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Contents

12. Early Upper Paleolithic Population Dynamics and Raw Material Procurement Patterns in Italy

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Abstract

Contemporary discussions of the Middle-Upper Paleolithic transition need to employ common analytical yardsticks in order to objectively compare the two periods. We present new perspectives on that issue in the Italian peninsula, focusing on raw material procurement dynamics as the analytical constant to compare late Mousterian, Uluzzian, and Aurignacian assemblages. Evidence from the northern and the southern parts of the peninsula combine to suggest that some of the distinctions between the Uluzzian and Aurignacian patterns may reflect fundamentally different ways in which the Early Upper Paleolithic landscape was conceptualized. Combined with new data about the age of the Aurignacian and Uluzzian in southern Italy, these observations suggest that increased raw material transfers do not represent a useful monitor of behavioral modernity, and that more attention needs to be given to the context of individual assemblages in order to reconstruct population dynamics across the Transition interval.

Introduction

This paper aims to be a comprehensive discussion of human population dynamics across the so-called Middle-Upper Paleolithic Transition in the Italian peninsula, a research theme prompted by two main factors. Firstly, Italy's geography has always positioned it as a bridge between the Balkans and the rest of western Europe. Secondly, the results of Italian prehistoric research are generally poorly disseminated beyond the bounds of the country. To remedy this situation, we present an up-to-date overview of current data to ensure that empirical and theoretical developments in Italy can be integrated in broader, pan-Mediterranean perspectives on the topic of modern human origins. We frame our study within a discussion of the purported social geographies of Mousterian, Uluzzian and Aurignacian groups as inferred from raw material transfer patterns, a long-standing component of the trait list of the archaeological monitors of "modern behavior". We begin by reviewing and discussing of recent data from the north of the peninsula – an area whose record is relatively well-known internationally –before incorporating complementary data from the center and south of the peninsula in order to generate a peninsular view of population dynamics during the Transition interval. Doing so allows us to assess the validity of traditional models of the nature of cultural dynamics at that time, as well as to clarify the nature of potential modern human-Neanderthal interactions. We conclude with a summary discussion of new chronological studies from southern Italy that may have important implications for our understanding of the timing of the emergence of modern human behavior in the peninsula.

The Middle-Upper Paleolithic Transition in Italy

The Italian peninsula is an appealing area in which to study the Middle-Upper Paleolithic Transition for ecological, geographical and anthropological reasons. First, its position as a peninsula aligned roughly north-south *in* the Mediterranean – and its correspondingly generally temperate climate relative to the rest of the European landmass – made it a natural refugium for both fauna and hominins during Quaternary glacial advances (Finlayson 2004, 16, 68; van Andel

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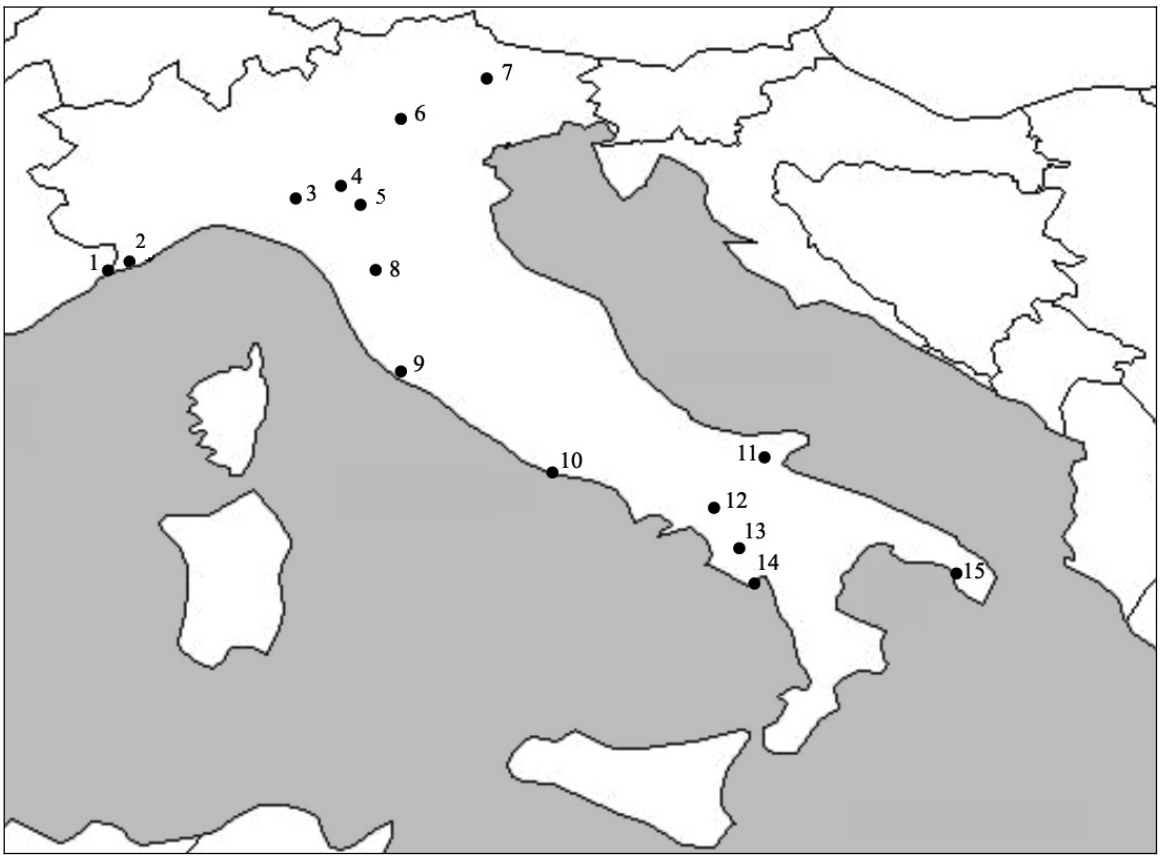

Figure 12.1. Map of Italy, with sites discussed in the text indicated by numbered dots. 1: Balzi Rossi: Riparo Mochi, Riparo Bombrini, ex-Birreria site; 2: Via San Francesco; 3: Ronco del Gatto; 4: Lemignano; 5: Ghiardo Cave; 6: Riparo di Fumane; 7: Monte Avena; 8: Pontecosi; 9: Grotta La Fabbrica; 10: Monte Circeo: Grotta Breuil, Grotta del Fossellone, Grotta Barbara; 11: Grotta Paglicci; 12: Serino; 13: Grotta di Castelcivita; 14: Grotta della Cala; 15: Grotta del Cavallo, Grotta Mario Bernardini, Grotta di Uluzzo, Grotta-Riparo di Uluzzo C, Grotta della Serra Cicora A.

et al. 2003). Furthermore, while the northern two-thirds of the peninsula would have been connected to the Balkans by the low-lying deltaic plain of the northern Adriatic during long segments of the Late Pleistocene, southern Italy would have remained an isolated geographical *cul-de-sac* (Shackleton *et al.* 1984; van Andel *et al.* 2003). These two observations highlight the importance of Italy as a potentially very informative "archaeological laboratory" in which the human dynamics of the Transition would have been magnified by the combined impacts of higher population densities, a peninsular geography of limited area, and high ecological diversity.

From an anthropological perspective, the analytical units (*i.e.* the "cultures") of the Transition in Italy are represented by regional Mousterian and Aurignacian facies, as well as a transitional industry – the Uluzzian (Kuhn and Bietti 2000; Mussi 2001; Palma di Cesnola 1993, 1996). Relevant chronological data are presented in Table 12.1. The Uluzzian is identified on the basis of small crescent-shaped microliths, a combination of many Middle and a few Upper Paleolithic tool types, and a high incidence of splintered pieces (Palma di Cesnola 1993). The industry is known from cave and rockshelter sites that usually contain several Uluzzian layers, reinforcing the view that it represents a distinct industry rather than a mixing of Mousterian and Aurignacian assemblages, with both of which it shares little technologically (Kuhn and Bietti 2000). Due to the fact that they lack secure stratigraphic and contextual integrity, a dozen open-air Uluzzian sites are excluded from most studies, including this one, resulting in a useable sample of eight stratified Uluzzian sites (see Figure 12.1).

At present, it is fair to say that the "transitional" record of northern Italy is better known overall than that of the south, thanks to a relative abundance of dated Late Mousterian and Aurignacian assemblages, some of which are further contextualized by paleoenvironmental data. In contrast, we lack a reliable

chrono-climatic framework for the transition in the south of the peninsula, the area where the Uluzzian developed. The one exception to this rule is Grotta Castelcivita (Gambassini 1997a), where radiocarbon dates indicate a late emergence of both the Uluzzian and Aurignacian, in that order of appearance. It is important to stress that while currently available data are not *incompatible* with the idea that the Uluzzian emerged only after the appearance of the earliest Aurignacian in Italy as a result of some form of 'acculturation' of Neanderthals by anatomically modern humans (Kuhn and Bietti 2000, 70-71; Mussi 2001; Palma di Cesnola 2004), its chronostratigraphic position and the degree of behavioral modernity it embodies largely remain enigmas.

