Accordia Research Papers

Volume 13

2013

Special Issue

Rethinking the Italian Neolithic

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Accordia Research Institute

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Accordia Research Papers
(Editors of this volume: Mark Pearce, Ruth D.Whitehouse)

Volume 13 ISBN 978-1-873415-40-5
Published 2013

British Library Cataloguing in Publication Data
A catalogue record of this book is available from the British Library

Computer typeset by the Accordia Research Institute

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Neolithic Italy at 4004 BC: people and places

Robin Skeates

According to James Ussher, the creation of the world began on Sunday 23rd October, in the year 4004 BC (Ussher 1658). Ussher (1581–1656) was the Anglican Archbishop of Armagh in northern Ireland, and he deduced this date from his interpretation of the Old Testament, as a contribution to the long-running Christian theological debate on the age and history of the Earth (Barr 1985; Ford 2007). His creation date of 4004 BC was widely accepted in England in the eighteenth century, particularly when it was included in annotated editions of the influential King James Bible, although it was increasingly rejected by geologists and theologians in the nineteenth century, and is now a classic date remembered by historians of archaeology (e.g. Daniel 1975: 27), not to mention American creationists. For my purposes, it is also a convenient date upon which to base an experiment to establish what we can (and cannot) say about Neolithic Italy at a very specific point in time, focussing on the archaeological data from a sample of radiocarbon dated sites, whilst not ignoring the long-term trends with which archaeology is usually concerned.

At the same time, in the context of this volume dedicated to *Rethinking the Italian Neolithic*, my aim is to question some old and new archaeological narratives on Neolithic Italy, with particular reference to a theme of 'people and places'. This is a pun on the title of the long-running 'Ancient Peoples and Places' series of books, originally edited by Glyn Daniel and published by Thames and Hudson, in which leading scholars summed up what was known about the archaeology of different parts of the world within a culture-historical theoretical framework where human migration was often evoked as a causal factor in cultural (and especially ceramic) change (e.g. Barfield 1971; Bernabò Brea 1957; Trump 1966). This tradition lives on in much of the work published by Italian archaeologists on Neolithic Italy, which can often be characterised in terms of an obsession with typometric description of ceramic and lithic artefact attributes and their stylistic affinities (e.g. Volante 2003) – an approach which is consciously down-played here. My own theoretical perspective can be described as 'interpretive' (Shanks & Hodder 1995), and is, in part, informed by some of the ideas about cultural landscapes developed by social geographers, anthropologists and archaeologists since the 1980s (e.g. Ashmore & Knapp 1999; Bender 1993; Cosgrove 1984; Eyles 1985; Feld & Basso 1996; Hirsch & O'Hanlon 1995; Muir 1999; Tilley 1994; Ucko and Layton 1999). For archaeologists, these ideas encourage a change of analytical emphasis:

away from a focus on what people do to the land and how it aids or constrains them, towards a focus on different people's experiences and perceptions of the landscape and of meaningful places within it. According to this way of thinking, landscapes are always in a dynamic process of being constructed and transformed by people, both physically and conceptually: almost unconsciously, through their everyday routines of dwelling, work and mobility; and more strategically, as with the construction of monuments in the landscape. And, where the forces of nature do bring about significant environmental change, what is important is how human groups understand and choose to respond to that change. Furthermore, as Tilley (2004) emphasises, landscapes are not just something looked at or thought about, but synaesthetically experienced through the body's senses, to the extent that people are part of landscapes and landscapes part of us (c.f. Skeates 2010a: 76–123). John Robb, in particular, has produced some very good examples of the application of this theoretical approach to the archaeology of Neolithic Italy (e.g. Robb 2007; Robb & van Hove 2003). But there is still a limit to the depth to such studies, particularly in terms of their consideration of the growing body of data relating to mid-Holocene climate and vegetation, which deserve greater integration into discussions of Neolithic cultural landscapes.

THE RADIOCARBON DATES

Before we can begin to reconstruct what life was like in the landscapes of Neolithic Italy at 4004 cal.BC, we have to face up to some serious difficulties in identifying precisely which Italian archaeological sites were occupied in that year – difficulties that demand methodological compromises.

First, for reasons of accuracy, I have narrowly confined my search to excavated archaeological sites with published radiocarbon determinations (Table 1). This somewhat draconian measure clearly excludes a significant number of known later Neolithic sites, either without radiocarbon determinations or without calibrated radiocarbon dates overlapping this precise year, including the type-site of Lagozza di Besnate.

Second, I have probably overlooked some relevant dated sites, amongst the diffuse and ever-expanding archaeological literature on later Neolithic Italy.

Third, the quality of the 64 radiocarbon determinations that I have tracked down is – by today's scientific standards – generally poor. Nearly three-quarters of the specified samples are of charcoal or wood (with the inherent risk of 'the old wood effect'). Also, 39% of all the determinations have large standard deviations of more than ± 100 and consequently wide calibrated date ranges, even at the – optimistic – 1σ confidence level (spanning, on average, 319 calendar years). It is important that this large error margin is remembered throughout this article, since although the focus is on the year 4004 BC, what really is being considered is a time-span of around 4150–3850 cal.BC.

Fourth, the inconsistency of some of the dates, either with other radiocarbon dates or with the style of decorated ceramics from the same stratigraphic context as the dated samples or from adjacent deposits, particularly at sites with deep deposits, has led me to minimise reference to some samples and sites, due to the possibility of the dated deposits having been disturbed and contaminated by later activity at the site. This is not to say that these sites were not occupied during the later Neolithic; only that it is unclear what contexts their radiocarbon dated samples relate to. The easiest to question is the radiocarbon determination of 5270 ± 60 BP (R-1171) for Grotta di Monte Venere. It was made on a (problematic) combined sample of two pieces of charcoal from Stratum 4. It is more recent than another radiocarbon determination from the same context (6940 ± 100 BP – R-1175) and compared with two radiocarbon determinations from the overlying Stratum 3 (5800 ± 60 BP R-1174 and 5770 ± 50 BP – R-1169σ) (Alessio *et al*. 1991: 136). It is also incompatible with the Middle Neolithic Sasso culture material found predominantly at this site. A similar problem relates to the radiocarbon determination of 5200 ± 60 BP (R-366σ) for the Castello

di Lipari. This was produced on a sample of charcoal from the deepest cultural deposits, containing Middle Neolithic style trichrome painted pottery. The comment accompanying the original publication of this date, which remains appropriate today, noted that, the "Age obtained seems rather young when compared with dates obtained for overlying layer of Late Neolithic", notably 5000 ± 200 BP (R-180) (Alessio *et al*. 1969: 488). The radiocarbon determination of 5290 ± 90 BP (Gif-6338) for Scamuso is also problematic. It was made on a sample of charcoal from a hearth, sandwiched between deposits containing Middle Neolithic Passo di Corvo style painted pottery, which – as the excavator of the site remarked – makes the date "slightly discordant" (Coppola 1987: 229). By contrast, I have *not* rejected the radiocarbon determination of 5230 ± 70 BP (OxA-4546) on a sample of charcoal from Hearth 144 in the Riparo Valtenesi, despite the excavator's claim that "This is unacceptably early as it would place the hearth in the Late Neolithic and since no Late Neolithic material was present on the site we must assume that we are dealing with old wood." (Hedges *et al*. 1995: 209) – the implication being that this 'old wood' was burnt and re-deposited during the Chalcolithic occupation of the site, some 1000 years later. In fact, a distinctive sherd of Serra d'Alto style painted pottery was found at this site (albeit in a disturbed deposit) (Barfield 1983: 117), which makes it possible that the hearth was indeed used in the later Neolithic – as suggested by the radiocarbon date. Molino Casarotto may seem like an odd inclusion, since it is best known as a Middle Neolithic site associated with pottery assigned to an early phase of the Square-Mouthed Pottery Culture. Nevertheless, the 30 radiocarbon dates for Site 4 span a wide period, of around 5400–3900 BC (Skeates 1994: 213–5), within which the determination 5260 ± 50 BP (R-750) sits comfortably, albeit towards the end of the dated lifespan of the settlement. Pizzio di Bodio is also, predominantly, a Middle Neolithic site. It only just squeezes into the sample of 4004 BC sites due to the large standard deviation of its relevant radiocarbon date – 5420 ± 205 BP (GX-22168), although the site was reoccupied during the Late Neolithic.

Fifth, there is a clear geographical bias in the radiocarbon dated sites, with 85% situated in northern or central Italy, as opposed to a distinct minority in southern Italy, including the large islands of Sicily and Sardinia. This reflects the nature of prehistoric archaeology practised in Italy over the last 50 years, which has been marked by strong regional differences in attitude towards (and investment in) radiocarbon dating and archaeological science in general. As a consequence, most of what I have to say in this article relates to northern and central Italy, although southern Italy and the islands are not entirely left out of the equation.

PEOPLE AND PLACES IN THE LANDSCAPE

Bearing all of these problems and compromises in mind, we are left with 39 Italian later Neolithic sites to consider, all of which can be regarded as having been occupied at roughly the same time – at around 4004 cal.BC (see Table 1, which includes bibliographic details for each site, and Fig. 1). These can be divided, according to their locations and forms, into three general types of place and at least six more specific types of place, all of which are described below. However, these categories do overlap, and in my conclusion I try to integrate them.

