzo-Marche region.

Fourteen sites lie by streams and the upper parts of major rivers in intermontane valleys. They have been found between heights of 250 and about 460 m above sea level, and between 33 and 62 km inland from the Adriatic coast. Fonterossi lies along the upper section of the River Aventino on the edge of the Maiella mountains [CH] (Rellini 1932; Barker 1975). Five of the sites lie along the Cesolone valley, in the area of Serrapetrona [MC] (Fig. 102): Torre Beregna - Serrapetrona (Pigorini and Gnoli 1888; unpublished material in the Pigorini Museum); Il Colle (unpublished material in the Pigorini Museum); Capannacce (Rellini 1934: 44-5); La Pisciarella (Pigorini and Gnoli 1888); and Pian delle Mure (unpublished material in the Pigorini Museum). Lucciano [MC] lies along the upper section of the River Chienti (Lollini 1979: 47-8) (Fig. 86). Cava Giacometti [AN] lies by the Fosso delle Grazie stream (Moscoloni 1987) (Fig. 103). Three sites are sitauted along the Sentino gorge [AN] (Fig. 85): Grotta dei Baffoni (Radmilli 1953, 1956a), Fondo Argentini and Fondo Coccia (Rellini 1931a and b, 1933; Lollini 1978: 96). I Fossi [AN] lies about 5 km away from the Sentino gorge along the Fosso S. Francesco stream (Lollini 1964: 308, Lollini 1968: 414) (Fig. 85). Borgo Tufico [AN] lies along the River Esino, again, not far upstream from the mouth of the Sentino gorge (Alianiello 1982-3). Finally, Aquatina [AN] lies at the head of a small intermontane valley and at the junction of two streams which run over a distance of 9 km to the River Esino (Lollini 1959: 320, 1965; Barker 1975; Wilkens 1989).

Five final Neolithic/early Copper Age open sites are known from the extensive intermontane Camerino - Matelica- Fabriano - Sassoferrato depression which runs in a south-north direction between about 40 and 60 km inland from the Adriatic coast in the Macerata and Ancona provinces of Marche. The depression is separated from the Adriatic lowlands by the minor beginnings of the Sibillini mountain chain, and its floor is covered by deposits of soft sand and clay which have been cut into ridges by the upper sections of the Adriatic rivers. The sites include: Piampalente [MC] (unpublished material in Camerino Museum; Boccanera 1983: 43); Matelica [MC] (Pigorini and Gnoli

1888); Cartiere Miliani [AN] (Dall'Osso 1915: 17); Berbentina [AN] (Lollini 1965; Barker 1975: 135; Wilkens in press b: 3) (Plate 30); and Donatelli [AN] (Puglisi 1959; Barker 1975; Wilkens in press d) (Fig. 85).

Five sites have been found in two of the intermontane basins in the L'Aquila province of Abruzzo: Settefonti in the S. Pio - Navelli intermontane basin (Mattiocco 1986: 37-8) (Plate 18); and Cellitto (Di Fraia 1970; Cremonesi 1985) (Plate 15), Avezzano (unpublished material in Perugia museum), Grotta Maritza (Grifoni and Radmilli 1964) (Plate 10), and Grotta S. Nicola (Borzatti von Löwenstern 1962b) (Plate 13) in the Fucino basin (Fig. 84).

Seven final Neolithic/early Copper Age sites have been found in the Apennine mountains, between heights of about 750 and 1150 m above sea level near to the upper sections of streams and rivers. Grotta delle Marmitte [AQ] is located at 750 m above sea level on the east side of Monte la Serra which lies at the north-west end of the Ofena basin (Grifoni Cremonesi 1969) (Plate 17). Three sites lie along the upper Imele and Liri valleys between Tagliacozzo and Cappadocia [AQ] (Fig. 104): Riparo Monte la Difesa (Agostini and D'Ercole 1986: 211); Grotta Beatrice Cenci (Agostini and D'Ercole 1986: 211) (Plate 19); and Grotta Cola II (Radmilli 1957) (Plate 20). S. Giovanni - S. Lorenzo [AQ] (unpublished material in Perugia Museum) lies on the north-west slope of Monte Bove at the head of a stream which feeds the River Imele. Tufo [AQ] (unpublished material in Perugia Museum) lies at about 800 m above sea level in the Monti Carseolani, near to the head of a stream-valley and a mountain pass. Finally, Torre Beregna [MC] lies on a hill top at the head of a number of stream valleys (Pigorini and Gnoli 1888) (Fig. 102).

Both continuity and change can be seen in the pattern of final Neolithic/early Copper Age site locations in the Abruzzo-Marche region compared to that of earlier periods. Infilling of the settlement zone situated along the lower sections of major river valleys continued to take place during the final Neolithic/early Copper Age, and at Ripoli, located on a fluvial terrace by the River Vibrata, there is evidence of direct settlement continuity from the late to the final stages of the Neolithic. The trend towards locating residential sites closer to the bottoms of these major lowland river valleys also continued: during the late Neolithic sites were located at an average of 21 m above the level of such rivers, and in the final Neolithic/early Copper Age the average dropped to 15 m. The density of lowland settlement does not, however, appear to have increased further during this period: as with the four late Neolithic sites in the Vibrata valley, the six final Neolithic/early Copper Age sites flanking the Tronto valley were spaced at an average of 3.5 km apart.

In contrast to this evidence of continuity, a major expansion of sites into a wide range of previously peripheral zones took place during the final

Neolithic/early Copper Age. New sites were established on the coastal hills, on the interfluvial hills to the north of the Tronto valley, in the inner lowlands of Abruzzo and Marche, in the intermontane depressions of Marche and intermontane valleys of Abruzzo and especially Marche, and in the mountains. Some of these areas had been previously occupied during the Mesolithic and early Neolithic (the final Neolithic/early Copper Age deposits at Lucciano, for example, in the Pieve Torina intermontane valley, overlay Mesolithic deposits), but elsewhere (in the Camerino-Sassoferrato depression, for example) such evidence is lacking (compare Figs. 87 and 100).

For the group of nine sites found to the north of the River Tronto in the Ascoli-Piceno province in southern Marche, (including, for example, the residential site at Monte Tinello), it is tempting to suggest that they may have been established by immigrants from the south. Groups may have fissioned off from the concentration of late Neolithic and final Neolithic/early Copper Age residential sites (including, for example, the large site at Ripoli) found along the Vibrata and Salinello valleys located directly to the south of the River Tronto, and could have established themselves in places situated up to a maximum of 18 km to the north, on the other side of the River Tronto (compare Figs. 96 and 100). This suggestion is supported by the similarities that exist between the excavated features and artefacts found on final Neolithic/early Copper Age sites in these two areas.

Silvestrini (1983: 215-6), for example, notes the strong links that exist between the excavated features and artefacts found at Monte Tinello [AP] and those dating to the final Neolithic/early Copper Age at Ripoli [TE], located just a few kilometres to the south; she also claims that they are stronger than those with the final Neolithic/early Copper Age site located at S. Maria in Selva [MC], about 55 km to the north-west.

Another element of change in the spatial patterning of sites is the location of at least two sites on hill-tops (Monte Prandone [AP] and S. Maria in Selva [MC]), which might partly be regarded as a defensive measure.

Evidence of even more extreme changes in settlement patterns comes from elsewhere in Italy during the final Neolithic/early Copper Age and following full Copper Age. In southern Italy the lowland zone became virtually deserted, and, in particular, areas such as the Tavoliere plain which had supported the bulk of settlement during earlier stages of the Neolithic. New settlements were also established in the previously almost uninhabited mountain zone (Whitehouse 1968: 360). Similarly, in northern Italy, most of the Neolithic sites in the central Po valley were deserted during the final Neolithic, and Lagozza sites came to be confined to specific zones such as lake shores and fluvial fans (Biagi et al. 1985: 276). Elsewhere in Europe settlement broke out of its tight constraints which had previously tied it closely to watercourses, and it spread to a wider range of often drier and less fertile soils, sometimes in association with the abandonment of formerly cultivated areas (Sherratt 1981).

A new range of archaeological sites also emerged in the Abruzzo-Marche region during the final Neolithic/early Copper Age alongside the standard Neolithic residential sites and ritual cave sites, particularly in the newly occupied inland areas. These included: a variety of lithic survey sites, which probably relate to activities such as hunting (eg. the arrowhead at the mountain site of Tufo [AQ] and the numerous arrowheads found at Piampalente [MC]), forest clearance (eg. the stone axes found at Rocciano [TE] and Fienili [AN]), chert quarrying (eg. Torre Beregna [MC]), and lithic artefact production (eg. the Cesolone valley sites [MC]); and non-ritual cave sites (eg. Grotta Cola II [AQ], located in the Apennines, with a very restricted assemblage of artefacts and faunal remains.)

The nature of features found within residential sites, such as cavities, post-holes, shallow ditches, and cobbled areas, appears to have continued during the final Neolithic/early Copper Age. However, the existence of thickly plastered large cavities at Fossacesia and Monte Tinello might indicate an improvement of crop storage facilities.

Evidence of the use of plant foods during the final Neolithic/early Copper Age in the Abruzzo-Marche region is limited to the impressions of barley and bread wheat identified in daub from S. Maria in Selva. Both species were identified in the middle Neolithic botanical sample at Catiganano. The predominance of barley (13 grains) over bread wheat (1 grain) in the sample from S. Maria, if representive for the site as a whole, might be seen as a local adaptation to the light and relatively dry soils which are likely to have prevailed on the S. Maria hill during the final Neolithic/early Copper Age, but can also be related on a regional scale to the general preference for barley in northern Italy which was already evident during the early and middle stages of the Neolithic. A similar combination of six-row barley and bread wheat was found in the final Neolithic/early Copper Age deposits in Grotta di Cala Scizzo in southern Italy (Castelletti et al. 1987: 41).