Raw Material Transfers

This paper focuses predominantly on raw material procurement patterns to address the question of human population dynamics in Early Upper Paleolithic Italy. This analytical focus is due to the repeated inclusion of this facet of the archaeological record into trait lists used by some researchers to define the "material signature" of behavioral modernity (*e.g.* Bar-Yosef 2002, 2003; Mellars 1996, 2005; but cf. Clark 2002; Henshilwood and Marean 2003). Specifically, these authors argue that exotic raw materials were transferred more frequently and over greater distances during the Aurignacian than during the preceding Mousterian, an element taken to directly reflect the extent of the geographical ranges of foragers groups and the extent of their social networks. Given that the same researchers attribute the Mousterian to Neanderthals and the Aurignacian to modern humans, it has been argued *post hoc* that this difference must somehow reflect the "modern" behavior of modern humans who are assumed to have extirpated the Neanderthals from Eurasia over the Transition interval. The pattern of raw material transfers for "transitional" industries such as the Uluzzian is generally left unaddressed in most discussions, though based on the latter's putative attribution to Neanderthals (Churchill and Smith 2000; Kuhn and Bietti 2000; Palma di Cesnola 2004), it is not unreasonable to assume that they should resemble Mousterian ones.

From this perspective, increased and more far-ranging raw material transfers are interpreted as symptomatic of the "appearance of extensive and organized exchange systems for the distribution of both raw material and decorative prestige items" (Mellars 2005, 16) qualitatively different from anything in the preceding Mousterian. In a recent review of ethnographic data on hunter-gatherer geographical ranges, however, Marwick (2003) argues that lithotype transfers surpassing 140 km indicate the existence of exchange networks that can only exist with fully modern linguistic capacities and, by extension, fully modern behavior. This is an interesting observation in light of the fact that raw material procurement patterns of the Central European Mousterian greatly surpass that supposed threshold (Féblot-Augustins 1997), perhaps leading to the conclusion that Neanderthals must have possessed modern behavior. That most interpretations reject this conclusion emphasizes the kind of double-standard that pervades many comparisons of the Middle and Early Upper Paleolithic archaeological records and highlights the prevalence of *post hoc* accommodation implicit in much contemporary research that seeks to differentiate "archaic" and "modern" humans (Roebroeks and Corbey 2000). In the case of raw material transfers, for Neanderthals such a pattern is usually explained as an atypical and presumably short-lived behavioral mode that does not characterize the species/population as a whole. For the modern human makers of the Aurignacian, on the other hand, it is generally taken for granted that this behavior is a generalized one that defines the makers of this industry. In contrast with the situation for the Mousterian, when the absence of this pattern is noted in an Aurignacian assemblage it is typically explained as the result of adaptation to especially favorable local conditions or an assemblage's function-specific nature.

Despite the inbuilt assumptions of these views, which were developed based on the archaeological records of southwestern France (Mellars 1996, 2005) and the Levant (Bar-Yosef 2002, 2003), they have the merit of being amenable to testing using data from other regions. The present study is thus an empirical test of the validity of facet of this model concerned with lithic raw material using the archaeological record from a well-bounded and geographically meaningful analytical unit, namely the Italian peninsula. This research fits within a broader set of studies that have begun to critically examine the empirical foundation of accepted wisdoms about what constitutes "modern" behavior, especially identified through the use of "trait lists" (*e.g.* Henshilwood and Marean 2003; see also Grayson and Delpech 2002). Of specific interest here, a number of recent studies that fit within this larger effort have sought to address the meaning of differences in lithotype transfer patterns in the archaeological record from a variety of perspectives (*e.g.* Brantingham 2003; Marwick 2003).

Nonetheless, the use of changes in raw material procurement patterns as an alleged diagnostic feature of modern behavior continues unabated in recent synthetic overviews of the Transition (*e.g.* Mellars 2005). This, along with the critiques mentioned above,

Table 12.1. Chronometric dates for the Italian Late Middle Paleolithic and Early Upper Paleolithic. Sources: 1. Cremaschi et al. 2005; 2. Martini et al. 2001; 3. Leonardi and Broglio 1966; 4. Schwarcz et al. 1990-1991; 5. Alhaique et al. 2000; 6: Pitti and Tozzi 1971; 7. Palma di Cesnola 2003a; 8. Gambassini 1997b; 9. Broglio 1994; 10. Accorsi et al. 1979; 11. Hedges et al. 1994; 12. Azzi et al. 1977; 13. Benini et al. 1997; 14: Alessio et al. 1970.

Site	*Archaeology*	*Level*	*Date*	*+/-*	*Method*	*Source*
Fumane	Proto-Aurignacian	D3b	31700	1200/1100	AMS 14C	1
	Proto-Aurignacian	D3b	32300	400	AMS 14C	
	Proto-Aurignacian	D3ba – str. 15 – liv. A	30320	320	AMS 14C	
	Proto-Aurignacian	D3ba – str. 15 – liv. A	32020	340	AMS 14C	
	Proto-Aurignacian	D6	32300	500	AMS 14C	
	Proto-Aurignacian	D6	37100	240	AMS 14C	
	Proto-Aurignacian	A1	31900	500	AMS 14C	
	Proto-Aurignacian	A2	32100	500	AMS 14C	
	Proto-Aurignacian	A2	30650	260	AMS 14C	
	Proto-Aurignacian	A2	31830	260	AMS 14C	
	Proto-Aurignacian	A2	36500	600	AMS 14C	
	Proto-Aurignacian	A2	33160	400	AMS 14C	
	Proto-Aurignacian	A2	32000	90	AMS 14C	
	Proto-Aurignacian	A2	32700	140	AMS 14C	
	Proto-Aurignacian	A2R	34312	347	AMS 14C	
	Proto-Aurignacian	A2 – str. 9	31600	400	AMS 14C	
	Proto-Aurignacian	A2 – str. 10	32800	400	AMS 14C	
	Proto-Aurignacian	A2 – str.10	40000	4000/3000	AMS 14C	
	Proto-Aurignacian	A2 – str. 16	31300	395	Conventional 14C	
	Proto-Aurignacian	A2 – str. 19	32415	1045	AMS 14C	
	Proto-Aurignacian	A2 – str. 19	33140	460	AMS 14C	
	Proto-Aurignacian	A2 str. 14 – top	31900	1100	AMS 14C	
	Proto-Aurignacian	A2 str. 14 – top	34120	460	AMS 14C	
	Proto-Aurignacian	A2 str. 14 – liv. A	36800	1200/1400	AMS 14C	
	Proto-Aurignacian	A2 str. 14 – liv. B1	35400	1100/1300	AMS 14C	
	Proto-Aurignacian	A2 str. 14 – liv. B2	34200	900/1100	AMS 14C	
	Proto-Aurignacian	A2 str. 14 – base	31620	500	AMS 14C	
	Proto-Aurignacian	A2 str. 14 – base	33640	440	AMS 14C	
	Mousterian	A4	33300	400	AMS 14C	
	Mousterian	A4II	33150	600	AMS 14C	
	Mousterian	A5	33700	600	AMS 14C	
	Mousterian	A6	34950	700	AMS 14C	
	Mousterian	A6	34400	800	AMS 14C	
	Mousterian	A6	> 29000		Conventional 14C	
	Mousterian	A6	> 35000		Conventional 14C	
	Mousterian	A6	50000	8000	TL	2
	Mousterian	A5+A6	38800	750	AMS 14C	1
	Mousterian	A5+A6	38250	700	AMS 14C	
	Mousterian	A9	39950	550	AMS 14C	
	Mousterian	A9	42751	720	AMS 14C	
	Mousterian	A9	> 31400		Conventional 14C	
	Mousterian	A10	41327	730	AMS 14C	
	Mousterian	A11	42004	760	AMS 14C	
Grotta del Broion	Mousterian	I	40000	1270	Conventional 14C	3
	Mousterian	I	46400	1500	Conventional 14C	3
Grotta Breuil	Mousterian	3 – 4	36600	2700	ESR (LU)	4
	Mousterian	6	33000	5000	ESR (LU)	5

Table 12.1., cont.

Site	*Archaeology*	*Level*	*Date*	*+/-*	*Method*	*Source*
Buca della Iena	Under Mousterian	Under Mousterian	41000		U/Th	6
Grotta all'Onda	Under Mousterian	Under Mousterian	39300	3200	U/Th	6
Grotta di Sant'Agostino	Mousterian		43000	9000	ESR (LU)	4
Grotta Paglicci	Proto-Aurignacian	24Ai	29300	600	?AMS 14C	7
	Proto-Aurignacian	24Bi	34000	900/800	?AMS 14C	
Grotta Castelcivita	Proto-Aurignacian	6	32390	490	AMS 14C	8
	Proto-Aurignacian	8	31950	650	Conventional 14C	
	Proto-Aurignacian	9	32930	720	Conventional 14C	
	Uluzzian	10 – 11	32470	650	Conventional 14C	
	Uluzzian	12	> 34000		Conventional 14C	
	Uluzzian	12	33300	430	Conventional 14C	
	Uluzzian	14	33220	780	Conventional 14C	
	Mousterian	27–28	33800	1300	Conventional 14C	
	Mousterian	29–30	39100	1300	Conventional 14C	
	Mousterian	29–30	42700	900	Conventional 14C	
Grotta di Paina	Proto-Aurignacian	9	37900	800	?AMS 14C	9
	Proto-Aurignacian	9	38600	1400/1800	?AMS 14C	
Serino	Proto-Aurignacian	12	31200	650	Conventional 14C	10
Riparo Mochi	Proto-Aurignacian	G/50	32280	580	AMS 14C	11
	Proto-Aurignacian	G/51	33400	750	AMS 14C	
	Proto-Aurignacian	G/56–57	34680	760	AMS 14C	
	Proto-Aurignacian	G/59	35700	850	AMS 14C	
	Proto-Aurignacian	G/60	34870	800	AMS 14C	
	Proto-Aurignacian	G/base	37400	1300	?Conventional 14C	5
Grotta della Cala	Proto-Aurignacian	13	29850	870	Conventional 14C	12
	Proto-Aurignacian	13	27050	850	AMS 14C	13
	Uluzzian	14	29120	300	AMS 14C	
Grotta del Cavallo	Uluzzian	E II-I	>31000		Conventional 14C	14

fully justifies taking a critical look at the Italian data in an attempt to test the empirical "goodness of fit" between the expectations of the trait list model as concerns raw material exploitation and what the record actually demonstrates. To do so, a focus on lithitype transfer patterns is especially useful since it offers a common yardstick according to which assemblages belonging to different typologically-defined industries can be objectively compared. As well, this facet of the archaeological record offers the potential of addressing issues of social organization during that crucial interval of our recent evolutionary past, thus allowing for discussions of human population dynamics during that period.