Wetland and woodland places in northern and central Italy

Over half (56%) of the sample of sites dated to 4004 cal.BC can be described – to varying degrees – as low-lying wetland settlements, where proximity to courses or bodies of freshwater, and to a combination of marshy and forested habitats, appear to have been priorities in site location; even though local geomorphology and significant cultural and

Table 1 Details of Italian archaeological samples and sites radiocarbon dated to around 4004 cal.BC. (Note: selected bibliographic references to these sites are provided here, rather than repeatedly in the main text)

Site #	Site name	Location	C^{14} sample type and context	BP and lab. ref.	Cal. BC 1σ (CALIB 6.0)	Selected references
1	Grotta di Cladreccis	Prepotto, Udine, Friuli Venezia Giulia		5220±100 UD-	4229-3955	Barbina *et al.* 1994: 31
2	Bannia – Palazzine di Sopra	Pordenone, Friuli Venezia Giulia	Charcoal Pit 11	5240±110 GrN-25996	4232-3963	Cottini *et al.* 1996; Ottomano 2002; Tasca *et al.*1997; Visentini 2002
3	Palù di Livenza	Caneva, Polcenigo, Pordenone, Friuli Venezia Giulia	Wood ES 79 horizontal element	5305±90 GX-18756	4242-4001	Corti *et al.*1997; Micheli 2002; Visentini 2002; Vitri et al. 2002
			Wood ES 415 horizontal element	5230±95 GX-23010	4228-3962	
			Wood ES 669 vertical element	5130±145 GX-22104	4219-3713	
4	Molino Casarotto –Site 4	Vicenza, Veneto	Charcoal Anthropogenic horizon at bottom of peaty level around main hearth, Square 37J, Spit 3, first dwelling area	5260±50 R-750	4226-3990	Bagolini *et al.* 1973; Barfield & Broglio 1966; Corona *et al.* 1974; Durante Pasa 1972; Fontana 1998; Jarman 1971; Magaldi 1973; Valsecchi *et al.* 2008
5	La Vela	Trento, Trentino-Alto Adige	Charcoal Level 1	5370±180 UD-176	4357-3986	Bagolini & Biagi 1976; Barfield 1967-9; Calligaris *et al.*1991; Degasperi & Pedrotti 1997; Degasperi *et al.* 2006; Mottes & Rottoli 2006; Pedrotti 1990
6	Rocca di Manerba	Brescia, Lombardia	Occupation deposits accumulated against inner face of wall/ terrace	5165±50 OxA-8947	4042-3850	Barfield & Buteux 1999; 2002; Barfield *et al.*2002
7	Riparo Valtenesi	Manerba del Garda, Brescia, Lombardia	Charcoal Hearth 144, from 'sub-tomb' layer	5230±70 OxA-4546	4225-3966	Barfield 1983; Hedges *et al.* 1995
8	Canton di Trescore Balneario	Bergamo, Lombardia	Charcoal US 392, Sector A, tumulus	5515±370 GX-19836	4786-3958	Baioni & Poggiani Keller 2008; Poggiani Keller 2002; 2003-6
			Charcoal US 216, Sector A	5385±230 GX-20986	4453-3968	
			Charcoal US 217, Sector A, hearth connected with the tumulus	5280±270 GX-22929	4362-3788	
9	Isolino Viriginia	Varese, Lombardia	Wood Floor of platform immediately below clay layer	5326±180 Pi-38	4339-3973	Banchieri 2008; Castelletti 1990; Castiglioni & Rottoli 1994-9; Ferrara *et al.* 1959; Fusco 1976-7; Guerreschi 1976-7; 1990; Guerreschi *et al.* 1990-1; Pasa Durante & Pasa 1964-6
10	Pizzo di Bodio	Bodio Lomnago, Varese, Lombardia	Charcoal US 412	5420±205 GX-22168	4454-3997	Banchieri 1990; 1995-7; 2008
11	St-Martin-de-Corléans	Aosta, Valle d'Aosta	Carbonised wood Pit I	5290±90 UtC-1681	4234-3999	Azzi *et al.* 1977; Cavallaro 1988; Mezzena 1975-6; 1997
			Carbonised wood Pit G	5290±90 UtC-1679	4234-3999	
			Carbonised wood Pit P	5270±80 UtC-1682	4229-3992	
			Carbonised wood Pit F	5270±60 UtC-1678	4228-3995	
			Carbonised wood Pit D	5230±90 UtC-1680	4228-3962	
			Carbonised wood Post-hole 12	5020±180 F-78	4037-3638	

12	La Maddalena di Chiomonte	Torino, Piemonte	Charcoal Context B15, Spit 18, hearth	5135±180 CRG-895	4225-3711	Bertone & Fozzati 1998
13	Alba – Corso Langhe 43	Cuneo, Piemonte		5210±70 GX-26252	4225-3955	Bernabò Brea *et al.* 2002; Venturino Gambari *et al.* 2002
14	Grotta Arma dello Stefanin	Aquila d'Arroscia, Imperia, Liguria	Charcoal Stratum III, Hearth B	5180±70 R-143	4218-3812	Alessio *et al.*1967; Barker *et al.* 1990; Biagi *et al.*1987; Leale Anfossi 1972
15	Caverna delle Arene Candide	Savona, Liguria	Charcoal Layers 11-13H, Locus H10 Charcoal Layer 17H, Locus H13 Human bone Burial VI Charcoal – Pistacia lentiscus Layer 13 Charcoal Layer 1, top of baulk P-Q Marine shell Middle-Late Neolithic transition Marine shell Middle-Late Neolithic transition	5290±80 Beta-60692 5280±110 Beta-60694 5260±135 GX-16962G 5250±140 Beta-65306 5160±90 Beta-56697 5130±200 Pi- 5005±200 Pi-	4233-4002 4235-3989 4258-3960 4311-3952 4050-3800 4228-3704 4031-3546	Bagolini & Biagi 1990; Bernabò Brea 1946; Emiliani *et al.* 1964; Maggi 1997
16	S. Andrea di Travo	Piacenza, Emilia-Romagna	Charcoal US 7, Square 2E – House II Charcoal US 522 – House V	5259±26 Hd-23012 5224±26 Hd-23011	4223-3994 4041-3988	Bernabò Brea 1987; Bernabò Brea *et al.* 2002
17	Valle Lagorara	Maissana, La Spezia, Liguria	Human bone Burial	5390±160 Beta-48965	4360-4001	Maggi 1998
18	Riparo del Lauro	Candalla, Lucca, Toscana	Charcoal Stratum 7	5250±150 GrN-15281	4318-3948	Cocchi Genick 1987-8
19	Poggio di Mezzo	Pisa, Toscana	Charcoal Square G13	5150±80 Pi-	4043-3804	Bagnone 1982
20	Podere Casanuova	Palaia, Pisa, Toscana	Plant material Structure δ2	5200±60 Paris-	4221-3952	Aranguren & Perazzi 1984; Aranguren *et al.* 1987; 1991
21	Scandicci – Via Deledda	Firenze, Toscana	Charcoal Stratum 6	5170±40 Beta-177114	4038-3955	Volante *et al.* 2008
22	Neto di Bolasse	Sesto Fiorentino, Firenze, Toscana	Charcoal Settlement level in principal trench	5200±150 UD-184	4232-3805	Cioppi *et al.* 1987; Sarti 1985
23	Neto-Via Verga	Sesto Fiorentino, Firenze, Toscana	Horizon 7 Horizon 7	5190±70 5170±140	4223-3822 4226-3797	Sarti & Volante 2002; Seccaroni *et al.* 2008; Volante 2003
24	Poggio Olivastro	Canino, Viterbo, Lazio	Charcoal Sector E3, Spits 6-8; Hearth	5120±150 UD-	4143-3709	Bulgarelli *et al.* 1993; 2009; Tykot *et al.*. n.d.
25	Grotta di Monte Venere	Caprarola, Viterbo, Lazio	Charcoal (two pieces) Stratum 4, Sector B	5270±60 R-1171	4228-3995	Alessio *et al.*1991; Delpino & Fugazzola Delpino 1975-80
26	Casale di Valleranello	Roma, Lazio	Charcoal IN-IM 386 Charcoal – wood of Laurus nobilis Hv373 III	5280±65 OxA-4328 5280±45 OxA-8916	4229-4001 4228-4004	Anzidei *et al.* 2002; Bronk Ramsey *et al.* 2002; Hedges *et al.* 1995
27	Casali di Porta Medaglia	Roma, Lazio	Charcoal – wood of Ulmus sp. Grid sqare M28, SW(III)H	5270±50 OxA-7706	4227-3996	Anzidei *et al.* 2002; Baiocco *et al.* 1987; Bronk Ramsey *et al.* 2002

28	Quadrato di Torre Spaccata	Roma, Lazio	Charred seeds – Triticum aestivum durum Square M10 W, Spit XV Charred seeds –Triticum sp. Square M10 W, Spit XV	5270±50 OxA-6049 5280±50 OxA-6050	4227-3996 4228-4004	Anzidei 1987; Anzidei & Bietti Sestieri 1980; Anzidei & Carboni 1995; Anzidei *et al.* 2002; 2010; Bronk Ramsey *et al.* 2002; Celant *et al.*1996; Guidi *et al.* 2004
29	Coppetella di Jesi	Ancona, Marche		5185±55	4050-3946	Barker 1975; Lollini 1963; 1991b; Wilkens 1988
30	Santa Maria in Selva	Macerata, Marche	Animal bone –tibia Bos Taurus Structure 4c Animal bone – metataurus Cervus elaphus Structure 4d	5225±45 LTL-1487A 5202±45 LTL-1488A	4217-3969 4042-3969	Lollini 1965; 1991a; Manfredini *et al.* 2009; Silvestrini *et al.* 2002
31	Ripoli	Teramo, Abruzzo	Charcoal Cavity 21 Cavity 3	5110±210 F-31 5100±120 Pi-	4226-3664 4038-3715	Azzi *et al.*1973; Cremonesi 1965; Dall'Osso 1910
32	Fossacesia	Chieti, Abruzzo	Charcoal Sector B, Spit 1, floor of Cavity 1	5420±210 F-30	4456-3994	Alessio *et al.*1973; Cremonesi 1973
33	Scamuso	Torre a Mare, Bari, Puglia	Charcoal Trench AIII, Spits 15 base-15, Level of stones with hearth	5290±90 Gif-6338	4234-3999	Biancofiore & Coppola 1997; Coppola 1987
34	Grotta di Cala Scizzo	Torre a Mare, Bari, Puglia	Animal bone Level 1	5200±250 BM-2253R	4323-3768	Ambers *et al.* 1987; Bowman *et al.* 1991; Coppola 1988b; Geniola 1987; Geniola & Tunzi 1980; Striccoli 1987
35	Grotta 1 di Cala Colombo	Torre a Mare, Bari, Puglia	Animal bone Levels II-IV Animal bone Level VII	5180±140 BM-2260R 5080±250 BM-2302R	4228-3800 4228-3640	Ambers *et al.* 1987; Bowman *et al.*1991; Coppola 1988a; De Lucia *et al.* 1977; Ronchitelli & Sarti 1984
36	Castello di Lipari	Lipari, Messina, Sicilia	Charcoal Zone AO, deepest cultural horizon, sounding y	5200±60 R-366α	4223-3963	Alessio *et al.* 1969
37	Riparo del Castello	Termini Imerese, Palermo, Sicilia	Charcoal Stratum 9, Spit 24 Charcoal Stratum 9, Spit 14 Charcoal Stratum 8, Spit 12 Charcoal Stratum 9, Spit 18	5240±45 OxA-10001 5220±40 OxA-9998 5215±40 OxA-9997 5214±40 OxA-9999	4223-3976 4046-3973 4043-3975 4043-3975	Skeates 1999-2000
38	Grutta I de Longu Fresu	Seulo, Cagliari, Sardegna	Human bone –juvenile tibia	5258±34 OxA-22195	4224-3991	Skeates 2011; 2013
39	Grotta Filiestru	Mara, Sassari, Sardegna	Charcoal Trench B, Stratum 7	5250±60 Q-3027	4226-3980	Trump 1982; 1983