Some notable developments in crop cultivation took place in northern Italy during the final Neolithic/early Copper Age, which might be applicable to the Abruzzo-Marche region. There is increasing evidence of upland farming during this period. At Völseraicha near Aica di Fiè in the south Tyrol, for example, barley was grown in terraced fields situated on hill slopes at an altitude of about 1000 m above sea level, between the upper limits of the valley bottom woodland and the lower limits of the pine woods of the higher slopes (Biagi et al. 1985: 276). There is also a fair amount of evidence of the importance of wild plants. At the lake-side site of La Lagozza, for example, there were numerous examples of edible wild fuits, nuts, and seeds, including apples, winter cherries, strawberries, blackberries, grapes, hazel nuts, acorns, and poppy seeds (Cornaggia Castiglioni 1955).

<u>Table 6. Proportions (%) of bones of domesticated and wild species found on final Neolithic/early Copper Age sites located at varying distances inland from the Adriatic coast</u>

Site	Km inland	SS	Cattle	Sh/g	Pig	Dog	Wild species
LOWLAND							
107.Ripoli	4	1083	26	27	26	0.1	20.9
229.Coppetella	10	557	29	18	34	0.5	18.5
162.Area Guzz. W.	15	?	Most	20	Many	-	31
206.S. Maria S.	25	2469	40	26	19	1	14
24. Piano d'Orta	33	189	25	30	35	2	8
INLAND							
23. Gr. dei Picc.	34	196	10	44	20	2	24
230.Donatelli	40	169	21	10	50	5	14
219.Berbentina	46	?	22.5	56.5	21	-	?
216.Aquatina	52	335	14	32.5	47	0.5	6

(SS = sample size, ie. total number of identified bones. Sites such as Cellitto with samples of less than 100 identified bones have not been included in the table.)

Some general differences can be identified between the faunal assemblages found on final Neolithic/early Copper Age lowland sites (Ripoli, Area Guzzini West, Coppetella, Piano d'Orta, and S. Maria in Selva) and inland sites (Grotta dei Piccioni, Cava Giacometti, Grotta dei Baffoni, Aquatina, Berbentina, Donatelli, Cellitto, and Grotta Cola II) in the Abruzzo-Marche region (see Table 6 above). On a general level, proportions of sheep/goat (of which the great majority were sheep at Piano d'Orta and Aquatina) were notably higher on inland sites (average 40% of all bones) than on lowland sites (average 24% of all bones), and cattle were more commonly represented on lowland sites (average 30% of all bones) than on inland sites (average 24% of all bones). Pig and wild animals, however, were represented in fairly similar proportions on sites in both areas.

In more detail, at the lowland sites fairly even proportions of the three main domestic species (sheep/goat, pig, and cattle) were represented in the bone assemblages, although there was some variation among them in the precise proportions of these species. At Coppetella, for example, sheep/goat bones were the least represented of the domesticates (18% of all animal bones), whereas at Piano d'Orta cattle were the least represented (25% of all animal bones). S. Maria in Selva stands out as a slight exception with its high proportion of cattle bones (41.5% of all animal bones), the great majority of which were domesticated (40% domesticated cattle bones : 1.5% aurochs). Wild animal bones comprised a significant proportion of the faunal remains found on the lowland sites (10-31% of all animal bones), especially at those sites located in the coastal lowlands (19, 21, and 31% at Coppetella, Ripoli, and Area Guzzini West respectively), where a wide range of wild species was also represented (13 and 8 different wild species at Ripoli and Coppetella). On the inland sites a slightly greater degree, and more frequent occurrence, of specialization seems evident in the faunal assemblages compared to the lowland sites, although the nature of this apparent specialization varies from site to site. High proportions of sheep/goat bones, for example, were represented in the Grotta dei Piccioni assemblage (45% of all animal bones), at Berbentina (average 56.5% of domesticated species), and at Cellitto (about two-thirds of the animal bones); high proportions of pig bones were represented at Donatelli (50% of all animal bones), and at Aquatina (47% of all animal bones) where they were predominantly domesticated (45% domesticated : 2% wild); and a high proportion of wild species were represented at Cava Giacometti (almost 33% of all animal bones). However, the degree of this specialization should not be over-emphasized: all three main domesticated species were present at all of the inland sites with substantial sample sizes, and wild species were generally present in significant quantities, with the exception of Aquatina, where they represented only 6.5% of all animal bones.

Age data are available for faunal remains from five sites: Coppetella, Piano d'Orta, S. Maria in Selva, Aquatina, and Donatelli (for full details see Appendix 4). A few pigs were killed young (under two years) at Coppetella and Donatelli, but the majority were killed as young adults (under four or five years) at these sites, and this is also the case at Piano d'Orta and S. Maria in Selva. It can probably be assumed that these pigs were raised primarily for their carcasses, and if this is so, then it is interesting that relatively few were killed off as infants or juveniles. When animals are raised purely for meat it is most 'economic' to slaughter them when they are relatively young (ie. under two years), for the increase in live weight is roughly proportional to the amount of feed consumed at this stage, whereas after this stage live weight increases more slowly and feed consumption remains constant (Sherratt 1981: 283-4). It would appear, however, that there was no great pressure to slaughter pigs in the most 'economic' way during the final Neolithic/early Copper Age in the Abruzzo-Marche region, and that perhaps feed for pigs, both in the lowlands and further inland, was available in sufficient quantities to keep pigs until they were more fully developed. Sheep/goat were generally killed young (under three years, and especially between one and a half and three years at Piano d'Orta and S. Maria in Selva), which again may suggest that they were kept prmarily for their meat on both lowland and inland sites. However, at S. Maria in Selva about half of the sample of 89 aged sheep/goat bones were aged over four years, and a third of these were aged over eight years. This may well indicate the maintenance of a large breeding stock, and perhaps also suggests that sheep/goat were kept for their secondary products such as milk and, less probably, wool. In subsistence systems where milk production is especially important, but where meat production is also important, few infants and juveniles tend to be killed, male animals are generally killed at two and three years, and females are generally killed as adults. In addition the median age of culling in such a system tends to be higher than that for a system based purely upon meat exploitation (Greenfield

1988). The majority of the aged sheep/goat bones from Donatelli were also adults, but it is unclear whether these were young or old adults. The pattern of cattle ages seems to vary between sites in relation to their distance inland from the Adriatic coast. At Coppetella, which is located in the coastal lowlands, there were some bones aged under two years old, but the majority of aged cattle bones belonged to adults; at Piano d'Orta and S. Maria in Selva, which are both located in the inner lowlands, half of the cattle appear to have been killed at relatively young ages (under two and a half years at Piano d'Orta, especially between two and four years at S. Maria in Selva) and the other half seem to have been killed as older adults (between five and eight years at Piano d'Orta); and at Aquatina, located inland in an intermontane valley, all of the aged cattle bones were under four years, and especially between two and two and a half years. These patterns might suggest that at the inland intermontane site of Aquatina cattle were kept purely for meat and killed off at an 'economic' age (one and a half to two and a half years - Sherratt 1982); that at the inner lowland sites of Piano d'Orta and S. Maria in Selva half of the cattle were killed off at young, 'economic' ages, probably for meat, and the other half were kept as older adults, probably for breeding, and possibly also for secondary products such as milk and traction power; and at the coastal lowland site of Coppetella the majority of cattle were killed off as adults, possibly due to the importance of their secondary products here as opposed to their meat. These interpretations are based on very small samples of aged bones, and no sex data are available to provide additional information, and so they must be regarded as fairly tentative at this stage.

Estimates of meat weights for the bones of domestic species from three of these sites (Coppetella, S. Maria, and Aquatina) provide some additional information. Sheep/goat bones comprise fairly significant proportions of the faunal assemblages at these sites, but in terms of meat weight represented by their bones they comprise only low proportions of the total amount of meat provided by all animals. The contribution of cow's meat, on the other hand, is under-represented when looking simply at the numbers of their bones. Numbers of pig bones appear to be roughly proportional to their meat weight contribution. These results are particularly significant for the site of Aquatina, where the age data possibly suggest that the domestic animals were kept primarily for meat, for they reverse the relative importance of sheep/goat and cattle. Sheep/goat bones comprised 32.5% of the total number of animal bones but contributed only 10% of the total meat weight, whereas cattle bones comprised only 14% of the total number of animal bones but contributed 40% of the total meat weight.

The appearance of two new artefact types on sites dating to the end of the late Neolithic and the final Neolithic/early Copper Age - ceramic sieves and clay spindle whorls - may correlate with the tentative indications provided by the age data (mentioned above) of a certain significance of secondary animal products in subsistence economies at final Neolithic/early Copper Age sites in the Abruzzo-Marche region. Flat and round, plate-shaped, ceramic sieves have been found at the residential sites of Fossacesia (CH) (17.5 cm diameter), Settefonti (AQ), and Ripoli (TE) (16.5 cm diameter) in the Abruzzo region, and similar examples have been found elsewhere in Italy, particularly in final Neolithic contexts including the Diana phase levels on the Lipari Acropolis in southern Italy, the residential site deposits at Norcia and in stratum F at Petescia in central Italy, and the residential site at Monte Rocca in northern Italy. They are very similar in form to the dish-sieves used to separate curds from whey in the production of cottage cheese in the Eifel mountains in West Germany during the early 20th century (Bogucki 1984: 21), and, given the evidence of the maintenance of significant numbers of adult cattle and sheep on certain sites in the Abruzzo-Marche region outlined above, they may therefore have been used for processing milk during the final Neolithic/early Copper Age. (An alternative interpretation might be that they were used as strainers for alcoholic drinks.) Bogucki (1984) has come to a similar conclusion, using this formal analogy in combination with archaeozoological data to interpret the function of similar ceramic sieves found in early Neolithic Linearbandkeramik contexts in temperate Europe. Indications of milking also come from sites of the final Neolithic Pfyn and Cortaillod cultures in Switzerland (3800-3500 Cal. BC), where high percentages of cattle and ovicaprids survived to maturity, of which the majority were female (Sherratt 1983).