Data Selection

We limit the analytical scope of this study to a restricted subset of assemblages, namely those that (1) were found stratified *in situ*, (2) contain over 40 lithics (of any type) and (3) were recovered and analyzed according to modern methods. As well, we exclude those assemblages that have been discussed in a preliminary fashion, as they generally do not allow us to assess the potential impact of collection methodologies and/or taphonomic factors on the integrity of the assemblages. While we present data from our own ongoing projects, we explicitly discuss their context and the recovery methods in order to ascertain that they are "up to snuff" for our analytical purposes.

We do not impose these strictures on our data selection protocol out of any desire to discriminate against or call into question the quality of the work of certain research teams. Rather, such criteria must be imposed in order to ensure the maximum comparability of data from various sites and to exclude assemblages that might lead to unwarranted characterizations of the Italian record as a whole. In fact, the results of the present study will yield reliable conclusions about population dynamics in the peninsula during

the Transition interval, conclusions that can then be assessed using data from assemblages omitted from this study to test their empirical robustness.

Our analysis separates Italy into three segments (north, center and south) in an effort to isolate regional trends that can subsequently be integrated to derive a general understanding of the patterns of raw material transfers of the industries involved in the Transition in the peninsula. For each segment, we begin with an explanation of site selection and follow this with an analysis of the raw material procurement patterns identified in the various assemblages coming from a given site. These results are then contextualized with data from other reliable assemblages, leading to a synthetic overview of raw material transfer for each region across the Transition.

The Transitional Record in Northern Italy

The Transitional record of northern Italy is relatively abundant and the region has so far yielded only Mousterian and Aurignacian assemblages (Bietti 1997; Kuhn and Bietti 2000; Mussi 2001; Palma di Cesnola 1993, 1996). While d'Errico *et al.* (1998; see also Zilhão and d'Errico 1999) mention the presence of an Uluzzian assemblage in level A41 of Fumane, this interpretation is unwarranted since the assemblage bears little techno-typological similarities to other Uluzzian assemblages. In fact, it appears to be the result of mechanical mixing of Mousterian and Aurignacian artifacts from the levels that sandwich it (Broglio and Cremaschi 1999). Except for numerous surface assemblages (attributed to the Mousterian, Uluzzian [in Tuscany only], and Aurignacian), there appears to be little reason to omit many assemblages from our survey, save for the alleged Aurignacian assemblages from the Barma Grande and Balzo della Torre (part of the Grimaldi sites), since they were collected unsystematically in the latter part of the 19th century. Thankfully, recent excavations at two of the Balzi Rossi sites allow us to incorporate reliable data from this important site complex into our analysis. We begin our analysis with data collected by one of us (FN) from a series of assemblages from Liguria, Emilia-Romagna and northern Tuscany, in order to develop an empirical base on which to build a generalized model of raw material procurement patterns in the north of the peninsula (see Negrino 1998-2002 for full discussion).

The Balzi Rossi: Riparo Mochi and Riparo Bombrini

Riparo Mochi and Riparo Bombrini are part of the Grimaldi Caves – arguably one of the most important Pleistocene archaeological localities in Italy, if not Europe – and both sites have yielded Aurignacian and Mousterian assemblages excavated using rigorous and modern methods that include fine-sieve water-screening and tridimensional piece-plotting (Alhaique *et al.* 2000; Holt *et al.* 2003, 2006; Kuhn and Stiner 1998; Negrino *et al.* 2004). Since excavations at Bombrini are ongoing, we focus this discussion mainly on the material from Mochi, incorporating insights from the unpublished material from Bombrini when necessary to highlight specific features of the record. Overall, at Mochi, the Mousterian displays a diachronic shift from a Levallois-based core preparation strategy in its lower levels to one dominated by more generic discoid methods (Negrino 1998-2002). Throughout the Mousterian sequence, however, the stone procurement strategy is centered almost exclusively on the exploitation of local resources, namely flint of usually passable quality from the nearby "Ciotti" conglomerates (del Lucchese *et al.* 2000-2001). While this material dominates all Mousterian assemblage at Mochi, they also contain relatively frequent tools on quartzarenites from the Sanremese (dubbed "circumlocal," as this area is located 15-20 km away) as well as rare elements on French lithotypes such as rhyolite from Estérel and quartzite from Castellane. Layer 44 at Mochi also yielded a denticulated scraper on yellowish-red flint likely derived from sources near Trevans in modern-day France (about 80 km away). The implements on circumlocal and exotic materials comprise mainly large Levallois points and retouched tools (Negrino 1998-2002, 50), suggesting that these materials were valued, likely due to their greater workability and durability compared to local flint. An almost exclusive reliance on locally available raw materials in the Mousterian is also documented in the Mousterian levels from Riparo Bombrini (see Vicino 1984), with one important exception represented by a pseudo-Levallois point made on jasper from eastern Liguria whose outcrop is roughly 150 km west of the site (Holt *et al.* 2003, 2006; Negrino and Starnini 2003). While keeping in mind that this is a single artifact, this discovery nonetheless considerably extends the geographical range of Mousterian procurement systems at the Balzi Rossi.

The situation changes dramatically in the earliest Aurignacian layer at Mochi (Layers G – see Kuhn and Stiner 1992, 1998). In addition to typological and technological shifts bespeaking the wholesale adoption of blade and especially bladelet production methods radically different from anything seen previously in the Mousterian, Table 12.2 indicates that raw material procurement patterns also underwent significant modifications. While Ciotti flint remains the dominant raw material, the exploited lithotypes include the first common instances of material from over 100 km away, such as flints from the Vaucluse,

Table 12.2. Raw material frequencies for the Layer G proto-Aurignacian assemblage from Riparo Mochi. VF = very frequent, P = present, R = rare, N/A = not applicable, Overall = weighted average of blades, bladelets and retouched tools. Note that, except for N, all numerical values are percentages.

	Cores	*Unret. Flakes*	*All Blades*	*All Bladelets*	*Other Retouched*	*Overall*
Ciotti Flint	VF	VF	0.0	70.2	27.5	65.4
Quartzite/Quartzarenite	-	P	0.0	0.6	7.8	1.3
French Flint	R	P	50.0	18.8	47.1	21.8
Rhyolite	-	P	0.0	0.2	0.0	0.2
E-L Chert	R	P	50.0	4.1	5.9	4.8
"Scaglia" Flint	-	P	0.0	2.1	0.0	1.8
Other	-	P	0.0	3.9	11.8	4.6
N	N/A	N/A	6	484	51	541

Ligurian-Emilian cherts and distinctive reddish and pinkish "Scaglia" flints likely from the Marche region in central Italy, over 400 km away! These new, clearly exotic materials are complemented by a broader range of circumlocal materials such as various grey-white vitreous flints (perhaps from the Liguro-Emilian arc) and chalcedony (perhaps from the Finalese) (Negrino 1998-2002, 74-75). In addition, the Early Upper Paleolithic exploitation of Ciotti flint at Mochi is much more selective than in the Middle Paleolithic. Whereas the Mousterian assemblages attest to a relatively uncritical and opportunistic selection of flint nodules, the material exploited by Aurignacian toolmakers underwent a more exacting selection process resulting in the predominant exploitation of the more fine-grained varieties of local material. Again, the early Aurignacian at Bombrini (Layer 3) generally conforms to the pattern seen at Mochi, though we hope to soon publish analyses of the lithotypes exploited at Bombrini to empirically assess the similarities between the two sites.

Ronco del Gatto

Further east, the open-air site of Ronco del Gatto also contains Mousterian and Aurignacian deposits and thus provides an interesting comparative sample to the Balzi Rossi sites (see Figure 12.2). The site is located next to outcrops of high-quality radiolarite and appears to have been used through all the Late Pleistocene principally as an extraction site where blanks and cores were prepared prior to being taken elsewhere by mobile foragers. In the Mousterian, Levallois methods were preferentially used to produce flakes, and all of the available varieties of locally available stone were utilized, regardless of flaking properties. For instance, Mousterian toolmakers indiscriminately selected nodules of fine-grained maroonish vitreous rock and nodules of coarser-grained greenish material replete with inclusions that diminished its workability. The only exotic lithotype in the Ronco del Gatto Mousterian is a kind of gray quatrzarenite, largely utilized in the near by open-air Mousterian site of Ghiardo Cave, although it is represented by only a few, mainly retouched, implements (Negrino 1998-2002, 23-34).