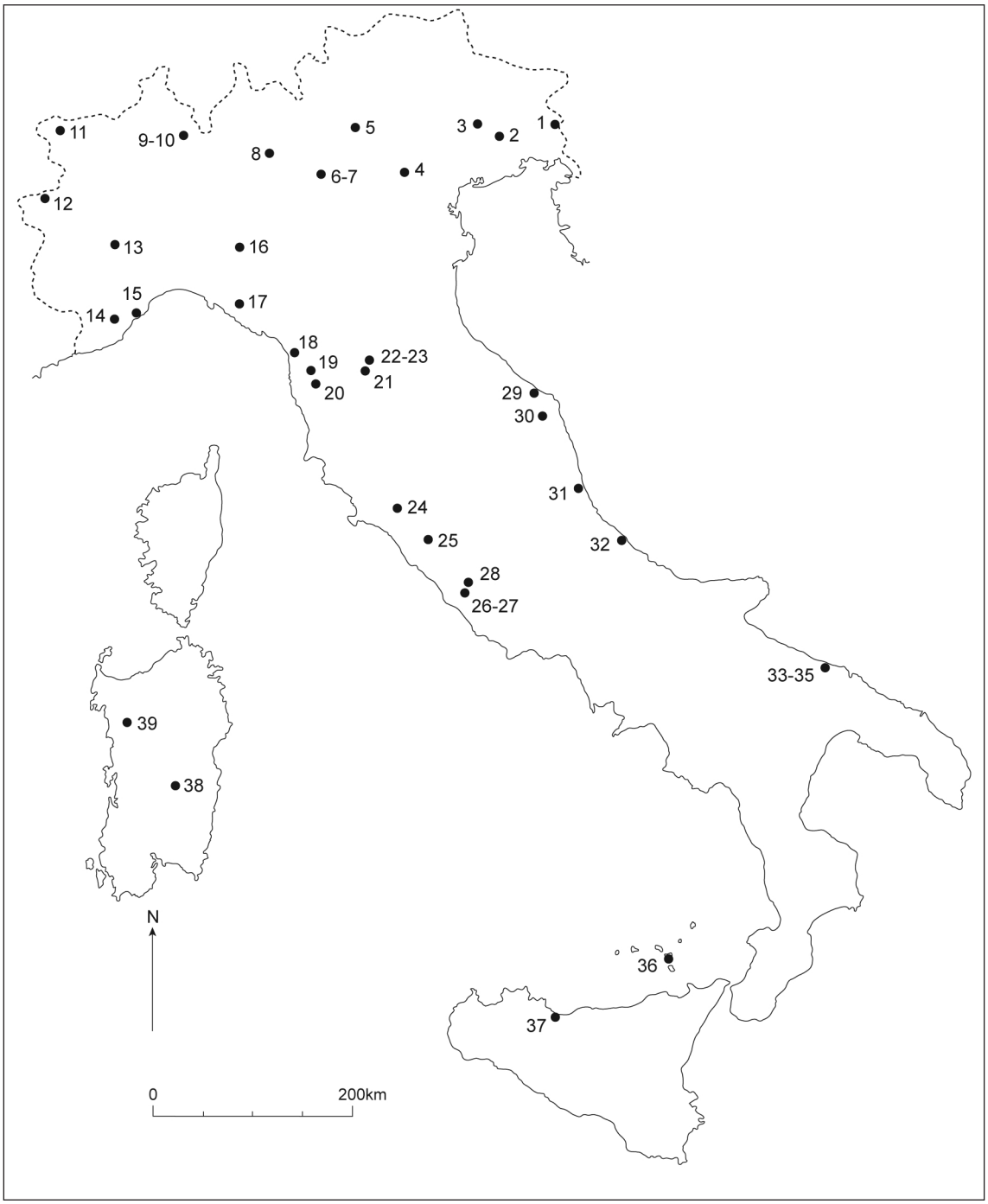

Fig. 1 Map of sites mentioned in the text. (Site numbers correspond to those used in Table 1.)

1. Grotta di Cladreccis, 2. Bannia – Palazzine di Sopra, 3. Palù di Livenza, 4. Molino Casarotto –Site 4, 5. La Vela, 6. Rocca di Manerba, 7. Riparo Valtenesi, 8. Canton di Trescore Balneario, 9. Isolino Viriginia, 10. Pizzo di Bodio, 11. St-Martin-de-Corléans, 12. La Maddalena di Chiomonte, 13. Alba – Corso Langhe 43, 14. Grotta Arma dello Stefanin, 15. Caverna delle Arene Candide, 16. S. Andrea di Travo, 17. Valle Lagorara, 18. Riparo del Lauro, 19. Poggio di Mezzo, 20. Podere Casanuova, 21. Scandicci – Via Deledda, 22. Neto di Bolasse, 23. Neto-Via Verga, 24. Poggio Olivastro, 25. Grotta di Monte Venere, 26. Casale di Valleranello, 27. Casali di Porta Medaglia, 28. Quadrato di Torre Spaccata, 29. Coppetella di Jesi, 30. Santa Maria in Selva, 31. Ripoli, 32. Fossacesia, 33. Scamuso, 34. Grotta di Cala Scizzo, 35. Grotta 1 di Cala Colombo, 36. Castello di Lipari, 37. Riparo del Castello, 38. Grutta I de Longu Fresu, 39. Grotta Filiestru. *Illustration: Y. Beadnell*

social choice ensured variability from place to place (cf. Robb & van Hove 2003). This strong association between later Neolithic settlement and wetland zones in the lowlands of Italy has previously been noted by a number of scholars (e.g. Biagi *et al*. 1985: 276; Gravina 1999; Malone 2003: 264; Skeates 1992: 244; Whitehouse 1968: 360). It forms part of an even wider Eurasian Neolithic settlement preference for alluvial, lake-edge and springside locations, which has been persuasively explained by Sherratt (1980) in terms of the practice of a form of horticulture dependent upon moist soils linked to high ground- and surface-water (as opposed to dry farming on interfluves or irrigation agriculture), as well as the exploitation of the wild plant and animal resources in such areas.

More specifically, a number of archaeologists have suspected for some time now that the apparent abandonment of settlement on the Tavoliere plain and the growing emphasis of lowland settlement in wetland places elsewhere in the Italy during the later Neolithic (and on into the Copper Age) might partly be explained in terms of a human response to climate change, and specifically to an aridification of the Italian Mediterranean climate at around 4004 cal.BC (e.g. Caldara *et al*. 2002: 127–8; Robb 2007: 326; Trump 1966: 56–7). But unambiguous evidence to support or refute this hypothesis has been elusive. Even over the last decade, with a surge in funded research into climate change, reconstructing palaeoclimates is by no means an exact science, with mid-Holocene Mediterranean datasets being characterised by regional variation. Indeed, Allen (2003: 370) emphasises that caution is especially necessary in the interpretation of pollen diagrams in the Mediterranean, where "disparate records of ecosystem change can come from catchments in close proximity to each other." But some consensus is beginning to emerge regarding general trends, while studies of a wider range of palaeoenvironmental datasets, including some new high-resolution cores from central Italian lakes, are also beginning to pinpoint some more specific vegetational and climatic changes. It is broadly agreed that in the Mediterranean the mid-Holocene saw a transition from an Early Holocene climate that was wetter than present to a drier Late Holocene climate, with pollen, palaeohydrological and geological records dating the beginning of this drying trend to between around 7750–7700 cal.BP and 5600–5000 cal.BP (e.g. Magny *et al*. 2002; Peyron *et al*. 2011; Giraudi *et al*. 2011). For example, studies of a high-resolution sequence of pollen, charcoal and diatoms in a palaeoenvironmental core from a lake on the coastal plain of northern Tuscany – Lago di Massaciuccoli – suggest that from around 6020–5940 cal.BP a major climatic shift towards aridity may have triggered increased fire activity, which rapidly caused a strong decline in fir (*Abies alba*) and hindered the expansion of holm oak (*Quercus ilex*) (Colombaroli *et al*. 2007). Human activities (woodland management and the fertilisation of agricultural soils in particular) cannot be excluded completely as contributing to this increase of fire incidence, particularly considering that the later Neolithic marshland site of Poggio di Mezzo is located only about 10km to the south of Lago di Massaciuccoli and has a radiocarbon date of around 6000–5750 cal.BP. However, direct evidence of human impact is weak in the Massaciuccoli sequence, with primary and secondary indicators like *Plantago*, *Cerealia*, *Linum*, *Artemisia* and *Asteroideae* not showing any significant trends (Colombaroli *et al*. 2007: 767). So, an increasing aridification of the climate may well have been a significant factor that human groups living in Italy at around 4004 cal.BC were aware of and responded to, particularly in terms of their settlement strategies and agricultural practices (cf. Jalut *et al*. 2009).