Milk products are nutritionally important in a number of ways: milk supplies the amino-acid lysine which is missing in cereal-based food; it contains fat, protein, and sugar (lactose) in a balanced form; and it contains significant quantities of calcium (Sherratt 1983). In addition, milk is easily handled and can be converted into a variety of storable products. Milk processing is important, for certain adult human populations are not physiologically well adapted to the lactose which raw milk contains. In fermented milk products such as yogurt and cheese most of the lactose is removed with the whey in their production, and what little remains in cheese becomes hydrolised into lactic acid (Bogucki 1984: 26). Milking is a highly efficient exploitation strategy, for regular milking of ovicaprids and cattle provides a continuous supply of food without the necessity of slaughtering the stock (Sherratt 1983). However, only small quantities of milk are produced by animals which are not specially bred for milking, and a high level of economic efficiency may not have been aimed at during the final Neolithic/early Copper Age. Although there is some evidence of the existence of cattle breeding centres in the Abruzzo-Marche lowlands throughout the Neolithic, it seems likely therefore that the scale of dairying was fairly small during the final Neolithic/early Copper Age.

Baked clay 'spindle whorls', which also first appear on sites in the Abruzzo-Marche region at the very end of the late Neolithic, can probably be regarded as elements of spinning equipment, and might relate to the spinning of sheep's wool, but might equally relate to the spinning of certain plant fibres. These objects were relatively abundant at Fossacesia (CH), and one was decorated with incised lines (Cremonesi 1973); two come from Piano d'Orta (PE) (Di Fraia 1988); two were found at Ripoli (TE) (Cremonesi 1965); one at Area Guzzini West (Percossi Serenelli and Silvestrini Lavagnoli 1988); four at Cartiere Miliani (MC) (Dall'Osso 1915: 17); some at S. Maria in Selva (MC) (Lollini 1965) (where half of the sheep/goat were aged over four years); and three were found in level 7 at Cava Giacometti (AN) (Moscoloni 1987). Examples were also found for the first time, and in significant quantities, in northern Italy on sites of the final Neolithic 'Lagozza culture' (Trump 1966: 64). The earliest direct evidence of wool in Europe is a find of carbonized wool from Switzerland which dates to around 2900 Cal. BC (P. Petrequin pers. comm. in Sherratt 1983: 93), which is followed by the appearance of pin-held woollen garments in the Swiss lake villages during the late 3rd millennium Cal. BC. These dates correspond to the middle-late Copper Age in the Abruzzo-Marche region, and for the moment might suggest that the final Neolithic/early Copper Age clay 'spindle whorls' were not actually used for the spinning of sheep's wool.

The scratch plough or ard was probably introduced into Italy during the final Neolithic/early Copper Age. The earliest evidence of ploughing in Italy is provided by the plough marks found beneath Neolithic cist-graves at Saint-Martin-de-Corleans in the Valle d'Aosta in northern Italy, which date to between 3600 and 3000 Cal. BC (Sherratt 1983: 91). The ard, which can be considered simply as a mechanical hoe, would probably have been drawn by fully-grown castrated male cattle (over three to four years old). Compared to hoe cultivation, the ard would have increased a farmer's ability to prepare his or her land by a factor of up to four or more, it would have increased the productivity of good land, and it would have made 'economic' the cultivation of a range of poorer quality soils (Sherratt 1983).

The scale of fishing may have increased during the final Neolithic/early Copper Age in the Fucino basin. Eleven fragments of clay 'net weights' (see below, p. 409-411) were found at Cellitto on the northern side of the Fucino lake basin (Di Fraia 1970: Fig. 3.2-3), and the fish bones found in stratum A2 in the Grotta S. Nicola may date to the final Neolithic/early Copper Age.

The developments seen in the exploitation of animals during the final Neolithic/early Copper Age in the Abruzzo-Marche region can be seen especially as a continuation of developments begun during the middle and late stages of the Neolithic, although the scale of these developments increased notably during the final Neolithic/early Copper Age. The proportions of sheep/goat continued to decrease in faunal assemblages on lowland sites (late Neolithic-average 30% sheep/goat on lowland sites, final Neolithic/early Copper Age - average 24%). Cattle breeding centres continued to exist on the lowlands, although there was no further increase in the proportions of cattle at such sites. At the late Neolithic site at S. Agnese, for example, cattle comprised 42% of the faunal remains, and at the final Neolithic/early Copper Age site at S. Maria in Selva they comprised 41.5%. The proportions of sheep/goat continued to increase on sites located further inland (to an average of 40% of all animal bones on inland sites), and there is again some evidence to suggest that herds were grazed in the mountains during the summer (eg. the relatively high altitude Imele - Liri valley sites including Grotta Cola II). There is also some evidence of the continuation of a certain degree of economic specialization at some sites in the Abruzzo-Marche region during the final Neolithic/early Copper Age. In contrast to this strong evidence of continuity in animal exploitation during the final Neolithic/early Copper Age, the most outstanding element of change at this time seems to be the significant increase in the remains of wild animals found on both lowland and inland sites in the Abruzzo-Marche region: in the lowlands the average proportion of wild animal bones found on sites increased from 7% during the late Neolithic to 19% during the final Neolithic/early Copper Age, and on inland sites from 23% to 37%.

f) Middle-late Copper Age

Ninety-two middle-late Copper Age (and perhaps also Early Bronze Age) sites in the Abruzzo-Marche region have been recorded in sufficient detail to plot their locations with at least some degree of precision. They include find-spots, residential sites, cave sites, and special-purpose human burial sites. They are distributed in the following four major geographical zones: the coastal lowlands; the inner lowlands; the intermontane valleys, depressions, and basins; and the Apennine mountains (Fig. 105). (See Appendix 1 for full details of the sites.)

28 sites have been found in the coastal lowlands. Five of these lie on the hills flanking the Adriatic coast in the Marche region: Porto Recanati [MC] (unpublished material in the Pigorini Museum and Perugia Museum); Via Cardeto [AN] (Cazzella and Moscoloni 1988: 365); Fosso Betellico [AN] (Bevilacqua 1874: 9); Senigallia [AN] (Strobel 1881: 130); and S. Biagio [PO] (Rellini 1909-10: 61; Dall'Osso 1915: 13-16; Barker 1975) (Fig. 106).

Eleven sites have been found along the lower sections of major river valleys: Madonna del Freddo [CH] (Dall'Osso 1910: 380-382); Crocetta [TE] (D'Ercole 1988b); Area Guzzini East [MC] (Percossi Serenelli and Silvestrini Lavagnoli 1988) (Fig. 101); Cava Koch [MC] (Galli 1941; Galli 1947-50) (Fig. 101); Via Duomo [MC] (Lollini and Capitanio 1970) (Fig. 101); Campograsso [AN] (Percossi

Serenelli and Silvestrini Lavagnoli 1984-6: 375, 382); Moje [AN] (Strobel 1881: 130; Annibaldi 1951-2: 111); S. Giovanni [AN] (Lollini 1974: 250-1, 1975: 385, 1978: 95-6); Via Marconi [AN] (Lollini 1978: 79); Campo di Aviazione [PO] (Cazzella and Moscoloni 1988: 364) (Fig. 106); and Fossombrone [PO] (Pigorini 1878: 125-6; unpublished material in the Pigorini Museum).

Eight sites have been found on lower interfluvial hills (below an altitude of 200 m above sea level) in the coastal lowlands: Ancarano [TE] (Rosa 1871: 513); Cologna [TE] (D'Ercole 1988b); La Badia [TE] (Rosa 1871: 503, 1874: 190-2); Fermo [AP] (unpublished material in the Pigorini Museum and in Perugia Museum); Monticello dei Frati [AN] (Gentili 1958); Osimo [AN] (unpublished material in Perugia Museum); S. Rocco [AN] (Bevilacqua 1874: 7; Pigorini 1897: 98); and Vescovara [AN] (Annibaldi 1951-2).

At least four more middle-late Copper Age sites have been found on the higher interfluvial hills of the coastal lowlands (located above an altitude of 200 m above sea level, and up to 25 km inland from the Adriatic coast): Pluviano [PE] (Radmilli et al. 1953: 74; Barker 1975); Fondo Alessandrini [AP] (Lucentini 1984-6: 480-3); S. Lazzaro [AP] (Lucentini 1984-6: 476); and Orciano [PO] (Rellini 1909-10, part 2: 2-21).

Twenty-six sites have been found in the <u>inner lowlands</u>. Eight of these come from the middle sections of major river valleys in Marche: Servigliano [AP] (unpublished material in the Pigorini Museum); Casone [MC] (Pigorini 1879: 198-9, 1880: 29); Campilunghi [MC] (Percossi and Silvestrini 1986: 39); Penna S. Giovanni [MC] (unpublished material in the Pigorini Museum); Rangore [MC] (Percossi and Silvestrini 1986: 41); Rocchetta [MC] (Piangatelli 1970); Buzzetto [AN] (unpublished material in the Pigorini Museum); and S. Lorenzo in Campo [PO] (Rellini 1909-10: 59-65, 13).

Sixteen middle-late Copper Age sites are located on interfluvial hills in the inner lowlands of the Marche region: S. Vittoria in Materano [AP] (unpublished material in the Pigorini Museum and in Perugia Museum); Venarotto-Vindola [AP] (unpublished material in the Pigorini Museum); Codarone [MC] (Percossi and Silvestrini 1986: 37); Colle Argento [MC] (Colini 1892: 160-1; Piangatelli 1970); Colle Montanari [MC] (Piangatelli 1970); Gaglianovo [MC] (Piangatelli 1970); S. Ginesio [MC] (unpublished material in the Pigorini Museum); Le Conche [AN] (Brizio 1899b: 622) (Fig. 103); Le Conelle [AN] (Puglisi 1959, 1965b; Barker 1975; Cazzella 1987; Wilkens 1987) (Fig. 103); Madonna delle Spinelle [AN] (Brizio 1899b: 621) (Fig. 103); Novali [AN] (unpublished material in the Pigorini Museum); Pianetti [AN] (Brizio 1899b: 622) (Fig. 103); Fiori [PO] (Bevilacqua 1874: 6); Pardo di Sotto [PO] (Rellini 1909-10: part 1 - 46, part 2 - 13, 22); Porto Cavour, Urbino [PO] (Bevilacqua 1874: 6); and Urbania [PO] (Rellini 1909-10: part 1 - 46, part 2 - 13, 22).