The Aurignacian of Ronco del Gatto displays a much higher density of chipped stone than the Mousterian, although its raw material exploitation pattern also is dominated by local raw materials, including also a grey-white flint that outcrops a few dozen meters from the site. Interestingly, and in contrast to the situation at the Balzi Rossi, exotic stone is very rare in the Ronco del Gatto Aurignacian, albeit being somewhat more diverse than in the Mousterian. In contrast to the Mousterian, however, the more homogeneous and vitreous varieties of local material were preferentially selected and there is very little evidence of the use of poorer quality local material (Negrino, personal observation). Exotic materials include several varieties of Apenninic stones such as lutite and quartzarenites procured from 50-60 km away. This pattern of more selective exploitation of local raw materials parallels that highlighted at the Balzi Rossi sites, and is also mirrored by the data from the primary acquisition site of Monte Avena where both Mousterian and Aurignacian occupations were discovered (Lanzinger 1984; Lanzinger and Cremaschi 1988).

Other northern sites

The Late Mousterian assemblages from Ghiardo Cave and from the Ex-Birreria site of the Balzi Rossi reinforce the interpretation of the Mousterian as a very locally-focused adaptive strategy overwhelmingly dominated

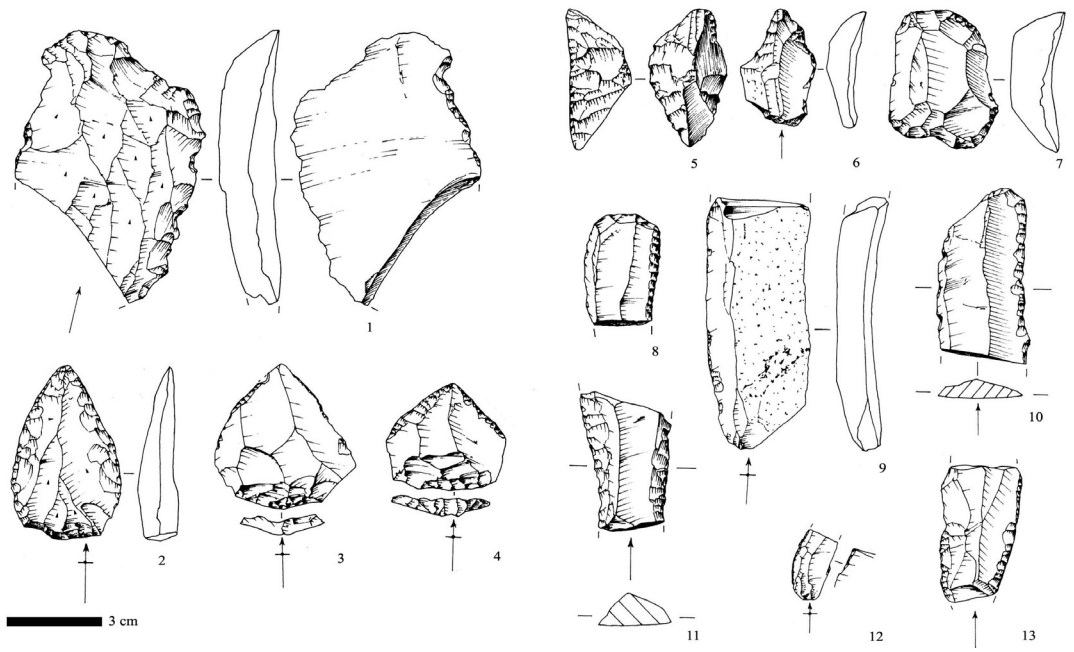

Figure 12.2. Mousterian (1–4) and Aurignacian (5–13) artifacts from Ronco del Gatto (after Negrino 1998-2002). 1: denticulate; 2 and 4: convergent sidescrapers; 3: retouched Levallois point; 5: double nosed carenated endscraper; 6: endscraper-bec; 7: short frontal endscraper; 8: long frontal endscraper with lateral retouch; 9: large marginally retouched cortical blade; 10: retouched blade; 11: "strangled" blade; 12: bladelet with marginal inverse retouch; 13: blade with bilateral retouch.

by the more or less indiscriminate exploitation of locally available lithotypes (Negrino 1998-2002). On the other hand, Aurignacian assemblages from sites such as Pontecosi (Negrino and Tozzi 2001) and Lemignano (Ghiretti *et al.* 1991) strengthen the case that this industry represents an adaptive strategy making the best use of locally available raw materials while remaining part of a much broader social network, as reflected by the significant presence of exotic raw materials carried over considerable distance. It should be noted, however, that the Aurignacian at Lemignano – which is located next to abundant sources of fine-grained raw material – has yielded very little evidence for long-distance stone procurement.

Two sites merit further mention in a consideration of the behavioral patterns evident during the transition in northern Italy. First, the Late Mousterian site of Via San Francesco, in San Remo, is an enigmatic and so-far unique assemblage (*contra* Bachechi 2001) characterized by a *bone fide* blade industry with clear leptolithic typological tendencies (Figure 12.3; see also Tavoso 1988). Despite these allegedly "progressive" characters, however, the raw material pattern of almost exclusively local raw material procurement firmly anchors this assemblage in the regional Mousterian pattern. The lithotypes identified in the Via San Francesco assemblage, which comprise quartzarenite, fine-grained limestone and rare examples of quartzite, are all readily available in the site's vicinity as rolled river cobbles. Another local lithotype is a grayish-green flint, likely present in local beds of Eocene deposits. The only exotic materials are represented by rare pieces of Ciotti flint and a single tool on French flint likely coming from the Vaucluse (Negrino 1998-2002, 58).

The second site is the well-known cave site of Fumane, in the Veneto, which comprises both Mousterian and Aurignacian assemblages (Bartolomei *et al.* 1992; Broglio and Cremaschi 1999). In contrast to most other northern sites, however, both industries are almost completely made on varieties of flint available either locally or circumlocally in the eastern Lessini Mountains. For instance, in a discussion of proto-Aurignacian bladelet production at Fumane, Broglio *et al.* (2005) mention that none of the cores and a mere 1% of bladelets are made on radiolarite, the only documented allochtonous lithotype. This attests to a very localized raw material procurement strategy in both periods, suggesting that other kinds of artifactual evidence, such as ornaments, may be better monitors of links to wider social networks than lithic assemblages alone (see Fiocchi 1999). On the basis of raw material transfers, however, there does not appear to have been an important difference between the effective socio-geographical ranges of the Mousterian and Aurignacian occupants of Fumane.