Fluvial settlements

The majority of these wetland sites can be described, more specifically, as fluvial settlements: i.e. as dwelling places located in low-lying, sometimes marshy, areas close to rivers or streams. Just over two-thirds of these sites appear to have been newly established in the later Neolithic, which perhaps reflects a growing emphasis on establishing residential bases in well watered places in the landscape at around 4004 cal.BC. Examples of such sites

extend from river valleys flowing through the mountains and foothills of northern Italy (La Vela di Trento, Canton di Trescore Balneario, Alba – Corso Langhe 43, La Maddalena di Chiomonte, S. Andrea di Travo), to the lower plains of northern Italy (Bannia – Palazzine di Sopra), to the floodplains and tributary streams of the River Arno in Tuscany (Neto di Bolasse and Neto – Via Verga, Podere Casanuova, Scandicci – Via Deladda, Poggio di Mezzo), to the tributary rivers and streams of the Tiber on the south and east peripheries of Rome (Casali di Porta Medaglia, Casale di Valleranello, Quadrato di Torre Spaccata), to the lower river valleys of east-central Italy (Coppetella di Jesi, Ripoli, Fossacesia). Sometimes – but not always – these sites were located on raised landforms, including fluvial and colluvial terraces of varying composition, extent, elevation, slope and drainage. For example, the Alpine site of La Maddalena di Chiomonte is located on a high and wide fluvial terrace in the Dora Riparia river basin; while the coastal lowland site of Poggio di Mezzo is located on the edge of the slightly raised ancient sand dunes of Palazzetto, along the Fosso dell'Anguillara watercourse, in a low-lying marshy area between the Serchio and Arno rivers. By contrast, Coppetella di Jesi is located on Holocene deposits right on the floor of the River Esino.

Not surprisingly, the general humidity of these places is confirmed at those sites with good evidence of plant remains. For example, at Bannia – Palazzine di Sopra, located on Pleistocene fluvial deposits between the rivers Sile and Fiume in the lower plain of Pordenone, the humidity of the palaeo-environment was confirmed by the abundant macro-remains of ash (*Fraxinus*) and alder (*Alnus*) found at the site (e.g. Visentini 2002). At Neto di Bolasse, sediments, freshwater molluscs and pollen grains from the settlement deposits – including grains of Rannock rush (*Scheuchzeria palustris*) and marsh fern (*Thelypteris palustris*) – are indicative of a marsh-edge environment in the area of the site, while oak (*Quercus*), hornbeam (*Carpinus*), birch (*Betulaceae*), alder (*Alnus*), maple (*Acer*) and spruce (*Picea*) are indicative of forest, albeit one with possible clearings, as suggested by the presence of *Plantago* and *Compositae* (Sarti 1985). Similarly, in the territory of Rome, the vegetation at around 4004 cal.BC has been characterised in terms of wooded areas – with, for example, the remains of deciduous and evergreen oaks (*Quercus*), ash (*Fraxinus*), poplar (*Populus*) and elm (*Ulmus*) identified at Quadrato di Torre Spaccata (Celant *et al*. 1996) – and deforested areas indicated by herbaceous vegetation, some probably anthropogenic but others created by lahars (volcanic mudflows) from Lago Albano which was still active at this time (Anzidei *et al*. 2010). (The contrast with the steppe-like vegetation indicated by plant remains from Scamuso in south-east Italy is particularly striking (Biancofiore & Coppola 1997). Here, plant macrofossils were recovered from Spit 15 in Trench AIII, radiocarbon dated to around 4300–4000 cal.BC, while pollen grains were recovered from equivalent cultural deposits, at a depth of 100–105 cm in Trench AIII. The pollen was dominated by grains of *Cichoriae*, *Anthemideae* and *Artemisia* – all plants belonging to the light-loving *Compositae* family.)

Human groups practised integrated subsistence economies in and around these rich environments. These were primarily based on the cultivation of cereals, and – to a lesser extent – pulses and legumes. Identified species include einkorn wheat (*Triticum monococcum*), emmer wheat (*Triticum dicoccum*), spelt (*Triticum spelta*), bread wheat (*Triticum aestivum*), durum wheat (*Triticum durum*), naked barley (*Hordeum vulgare* var *nudum*), broad bean (*Vicia faba*), common vetch (*Vicia sativa*), sweet pea (*Lathyrus odoratus*), and pea (*Pisum*) (e.g. Celant *et al*. 1996; Mottes & Rottoli 2006). Precisely where in the landscape these crops were grown, and how intensively, is an unresolved problem. In contrast to Malone's (2003: 264, 271) picture of "woodland clearance and the development of extensive pastures and fields" in the full Neolithic, of the unsuitability of wetland soils for cereal cultivation, and of the consequent adoption of the ox-drawn ard in places such as Ripoli to plough heavy valley-bottom soils, a much more gradual adoption of new forms of husbandry can be envisaged (Sherratt 1998: 171). Indeed, it is possible that families maintained a patchwork of small scattered garden plots, situated on the best soils within a fairly close distance from these wetland settlements, which reduced the ecological risks of catastrophic crop failure (e.g.

Jones 2005; Robb & van Hove 2003). It may be that the pattern suggested by Biagi *et al*. (1993) for the Middle Neolithic in northern Italy continued into the later Neolithic, with farmers exploiting patches of relatively well drained silt-clay-loams with not too many stones. However, a variety of soils might have been exploited; we just do not know for sure, although new studies of the weeds associated with cereal crops have the potential to provide some clues (e.g. Bogaard *et al*. 2000).

A variety of local wild plants was also gathered, albeit in apparently small quantities (Rottoli & Castiglioni 2009: 98). In addition to providing a wide variety of flavours to diets, these helped cushion the impact of any shortfalls in the productivity of the cultivated crops. Examples of gathered edible fruits, berries and nuts identified at these sites include apple (*Malus*), pear (*Pyrus*), grape (*Vitis vinifera*), raspberry (*Rubus idaeus*), dogberry (*Cornus sanguinea*), Cornelian cherry (*Cornus mas*), elderberry (*Sambucus ebulus*), acorn (*Quercus*), and hazel nut (*Corylus avellana*). The close integration of wild and cultivated plant foods was highlighted at Podere Casanuova, where a deposit containing numerous grains of wheat (*Triticum sativum* and *aestivum*) and oats (*Avena sativa*) was found in the bottom of a pit together with some fragments of acorns (*Quercus*) (Aranguren *et al*. 1991).

Domestic animals likewise dominated faunal assemblages, although proportions of domestic to wild and of different species varied from place to place. For example, domestic animals comprised 91% of the animal bone assemblage at Neto di Bolasse, although it is worth mentioning that the shells of a large number of freshwater molluscs were also found here (Sarti 1985). Amongst the domestic species, sheep and goat (*Ovis/Capra*) were generally predominant (e.g. comprising 64% of all animal bones at Neto di Bolasse), followed by cattle (*Bos*) and pig (*Sus*), then dog (*Canis familiaris*). However, at Coppetella di Jesi the proportion of sheep/goat is relatively low (18% of all animal bones) compared to cattle (30%), pig (28%) and wild animals (23%) (Wilkens 1988). Although local environmental conditions undoubtedly influenced the relative proportions of animals, local tradition and choice were surely also influential (considering, for example, that the marshy environment of Neto di Bolasse – with many sheep/goat – was as humid as that of valley-bottom Coppetella di Jesi – with relatively few sheep/goat). Red deer (*Cervus elaphus*), roe deer (*Capreolus capreolus*) and wild boar (*Sus scrofa*) were the main hunted animals (although one should note the difficulties in distinguishing domestic from wild pigs – Albarella *et al*. 2006). Other wild fauna identified at these sites include: ibex (*Capra ibex*), brown bear (*Ursus arctos*), hare (*Lepus europaeus*), lynx (*Lynx lynx*), wildcat (*Felis sylvestris*), beech marten (*Martes foina*), fox (*Vulpes vulpes*), badger (*Meles meles*), tortoise (*Testudo*), edible dormouse (*Glis glis*), garden dormouse (*Eliomys quercinus*), shrews, moles, hedgehogs and relatives (*Talpidae*), toad (*Bufo*), freshwater and marine molluscs, and fish – most, but not all, of which were probably eaten.

Raw materials for building and for tools were also procured from the environs of these wetland sites, the sources of which local people would have been intimately acquainted. Wood, cobbles and – to a lesser extent – clay were major components in houses and related structures (see below). Indeed, woodworking was identified as a major cause of microwear on chipped stone artefacts at Bannia – Palazzine di Sopra (Visentini 2002) (as at Arene Candide cave – see below). Wood from a variety of trees and shrubs was also burnt ubiquitously as fuel. Other, less archaeologically visible, organic materials would also have been widely used. For example, at Quadrato di Torre Spaccata, the imprint of a basket made of plant fibre has been identified on the interior surface of a pottery sherd (having probably been used as the framework upon which to construct the clay vessel), while lithic microwear analysis indicates the frequent working of hides and of horn (e.g. Anzidei & Carboni 1995). Local clay was also a key ingredient in the manufacture of a range of coarse to fine pottery vessels. At Quadrato di Torre Spaccata, for example, petrographic analyses indicate the predominant use of local clays, tempered with rocks, minerals, shells and grog, even for the production of a fine *figulina* fabric (traditionally thought to have been imported from southern Italy). Vessel forms indicate that they were used especially for the serving of food and drink (notably in the form of an increasingly standardised repertoire of bowls), but also

for storage and processing. Some were also visually attractive objects of display: decorated by burnishing, by occasional impressions, incisions, cordons, pastilles, coloured fills and paint, and by elaborated handles. Although generally replaceable, some vessels were valued sufficiently to be repaired, as indicated by a few sherds with repair holes placed along fracture lines. Clay was also used to make spindle whorls, weights and stamps. Depending on local geology, accessible sources of flint, siliceous limestone, chert, jasper and rock crystal were used for chipped stone tools (especially arrowheads and other projectile points, blades, scrapers, burins, perforators, and small flaked axes). Smooth 'greenstones' (e.g. eclogites and jades) were used for ground and polished stone artefacts; coarse sandstone, quartzite and lava stone for grindstones; and pebbles of various rock types for hammer-stones and smoothers. Deer antlers were used for bone handles (at La Maddalena di Chiomonte) and as picks for ditch digging (at Ripoli). A cattle ulna (foreleg) was used for a hoe (at Podere Casanuova), and other bones were used for artefacts interpreted as awls, points, needles, spatulae, scalpels, a fishhook (at Ripoli), and occasional ornaments.