Two cave sites in Abruzzo, located in transitional positions between the lowland hills and the Apennine mountains, provide evidence of continued occupation during the middle-late Copper Age: Grotta dei Piccioni in the Orta gorge [PE] (Cremonesi 1976) (Fig. 91, Plates 2-3), and Grotta S. Angelo above the Salinello gorge [TE] (Sorrentino 1978) (Fig. 92, Plates 23-25).

Thrity-two middle-late Copper Age sites have been found in <u>inland intermontane valleys, depressions and basins</u>. 17 of these come from intermontane valleys: Bomba [CH] (Radmilli 1981: 381); Fonterossi [CH] (Rellini 1932); Lettopalena [CH] (Colini 1896: 12-13; Pigorini 1896); Salle [PE] (Radmilli 1981: 380) (Plate 7); Camerata [AQ] (Pigorini 1888: 134-5, 193) (Plate 21); Villa Ripa [TE] (Rosa 1871: 503) (Fig. 92, Plates 23 and 26); Crispiero [MC] (unpublished material in the Pigorini Museum); Serrapetrona [MC] (Piangatelli 1970; unpublished material in Camerino Museum) (Fig. 102); Aquatina [AN] (Lollini 1959: 320, 1965, 1978: 96; Barker 1975; Wilkens in press b); Cava Giacometti [AN] (Puglisi 1965a; Moscoloni 1987) (Fig. 103); Genga [AN] (unpublished material in the Pigorini Museum) (Fig. 85); Grotta dei Baffoni [AN] (Radmilli 1953, 1956a) (Fig. 85); Grotta del Mezzogiorno [AN] (Puglisi 1956; Tongiorgi 1956) (Fig. 85); I Fossi [AN] (Fig. 85); Costa [PO] (Rellini 1909-10: 46, 21); Frontone [PO] (unpublished material in Perugia Museum); and Ponte d'Azzo [PO] (Rellini 1904, 1909-10).

Four middle-late Copper Age sites have been found in the Camerino - Sassoferrato inland intermontane depression in the Ancona province of Marche: Berbentina (Lollini 1965) (Plate 30); Col d'Api (Rellini 1909-10: 46, 22); S. Lorenzo (Pigorini 1911: 198-9; Rellini 1912); and Tignano (unpublished material in Perugia Museum).

Eleven sites have been found in two intermontane basins in the Abruzzo region: Fonti di S. Callisto [PE] (Radi 1986-7; Bigini 1986-7) (Plate 5), and the general basin area [AQ] in the Sulmona basin (Mattiocco 1981; and unpublished material in the Pigorini Museum and Perugia Museum); and Arciprete (R. Grifoni Cremonesi pers. comm. 1986), Grotta la Cava (Tozzi 1962), Grotta Maritza (Grifoni and Radmilli 1964) (Plate 10), Grotta la Punta (Cremonesi 1968) (Plate 10), Grotta di Ortucchio (Radmilli 1965a; Cremonesi 1968), Il Mulino (Irti 1980: 103-4, 1986), Ortucchio (Radmilli 1981: 358-363; Irti 1986) (Plate 9), Pescina (Radmilli 1981: 380), and S. Ruffino (D'Ercole 1984: 371) in the Fucino basin [AQ] (Fig. 84).

Six middle-late Copper Age sites have been found in the <u>Apennine mountains</u> in the Abruzzo-Marche region: Grotta a Male [AQ] (Pannuti 1969); Pescocostanzo [AQ] (Radmilli 1981: 337, 380); S. Sebastiano [AQ] (unpublished material in Perugia Museum); Fiastra [MC] (unpublished material in Perugia Museum); Torre Beregna [MC] (Pigorini and Gnoli 1888) (Fig. 102); and Protonara [AN] (Brizio 1899b: 621).

A number of related developments in settlement and subsistence systems took place during the middle-late Copper Age in the Abruzzo-Marche region. These can be seen in each of the four major geographical zones.

Settlement continued on the coastal lowlands, and a similar proportion of the total number of sites from the Abruzzo-Marche region were located in this area (31% during the middle-late Copper Age compared to 30% during the final Neolithic/early Copper Age). The nature of this settlement, however, appears to have continued to change during the middle-late Copper Age. At least 7 out of the 27 sites found in this area were new special-purpose human burial sites. Residential sites situated in the major river valleys were located even closer to the river beds (at an average of 8 m above the river-bed, compared to 15 m during the final Neolithic/early Copper Age). Far fewer sites were located on the lower interfluvial hills, but new settlement sites were established on the higher interfluvial hills. These changes probably relate partly to the full establishment of the 'Sub-boreal' climatic phase during the middle-late Copper Age, when drier conditions prevailed in central Italy (see Chapter 2). The impact of this climatic change would have been felt most strongly on the relatively dry coastal lowlands which were particularly susceptible to degradation, especially in those areas where open ploughed fields existed, and it appears that permanent residential settlement remained here only in the most well-watered places. Even more extreme changes in the nature of lowland settlement, which began to develop during the final Neolithic/early Copper Age, have been noted elsewhere in Italy during the later Copper Age (see above, p. 246-48).

A marked increase in the number of sites took place in the inner lowlands during the middle-late Copper Age. The proportion of the total number of sites in the region increased from 18 to 29% between the final Neolithic/early Copper Age and the middle-late Copper Age, and this increase is particularly notable on the interfluvial hills. It seems relevant that today these inland hills receive much more annual precipitation than either the coastal lowlands or the majority of inland intermontane basins in the Abruzzo-Marche region (Fig. 81). This change in settlement patterns can be seen as a continuation of the process of major settlement expansion in the lowlands begun during the final Neolithic/early Copper Age, and as a process of infilling of newly established settlement zones. Considering this shift of settlement onto the slightly wetter hills, it seems likely that crop cultivation, which requires reliable supplies of water, remained an important, if not the most important, element in lowland subsistence systems. However, the few available faunal and plant remains from inner lowland sites suggest that the diversified, broad-spectrum, subsistence strategy established in the final Neolithic/early Copper Age was maintained during the middle-late Copper Age in the Abruzzo-Marche region. At Le Conelle cattle bones were very abundant, but sheep/goat and pigs were also present in significant numbers, and nine different species of wild animals were hunted. 60% of the pig bones were from animals under two years old which seems to confirm that they were exploited primarily for meat, whereas only 38% and 42% of sheep/goat and cattle bones respectively were aged under two years, which might suggest that the latter two domesticated species were also exploited for their secondary products. In the Grotta dei Piccioni an even wider range of wild animal species was hunted, and the abundant remains of carbonized acorns found here probably relate to the exploitation of wild plant foods in the inland woods and forests. These acorns tie in chronologically with the significant rise in acorn consumption, identified by Lewthwaite (1982a), which took place during the later third and earlier second millennia BC in the western Mediterranean region (ie. the middle-late Copper Age in the Abruzzo-Marche region). As Lewthwaite (1982a: 222 and 226) points out, this development took place within the context of major cultural re-organization, apparent population growth and expansion, and, more generally, a period of instability in the western Mediterranean. Indications of such instability, already suggested for the final Neolithic/early Copper Age by a few possibly defensive hill-top site locations, are provided by the nature of the settlement at Le Conelle, which is located in a particularly defensive position on a small steep-sided hill with a deep artificial ditch cutting across the major access-route to the site.

Further inland, in the intermontane valleys, depressions, and basins, it seems possible to identify both strong continuity and some further developments with respect to final Neolithic/early Copper Age subsistence and settlement patterns. There is strong evidence of the continuity of site locations in these areas, particularly in the intermontane valleys in the Ancona province where middle-late Copper Age deposits directly overlie final Neolithic/early Copper Age deposits at four sites (Aquatina, Cava Giacometti, Grotta dei Baffoni, and I Fossi). Changes, however, can be identified in the number of sites in this area and in the assemblages of faunal remains from the three main sites. Although the proportion of sites in the intermontane areas dropped from 40% to 34% between the final Neolithic/early Copper Age and the middle-late Copper Age, actual numbers of sites increased, particularly in the intermontane valleys and basins. At Aquatina the proportion of sheep/goat bones decreased by 14.5% to 18% between the final Neolithic/early Copper Age and the middle Copper Age, and the proportion of cattle rose by almost the same amount (13%) to 27%. A similar increase of cattle at the expense of sheep/goat can be seen in the Cava Giacometti sequence, and the number of wild species dropped to negligible quanitites at both sites. This may relate to the importance of cattle traction power for ploughing in marginal areas, but may also relate to the growing importance of cattle as 'valuables' or 'prestige goods' during the middle-late Copper Age. More generally this might also be seen as a development towards a more specialized pastoralist subsistence economy at certain intermontane sites. There is no evidence to suport Barker's (1981a) suggestion that the decline in sheep/goat herding at inland settlements was due to population expansion on the lowlands depriving the inland people of the winter pastures neccessary for the maintenance of efficient herding economies unsupported by fodder crops.