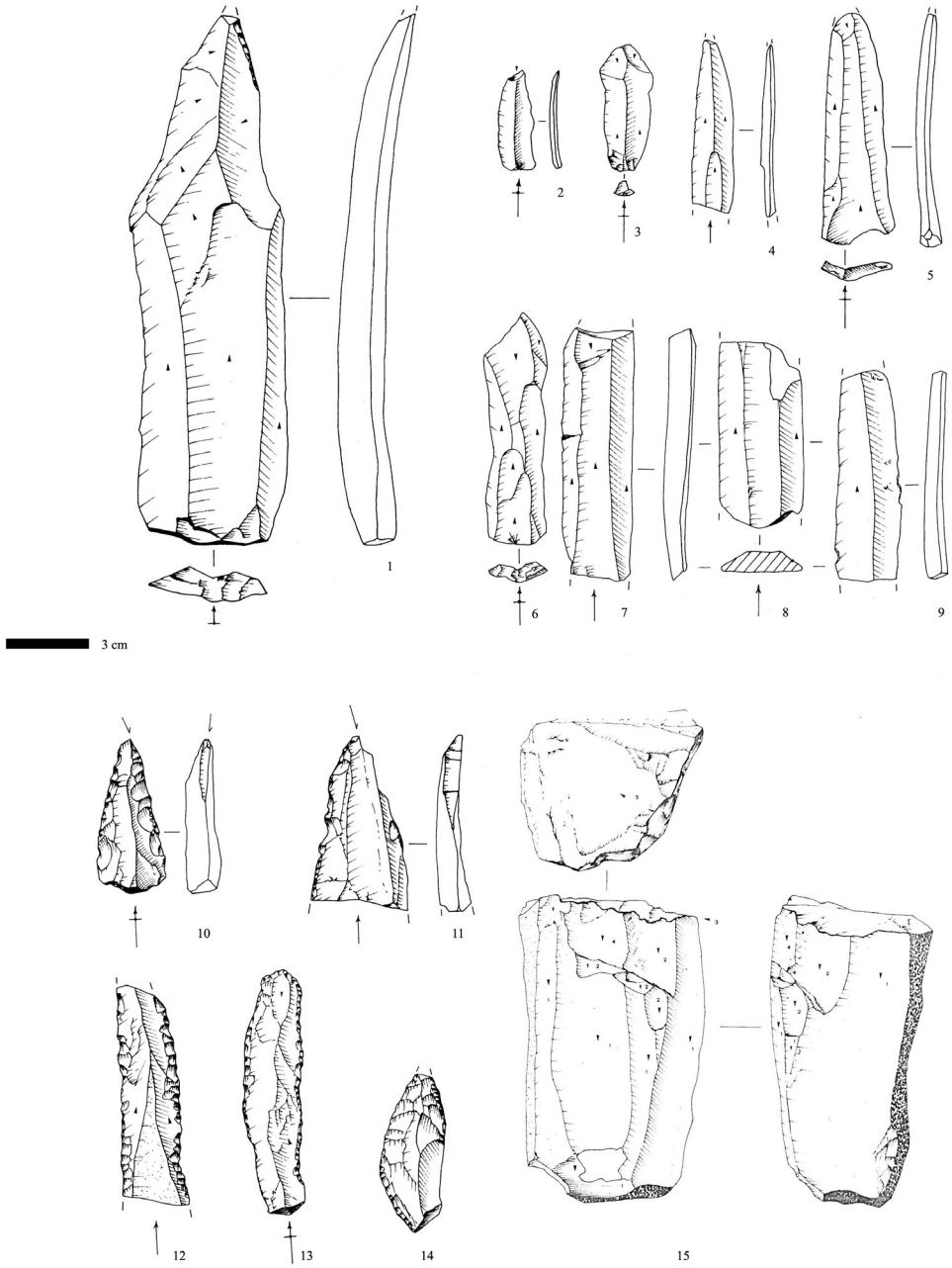

Figure 12.3. Late Mousterian laminar industry from Via San Franceso in San Remo (after Negrino 1998-2002). 1: large quartzarenite blade with abrupt distal retouch (partially backed knife); 2, 3, 7, 9: blades on quatrzarenite; 4, 5, 6, 8: blades on limestone; 10: burin on Vaucluse (?) flint; 11: burin on local flint; 12: denticulate on local flint; 13: denitculated endscraper on fine-grained quartzarenite; 14: quartzite sidescraper/point; 15: limestone prismatic blade core.

Summary of northern data

The picture that emerges from this synthesis of data from the north of the peninsula is relatively coherent, though it bespeaks considerable evidence for local variability in raw material transfer patterns. In all cases, local material dominates in both Mousterian and Aurignacian assemblages. All of the Aurignacian assemblages display evidence of systematic exploitation of the better quality local lithotypes, however, a fact that may have been due to a greater dependence on fine-grained material to minimize chances of failure during blade and especially bladelet production (Negrino 1998-2002). Additionally, the frequency and diversity of exotic lithotypes tend to increase markedly in northern Italian Aurignacian assemblages, although cases such as Lemignano

and Ronco del Gatto demonstrate that this is not necessarily always the case. Recent evidence for raw material transfers of over 150 km in the Mousterian of Riparo Bombrini (Holt *et al.* 2003; Negrino and Starnini 2003) also demonstrate that long-distance transfers could be part of the Mousterian behavioral repertoire, although their low frequency is a separate research question requiring further investigation to fully explain. If we accept the precept that longer transfer distances reflect more far-ranging social geographies for Late Pleistocene toolmakers, however, it does appear that, after roughly 40 ky BP in northern Italy, the ability to depend on large-scale social networks – present at least in semi-latent form in Mousterian times – became much more visibly expressed by, and therefore presumably much more crucial to the survival of foragers in that part of the peninsula.

The Transitional Record in Central Italy

The sample of central Italian assemblages on which to reconstruct raw material transfer patterns across the Transition is unfortunately small and limited to sites on the Tyrrhenian coast. We exclude the putative Aurignacian assemblage from Grotta Salomone in Abbruzzo due to its extremely small size and unclear depositional history (see Radmilli 1977) and we also disregard open-air surface assemblages such as Pratica di Mare in Lazio because of their uncertain context. As well, the surface assemblages from Sugherone and the Cinquemiglia open-air sites are not included in our discussion since they remain for all intents and purposes unpublished, aside from very general observations.

Pitti *et al.* (1976) described the La Fabbrica Transitional sequence as containing an Uluzzian (Layer 2) and proto-Aurignacian (Layers 3–4), although Bietti and Negrino (2007) have convincingly demonstrated that the assemblage from Layer 2 is in reality more likely to be a Late Mousterian, despite a dearth of radiometric dates. While the lowermost Mousterian (Layer 1) remains undescribed, the assemblage from Layer 2 is described (Pitti *et al.* 1976, 186) as made mainly on local chert and quartz (the latter of which accounts for over 20% of the debitage but very few of the tools), both of which are described as probably local lithotypes of poor workability. Flint and quartzite, presumably from more distant, perhaps circumlocal sources, are also documented, but are very rare. The exploited materials remained essentially the same during the proto-Aurignacian (Layers 3-4), although flint is described as slightly more frequent than in the underlying assemblage (Pitti *et al.* 1976, 194). A recent reanalysis of a sample of La Fabbrica's Transitional assemblages (*i.e.* Bietti 2006; Bietti and Negrino 2007) indicates that exotic lithotypes account for less than one percent of the Layer 2 assemblage, while they are nearly ten times as frequent in the overlying proto-Aurignacian assemblages. Overall, then, the picture we get from La Fabbrica is broadly concordant with the general pattern identified over the Transition interval in more northerly sites.

Further to the south, Layer 7 of the site of Grotta Breuil on Mt. Circeo (see Alhaique *et al.* 1998, 2000 for recent summaries) has yielded a Late Mousterian characterized by a high incidence of the Levallois technique, somewhat different from the "Pontinian" Mousterian that characterizes the region as a whole (Kuhn 1995). This assemblage has been dated by ESR to about 33 ± 4 ky BP (Alhaique *et al.* 2000), making it very recent and almost contemporary with the recently reported very Late Mousterian of Gorham's Cave, Gibraltar (Finlayson *et al.* 2006). The lithic industry is dominated by convex sidescrapers made on blanks obtained through Levallois reduction methods and the bipolar reduction of locally available flint pebbles aimed towards the production of elongated, almost laminar flakes (Bietti and Grimaldi 1996; Kuhn 1995). Alhaique *et al.* (2000, 111) argue that this represents a local "transitional" industry with undeniable Mousterian affinities, an observation reinforced by the almost exclusively local raw material procurement patterns dominated by the exploitation of small beach pebbles and, in very rare cases, circum-local flint of poor quality.

The only well-published site from Mt. Circeo to contain both Mousterian and Aurignacian assemblages is Grotta del Fossellone (Blanc 1938; Blanc and Segre 1953). Vitagliano and Piperno (1991) describe the assemblage from layer 27b as a Late Mousterian very rich in denticulates and scrapers which, like that of Grotta Breuil, is rather different from the "Pontinian" Mousterian prevalent in the area. Regarding its raw material composition, this assemblage shows an almost complete reliance on local flint beach pebbles. The Aurignacian assemblage from Fossellone (Layer 21) represents an original local facies of the industry rich in endscrapers and split-base bone points denominated "Circean" due to its distinctive appearance derived from the use of small-sized beach pebbles as the main source of raw material (Blanc and Segre 1953). While mainly known in typological terms (*e.g.* Laplace 1966), more recent work presents a complementary analysis of the technological aspects of this assemblage (*i.e.* Bietti 1998). These data indicate that cores were made almost exclusively (98.4%) on local and circumlocal (1.6%) material, while all of the abundant and rather diverse splintered pieces of the assemblage (interpreted as bipolar cores) are on locally available beach pebbles. Insofar as "undetermined" raw material may or may not be local, non-local lithotypes must be seen as comprising anywhere from 6.0-35.1% of the debitage

excluding the debris, with strong indications that the higher figures are the more realistic ones (Bietti 1998, 564). While they are impossible to actually quantify on the basis of the available data (Bietti 1998, 567, Table 12. 2), the retouched pieces display two distinct patterns. On one hand, over half of all endscrapers (of both simple and carinated/nosed types) and sidescrapers are made on longitudinal blanks derived from bipolar reduction of locally available pebbles (with 26-47% on "undetermined or exotic lithotypes). On the other, a minority of retouched blades (14%) are unambiguously made on local pebbles, with 36-86% of them made on material that may come from sources up to 200 km away.

While these figures remain estimates, it seems fair to say that in southern Lazio, much like in the north of the peninsula, exotic raw material was much more systematically and extensively exploited during the Aurignacian than in the Mousterian. The Mousterian and Aurignacian material from Grotta Barbara is still largely unpublished, but preliminary reports (*e.g.* Mussi and Zampetti 1990-1991; Zampetti and Mussi 1988) indicate that they bear strong similarities to the comparable assemblages from Fossellone, although none of the bone points from Grotta Barbara retain their bases. Overall, then, it appears that the central Italian Transitional record largely conforms to the expectations derived from our analysis of northern Italian data, with the Mousterian representing mainly local procurement and the Aurignacian yielding clear evidence of more frequent and more far-ranging procurement of exotic lithotypes.

The Transitional Record in Southern Italy

Our analysis of raw material patterns in southern Italy is restricted by the range of published data since, except for Grotta di Castelcivita, most published accounts of raw material procurement patterns in that part of the peninsula come in the form of qualitative descriptions which cannot be quantified or directly compared to data from other sites. We therefore start with a discussion of the Castelcivita data and subsequently complement it with patterns from a recent reanalysis of the Uluzzian assemblage from Grotta del Cavallo undertaken by one of us (JR-S). These combined patterns are finally used to generate a qualitative assessment of raw material transfer patterns that can then be compared *grosso modo* to patterns from other southern Italian sites.