At the same time, generally small quantities of localised materials with valued properties were carried and exchanged by mobile people, sometimes over long distances, either as partly processed raw materials or as finished artefacts. Fine French flint (*silex blond*) was imported into the adjacent Italian regions of Piemonte and Liguria, while fine glossy flint from the Verona area (Monti Lessini) was distributed throughout northern Italy (Barfield 1999). Sharp obsidian, sourced to the islands of Lipari, Palmarola and Sardinia, was imported in variable quantities to some sites – particularly in central Italy, but occasionally also further north – in the form of cores and blades (e.g. Ammerman & Polglase 1997; Seccaroni *et al*. 2008; Tykot 1996). 'Greenstone' axes, adzes and chisels, petrographically sourced to the Alps of Piemonte and Liguria, circulated within and beyond those regions, to be used perhaps especially as woodworking tools, but also valued as socially-significant biographical possessions (e.g. D'Amico & Starnini 2006; Skeates 1995a). So too did occasional pieces of early copper. A key example is a small 'awl' made on a square-sectioned rod, perhaps used as a pressure-flaking implement (Pearce 2000), then discarded or lost in the settlement deposits at S. Andrea di Travo. This artefact fits into the broader context of an 'early metal using horizon' in the Central Mediterranean region, beginning at around 4300 cal.BC (Skeates 1993).

The size of the north and central Italian fluvial settlements is difficult to estimate, due to the incomplete extent of their archaeological investigation (despite some extensive area excavations) and the difficulty in establishing what parts of these often multi-phase sites were actually in use at 4004 cal.BC (a third having been previously occupied during the Middle Neolithic). However, many have been described as large Neolithic sites. This impression is broadly supported by the available statistics, with, for example, 'anthropic' soil extending over a surface area of 7500m^2 at Podere Casanuova, over one hectare (10,000 m^2) or more at S. Andrea di Travo, Casali di Porta Medaglia and Quadrato di Torre Spaccata, and over 3.5 hectares at Ripoli. We can, then, imagine these as significant places in their landscapes.

Some of these settlements have provided good evidence of houses and related structural features, built out of timber and other local materials, although we know relatively little about their human uses. The best structural evidence comes from S. Andrea di Travo, located on a low fluvial terrace by the River Trebbia in Emilia-Romagna, where the settlement space appears to have been ordered with reference to the river, both spatially and perceptually. An alignment of post-holes inserted in a small foundation trench, and three long alignments of river cobbles – interpreted respectively as a palisade and a dry-stone walled enclosure – ran perpendicular and parallel to the river (e.g. Bernabò Brea *et al*. 2002). Three large rectangular houses were also aligned along the river bank. The largest measured 15m long and 7m wide, and the smallest was 11m long and 5.5m wide. Wall posts were set in holes and horizontal beams within foundation trenches. Two more structures were built on higher ground, also delimited by post-holes, but oriented differently and smaller in size (7 by 5.6m).

Pits, some perhaps used as silos, were placed near the houses, some concentrated in a single area. Numerous shallow fire pits, containing carbonised wood and heat-altered pebbles, were also found. Houses have also been found at three other contemporary sites. At Alba – Corso Langhe 43, a large rectangular house was identified (Venturino Gambari *et al*. 2002), which is comparable in form to the houses at S. Andrea di Travo. Given the absence of daub here (and at most other contemporary sites in north and central Italy), a superstructure of wood and thatch has been hypothesised (Bernabò Brea *et al.* 2002: 399), with implications for the exploitation of the resources of adjacent forested areas. (However, it is possible that daub was simply not preserved archaeologically in the case of houses not destroyed by fire.) Post-holes also enabled the outlines of two superimposed sub-rectangular houses to be identified at Quadrato di Torre Spaccata (e.g. Anzidei & Carboni 1995). By contrast, at La Maddalena di Chiomonte, a series of relatively small houses has been recorded. Some were based on a circle of posts converging towards the top of a conical roof. Others were built against large rocks, with walls formed by posts set in foundation trenches and finished with clay plaster. Hearths were generally placed outside these structures, which were evidently too small to light fires in. Hints of built structures are also provided at Neto di Bolasse and Ripoli by the discovery of fragments of daub with wattle impressions. However, houses may not have been the norm at all sites, some of which might have served more as seasonal bases than as permanent agricultural settlements. Poggio di Mezzo in Tuscany, for example, has been interpreted as a seasonal hunting and fishing camp, situated on sand dunes that enabled access through an extensive area of coastal lowland marshes lying between the Monti Pisani and the Tyrrhenian Sea (Bagnone 1982: 80–1).

Elsewhere, common settlement features include: cobbled surfaces (extending over an estimated distance of more than 100m at Casale di Valleranello), covered by tramped cultural deposits of soil, charcoal, pottery sherds, artefacts and animal bones; hearths and associated clay layers hardened by fire; post-holes; and channels, depressions, pits and cavities of various shapes and sizes. At Quadrato di Torre Spaccata, an area used for the preparation of plant food was indicated by the discovery of a major concentration of grains and seeds near to a clay surface and a grindstone. A chipped stone tool working area and/or dump of débitage was also found at this site, represented by a deposit of some 1000 small flakes of flint and obsidian concentrated within an area of 1.5 by 1.5m. And at Ripoli a large ditch (7.2–7.5m wide and 4.5–5.0m deep), dug in at least two phases of activity, surrounded part of the settlement (Cremonesi 1965). In addition to acting as a substantial physical barrier (to the movement of domestic animals, for example), this ditch was arguably also of social significance, in signifying distinctions between 'insiders' and 'outsiders' and between a lived-in domestic place as opposed to the less well-known space of the wider landscape (cf. Skeates 2000).

Cemeteries, situated close to but separate from these living areas, have been identified at three of the fluvial settlements. Their meaningful positioning in relation to dwelling places presumably established and highlighted spatial and symbolic boundaries and relations between communities of the living, the newly dead and the ancestors, distancing them compared to earlier Neolithic mortuary practices (cf. Skeates 1995b). At La Vela di Trento, some fifteen inhumation burials have so far been found on the north-east and south-west edges of the excavated area: in trench and stone boulder graves in the former; and in relatively richly furnished, stone slab, cist graves in the latter (e.g. Barfield 1967–9; Degasperi & Pedrotti 1997). However, radiocarbon dates on samples of human bone from three of these burials, and associated square-mouthed pottery, place them in the Middle Neolithic, between around 4700 and 4350 BC. Nevertheless, the cist burial tradition did continue into and become characteristic of the later Neolithic in northern Italy (including at Arene Candide cave – see below) and in southern Italy (Robb 1994: 41–2). At La Maddalena di Chiomonte in Piemonte, in a possibly enclosed area slightly raised in relation to the inhabited fluvial terrace, eleven stone cists were found to contain inhumation burials accompanied by grave goods linked to the French Chassey culture (Bertone & Fozzati

1998). By contrast, at Ripoli, a cemetery comprising a line of burial ditches was dug across the centre of the multi-phase site (Cremonesi 1965; Dall'Osso 1910). These contained the remains of over 45 adults and one child, deposited as both primary and secondary burials, as well as pottery, stone artefacts and animal bones, perhaps representing the remains of funerary feasts and/or gifts to the deceased. According to the style of the pottery, these burial ditches were dug and filled over an extended period of time during the later Neolithic.

Another kind of special-purpose area was identified at Canton di Trescore Balneario, to the south-west of the habitation area and separated from it by a band of 'empty' ground (e.g. Poggiani Keller 2003-6). Here, a large circular tumulus was constructed, probably during the Final Neolithic, to judge by the Lagozza and Breno style pottery found in the tumulus. It was 15m in diameter and survived to a height of 0.6–0.8m. Post-holes found on one side suggest a wooden palisade or revetment. The tumulus was constructed over what appears to have been a wooden box, which was covered by gravel and contained fragments of charcoal. A line of five hearths extended from near the tumulus into the band of 'empty' ground. Charcoal from two of these hearths has been radiocarbon dated (unfortunately with wide standard deviations) to around 4450 to 3800 cal.BC.

Hints of smaller-scale domestic rituals and socially significant displays are also indicated by examples of portable material culture found at these fluvial sites. A pile of red ochre and occasional isolated human bones may have been ritually deposited in cavities in the settlement area at Ripoli (Cremonesi 1965). Ceramic containers, shaped and sometimes decorated in the widely shared regional styles of Late Square Mouthed Pottery, Chassey, Lagozza, Breno, Late Ripoli, Serra d'Alto and Diana, expressed connections to pots and to people in neighbouring and more distant communities, although local choices over precisely which novel stylistic elements to adopt ensured an underlying local variability, which increased with distance from stylistic source areas (Cocchi Genick 2002; Crepaldi 2002). Rare decorative clay stamps or *pintaderas* (from La Vela di Trento, La Maddalena di Chiomonte, and Coppetella di Jesi) were arguably used as hand-held printing and impressing tools, to reproduce copies of powerful graphic images on the surface of other cultural materials (Skeates 2007). Equally rare personal ornaments enhanced the expressiveness of human bodies, perhaps at the same time as provoking memories of significant places, people and events (Skeates 2010b). Examples include a few beads and a pendant of imported steatite (from Casali di Porta Medaglia, Quadrato di Torre Spaccata and Coppetella di Jesi), a sandstone pendant (from Fossacesia), an incised pebble pendant (from La Maddalena di Chiomonte), a perforated bear's tooth (from Coppetella di Jesi), and perforated sea shells (from Ripoli, today situated 4km inland from the Adriatic coast). Incised ceramic spindle whorls and weights and polished stone and ceramic rings (from Podere Casanuova, Ripoli and Fossacesia) may also have been designed, at least in part, to attract people's attention. Pebbles painted with red bands found at Fossacesia in east-central Italy also stand out as special artefacts (Cremonesi 1973) (and are comparable to examples deposited in the cult cave of Grotta di Cala Scizzo in south-east Italy – see below).