At other sites in the intermontane zone developments appear to have moved in the opposite direction, away from the husbandry of domesticated animals towards a greater emphasis upon fishing and hunting. The large numbers of elongated clay weights found at Ortucchio and two of the other middle-late Copper Age sites located around the Fucino lake basin, for example, point towards the intensification of fishing activities in and around this large freshwater lake. Cylindrical and longitudinally-pierced clay weights with smoothed and sometimes polished surfaces, measuring between 6 and 11 cm in length and 1.5 and 2.5 cm in width, have been found in the Copper Age levels at Il Mulino (numerous examples) (Irti 1980: 104, 1986: 260), S. Ruffino (D'Ercole 1984: 371), Ortucchio (30 examples) (Radmilli 1981: 353, Fig. 138; Irti 1986: 258), Grotta Maritza (22) (Grifoni and Radmilli 1964: 100), and Grotta la Punta (6) (Cremonesi 1968: 189, Fig. 19.5-6). All of these sites were located within a distance of about 1.6 km from the edge of the lake. The most likely interpretation of the weights is that they were used as net-weights by fishermen. Today, with cast-nets, for example, the fisherman stands in a boat or wades into the water and throws out the net as far outspread as possible onto the surface of the water. On account of the weights attached to it, the net sinks rapidly to the bottom and covers the fish there; and by pulling up the ropes that run through the central hole in the net the fisherman is able to trap the fish inside the net, which is then pulled out of the water (Brinkhuizen 1983: 27-28). Fishing with nets is in many ways more advantageous than fishing with weirs, wickerwork fish-traps, or lines (indicated at Ripoli by the presence of a bone fish-hook), for nets are less conspicuous to the fish, fewer fish escape from them, they are easy to handle, and they take up little space when stored away (Brinkhuizen 1983). Actual fish bones from Lake Fucino have been found in the general Neolithic levels in Grotta S. Nicola (Borzatti von Löwenstern 1962b), and in the Mesolithic levels in Grotta Continenza (R. Grifoni Cremonesi pers. comm. 1986). Fish probably would have been plentiful throughout the year in this freshwater lake: in 1873 it was estimated that the lake supported as many as 500 fishermen (Nardelli 1883: 29).

Intensified hunting may also be indicated by the fairly large sample of faunal remains found at Ortucchio which was dominated by the bones of red deer. Considering that the 29% proportion of red deer bones from the intermontane basin site at Fonti di S. Callisto stood out as high during the late Neolithic, the figure of 75% red deer bones for Ortucchio is particulary notable. However, it should be noted that a large number of these deer bones were of antlers (Radmilli 1981: 363), which could have been collected annually from the ground, rather through the hunting of red deer. (There is no mention in the excavation report of whether the antlers appear to have been shed or cut off.)

The mountain zone continued to be exploited during the middle-late Copper Age for a number of activities, which included burial (eg. Grotta a Male), possible summer grazing of stock on the 'altipiani' (eg. Pescocostanzo), hunting (eg. Fiastra), and chert quarrying (eg. Torre Beregna).

During the late Copper Age and Early Bronze Age in southern Italy settlement patterns seem to suggest the existence of two distinct groups: a coastal group with a subsistence economy based upon mixed farming and supplemented by shellfish collecting and exchange of foodstuffs, and an inland group with a predominantly pastoralist subsistence economy exploiting the mountain pastures (Whitehouse 1968). Although similar differences can be noted between lowland and inland groups in the Abruzzo-Marche region they appear to be much less sharply divided. Settlement sites, for example, although concentrated in certain zones, were distributed extensively and fairly continuously over the landscape, from the coastal hills to the intermontane basins. One possible explanation for the differences in settlement and subsistence patterns between southern and central Italy during the middle-late Copper Age could be the impact of the drier 'Sub-Boreal' climate that might have been felt more strongly in the south, which normally receives less precipitation than the centre.

Baked clay 'spindle whorls' continued to be used during the middle-late Copper Age in the Abruzzo-Marche region. They have generally been found in deposits at residential sites, but a few now also appear in human burial contexts, and a greater number are decorated, which might possibly relate to a growing importance of textile production at this time. Two 'spindle whorls' were found in the upper level at Fonti di S. Callisto (PE) (Radi 1986-7); one was found in the Grotta la Cava (AQ) (Tozzi 1962); four were found at Ortucchio (AQ) (Radmilli 1981); some were collected at S. Ruffino (AQ) (D'Ercole 1984); one with incised decoration was found at Acquafresca (MC) (Piangatelli 1970); and some were recovered from the ditch at Le Conelle (AN), some of which were decorated with radial motifs of lines, points, and circles (Puglisi 1965b). At S. Rocco (AN) a spindle whorl was found in a grave which also contained a single skeleton (sex unknown), three chert blades, a chert dagger or lance, 26 chert arrowheads, and a copper flat axe (Pigorini 1897: 98). Baked clay 'spindle whorls' were also found in association with human remains (sex unknown), pottery, a chert arrowhead, and a copper blade in Grotta di Castello, near Vecchiano in Toscana (Colini 1898: 215; Grifoni 1962: 457-

8).

g) <u>Summary and conclusions</u>

The five tables displayed below summarize aspects of the settlement data referred to in this chapter. The first two tables indicate the distribution of the 207 Mesolithic, Neolithic, and Copper Age sites in the Abruzzo-Marche region which can be assigned to a specific chronological phase (eg. late Neolithic): Table 7 shows their distribution in relation to the modern provinces and regions (eg. the Macerata province, and the Marche region), and Table 8 shows their distribution in relation to the major geographical areas of region (eg. the inner lowlands). The last three tables then concentrate upon those Neolithic and Copper Age sites which can be classified as 'residential', and which can again be assigned to a specific chronological phase: Table 9 shows their distribution in relation to the major geographical areas of the Abruzzo-Marche region; Table 10 shows their average heights above river valley floors in the coastal lowlands; and Table 11 shows the extent of surface finds found on eight of them which have been studied in sufficient detail to provide such information.

Table 7. Numbers of sites per province and region for the Mesolithic, Neolithic, and Copper Age

Period	CH	PE	AQ	TE	AP	MC	AN	PO	Abr	Mar	Total
Meso	-	-	4	1	-	1	2	-	5	3	8
EN	3	4	8	2	-	2	3	-	17	5	22
MN	-	5	2	1	-	-	-	-	8	-	8
LN	-	3	5	5	-	-	-	-	13	-	13
FN/ECu	3	4	11	7	11	15	13	-	25	39	64
M-LCu	4	4	13	6	6	18	29	12	27	65	92

(CH - Chieti, PE - Pescara, AQ - L'Aquila, TE - Teramo, AP - Ascoli Piceno, MC - Macerata, AN - Ancona, PO - Pesaro-Urbino; Abr - Abruzzo, Mar - Marche.)

Table 8. Numbers of sites in the major geographical areas of the Abruzzo-Marche region for the Mesolithic, Neolithic, and Copper Age

Period	CL	IL	IIVDB	AM	Total
Meso	1	-	6	1	8
EN	10	2	10	-	22
MN	2	4	2	-	8
LN	5	3	5	-	13
FN/ECu	22	11	24	7	64
M-LCu	29	26	31	6	92

(CL - coastal lowlands; IL - inner lowlands; IIVDB - inland intermontane valleys, depressions, and basins; AM-Apennine mountains.)

Table 9. Numbers of residential sites in the major geographical areas of the Abruzzo-Marche region for the Neolithic and Copper Age

Period	CL	IL	IIVDB	AM	Total
EN	9(?10)	-	9	-	18(?19)
MN	2	-	-	-	2
LN	5	-	3	-	8
FN/ECu	17(?18)	6	15	-	38(?39)
M-LCu	9	8	9(?10)	-	26(?27)

(CL - coastal lowlands; IL - inner lowlands; IIVDB - inland intermontane valleys, depressions, and basins; AM-Apennine mountains.)

Table 10. Average heights above river valley floors of Neolithic and Copper Age residential sites in the coastal lowlands of the Abruzzo-Marche region

Period	Av. height above valley floor (m)	Sample of sites
EN	87	Fontanelle, Crocefisso, Villaggio Leopardi, Monte Cappone.
MN	30	Villa Badessa, Catignano.
LN	21	Città S. Angelo, Pianaccio, Ripoli, S. Donato, S. Maria a Vico.
FN/ECu	30	Fossacesia, Ripoli, Viale Kennedy, Sambuco, Villa Panezia, Area Guzzini West, Coppetella.
M-LCu	8	Area Guzzini East, Campograsso, Campo di Aviazione.

Table 11. Extent of surface finds from Neolithic and Copper Age residential sites in the Abruzzo-Marche region

Period	Area (m^2)	Sample of sites
EN	4,000 - 7,000	Fontanelle, Colle S. Stefano
MN	20,000 - 30,000	Catignano
LN	27,000 - 38,000	Pianaccio, Ripoli, S. Agnese
FN/ECu	-	-
M-LCu	45,000 - 144,000	Conelle, Ortucchio

It is difficult to draw any firm conclusions about the nature of settlement and subsistence during the Mesolithic (c. 8500-6500 BP) in the Abruzzo-Marche region, for the sample of data here is small and biased. For example, only eight Mesolithic sites have so far been discovered in this region, and these have not yet been studied in particular detail. However, on a general level, certain comparisons can be made with the preceding Upper Palaeolithic. Continuity, for example, can be seen in the use of specialist camps in the mountains, such as Campo di Giove, which would have been occupied seasonally, primarily for the hunting of large game. It can also be seen in the use of semi-specialist camps in intermontane areas, such as Grotta del Prete, which might have been occupied seasonally by groups subsisting upon both hunting and gathering. A number of changes, on the other hand, can also be identified. Climatically, the development of the Atlantic phase in central Italy saw a rise in temperature and an increase in the extent of humidity. This would have greatly encouraged the growth of plants, and probably led to an abundance of natural resources which could be exploited by human groups. Limited dietary studies of Mesolithic human remains in Europe indicate a shift towards a diet comprising a greater carbohydrate element (Fornaciari 1982; Zvelebil and Meiklejohn 1988), which corresponds with the idea of a wild plant food diet supplemented by hunting and fishing. In the Abruzzo-Marche region, new 'classic Mesolithic' sites, such as Ortucchio and Ripoli, were established in the Fucino basin and coastal lowlands. Subsistence at these sites would have been characterized by broad-spectrum hunting and gathering, but with a specialized emphasis upon aquatic resources, and their occupation would probably have been more sedentary than on other Mesolithic sites in the region. On a regional scale, residential mobility and the size of social territories may also have decreased during the Mesolithic, and may have resulted, for example, in a growing separation of coastal and inland groups. Overall, settlement and subsistence during the Mesolithic in Abruzzo and Marche appear to comprise a fairly stable generalized system, which was characterized by diversification and some specialization.