In terms of data selection, a number of surface assemblages attributed to the Mousterian (*e.g.* Falce del Viaggio), Uluzzian (*e.g.* Tornola, Torre Testa) and Aurignacian (*e.g.* Caruso, Punta Safò) were not considered here because they failed to meet the selection criteria outlined earlier in this paper. We also excluded the putative Aurignacian assemblage from Fontana Nuova di Ragusa (Chilardi *et al.* 1996; Gioia 1984-1987) because of its poorly understood excavation methods (see Bernabo Breà 1950) and because it contains very few Aurignacian industrial diagnostics. This latter problem has led other knowledgeable Italian prehistorians to argue that it is more likely, in fact, to be an Epigravettian assemblage (*e.g.* Bonfiglio and Piperno 1996; Palma di Cesnola 1993, 139). Likewise, since it remains unpublished, the recently reported Aurignacian assemblage from Grotta della Serratura (see Martini *et al.* 2000-2001, 140) was disregarded in this analysis. Lastly, on the basis of the results of a recent reanalysis that disproved the hypothesis that Layer D at Cavallo represents the mixing of Aurignacian and Uluzzian assemblages (*i.e.* Riel-Salvatore 2004, in press), we consider all of the Cavallo Early Upper Paleolithic assemblages as being unquestionably Uluzzian.

The southwest: Grotta di Castelcivita

Table 12.3 displays the raw material procurement patterns of the four assemblages from Castelcivita, where the exploited lithotypes include flint, chert, fine-grained quartzite, quartz and limestone. Flint clearly constitutes the preferred material, accounting for the vast majority of all lithics in the four assemblages, and

Table 12.3. Raw material frequencies for the retouched tools (ret.) and the debitage (unret.) of each of the Castelcivita assemblages (data from Gambassini 1997b). Note that, except for N, all values are percentages. P-A = proto-Aurignacian.

	Mousterian		*Uluzzian*		*P-A w/Dufour*		*P-A w/Castelcivita*	
	Ret.	*Unret.*	*Ret.*	*Unret.*	*Ret.*	*Unret.*	*Ret.*	*Unret.*
Flint	82.7	82.8	81.0	72.1	96.1	90.6	95.6	82.6
Chert	4.5	5.3	1.5	0.2	0	0.4	0.7	2
Quartzite	12.3	8.7	1.8	3.2	1.3	2.5	2.2	1.9
Quartz	0.0	0.0	1.3	0.6	0	0	0	0
Limestone	0.4	3.1	14.3	23.9	2.6	6.5	1.5	13.5
N	446	1498	775	3689	465	1894	321	1092

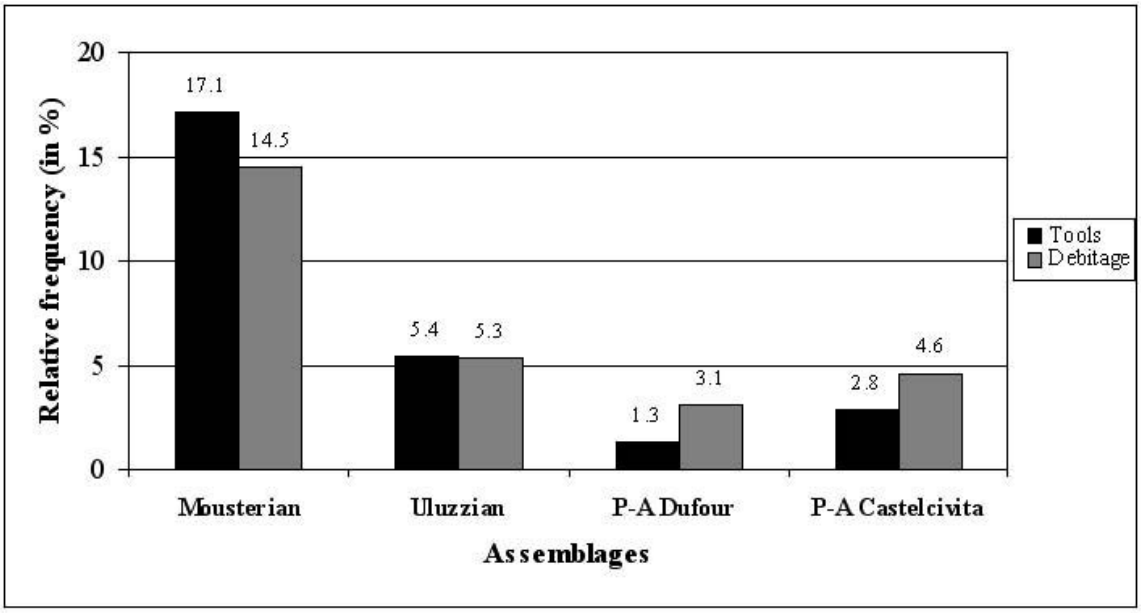

Figure 12.4. Incidence of non-limestone lithotypes other than flint in the Castelcivita assemblages. Data from Gambassini (1997b).

climbing to over 90% for the Aurignacian retouched tools. In the Uluzzian, the difference is made up by an increased reliance on limestone, while the difference in the Mousterian assemblage is made up mainly by chert and quartzite. Chert, quartz and quartzite all appear in relatively low numbers compared to flint, and while these materials are ultimately of allochtonous origins, they can nonetheless also be found as cobbles in the Calore River. Limestone is an immediately locally available lithotype, being found in the talus in front of the site in the form of angular cobbles, but the way in which it was worked indicates that this raw material is perhaps best considered separately from the other ones documented at the site (Gambassini 1997b).

Figure 12.4 presents the breakdown of the importance of flint versus other non-limestone lithotypes in the Castelcivita assemblages, and it appears that the Uluzzian and proto-Aurignacian display a comparably overwhelming concentration on flint to the near exclusion of all other known lithotypes. In contrast, the Mousterian focused noticeably less intensively on flint, incorporating especially large amounts of quartzite and chert. Without a comparative "naturalistic sample" of lithotype representation in the Calore River, it is hard to determine if these patterns demonstrate a conscious effort by Mousterian toolmakers to select lithotypes other than flint more frequently or an active selection of flint over other rocks by Uluzzian and proto-Aurignacian toolmakers, or both. What seems clear, however, is that the Mousterian pattern is distinct from that which characterizes both the Uluzzian and the proto-Aurignacian. It is also possible that this demonstrates a more targeted exploitation of locally available lithotypes starting with the Early Upper Paleolithic geared towards the systematic exploitation of finer-grained varieties. Indeed, at Castelcivita, the makers of Uluzzian and proto-Aurignacian assemblages appear to have used finer-grained varieties of local resources than they did in the Mousterian, which is intriguing given that the Uluzzian is thought to have been the handiwork of Neanderthals (Churchill and Smith 2000, Kuhn and Bietti 2000, Palma di Cesnola 2004).

The southeast: The Uluzzian of Grotta del Cavallo

Uluzzian assemblages from Grotta del Cavallo, the industry's type-site (Palma di Cesnola 1966, 1967, 1993), may be of help in testing the significance of the pattern highlighted at Castelcivita. The Cavallo assemblages have recently been reanalyzed by one of us, and these new data form the basis of the discussion presented here (Riel-Salvatore 2004, in press). Importantly, this reanalysis has demonstrated a lack of support of the idea that the assemblage from Layer D represents a mix of Uluzzian and Aurignacian artifacts (*contra* Gioia 1988, 1990), meaning that the raw material procurement patterns of all four assemblages can confidently be said to characterize the Uluzzian. The lithotypes identified at Cavallo include flint, chert, quartzite, limestone and thin slabs of poor-quality siliceous limestone known in Italian as *liste*. Of these materials, only limestone and *liste* have been reported as being available near the site (Sarti *et al.* 1998-2000, 2002), though it should be stressed that their exact provenience is not known. In contrast,

Table 12.4. – Relative frequency (in %) of retouched tools and debitage on fine-grained non-local raw material at Grotta del Cavallo and Grotta Mario Bernardini. N refers to total counts for each lithic subcategory.

	Retouched tools		*Unretouched debitage*	
	Frequency	*N*	*Frequency*	*N*
Cavallo EIII	84.7	444	-	-
Cavallo EII-I	84.8	224	-	-
Cavallo E-D	71.4	92	-	-
Cavallo D	21.8	176	-	-
Mario Bernardini A I-II	100.0	43	96.3	107
Mario Bernardini A III	38.5	13	28.6	28
Mario Bernardini IV	10.6	94	33.5	409
Mario Bernardini V	72.2	18	29.4	34