Lake- and marsh-edge settlements

The preference for humid settlement locations in north and central Italy (discussed above) reached its foremost expression in the case of water's-edge sites in northern Italy, two of which can be described, more specifically, as 'lake dwellings'. Those dated to 4004 cal.BC are widely distributed: from the marshy basin of Palù di Livenza in the Pordenone province in the east, to Molino Casarotto on the former edge of Lake Fimon in the Vicenza province, to Isolino Virginia and Pizzo di Bodio on Lake Varese in the north-west.

All four sites had deep (but probably discontinuous) human histories, having been occupied and constructed in complex sequences of building and rebuilding since the Early Neolithic, as indicated by radiocarbon dating, dendrochronology, ceramic typology and some stratified deposits. So, successive generations clearly identified with these places and their

water bodies, investing in them time and again. At Isolino Virginia, for example, wooden platforms were initially constructed on the centre of a small island, around 5050–4800 cal.BC, then expanded along the north and east shores of the island during the Middle and Late Neolithic, although occupations were repeatedly subject to flooding by fluctuating lake levels (e.g. Guerreschi *et al*. 1990-1).

Such wetland sites, with their often exceptional preservation of organic materials, have traditionally been celebrated by archaeologists as a distinct category of circum-Alpine settlement (and settler). However, some of their structural features are comparable to those found at the contemporary fluvial settlements in Italy – contributing to the impression of a continuum in settlement forms in Italy at 4004 cal.BC, as opposed to sharp distinctions. At Molino Casarotto, for example, there were cobbled activity areas, layers of settlement debris (including shell middens and a dump for broken pottery vessels), and hearths (including a succession of hearths maintained in the centre of some large wooden platforms) (e.g. Bagolini *et al*. 1973). At Isolino Virginia, the remains of a rectangular walled house were identified. And, at Palù di Livenza, pieces of clay daub with wickerwork impressions offer hints that some of the platforms supported wattle-and-daub houses (Corti *et al*. 1997). Here, at least three different types of underlying wooden structure have been identified, over an area of about 60,000m^2 (which seems very large in comparison with the size of the fluvial settlements). Anchorage structures, formed by beams with small horizontal rafters placed at right angles, made regular trellis girders. Flooring was composed of horizontal layers of rafters and branches covered by boarding. Building supports were also represented by a few large vertical oak poles. Although strong and durable oak (*Quercus robur*) was favoured in the oldest timber structures, a variety of other types of wood was also obtained from different vegetation zones in the environs, including hazel (*Corylus avellana*), alder (*Alnus glutinosa/incana*), maple (*Acer* sp.), beech (*Fagus sylvatica*), ash (*Fraxinus* sp.), willow (*Salix* sp.), poplar (*Populus* sp.), lime (*Tilia* sp.), and elm (*Ulmus* sp.). Wooden posts at Molino Casarotto were made of the same first six species. In addition, the European silver fir (*Abies alba*) was used at Isolino Virginia for timber, bark matting and firewood. The common use of hazel at Palù di Livenza and its increase (in contrast to beech) around 4400–3500 BC in a pollen core from Lake Fimon has been interpreted as a result of an increased human disturbance of the forest at this time, which created small openings that were colonised by light-demanding plants such as hazel (Valsecchi *et al*. 2008). Hazel may also have been actively coppiced for wattle, for fencing and for its nutritious nuts, the remains of which were found at both Molino Casarotto and – filling a small decorated pottery vessel – at Isolino Virginia. However, we should not over-estimate the speed or extent of forest clearance and landscape change at this time (Sherratt 1998: 168). Forests can, after all, regenerate.

The precise balance between domesticated and wild species in the subsistence economies of the later Neolithic communities that occupied these lake- and marsh-edge settlements is unclear. Certainly, wild foods continued to be consumed at them. Futhermore, a certain attention to lacustrine or marshland resources seems likely, given their locations and what we know about the Middle Neolithic economy of Molino Casarotto, where agriculture and herding may only have been of secondary importance to the exploitation of local wild foods, including water chestnut (*Trapa natans*), red deer (*Cervus elaphus*), pig (*Sus scrofa*) (thought to be wild or feral), and fresh-water molluscs (*Unio* sp.) (Jarman 1971). For the Late Neolithic lake-dwelling settlements of the Swiss Alpine foreland, Schibler (2004: 148) has argued that during unfavourable climatic conditions – including the 40th century BC – in which farmers are likely to have suffered from an increasing number of crop failures, people hunted more intensively, especially red deer, and also collected more plants, such as hazel nut and white goosefoot (*Chenopodium album*) (whose seeds and leaves are edible), to make up the missing calories in their diets. This could also apply to the Italian wetland sites at 4004 cal.BC. The uppermost 'Protolagozza' levels at Isolino Virginia, for example, contained the remains of: white goosefoot and acorns, as well as grains of cultivated barley, einkorn wheat and bread wheat (Castelletti 1990). Faunal remains likewise indicate a combination of wild (or feral)

species that were hunted (or, in the case of red deer, perhaps managed – Jarman 1971) and herded domesticates. Fish remains were also identified at Isolino Virginia and Molino Casarotto.

Wider resource exploitation and connectivities are indicated by aspects of the portable material culture found at these sites. A range of pottery vessels was used, broken and discarded, including large coarseware storage vessels and finer serving vessels (such as plates and bowls) modelled in selective conformity with the widespread regional styles of late Square Mouthed Pottery, Chassey and Lagozza. Ceramic weights and spindle whorls were used, and – at Palù di Livenza – ceramic *pintaderas*. Stone artefacts were made from a range of materials, some procured – perhaps indirectly – from non-local sources. At Isolino Virginia, for example, they especially comprised chipped stone tools of flint, but there were also a few flaked tools of distinctive rock crystal and obsidian, greenstone axes, grindstones made of coarse-grained granite or gneiss, and a cylindrical stone bead with an engraved spiral (e.g. Guerreschi *et al*. 1990–1). Bone and horn artefacts were also found at this site.

A timber monument in a forest setting

It is in this wet and forested north Italian environmental context that the contemporary monumental site of Saint-Martin-de-Corléans in the Alpine Valle d'Aosta can be understood (e.g. Mezzena 1975–6). The site is located on the western periphery of Aosta city, in the valley bottom, at an altitude of about 590m. At the bottom of a deep stratified deposit, which produced evidence of Copper and Early Bronze Age monuments, a Final Neolithic stratum was identified. No pottery was found in this deposit, but a series of cylindrical post-holes was uncovered in the north-eastern part of the excavation area, aligned in a south-west/north-east direction, and almost certainly continuing beyond the excavated area. In the bottom of a few of these pits, ashes containing the burnt remains of cattle skulls were deposited, apparently in some kind of foundation rite. Large (and heavy) wooden posts were then erected in these holes, and held in position by stones. These were later burnt down, leaving traces of carbonised wood in the holes. Samples of this wood from five different post-holes have all been radiocarbon dated to within 60 radiocarbon years of each other, which makes it possible that they were all destroyed during the same event. Given the absence of recognisable domestic deposits at this site and the location of the alignment of large wooden posts immediately beneath a later series of monuments, it seems acceptable to interpret this structure as a large monument, built by communal effort to delineate and memorialise ceremonial performances, then destroyed at around 4250–4000 cal.BC. The tantalising but incomplete available data do not allow us to evaluate the anthropogenic impact that the construction of this large timber structure and meaningful ceremonial place had on the surrounding vegetation, but one can imagine that it involved some reordering of the local forested environment (cf. Noble & Brophy 2011; Robb & van Hove 2003: 251–2).

Prominent settlements

In contrast to these relatively low-lying and humid sites, four sites dated to 4004 cal.BC can be described as 'prominent' settlements: i.e. sites located on prominent, raised, natural features in the landscape, offering extensive views over lower lying areas. Moving from north to south, they comprise: Rocca di Manerba, situated just below the peak of a high promontory overlooking the western shore of Lake Garda; Poggio Olivastro, located on the southwest slope of the Monte di Canino overlooking the central Fiora river valley in west-central Italy; Santa Maria in Selva, situated on top of a hill overlooking the middle section of the Potenza river valley in east-central Italy; and the Castello di Lipari, a present-day coastal promontory on the Aeolian island of Lipari, situated off the north coast of Sicily. Two had previously been occupied during earlier phases of the Neolithic, but two – Rocca di Manerba and Santa Maria in Selva – appear to have been first established during the later Neolithic.

The form of these sites, and of the cultural activities undertaken in and around them, cannot be pinned down precisely, due to the limitations of the available archaeological evidence, although they can be broadly described as settlements. Numerous post-holes, pits, shallow channels and hearths of various shapes and sizes have been uncovered, particularly at Poggio Olivastro (Bulgarelli *et al*. 1993), but also at Santa Maria in Selva where a notable quantity of plaster was also found (e.g. Lollini 1965). These might be interpreted as the remains of structures related to the construction of (unidentified) houses and of domestic activities performed in and around them. Deposited artefacts give a similar impression: including fragments of a range of serving and storage vessels (manufactured in a variety of regional styles); stone tools of flint, obsidian, quartz and schist; bone tools; grindstones; small greenstone axe-heads; ceramic weights; a few fragments of *pintaderas* and of a ceramic figurine (from Poggio Olivastro); and occasional perforated ornaments of seashell and of a dog's canine tooth. Plant and animal remains likewise indicate mixed later Neolithic subsistence economies, centred on the cultivation of cereals and legumes and the husbandry of domesticated animals, but supplemented by the gathering of wild nuts and fruits and the hunting of wild animals.