For the <u>early Neolithic</u> (c. 5750-4850 Cal. BC), the sample of settlement and subsistence data seems to be fairly representative, although we certainly require much more plant data. It also seems likely that many more early Neolithic sites remain to be discovered - 22 are known so far from the Abruzzo-Marche region, whereas on the Tavoliere plain (to take the most extreme example) 180 are now known (Whitehouse 1986: 37).

A fair degree of continuity in settlement and subsistence practices can be seen in relation to the Mesolithic in this region. Early Neolithic human diets probably remained plant-based. Diversity was maintained in subsistence practices, especially on inland sites, with the gathering of wild plant foods and the hunting of game- again with a particular emphasis upon red deer. In addition, certain differences continued to be exhibited in the nature of the subsistence economies practised on different sites located at varying distances inland from the Adriatic coast. Some distinction can be drawn, for example, between the classic Neolithic agricultural sites located on the lowlands, such as Villaggio Leopardi, and those sites located in intermontane areas with broader-spectrum subsistence economies, such as Colle S. Stefano and La Maddalena. The role of the indigenous Mesolithic populations should also not be underestimated when considering the 'Neolithic transition' in this region, especially in the inland intermontane areas where strong spatial continuity in site locations can be identified.

Climatic developments continued during this period, with peaks being reached in temperature and the extent of humidity, but the environment probably remained fundamentally the same in its overall structure, with changes taking the form of small-scale manipulations by the human population of a few selected components.

The most significant and probably widespread change in subsistence during the early Neolithic was the commitment to food production. This perhaps especially took the form of crop cultivation (notably cereals and pulses), for proximity to potentially cultivable soils now influenced the location of most sites in the region, and new facilities and tools were widely adopted at residential sites for the processing and storage of plant foods. From a dietary point of view, however, the change would not have been so great, for plant foods already dominated human diets during the Mesolithic. Domestic animals were also adopted - especially sheep, but also goats, pigs, and cattle - but their significance may have been primarily as a source of meat for occasional ritual sacrifices and feasts, rather than as dietary staples. Settlement expanded rapidly during the early Neolithic, although it was constrained within the lowlands to ecotonal locations, in areas situated along the major river valleys below an altitude of about 200 m, which gave easy access to relatively open or easily cleared fertile agricultural land (perhaps especially brown soils) and also to reserves of wild plants and animals.

It is possible, although difficult to establish clearly at the moment, that small waves of immigration, involving small groups of sea-borne agriculturalists, took place throughout the early Neolithic between the northern parts of south-east Italy (perhaps especially the densely populated Tavoliere plain) and the coastal lowlands of southern Abruzzo. Indigenous groups probably continued to exist, however, in inland areas of southern Abruzzo and further north in Abruzzo and Marche, and may well have become integrated with the immigrant groups elsewhere.

As a general process, adaptation seems to characterize the early Neolithic in this region. A fair degree of variation can be seen, for instance, in the adoption and use of subsistence-related innovations. On a regional scale, for example, the cultivation of the wheat-dominated south Italian crop complex on well drained soils probably only became established in Abruzzo, whereas in Marche settlement patterns suggest that crop cultivation may well have been adapted to suit the use of wetter soils lying closer to the bottom of river valleys. And on a local scale, the proportions of the bones of domestic animals varies at an almost site to site level, at least partly in relation to local environmental conditions, although social considerations should not be forgotten. (Restricted access of inland groups to coastal lowland networks of exchange may, for example, have contributed to limiting the numbers of ovicaprids initially imported into the interior of the region during the early Neolithic.)

The sample of sites for the middle Neolithic (c. 4850-4700 Cal. BC) is small and misleading. Only two open sites, for example, can be assigned to this period (Catignano and Villa Badessa), and they lie just 5 km away from each other in the same valley. Part of the problem can be explained by the poor and fairly recent definition of the middle Neolithic in the Abruzzo region, which for the moment relies upon the presence of typologically diagnostic Catignano-style painted pottery. The lack of middle Neolithic sites in Marche may therefore relate more to the limited use of painted pottery in that region than to the widespread desertion of this region suggested by Figure 93. Also, of course, this does appear to be a very short chronological period, and so we should not expect to be able to assign many sites to it.

New details concerning Neolithic subsistence and settlement in the Abruzzo-Marche region are provided by the results of the excavations at Catignano. A system of polyculture was employed here, in which a diverse assemblage of inter-dependent cereal and pulse crops were cultivated, probably in fixed plots, along with the collection of a wide range of fruits, nuts, and weeds of cultivation. Livestock (sheep and cattle in particular) were probably integrated into this system, as both consumers and fertilizing agents. Hence, a generalized agricultural system is likely to have existed which would have been relatively stable due to its structural and functional complexity (Harris 1969: 4-5). Area excavation exposed the remains of at least a pair of small long-houses, probably constructed of wattle and daub supported on a structure of posts, which were surrounded by a series of hearths and pits, some of which probably functioned as crop-storage silos (Fig. 94).

The general early Neolithic settlement zone, comprising Pleistocene terraces in the coastal lowlands, intermediate caves in the inner lowlands, and lake-side caves in the intermontane Fucino basin, continued to be occupied during the middle Neolithic (at least in the Pescara province, if not elsewhere). Some change, however, can perhaps be seen in the slight expansion of lowland settlement in the Pescara province along its inland border. The process of early Neolithic settlement fissioning probably continued, but there are also some indications of settlement nucleation at this time. Despite the problems in recognizing middle Neolithic sites, there does, for example, appear to have been a drop in the total number of sites; and the average size of residential sites (admittedly based upon a total sample of three sites) does seem to have risen significantly at this time (from 5,000 m^2 to 25,000 m^2). Such a process of nucleation may have been made possible by a growth in the scale and stability of the subsistence economy, but it was probably also encouraged by the development of larger and perhaps increasingly competitive social groupings within the region. Changes can also be seen in the relative proportions of domesticated animals on sites, with an increased investment in cattle on the coastal lowlands, and an increase in sheep in the inner lowlands. This may partly relate to the increasing scale of woodland clearance on the lowlands, but might also relate to the growing importance of cattle and beef as commodities of exchange. Compared to the preceding phase, then, settlement and subsistence during the middle Neolithic in the Abruzzo-Marche region can be characterized mainly in terms of stabilization and consolidation, although we should not overlook the hints which point towards the beginning of some important changes at this time.

The sample of sites only increases slightly for the late Neolithic (c. 4700-4200 Cal. BC), from eight to 13, and, again, no sites can be assigned to this phase in Marche, which possibly relates to the limited use of painted pottery during the late Neolithic in that area. The distribution of settlements shown in Figure 96 should therefore be treated with some caution.

Clear continuity with the middle Neolithic can be seen in the location of sites in inland areas, and also, to a fair degree, in the lowlands. More general continuity with the early and middle Neolithic can be seen in: the differences between the assemblages of animal bones found on sites in the lowlands and further inland; the evidence of animal sacrifice and meat feasting in inland caves; and the essentially meat-based exploitation of domestic animals. It can probably also be seen in the nature of crop cultivation, and in the shape and size of on-site features, such as bell-shaped pits.

Changes begun during the middle Neolithic also continued to develop during this period. In the lowlands, for example, there was a filling out of the pattern of settlement established during the early and middle Neolithic; the size of residential sites increased further; and sites situated along the lowland river valleys shifted closer towards the bottoms of the valleys, and also closer to each other, possibly forming a greater density of settlement. The composition of assemblages of animal bones also continued to change on lowland and inland sites, with a further decrease in the importance of ovicaprids, and an increase, at certain sites, in the importance of cattle in the lowlands; and a further increase in the importance of wild species, and a slight increase, at certain sites, in the importance of pig in inland areas.

A few new developments took place during the late Neolithic, particularly in subsistence economies. Faunal assemblages suggest that a certain degree of economic specialization developed at some sites. The high proportion of cattle bones found at S. Agnese is the most obvious example. This might relate to the expansion of networks of exchange involving live animals and meat, and perhaps also, to a lesser extent, to the growing food requirements of an expanding population. The milking of cattle may have begun at a few lowland sites during the late Neolithic, and the growing importance of ovicaprids on certain inland sites may relate to the development of grazing in the mountains. The scale of these changes should not, however, be over-emphasized, for overall, the late Neolithic can be characterized as a period of consolidation.

The quality and size of the sample of subsistence and settlement data increases significantly for the <u>final Neolithic/early Copper Age</u> (c. 4200-3250 Cal. BC). Detailed specialist reports, for example, are now available for five out of the 13 published faunal assemblages; and a much fuller distribution map (Fig. 100) is available for sites in the Abruzzo-Marche region, comprising a total of 64 sites (as opposed to 13 for the late Neolithic), and plentiful evidence of their occurrence in the Marche region (as opposed to the complete absence of evidence from this region for the late Neolithic).

Continuity with the late Neolithic can be seen specifically in the continued occupation of the coastal lowland residential site at Ripoli, and more generally in: the range of excavated features found on residential sites; the range of crop remains found, and the predominance of barley; the existence of differences between faunal assemblages found on lowland and inland sites; the importance of meat in the exploitation of domestic animals, especially in inland areas; and the probable existence of cattle breeding centres on the lowlands.