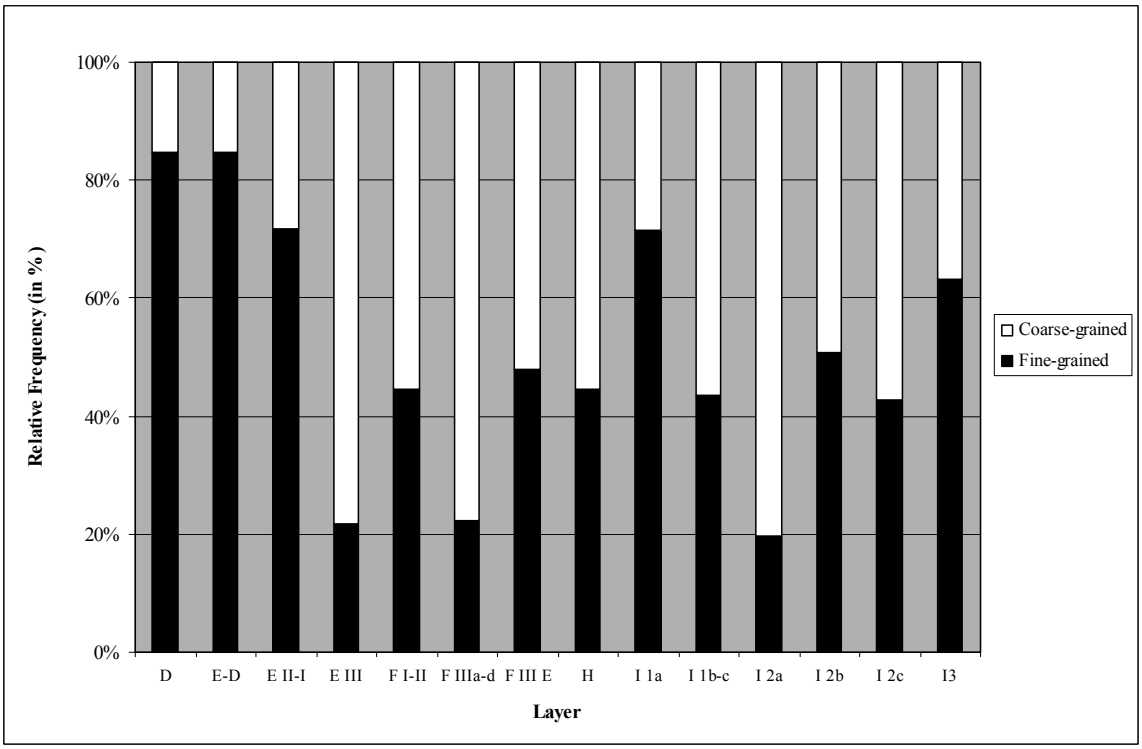

Figure 12.5. Proportions of fine- and coarse-grained materials in the retouched tool assemblages from Grotta del Cavallo. Uluzzian assemblages = D to E III. Data for the Mousterian from Sarti et al. (1998–2000, 2002).

despite well over a century of archaeological research in the Salento (the region where Grotta del Cavallo is located), no sources of flint, chert or quartzite are known in the area (R. Grifoni-Cremonesi, pers. comm. 2005; see also Milliken 1998, 1999–2000, 60). While some prehistorians have argued that sources of fine-grained materials may exist in Cretaceous outcrops located some 30 km east of the site (Bietti 2003, 48), currently available data lend more support to the assumption that fine-grained materials would have had to be imported over considerable distances (250+ km), from sources to the north located either in the Gargano promontory or the Basilicata Apennines piedmont (Milliken 1998, 1999–2000).

Whatever the case may be, however, it is unquestionable that raw material procurement patterns for the Uluzzian at Cavallo indicate increasing dependence on fine-grained non-local lithotypes over time (Table 12.4). The importance of this pattern is bolstered by comparisons to the procurement patterns of the underlying Mousterian layers, where fine-grained materials usually account for less than 40% of the assemblages, only surpassing the 50% mark in two of Cavallo's ten Mousterian layers (Figure 12.5). Needless to say, this pattern of increased dependence on distant sources of raw material over time does not agree well with scenarios that sees the Uluzzian as simply the result of acculturation of Mousterian-

making Neanderthals increasingly restricted to isolated refugia by the Aurignacians (whomever they may be) as they inexorably advanced southwards across the landscape.

The combined patterns from Cavallo and Castelcivita enable the formulation of an empirically-grounded qualitative assessment of raw material procurement patterns in southern Italy and, by extension, of the geographical ranges of the makers of Early Upper Paleolithic industries in that part of the peninsula. Contrary to the patterns evidenced in the north, the meridional Aurignacian appears to depend mainly on local sources of raw material, incidentally the same ones utilized by Mousterian and Uluzzian occupants of the same sites. As well, the Uluzzian appears characterized by a desire to exploit fine-grained material whenever possible, obtaining it over great distances if necessary. The differences in the Uluzzian raw material exploitation patterns between Castelcivita and Cavallo also highlight the need to consider contextual information in order to accurately interpret the meaning of differences in transfer distances. Lastly, the Castelcivita pattern indicates that, at sites where they co-occur, Aurignacian and Uluzzian assemblages can display nearly identical raw material procurement strategies, in this case both exploiting preferentially similarly local raw materials.

Other southern Italian Early Upper Paleolithic assemblages

These trends allow us to generate a set of qualitative expectations to assess raw material procurement patterns found in published on comparable southern Italian assemblages. Benini *et al.* (1997) explicitly state that the Uluzzian and Aurignacian assemblages from Grotta della Cala display broadly similar raw material exploitation patterns, which is in accordance with the model outlined above. These assemblages are dominated by local lithotypes, including beach pebbles of poor-quality flint that abound near the site (accounting for 62% of retouched pieces and 70+% of the debitage) and limestone (2.5% of retouched tools and 10% of debitage). Exogenous fine-grained chert from an unspecified location(s) is also present, however, accounting for 31% of retouched and 18% of unretouched pieces. The preferential selection of the exotic lithotype for retouched blanks strongly suggests its high desirability for both the Uluzzian and Aurignacian toolmakers (Benini *et al.* 1997, 51-52), and provides evidence of a noticeable exploitation of non-local resources during the Early Upper Paleolithic of the region that distinguishes it from the pattern of comparable assemblages at Castelcivita.

The Aurignacian assemblage from the stratified open-air site of Serino is dated to 31,200 ± 650 BP (Accorsi *et al.* 1979), and its lithic assemblage is described as quite similar to the proto-Aurignacian with Castelcivita bladelets found at the eponymous site. From the perspective or raw material exploitation, the industry is dominated by flint likely present as water-worn cobbles on the shore of the paleolake on which the site was located. A very small number of tools and pieces of debitage made on reddish and greenish cherts are also reported. That the "tools" on chert are mainly splintered pieces (Accorsi *et al.* 1979) indicates that this material may have been perceived as more valuable than local flint cobbles by the toolmakers at Serino, since these artifacts are often interpreted as exhausted cores (see Shott 1999; cf. Villa *et al.* 2005). The use of this reduction method coupled with chert's low representation strongly hints at the fact that this lithotype was probably non-local in nature and imported from a certain distance away, although the absence of quantified data makes it hard to assess its exact prevalence at Serino.

In the southeast of the peninsula, the only unambiguous stratified Aurignacian assemblages come from Grotta Paglicci on the Gargano promontory, and they date to between 29,300 ± 600 BP and 34,300 ± 800 BP (Palma di Cesnola 2003a, 2006). All three assemblages are described as made on high-quality flint that outcrops roughly 30 km from the site (Palma di Cesnola 2003b, c). The same kind of material has been reported to dominate most of the mainly open-air Mousterian assemblages found in the area (Milliken 1999-2000, 51; Palma di Cesnola 1996, 181-187). Neither the preliminary descriptions of these layers (Palma di Cesnola 1991, 1992, 1993) nor the definitive report on the site's Aurignacian industries (Palma di Cesnola 2003c, 2006) mention the presence of exotic raw materials in the assemblages. This lends credence to a characterization of their raw material procurement strategy as probably mainly local in nature. This time-transgressive pattern accords well with the data about Aurignacian exploitation patterns elsewhere in southern Italy.

The only other stratified early Upper Paleolithic assemblages in southeastern Italy are found in the Salento peninsula, not far from Grotta del Cavallo (Kuhn and Bietti 2000; Palma di Cesnola 1993; Riel-Salvatore and Barton 2004). All of these assemblages are described as Uluzzian, an attribution now beyond dispute in light of the recent demonstration that none of the Cavallo Uluzzian assemblages are mixed with Aurignacian ones (Riel-Salvatore 2004, in press). It is important to emphasize this, since claims for such an admixture was the main reason invoked by some to cast doubt on the integrity of neighboring Uluzzian assemblages (Gioia 1988, 1990; Mussi 1990, 2001). The only credible instance of an Aurignacian presence in the Salento is represented by the two uppermost levels from Serra Cicora A, variously attributed to the proto-Aurignacian (Spennato 1981)

or the "Uluzzo-Aurignacian" (Palma di Cesnola 1993). Regardless of their putative "cultural" attribution, however, recent work suggests that all Early Upper Paleolithic assemblages from the Salento appear to have conformed to a very similar flexible behavioral strategy and to have exploited the same sources of fine-grained lithotypes as those documented at Cavallo (Riel-Salvatore and Barton 2004, 264-266 and Figures 2, 3). Data from the same study indicate that the Uluzzian assemblages from Grotta Mario Bernardini (Table 12.4; see also Borzatti von Löwenstern 1970, 1971) display aggregate frequencies of flint, chert and quartzite of 10.6 to 100% (average 55.3%) for retouched tools, and of 28.6 to 96.3% for the debitage (average 43.9%). This indicates that fine-grained lithotypes were also preferentially selected for retouch and curation by both Uluzzian and proto-Aurignacian toolmakers in the area. In contrast, the Mousterian assemblages from the same and neighboring sites (*e.g.* Grotta di Uluzzo C – see Borzatti von Löwenstern 1965, 1966) display frequencies of fine-grained material of 8.3 to 64.3% (average 32.5%) in their retouched tools and of 0 to 61.8% (average 13.7%) for the debitage. This pattern indicates that while fine-grained raw materials were also preferentially retouched and curated during the Salentine Mousterian, these lithotypes were much less intensively exploited. While more data are needed to establish this interpretation, this disparity may represent evidence of better strategies for provisioning sites in the Salento with fine-grained lithotypes in Uluzzian times, as opposed to the "provisioning of individuals" (*sensu* Kuhn 1992, 1995) that may have characterized the local Mousterian.