In addition to this evidence of essentially domestic practices, it has been argued that some of these prominent settlements were strategically positioned, dominant and defensive sites (e.g. Borrello 1978: 78). Lipari acropolis, for example, has been interpreted as a "semi-fortified site" that dominated the exploitation of Lipari obsidian:

> "… the Lipari obsidian trade seems to have been controlled by the local inhabitants, situated safely and powerfully on the fortified Acropolis, manipulating perhaps the coming and going of potential traders. The rich and exotic deposits in the Neolithic levels (painted ceramics, polished axes, beads, etc.) suggest that the control of the obsidian source enabled the local inhabitants to demand a greater quantity of prestigious and valuable goods in return than was normal for Neolithic sites elsewhere in the central Mediterranean."
>
> (Malone 1986: 159)

Santa Maria in Selva has, likewise, been interpreted as a well-placed and "successful node of production and exchange", characterised in the Final Neolithic by larger proportions or numbers of obsidian artefacts, early copper, pottery made in the Lagozza style, and cattle relative to most Early, Middle and Late Neolithic sites in east-central Italy (Skeates 1992: 736). Poggio Olivastro also stands out for the large number of obsidian artefacts found at the site: more than 600 artefacts, sourced to Palmarola, Lipari and Sardinia – the most found at any site in central and northern Italy except Pescale and possibly Fornacce Cappuccini (Tykot *et al*. n.d.). A large, unidentified, structure, composed of a layered pile of stones and slabs, is another distinctive feature at Poggio Olivastro. And, at Rocca di Manerba, as many as three stone terraces were constructed on the steep hillslope, against the internal face of which accumulated occupation deposits during the Later Neolithic (e.g. Barfield & Buteux 1999). The first (and lowest) terrace wall was massive, measuring around 2.8m wide and surviving to a height of 2m. Although it undoubtedly helped to stabilise the settlement deposits and some possible rectangular wooden houses, the scale of this terrace structure and the site location itself do also point towards a 'defensive' control of access to and from the settlement. The terms 'dominant', 'defensive' and 'control' are problematic, in that they simplify into single functions the undoubtedly complex and dynamic histories of these sites, although the impression remains that the communities that inhabited them were powerful enough to choose to occupy prominent places in the landscape, to divert the long distance flow of valued commodities towards themselves, and to defend their resources from outsiders.

Caves and rock-shelters

At 28% of the sites included in my sample, the 11 caves or rock-shelters dated to 4004 cal. BC are not an insignificant site type. They can broadly be divided into two groups: relatively

large caves and rock-shelters used as convenient bases for residential and subsistence activities; and more restricted caves used for ritual performances. However, the distinction between these two categories is blurred in at least one case, and – above all – the diversity of these sites should not be underestimated.

At one end of the spectrum is Grotta Arma dello Stefanin (e.g. Leale Anfossi 1972). It is located 25km inland from the present-day Ligurian coast, at an altitude of 440m in a mountainous landscape, near the bottom of a narrow gorge formed by a bend in the River Pennavaira. It is a large, single-chambered cave: 27m wide and 4m high at the entrance, and 20m deep. It contained deposits of over 5m in depth, accumulated between the Upper Palaeolithic and the Iron Age, which reflect the long-term significance of this landmark place. However, radiocarbon dates on charcoal from the shallow (5–8cm thick) Stratum III span the period 4500–3800 cal.BC, which may provide some indication of the limited scale of the occupation of this site during the later Neolithic. The animal bones found in these deposits belonged primarily to three wild species (ibex, boar and red deer), which comprised 77% of the total number of identified animal bones. One domestic species (sheep/goat) made up a further 9%, with cattle and a range of other wild species present in much smaller numbers. Snail shells were present, including abundant examples of the edible *Helicidae* family. Marine mollusc shells were also identified, just over a quarter of which were perforated, presumably to be used as ornaments. Whether or not they represent portable food, their existence does indicate that the occupants of this cave maintained connections with coastal areas, perhaps directly during the course of a seasonal round of hunting and herding encompassing both inland and coastal areas and both caves and (open-air) agricultural settlements (Barker *et al.* 1990; cf. Miracle 1997). The remainder of the restricted material culture found at this site included: a hearth fuelled by evergreen oak wood (*Quercus ilex* and *Quercus pubescens*), pottery sherds (some assigned to the widespread Lagozza style), some chipped stone artefacts of quartzite and jasper, a few bone tools, a sandstone grindstone, a pendant of grey limestone, and some pieces of yellow and red ochre. Comparable stratified deposits have also been found in Grotta Filiestru, located on the edge of the Bonu Ighinu basin, over 20km inland from the west coast of Sardinia, and in Riparo del Lauro in Tuscany, situated on the bank of the Lombricese stream, 10km inland from the Tyrrhenian coast; and both have been interpreted as the (possibly seasonal) stations of small groups of mobile herder/hunters, perhaps connected to contemporary open-air agricultural communities (Cocchi Genick 1987–8; Trump 1983).

Caverna delle Arene Candide can also be interpreted as a herder/hunter site, but arguably lies towards the middle of the spectrum of later Neolithic caves and rock-shelters, due to its location closer to the Tyrrhenian coast and its use as a burial place (e.g. Maggi 1997). The cave is located at an altitude of 89m, on the southern slope of the Caprazzoppa mountain, which overlooks the coast of Finale Ligure. In the Neolithic, a sand dune (now removed by quarrying) would have extended from the sea almost up to the cave. The cave has four south-facing openings. These illuminate well the large and relatively dry interior space, which is 70m long and between 10 and 20m wide. The majority of the eight radiocarbon dates from this site that overlap 4004 cal.BC relate to its Late Neolithic, Chassey-Lagozza culture, phase of occupation. Studies of soil micromorphology and plant phytoliths from the cave deposits of this period suggest that the cave was used primarily for the repeated (possibly winter) stabling of cattle and sheep/goat. These appear to have been kept in fenced areas of the cave provided with bedding and fodder of branches, twigs and leaves of oak (and perhaps also fern or bracken), the trampled and dunged layers of which were then burnt at the end of stabling episodes (cf. Angelucci *et al*. 2009). Zooarchaeological studies confirm that sheep/goat in particular were killed, processed and consumed at, or close to, the site (primarily for meat as opposed to milk), and that cattle and (clearly domestic) pig bones are also present, as well red deer bones. As a consequence, the majority of the bone artefacts were made from the bones of domestic animals. Marine molluscs also contributed to the diet, especially a species of bittersweet (*Glycymeris insubrica*), many of

whose shells were perforated for presumed use as ornaments. The absence of grindstones in the Late Neolithic deposits, however, hints at an absence of plant food processing in the cave. Whatever the precise nature of the economy practised at Arene Candide, the human occupants and their domestic animals appear to have exacerbated a long-term anthropogenic impact on the forested environment surrounding the cave, which, at least on the lower mountain slopes, now became a more open and impoverished macchia-type vegetation. Microwear analysis of the Late Neolithic chipped stone artefacts from the cave also indicates an increase in wood working during the Late Neolithic. Associated pottery included Chassey-style fineware vessels, manufactured to a high standard (characterised by thin walls, regular forms, efficient firing, and high polish), and a more robust medium-ware – both made from local clays found within 2km of the site, and some probably made within the cave, to judge by the presence of cave calcite in several ceramic fabric samples. Some other artefacts, even if manufactured or modified locally, were made from valued materials originating in much more distant sources: more than 50% of the chipped stone artefacts were made of varieties of high quality flint sourced to the lower Rhône Valley in France; sharp obsidian was sourced to Lipari (in particular) and Sardinia; polished greenstone for axe-heads and a pendant may have come from Ligurian sources; as may the copper for an 'awl' – pointed at both ends with a quadrangular section, and measuring 6.8cm long. The cave was also used as a meaningful burial place at this time, as confirmed by the radiocarbon dating of a sample of human bone from one of the stone cist graves (Burial VI) to 5260 ± 135 BP (GX-16962G), which contained the crouched body of a young adult male, with an ochre-stained grindstone placed on his chest.

Other caves can be placed at the other end of the spectrum of later Neolithic caves and rockshelters, being more restricted in size and shape, and apparently having been used exclusively for ritual performances. A good example is provided by two caves located in small bays on the present-day Adriatic coastline near Torre a Mare, in central Puglia.

Grotta di Cala Colombo was used repeatedly as a burial place (De Lucia *et al*. 1977). It is a small natural cave (about 5m wide, 9m deep, and 2m high) which may have been artificially enlarged into a multi-lobed structure. It contained stratified mortuary deposits, the upper strata of which have been radiocarbon dated to around 4250–3650 cal.BC. These strata contained the remains of an estimated fifteen individuals – adult and young, male and female – deposited as primary and secondary burials. For example, one primary burial, comprising the strongly contracted body of an adult male aged 21–23 years, was found in a clay-lined grave. The skull of another body was surrounded by large stones. And a secondary burial was represented by the disarticulated remains of four individuals interspersed within a pile of stones. Associated grave goods, perhaps representing food remains and related equipment intended for consumption on the way to or in an afterlife, included: some seeds of wheat and lentils; animal bones; marine molluscs; pottery serving vessels made in the south Italian Late Serra d'Alto, Diana and Bellavista styles; flint and Lipari obsidian artefacts (including an unusually long flint blade, 13.5cm long); bone tools; and grindstone fragments.

Grotta di Cala Scizzo, located just under 2km along the present-day coast from Cala Colombo, was also adapted for use as a cult cave at about the same time (e.g. Geniola & Tunzi 1980). The cave is about 16m long and up to 7m wide, with a main elongated chamber and lateral niches. A sample of animal bone from the lowermost stratified deposits in the central area of the cave, containing Serra d'Alto, Diana and Bellavista style ceramics, has been radiocarbon dated to around 4350–3700 cal.BC. A small pebble, wrapped with a decoration of radiating red-painted lines, was found at the base of these deposits. This artefact is comparable stylistically – and, perhaps, also chronologically – to a larger pebble, also decorated with radiating red painted lines, found beneath the front of an otherwise undated structure of horizontal and vertical stone slabs and grindstones that delimited the inner area of the cave. The grindstones were presumably used to process wheat and barley, the remains of which were also found in the cave interior, and interpreted as ritual offerings.

A relatively large ceramic figurine head (7cm long) was also found beneath the back edge of the stone structure. Modelling and incisions represent shoulder-length hair, eyebrows and a nose (perhaps also representing a – male – bucranium), eyes, and a mouth under which are incised a V followed by a vertical line (perhaps representing a – female – vulva). Traces of red and white colouring can also be seen on the face. This is comparable, both in style and context, to a ceramic figurine head deposited beneath an imposing hearth built of limestone slabs in Grotta Pacelli, also located in central Puglia, which was associated with slightly earlier Serra d'Alto style pottery (Striccoli 1988). Prior to their burial, these miniature and three-dimensional representations of human heads would have been held and looked at: stimulating the senses and thoughts of the people who experienced them, and potentially raising questions about their gendered bodies and identities (Bailey 2005). More specifically, they can be interpreted – in these cave contexts –as having been used as cult objects that were perceived to be imbued with spiritual potency and religious significance (Holmes & Whitehouse 1998: 113).