Processes of change already established in the late Neolithic also continued during the final Neolithic/early Copper Age. Infilling of the settlement zone situated along the lower sections of the major river valleys continued, for example, although there does not appear to have been any significant increase in the density of settlement in this zone, which presumably relates to a combination of ecological, technological, and social contraints. The trend of locating lowland residential sites closer to the bottoms of river valleys also continued. This might relate partly to the development of drier and slightly warmer conditions during the 'Sub-Boreal' climatic phase (which began during the final Neolithic/early Copper Age), for the previously cleared and cultivated, and relatively dry, hillslopes flanking the river valleys may well have become ecologically precarious and vulnerable to degradation, especially with the impact of the Mediterranean summer drought in the lowlands, and the better watered river valleys may have become more favourable locations for crop-growing and associated residential settlement. This trend, however, might also relate to the expansion of transport routes along the lowland river valleys in association with the notable development of communication and exchange seen during the final Neolithic/early Copper Age (see Chapter 4). Proportions of ovicaprids continued to decrease in bone assemblages found on lowland sites and to increase on inland sites. This might relate in part to the seasonal exploitation of the mountain zone by herders, but can probably also be explained by Lewthwaite's (1981b) argument that sheep were kept especially as producers of manure in the Mediterranean, and that they would therefore have formed a particularly useful combination with crop growing in agriculturally marginal areas such as some of those inland. The exploitation of domestic cattle for 'secondary products', including manure, milk, and perhaps now also traction power, probably continued to develop during the final Neolithic/early Copper Age, especially in the coastal lowlands, although the significance of cattle may also have become increasingly important within the context of exchange at this time (either in the form of meat or as live animals).

Significant changes in subsistence and settlement also took place during the final Neolithic/early Copper Age. Technological developments point towards a growth in the efficiency and scale of subsistence production. The creation of thickly plastered large cavities in residential sites, for example, might indicate an an improvement in crop-storage facilities; the new appearance of ceramic sieves might relate to developments in the production and processing of both cattle and sheep's milk into cheese; the new appearance of clay spindle-whorls may likewise indicate an expansion in the scale of textile production; and the cattle-drawn ard, which may have been introduced into Italy at this time, would have facilitated more extensive crop cultivation of previously marginal areas, in particular the newly cleared and settled interfluves.

Other evidence points towards the development of a more diversified, and in some parts more specialized, subsistence economy, particularly in inland areas. Wild food resources were, for example, exploited to a greater degree. By analogy with evidence from northern Italy, wild plant foods appear to have provided an increasingly important supplement to crop plants during the final Neolithic/early Copper Age, perhaps as a result of greater crop failure occurring both in established settlement areas and in less fertile newly-settled areas. Similarly a large increase in the proportion of wild animals can be seen in the faunal assemblages found on both lowland and inland sites. Fishing also gained in importance in the Fucino basin. Greater specialization can also be seen in faunal assemblages at certain inland sites, although the degree of this should not be overemphasized. There is, for example, little evidence to support Barker's (1975, 1981a) suggestions concerning the existence of specialist pastoralist groups during the final Neolithic/early Copper Age moving seasonally between herders' camps located in the High Apennines (eg. Grotta Cola II), the hinterland (eg. Donatelli and the Sentino caves), and the lowland flood plains (eg. Coppitella). Only a few of the excavated inland intermontane sites, such as Lucciano and Grotta Cola II, are likely to have functioned as specialist hunter/herder camps. The rest can probably be considered as year-round residential sites where broad-spectrum subsistence economies were practised, involving crop cultivation, the gathering of wild plant foods, domestic animal herding, and hunting and fishing, and which were located in ecotonal positions that gave access to a variety of resource zones, including grazing land, woods and forests, rivers and lakes, and cultivable soils.

Settlement patterns indicate that there was a major expansion of sites into a wide range of previously peripheral geographical zones, including the coastal hills, the interfluvial hills to the north of the Tronto valley, the inner lowlands (up to about 500 m above sea level), the intermontane depressions and valleys (particularly in Marche), and the Apennine mountains (compare Figures 96 and 100). This can be correlated with the notable increase in the scale of forest clearance that took place in central Italy during the final Neolithic/early Copper Age, both in the lowlands and in the inland basins, which, for example, encouraged the evergreen holm oak to expand beyond the 200 m contour up to about 500 m above sea level in the lowlands (see Chapter 2). It is difficult to explain clearly how or why this expansion of settlement took place, but it is possible to suggest a number of influential factors that might have been involved in it.

Population growth is suggested, on a simplified level, by the dramatic increase in the total number of known sites in the Abruzzo-Marche region (from 13 to 64). However, if one takes into account the longer duration of the final Neolithic/early Copper Age phase (c. 950 years, as opposed to c. 500 years for the late Neolithic), and excludes the new final Neolithic/early Copper Age special-function sites (such as the lithic survey sites and the non-ritual cave sites), then the scale of the evidence for the proposed population growth becomes significantly smaller. In the Abruzzo region, for example, the number of known residential sites only increases from eight to 10 between the late Neolithic and the final Neolithic/early Copper Age. So pressure resulting from a growth in population size may not have been a critical factor in this process.

Population pressure, however, may well have existed in the coastal lowlands in the form of stresses being placed upon local subsistence resources as a result of increasing environmental degradation, and in the form of social pressures developing between groups of people at a time of increasing social interaction and even competition, particularly if a threshold of settlement density had been reached in the coastal lowlands during the late Neolithic. Territorial expansion, involving settlement fissioning, residential colonization of previously unoccupied areas, and more specialized exploitation of resources in previously under-exploited areas, may therefore have taken place in order to relieve these pressures. Settlement fissioning and colonization, for example, may have taken place in the areas situated either side of the River Tronto, and the practice of more specialized subsistence activities, such as hunting and herding, forest clearance, and chert quarrying and lithic artefact production, seems to be suggested by the establishment of a new range, and large number, of small-sized sites in the region, especially in the newly occupied inland areas such as the Camerino-Sassoferrato intermontane depression. Defence and raiding may have been pursued as an alternative strategy at major sites in the lowlands: the ditch dug around the important residential site at Ripoli may have functioned, at least in part, as a defensive ditch, and the placing of the new residential site at S. Maria in Selva on a hilltop may also have been a defensive measure.

Overall, subsistence and settlement in the Abruzzo-Marche region during the final Neolithic/early Copper Age can be characterized by diversification. To a certain extent, this might be regarded as an adaptation to the development of an increasingly unstable ecological situation on the coastal lowlands, which had previously formed the focus for Neolithic agricultural settlement. However, the role of socio-political factors should not be under-estimated in this process, and these will be considered more fully in the concluding chapter of this thesis.

A large sample of sites (92) is known for the <u>middle-late Copper Age</u> (c. 3250-2050 Cal. BC), but very little detailed information is available for most of them, which clearly limits the conclusions which can be made about subsistence and settlement in this important period.

Strong continuity can be seen in the pattern of settlement in the inland intermontane zone, especially in the intermontane valleys of the Ancona province where middle-late Copper Age deposits directly overlay final Neolithic/early Copper Age deposits at four out of the five excavated sites.

A large number of changes begun before or during the final Neolithic/early Copper Age continued to develop during the middle-late Copper Age. Along with an increase in the scale of forest clearance (seen in pollen diagrams, and perhaps also in the appearance of a new range of heavy work axes - see Chapters 2 and 4), and the further development of the 'Sub-Boreal' climate, greater degradation of the environment took place, possibly resulting in the first evidence of major soil erosion in central Italy. Further changes in the nature of settlement in the lowlands quite probably relate to this. On the coastal lowlands, for example, not only did residential site locations continue to shift towards the river beds, but they now also decreased in number. Likewise, far fewer sites were occupied on the lower interfluvial hills, which, like the coastal lowlands, may have become ecologically unstable and even marginal during this period. Further inland, on the other hand, in the inner lowlands, there was a marked increase in the number of sites, especially on the interfluvial hills, which today receive the highest quantities of rainfall in the region. Infilling also took place in the newly established settlement zones in the intermontane areas. Interestingly, environmental studies (Chapter 2) indicate that the greatest degree of forest clearance at this time took place in precisely these areas: the inland hills situated above the 500 m contour and the inland basins. Overall, then, it is possible to see a continued, but larger scale, shift of settlement away from the coastal lowlands and lower interfluvial hills, into the interior of the region. This must relate partly to the growing environmental degradation in the coastal lowlands, which had formed the focus for settlement during the Neolithic, but it probably also relates to the build up of socio-political pressures in that area. Access to, and control over, the exploitation of good agricultural land and other resources in the coastal lowlands, for example, is likely to have been characterized by increasing competition. The appearance of special-purpose human burial sites in the coastal lowlands at this time might relate to this, in the form of claims concerning ancestral land-rights, for example. Evidence of conflict is certainly apparent in the inland areas. For example, the positioning of the nucleated residential site at Le Conelle on top of a steep-sided hill, and the delineation of it on one side by a deep ditch, clearly related to defensive considerations.

A more diversified subsistence economy continued to develop. Greater reliance was placed, for example, upon wild sources of food, both in the lowlands, as in the Grotta dei Piccioni, and in the areas inland, as in the Fucino basin where fishing and red deer hunting activities were intensified. The use of the cattle-drawn ard may have become more widespread at this time, although the presence of a bone mattock in the grave at Camerata might suggest that hoe agriculture was still important. Sheep may now also have been exploited for their wool, as well as their meat and manure, and this might relate to a further development in textile production, which is suggested by the increase in numbers of decorated spindle-whorls and their presence in human burial contexts.

Changes of a more original nature also took place in subsistence and settlement during the middle-late Copper Age. Cattle bones increased at the expense of ovicaprid bones in faunal assemblages on inland sites. This might relate to a number of factors, including: the importance of cattle traction power for ploughing in marginal areas; the role of cattle and their food products as prestige goods (cattle bones were abundant at the defended site of Le Conelle); and the cultural preferences of immigrants from the coastal lowlands who had previously favoured cattle over sheep. More generally, a greater pastoral element in the subsistence economy can probably be envisaged for the middle-late Copper Age. The expansion of large scale forest clearance into the inner lowlands, for example, may relate as much to the grazing requirements of larger herds of domestic animals as to the land requirements of crop cultivation, which, in any case, would have been more open to failure with the development of the 'Sub-Boreal' climate. The massive site at Ortucchio and the defended site at Le Conelle provide some evidence of a significant increase in site size at the top end of the scale during the middle-late Copper Age (see Table 11). It might even be possible to speak of the development of a hierarchy of settlements at this time, although many more site sizes need to be recorded before this can be established.

Overall middle-late Copper Age subsistence and settlement was characterized by continuing changes and adaptations which sought to resolve an increasingly unstable ecological and socio-political situation in the Abruzzo-Marche region.