Summing up, the Early Upper Paleolithic of the Salento is marked by a shift towards a greater exploitation of exotic fine-grained stone than during the Mousterian. While the source of these lithotypes does not appear to have changed, its relative frequency became dramatically more important at that time, a pattern which stands in stark contrast to the Early Upper Paleolithic patterns elsewhere in southern Italy which were characterized by a heavy reliance on locally available raw materials complemented by a minor component of finer-grained and presumably non-local materials. It therefore appears that the record of southern Italy documents two distinct raw material exploitation patterns. On the one hand, all southwestern Early Upper Paleolithic assemblages, along with the three Aurignacian assemblages from Paglicci, appear to represent an extremely locally-based adaptive system, with little evidence for extensive social networks. On the other hand, the Uluzzian lithotype transfer pattern in the Salento in the southeast bespeaks an increased dependence on non-local fine-grained lithic raw materials which currently available data indicate may have come from several hundred kilometers away. This suggests a dramatic reorganization of the manner in which necessary resources were acquired by hunter-gatherers during that period, likely through the establishment (or at the very least the substantial reinforcement) of wide-ranging social networks, if the traditional tenets of long-distance procurement are to be believed. Since all currently available fossil data seem to associate the Uluzzian to Neanderthals (Churchill and Smith 2000; Gambassini *et al.* 2005), these conclusions stand in sharp contrast to the expectations of traditional models of the acculturation and ultimate demise of the Neanderthals in Italy (*e.g.* Palma di Cesnola 2004).

Interestingly, this lack of adherence to the traditional acculturation model is also manifest in two other dimensions of the "transitional" archaeological record of southern Italy. The first concerns the prevalence of the archaeological "markers" of the Aurignacian included in most typical trait-list approaches and assumed to represent the first evidence of behavioral modernity, namely ornaments, coloring materials, organic technologies, and spatial organization. With the exception of two fragmentary bone points and "numerous pierced shells" from the Aurignacian levels of La Cala (Benini *et al.* 1997, 51), in southern Italy, it is the *Uluzzian* which is associated with the vast majority of such evidence: Serino and Paglicci have yielded none of this range of evidence whatsoever, while the record of the proto-Aurignacian of Serra Cicora A comprises only a fragmented bone awl and faint traces of ochre (Spennato 1981), a record which pales in comparison to the abundant osseous industry and numerous pieces of coloring materials recovered from Uluzzian layers at Cavallo (Palma di Cesnola 1993; Riel-Salvatore 2004), Mario Bernardini (Borzatti von Löwenstern 1970, 1971) and Uluzzo C (Borzatti von Löwenstern 1965). The same is also true at Castelcivita where more organic implements have been found in the Uluzzian deposits than in the overlying Aurignacian ones, and where "structures" (*i.e.* post holes) have only been identified in the Uluzzian layers (Gambassini 1997b, 121). This is in addition to evidence that a broader spectrum of animal resources, including fish, appears to have been exploited in the Mousterian and Uluzzian of Castelcivita than in either of the proto-Aurignacian levels (Cassoli and Tagliacozzo 1997). This pattern is starkly different from that evidenced in the north and center of the peninsula where Aurignacian assemblages display numerous examples of all these traits in much greater frequencies than the Mousterian (see *e.g.* Kuhn and Stiner 1992, 1998).

The second set of data that goes against traditional assumptions of the Transition in southern Italy is provided by recent analyses which suggest that the Aurignacian and Uluzzian may be much older than previously thought (*e.g.* Fedele *et al.* 2002, 2003; Riel-Salvatore *et al.* 2006). If correct, this revised chronology has two very important implications for

our understanding of the Transition in Italy. First, the Uluzzian may well have developed in the south of the peninsula independently of any Aurignacian influence, direct or indirect (Riel-Salvatore *et al.* 2006). Second, when it took place, the diffusion of the Aurignacian in the peninsula would have been considerably more fast-paced than usually thought, being virtually instantaneous throughout the peninsula, or perhaps just slightly later in the south. These observations bear heavily on prevalent conceptions of the Uluzzian, since they imply the independent appearance of two very distinct technocomplexes in Italy at the beginning of the Early Upper Paleolithic.

While we soon hope to be able to publish more conclusive data about the chronology and behavioral features of the Uluzzian to clarify these issues, we cannot on the strength of current evidence accept at face value traditional models that see the Aurignacian simply expanding gradually from north to south and displacing Neanderthals who created the Uluzzian as a last-resort attempt to adapt to the new socio-geographical realities of the Early Upper Paleolithic. Rather, the data seem to suggest that the Uluzzian and Aurignacian, insofar as they are represented by stratified assemblages, were present in different parts of the peninsula, with the Uluzzian originally present in all of its southern third and tenaciously occupying the Salento peninsula after the appearance of the Aurignacian in southeastern Italy. That the Salentine Uluzzian depended so heavily on lithotypes that may have come from the Gargano, which as the Paglicci record suggests was "Aurignacian territory", implies that there must have been repeated – and likely not only inimical – contacts between makers of the Uluzzian and Aurignacian. This suggests that Early Upper Paleolithic population dynamics in the Italian peninsula were partaken into by groups that likely saw each other as equally "human," with all that entails in terms of potential social relations.

Discussion and Conclusions

Returning to our original goal of testing the hypothesis that long-distance raw material transfers are a diagnostic feature of the Aurignacian, what does the evidence presented above allow us to say about that feature of the archaeological record – and by extension about the putative socio-geographical ranges of their makers? First, using the whole peninsula as an analytical unit underscores the critical importance of using meaningful geographical units in order to adequately capture the full range of variability that characterizes specific behavioral patterns. In this case, looking at continental Italy as a whole - a widely recognized discrete geo-ecological unit (Finlayson 2004; Gamble 1999) – brings forth patterns that both agree and disagree with the expectations of the dominant model of the replacement of Neanderthals by modern humans. In fact, it appears that the traditional expectation of more frequent long-distance transfers in the Aurignacian is only valid in the north of peninsula, and then not in all cases (see also Bietti and Negrino 2007, Figure 12 for detailed maps of raw material transfers). In the south, in contrast, it is only Uluzzian assemblages that are associated with such transfers. In other words, this study demonstrates the empirical insufficiency of increased raw material transfers as a marker of modern human behavior as traditionally conceptualized, especially since all available fossil evidence associates the Uluzzian exclusively with Neanderthals. It is doubly unexpected to find so little evidence of long-distance lithotype transfers in the southern Italian Aurignacian in light of the observation that this region is precisely where "modern behavior" (as represented by the various material correlates of trait-list approaches) could be expected to have been most prevalently expressed, in order to explain the alleged displacement of Neanderthals by modern humans. Given that is is highly unlikely that the absence of long-distance lithotype transfers precludes the modernity of the makers of the southern Italian Aurignacian, we find it hard to justify using this behavior as a defining trait of modernity. Based on this evidence and recent arguments about the chronology of the Early Upper Paleolithic in Italy, we would therefore like to tentatively suggest that the Transition may not have been the simple north-to-south time-vectored phenomenon it has often been portrayed as in the Italian peninsula, and that renewed research is needed to clarify its nature in peninsular Italy.

At this point, the contrasting raw material transfer patterns in northern and southern Italian Aurignacian assemblages likely indicates the general lack of attention that has been paid to contextual factors in studies that have attempted to frame behavioral change in the Early Upper Paleolithic. It is undoubtedly easier to fold data into the interpretive niches defined by "grand models" of human origins, but what are we to do when our data display a patent lack of fit with the precepts of such models? Rather than continue to dogmatically interpret long-distance raw material procurement as evidence of behavioral modernity however defined, we would suggest that we can obtain much more useful information on multiple facets of Late Pleistocene lifeways by exploring the meaning of the greater or lesser expression of this – and other – behaviors in the broader socioecological context of individual assemblages. The data presented in this paper are currently insufficient to resolve the issue of the emergence of modern behavior in Italy. They do, however, highlight the importance

of employing geographically meaningful analytical units to get a sense of the true range of empirical variability that characterizes this research question. They also raise serious doubts about the heuristic validity of long-distance raw material transfers as a marker of behavioral modernity. What they *do* allow us to say, however, is that over the course of the 45-30 ky BP interval, the Italian peninsula is perhaps best understood as a landscape of new ideas engaging entrenched Late Pleistocene geo-cultural realities, resulting in a complex behavioral mosaic only coarsely transmitted to modern researchers through the archaeological record. As our data have shown, the resulting human dynamics were more complex than usually recognized and it is therefore not surprising that their archaeological signatures do not necessarily fit very well in the traditional models developed by previous generations of prehistorians. If we are to refine our understanding of the Transition in Italy, a first step will be the acquisition of reliable data from unexplored zones in Italy such as Abruzzo and Molise in the center and Basilicata in the south. Secondly, and perhaps most importantly, it is imperative to develop interpretive frameworks that can accommodate these new data as well as the archaeological variability we already know exists. Only then will we be able to reconstruct and appropriately contextualize the behavior of the makers of the industries that compose the multifaceted record of the Italian Early Upper Paleolithic and integrate these insights in broader, pan-Mediterranean outlooks on modern human origins.

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