The later Neolithic cult cave of Grutta I de Longu Fresu in the uplands of central Sardinia is also worth describing, since it shares a number of features with these two broadly contemporary south Italian cult caves (Skeates 2011). The cave is located in a small and secluded valley on the edge of the Longu Fresu stream, at an altitude of around 750 m (Fig. 2). It comprises a principal corridor (15m long and 1.5–7.5m wide) and eight lateral niches. Excavations – directed by the author – have focused on the innermost part of this cave (Fig. 3). Here, a small group of wall paintings was discovered by Giusi Gradoli, extending over an area of at least 30 by 30cm in a niche, just to the side of a now-extinct spring (Fig. 4). The dark grey paintings are covered by flowstone, but at least two schematic linear

Fig. 2. The small entrance to Grutta I de Longu Fresu (in the centre), located above the Longu Fresu stream bed *Photo: R. Skeates*

Fig. 3 Photograph of the innermost area of Grutta I de Longu Fresu, showing the innermost niche (in the centre at the back), flowstone-coated skull (immediately to the right), series of stone blocks (in the foreground) and small group of painted anthropomorphic figures (to the right) *Photo: J. Veitch*

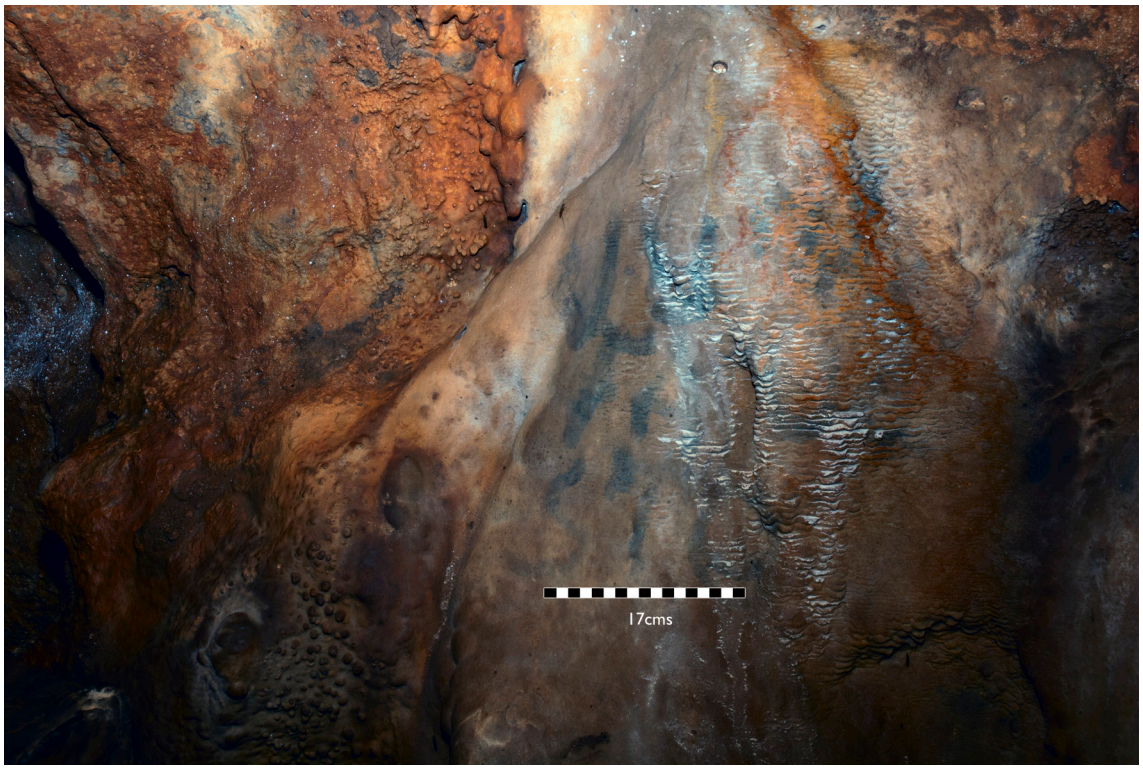

Fig. 4 Cave painting in Grutta I de Longu Fresu *Photo: J. Veitch*

representations of anthropomorphic (or combined animal-human) figures are visible, with legs, arms, and either an elongated head or horns. The style of these paintings is closely comparable to the corpus of Neolithic cave paintings known elsewhere in the central Mediterranean region (Graziosi 1973). Just 1m away, also cemented by flowstone to the same cave wall, was an adult human skull. This has been radiocarbon dated to 4250–4050 cal.BC. In adjacent deposits on the cave floor, delimited by one or more large stone blocks placed on a small group of truncated stalactites, a greenstone axe-head was found (Fig. 5), as well as just over 100 more disarticulated human bones, belonging to at least two other individuals. Two of these bones were radiocarbon dated to the same period as the skull. Taken together, these various features might be interpreted in terms of the human use of this cave for repeated, small-scale rites of passage, involving: the structuring of space by the natural elongated form of the cave and by the installations of material symbols within it; primary and secondary mortuary rites; the sacrifice of a valued greenstone axe; the visual (and presumably also oral) expression of secret knowledge relating to humans and perhaps

Fig. 5 Greenstone axe-blade from Grutta I de Longu Fresu. *Photo: J. Veitch*

also to their relations with the animal and spirit world; and an attention to the abnormal (oozing, dripping and solidifying) flow of water in the cave. Although locally specific, all of these features tie in well with what Whitehouse (1992) has described as an Italian-scale Neolithic cave cult, characterised by ritual attention to secrecy, hunting and abnormal water, and interpreted in terms of a fertility cult in which access to secret (male) religious knowledge was controlled by ritual leaders.

CONCLUSIONS

The world was not suddenly created by supernatural design in 4004 BC, nor was it in "decline"(Ferrari & Visentini 2002), but during the protracted "Neolithic-Copper Age transition" traditional places and practices were slowly reshaped by a combination of culturally mediated natural and human forces. Robb (2007: 286–320) characterises this period in Italy in terms of a number of significant and interrelated transformations, including: an expansion in trade and exchange; the development of a prestige goods economy involving the consumption and display of widely recognised valuables; the appearance of metal artefacts; the creation of similarity through the widespread production and use of plain polished pottery; an increased demand for over-production of food; an intensification of pastoralism; an increase in the practice and social significance of hunting; the abandonment of villages in favour of a highly dispersed settlement pattern; the more intensive occupation of caves; the colonisation of small islands and the uplands; new forms of visual representation; more overtly gendered human bodies; the rise of formal cemeteries furnished with standardised burial goods; and the construction of political genealogies. Why, then, do we only find hints rather than a clear and comprehensive reflection of these changes in the archaeological record of 4004 BC? Part of the problem lies in the approach adopted in this article: to focus on the short-term, at the expense of the long-term. But another problem lies with Robb's generalising theoretical approach – his "great simplification" (Robb 2007: 286). As Robb points out, and what my close inspection of the archaeological remains of 4004 BC confirms, not all these transformations occurred at once – "Change happened in degrees without abrupt ruptures, even when the aggregate transformation over long epochs was dramatic"(Robb 2007: 323). The transition to the Copper Age, then, came about gradually, locally, variably, and in some places hardly at all.

These statements might be regarded as the building blocks of a new consensus (at least amongst social archaeologists) about the 'Neolithic-Copper Age transition' in Italy. But where debate remains wide open, and where further research is required, concerns the nature of 'the environment' and of human relations with it at the end of the fifth millennium and at the start of the fourth millennium cal BC. This is an area that Robb pays relatively little attention to, mainly as a consequence of his socially-deterministic approach

to culture change (e.g. Robb 2007: 326). My intention has not been to provide a retrograde environmentally deterministic alternative, but I have tried to fill this lacuna with reference to some of the growing body of evidence relating to mid-Holocene climate and vegetation in my reconstruction of later Neolithic cultural landscapes, and with reference to the rich materiality of some meaningful places within these. In lower-lying parts of the landscape, moist and fertile soils (offering potentially high cereal crop yields) and a combination of marshy and forested habitats appear to have remained attractive features in settlement location for a significant number of Neolithic communities at around 4004 cal.BC. These places, situated close to courses and larger bodies of fresh water, were well-suited to mixed economies that were essentially agricultural (and above all horticultural) but also supplemented by a choice of local wild foods. These places also provided local residents with a rich variety of material resources, particularly for their never-ending tasks of building, tool making and food production. Indeed, the daily routines of these communities were deeply embedded in these meaningful wetland places. And as climate change continued, with a gradual long-term trend towards aridification, this core communal settlement and subsistence strategy was widely maintained (rather than radically transformed), and even strengthened socially by burial ritual and other ceremonial behaviour performed in these places. Nevertheless, this potentially threatening long-term climatic trend, combined with news of wider prestige-driven socio-economic innovations being adopted across Europe, may also have encouraged local communities to choose to reinforce themselves against the risks of crop failture, social isolation and raiding: by abandoning some of the driest traditionally settled parts of the lowland landscape; by further investing in mobile herds of domestic animals (and especially their meat), gradually expanding amongst the previously under-exploited grazing, hunting and gathering resources of island, inland and upland parts of the Italian landscape, appropriating conveniently-situated caves as seasonal shelters and as secluded sacred places of socially-restricted (male) ritual in the process; by collaborating even more actively in social and economic exchanges with neighbouring communities and individuals who formed networks of hospitality extending over long distances; and, in the case of the most prominent and exposed communities, by strengthening the physical and symbolic defences around their accumulated resources. In the landscape of Neolithic Italy at 4004 BC, people belonged to all of these dynamic places.

ACKNOWLEDGEMENTS

I would like to thank Ruth Whitehouse and Mark Pearce for inviting me to contribute to this volume, and for their combined encouragement, patience and editorial care. I am also grateful to Peter Rowley-Conwy and Andrea Dolfini who generously shared the contents of their private libraries with me, and to John Chapman who discussed Neolithic settlement patterns with me.

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