The results achieved in this chapter are necessarily limited, for the quantity and quality of published data concerning Neolithic and Copper Age subsistence and settlement in the Abruzzo-Marche region are still generally poor. However, it does at least provide the first detailed synthesis of these data, incorporating information drawn both from a large number of old and often overlooked sites, and from newly discovered sites excavated in the 1980's. A number of chronological and spatial patterns have been identified in these data, and although some of them support those previously put forward by Graeme Barker, they often add greater detail to his observations, and sometimes even disagree with them. In addition, a number of new interpretations of these patterns have been proposed as alternatives to those previously promoted in Italy by the 'Higgs school' of paleoeconomy (eg. the papers by Barker and Jarman and Webley in Higgs ed. 1975).

For the future, perhaps the most important requirement is the collection and analysis of plant remains from all newly excavated sites. Sampling strategies must also be integrated into all archaeological research, and site locations should be precisely recorded and published. The excavation of some small and marginally located sites would be extremely useful, in addition to the careful area-excavation of well-preserved sites. Further fieldwork should also be carried out in the Pesaro-Urbino province. Finally, greater palaeoenvironmental research should be carried out around Neolithic and Copper Age sites.

Table 12. Summary of sites referred to in Chapter 3

(Key to abreviations: r - residential site, l - lithic survey site, f - find-spot, c - cave site, b - human burial site; CH - Chieti, PE - Pescara, AQ - L'Aquila, TE-Teramo, AP - Ascoli Piceno, MC - Macerata, AN - Ancona, PO - Pesaro-Urbino.)

MESOLITHIC

Coastal lowlands

Lower section of major river valley: Ripoli (TE).

Inland intermontane basins and valleys

Intermontane basins: Capo d'Acqua (AQ), Grotta Continenza (AQ), Ortucchio (AQ).

Intermontane valleys: Lucciano (MC), Grotta del Prete (AN), Cava Romita (AN).

Mountains

Campo di Giove (AQ)

EARLY NEOLITHIC

Coastal lowlands

Lower sections of major river valleys: Abruzzo - Colle Sinello (r, CH), Crocefisso (r, CH), Fontanelle (r, PE), Colle S. Savino (?r, TE); Marche - Monte Colombo (r, AN), Ripabianca (r, AN), Monte Cappone (r, AN).

Inland tributary rivers and streams: Villaggio Rossi (r, CH), Villaggio Leopardi (r, PE), Colle Maggio (r, PE).

Inner lowlands

Intermediate caves: Grotta dei Piccioni (c, PE), Grotta S. Angelo (c, TE).

Inland intermontane basins, depressions, and valleys

Intermontane basins: Capo d'Acqua (r, AQ), Cellitto (r, AQ), Colle S. Stefano (r, AQ), Ortucchio (r, AQ), Grotta Continenza (c, AQ).

Intermontane depression: La Valle (r, AQ).

Intermontane valleys: Fonterossi (r, AQ), Madonna del Soccorso (r, AQ), La Maddalena (r, MC), Campo Sportivo (r, MC).

MIDDLE NEOLITHIC

Coastal lowlands

Inland tributary river: Villa Badessa (r, PE), Catignano (r, PE).

Inner lowlands

Intermediate caves: Grotta Oscura (c, PE), Grotta dei Piccioni (c, PE), Grotta di Pescosansonesco (c, PE), Grotta S. Angelo (c, TE).

Inland intermontane basin

Grotta Continenza (c, AQ), Grotta S. Nicola (c, AQ).

LATE NEOLITHIC

Coastal lowlands

Lower sections of major river valleys: Città S. Angelo (r, PE), Pianaccio (r, TE), Ripoli (r, TE), S. Donato (r, TE), S. Domenico (r, TE), S. Maria a Vico (r, TE).

Inner lowlands

Intermediate caves: Grotta dei Piccioni (c, PE), Grotta di Pescosansonesco (c, PE), Grotta S. Angelo (c, TE).

Inland intermontane depressions and basins

Intermontane depression: Settefonti (r, AQ).

Intermontane basins: Fonti di S. Callisto (r, AQ), Cellitto (r, AQ), Grotta la Punta (c, AQ), Grotta Maritza (c, AQ).

FINAL NEOLITHIC/EARLY COPPER AGE

Coastal lowlands

Coastal hills: S. Silvestro (r, PE), Pedaso (f, AP), Ponte Manarini (r, AN), Saline (r, AN).

Lower sections of major river valleys: Colle Sinello (r, CH), Fossacesia (r, CH), Ripoli (r, TE), Colli del Tronto (f, AP), Sambuco (r, AP), Villa Panezia (r, AP), Area Guzzini West (r, MC), Coppetella (r, AN).

Interfluvial hills: S. Giovanni - S. Lorenzo (f, AQ), Casoli (f, TE), Controguerra (l, TE), Mindoli (r, TE), Viale Kennedy (r, TE), Monte Tinello (r, AP), Colle Appeso (r, AP), Acquedotto (r, AP), Ciafone (r, AP), Buscalferri (r, AP), Valle S. Martino (?r, AP).

Inner lowlands

Middle sections of major river valleys: Turrivalignani (l, PE), Piano d'Orta (r, PE), Rocciano (f, TE), Monte Calvario (r, AP), Castellano (l, MC), S. Maria in Selva (r, MC), Mummuiola (r, MC).

Interfluvial hills: Madonna dell'Ospedale (r, MC), Colle Morico (r, MC).

Transitional caves: Grotta dei Piccioni (c, PE), Grotta S. Angelo (c, TE).

Inland intermontane valleys, depressions, and basins

Intermontane valleys: Fonterossi (r, CH), Torre Beregna-Serrapetrona (l, MC), Il Colle (f, MC), Capannacce (r, MC), La Pisciarella (r, MC), Pian delle Mure (l, MC), Lucciano (r, MC), Cava Giacometti (r, AN), Fondo Argentini (r, AN), Fondo Coccia (r, AN), Grotta dei Baffoni (c, AN), I Fossi (r, AN), Borgo Tufico (r, AN), Aquatina (r, AN).

Intermontane depressions: Settefonti (r, AQ), Piampalente (f, MC), Matelica (f, MC), Cartiere Miliani (r, AN), Berbentina (r, AN), Donatelli (r, AN).

Intermontane basins: Cellitto (r, AQ), Avezzano (f, AQ), Grotta Maritza (c, AQ), Grotta S. Nicola (c, AQ).

Mountains

Grotta delle Marmitte (c, AQ), Riparo Monte la Difesa (c, AQ), Grotta Beatrice Cenci (c, AQ), Grotta Cola II (c, AQ), Tufo (f, AQ), Torre Beregna (l, MC).

MIDDLE-LATE COPPER AGE

Coastal lowlands

Coastal hills: Porto Recanati (f, MC), Via Cardeto (r, AN), Fosso Betellico (f, AN), Senigallia (f, AN), S. Biagio (r, PO).

Lower sections of major river valleys: Madonna del Freddo (l, CH), Crocetta (r, TE), Area Guzzini East (r, MC), Cava Koch (b, MC), Via Duomo (b, MC), Campograsso (r, AN), Moje (l/?b, AN), S. Giovanni (b, AN), Via Marconi (b, AN), Campo di Aviazione (r, PO), Fossombrone (f, PO).

Lower interfluvial hills: Ancarano (f, TE), Cologna (f, TE), La Badia (f/?b, TE), Fermo (f, AP), Monticello dei Frati (f, AN), Osimo (f, AN), S. Rocco (b, AN), Vescovara (b, AN).

Higher interfluvial hills: Pluviano (f, PE), Fondo Alessandrini (r, AP), S. Lazzaro (r, AP), Orciano (r, PO).

Inner lowlands

Middle sections of major river valleys: Servigliano (f, AP), Casone (r, MC), Campilunghi (r, MC), Penna S. Giovanni (f, MC), Rangore (l, MC), Rocchetta (l, MC), Buzzetto (f, AN), S. Lorenzo in Campo (r, PO).

Interfluvial hills: S. Vittoria in Materano (f, AP), Venarotta/Vindola (f, AP), Codarone (r, MC), Colle Argento (l, MC), Colle Montanari (r, MC), Gaglianovo (f, MC), S. Ginesio (f, MC), Le Conche (r, AN), Le Conelle (r, AN), Madonna delle Spinelle (f, AN), Novalli (f, AN), Pianetti (r, AN), Fiori (f, PO), Pardo di Sotto (l, PO), Porto Cavour (f, PO), Urbania (l, PO).

Transitional caves: Grotta dei Piccioni (c, PE), Grotta S. Angelo (c, TE).

Inland intermontane valleys, depressions, and basins

Intermontane valleys: Bomba (f, CH), Fonterossi (f, CH), Lettopalena (l, CH), Salle (f, PE), Camerata (b, AQ), Villa Ripa (f, TE), Crispiero (f, MC), La Pisciarella, Serrapetrona (r, MC), Aquatina (r, AN), Cava Giacometti (r, AN), Genga (f, AN), Grotta dei Baffoni (c, AN), Grotta del Mezzogiorno (c, AN), I Fossi (r, AN), Costa (l, PO), Frontone (f, PO), Ponte d'Azzo (l, PO).

Intermontane depressions: Berbentina (r, AN), Col d'Api (l, AN), S. Lorenzo (r, AN), Tignano (f, AN).

Intermontane basins: Fonti di S. Callisto (r, PE), Sulmona basin (f, AQ), Grotta la Cava (c, AQ), Grotta Maritza (c, AQ), Grotta la Punta (c, AQ), Grotta di Ortucchio (c, AQ), Il Mulino (?r, AQ), Ortucchio (r, AQ), Pescina (f, AQ), S. Ruffino (r, AQ).

Mountains

Grotta a Male (c, AQ), Pescocostanzo (l, AQ), S. Sebastiano (f, AQ), Fiastra (f, MC), Torre Beregna (l, MC), Protonara (f, AN).