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Neanderthals in Italy: an evaluative review of current archeological knowledge

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ABSTRACT - This paper briefly reviews current archeological knowledge of Neanderthals in Italy. It is written from the perspective of an international consumer - critical and constructively provocative - of Italian archeological data. It considers eight themes: origins; paleoclimate and ecological refugia; competition between predators; seasonal mobility and dwelling; resource exploitation; intercommunicating; behavioural changes; Anatomically Modern Humans. It then highlights five areas for further research: dating; open sites; plants; human remains; behavioral changes during MIS 3.

Keywords: Neanderthals; Middle Paleolithic; Mousterian; Anatomically Modern Humans; MIS 3; Europe.

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1. INTRODUCTION

This paper considers what we know, and what we do not know, about the Neanderthals in Italy. Its study area equates to the present-day territory of the Italian Republic. It is based on the author's extensive review of relevant published literature, using Google Scholar as a starting point. An emphasis is placed here on post-2010 English language publications, to highlight recent developments and to be accessible to an international readership. It is written from the perspective of a critically minded consumer, as opposed to a producer, of the relevant archeological data. It begins by presenting a brief overview of current answers to eight key research questions and themes, illustrated by selected examples of archeological sites (Fig. 1) and recent scientific analyses and results. It then considers some of the limitations of the available archeological data and consequently highlights five areas that current and future research are addressing. The aim of this paper is, then, to offer an accessible yet well-informed introduction to and evaluation of current archeological knowledge and research on this internationally significant topic, as well as an update to a comparable review published over twenty years ago (Milliken, 1999-2000).

2. CURRENT QUESTIONS AND ANSWERS

2.1. WHAT WERE THE ORIGINS OF THE EARLIEST NEANDERTHALS IN ITALY?

As in other parts of Europe (Richter, 2011), the earliest Neanderthals in Italy and their evolutionary origins remain somewhat elusive, especially during the cool stages of Marine oxygen-Isotope Stages (MIS) 8 and 6. An exceptionally early example is provided by the site of Sedia del Diavolo, in the lowland Agro Romano of the Lazio region. Here, a few Neanderthal bones, plus faunal remains and a lithic assemblage with Levallois debitage are now confidently assigned to the early part of MIS 8, between 295,000 BP and 290,000 BP (Soriano and Villa, 2017) (Fig. 2). Another important example is represented by the skeleton from Grotta di Lamalunga in the Murge uplands of Puglia (e.g., Pesce Delfino and Vacca, 1994; Riga et al., 2020). This well-preserved human skeleton is generally regarded as belonging to an adult male with morphologically archaic *Homo neanderthalensis* features pointing to ancestry from *Homo heildelbergensis*. However, given ongoing debate over its age and evolutionary status, scientists extracted three fragments of the right scapula for detailed study. Morphometric and a aDNA analysis of the fragment, together with a recent digital reconstruction of the cranium, support the skeleton's ascription to *Homo neanderthalensis* (Di Vincenzo et al., 2019; Profico et al., 2023). Although insufficient collagen was recovered for direct radiocarbon dating, Uranium-thorium dating of the calcite directly covering the human bones now provides an indicative timespan of between 172,000±15,000 BP and 130,100±1,900 BP, which places the specimen in the relatively cool MIS 6 (Lari et al., 2015).

Fig. 1 - Map of sites mentioned in the text: 1) Balzi Rossi complex; 2) San Francesco and Grotta della Madonna dell'Arma; 3) Arma Veirana; 4) Grotta del Colombo and Grotta Superiore di Santa Lucia; 5) Caverna delle Fate and Arma delle Mànie; 6) Bargone and Drina; 7) Grotta di Rio Secco; 8) Grotta di Fumane; 9) Riparo Mezzena; 10) Pagnano d'Asolo; 11) Sedia del Diavolo and Saccopastore; 12) Grotta Breuil and Grotta Guattari; 13) Valle Giumentina; 14) Passo Lanciano and Rifugio Pomilio; 15) Grotta di Lamalunga; 16) Riparo l'Oscurusciuto; 17) Grotta del Cavallo.

2.2. WHAT REGIONAL ENVIRONMENTAL OPPORTUNITIES AND CONSTRAINTS WERE THERE FOR NEANDERTHAL EXPANSION?

Mobile groups of Neanderthals successfully exploited - flexibly and expansively - a range of ecological niches in Italy, albeit within the fluctuating, climatically determined, constraints of sea levels and glaciations, vegetation, and fauna. They lived through a long succession of alternating cool and warm paleoclimatic phases, documented as Marine oxygen-Isotope Stages: beginning with the cool MIS 8 (300,000-243,000 BP), and continuing through the warmer MIS 7 (243,000-191,000 BP), the cooler MIS 6 (191,000-130,000 BP), the generally warmer MIS 5, with five mild/warm oscillations (130,000-71,000 BP), the cooler last glaciation of MIS 4 (71,000-57,000), and the generally warmer MIS 3, with four mild/warm oscillations (57,000-29,000 BP). This global climatic sequence provides a useful and widely accepted chronological framework for Italy. However, it masks the regional variability in climate, vegetation, and fauna that Neanderthals experienced in different parts of Italy. For example, the mild climate of the Ligurian Riviera in northwest Italy meant that this region served as an ecologically diverse refugium for plants and animals during the cooler phases (Valensi and Psathi, 2004; Riel-Salvatore et al., 2022). The southern half of the Italian peninsula was also favorable to long-term Neanderthal occupation, enjoying a milder and more stable climate and being characterized by more open vegetation, compared to the cooler and more wooded North. For example, proxy data from cave stalagmites in Puglia attests to relatively stable and mild climatic and environmental conditions in this region between c. 106,000 and 27,000 BP, characterized by the availability of fresh water and of vegetation attractive to wildlife and hunter-gatherers (Colombu et al., 2020). These favorable conditions are reflected in the assemblage of bird bones from Grotta del Cavallo, situated on the Ionian coast of the Salento peninsula, which indicates predominantly open vegetation and wetlands in the environs of the cave during MIS 3 (Carrera et al., 2021). Over time, there was a significant increase in the number of Middle Paleolithic sites in Italy between MIS 5 and 3; including MIS 4, despite the onset of cold-climate conditions - to which the Neanderthals appear to have been physically and culturally well adapted (e.g., Will et al., 2021).

2.3. WHAT DEGREE OF COMPETITION DID OTHER PREDATORS PRESENT TO NEANDERTHALS, PARTICULARLY AT CAVE SITES?

The increasing human use of caves in the Middle Paleolithic was in part facilitated by falling sea levels and probably also by the more skillful Neanderthal use of fire and weapons to eject dangerous predators from them - notably cave bear (*Ursus spelaeus*) in northern Italy and spotted hyena (*Crocuta crocuta*) in central

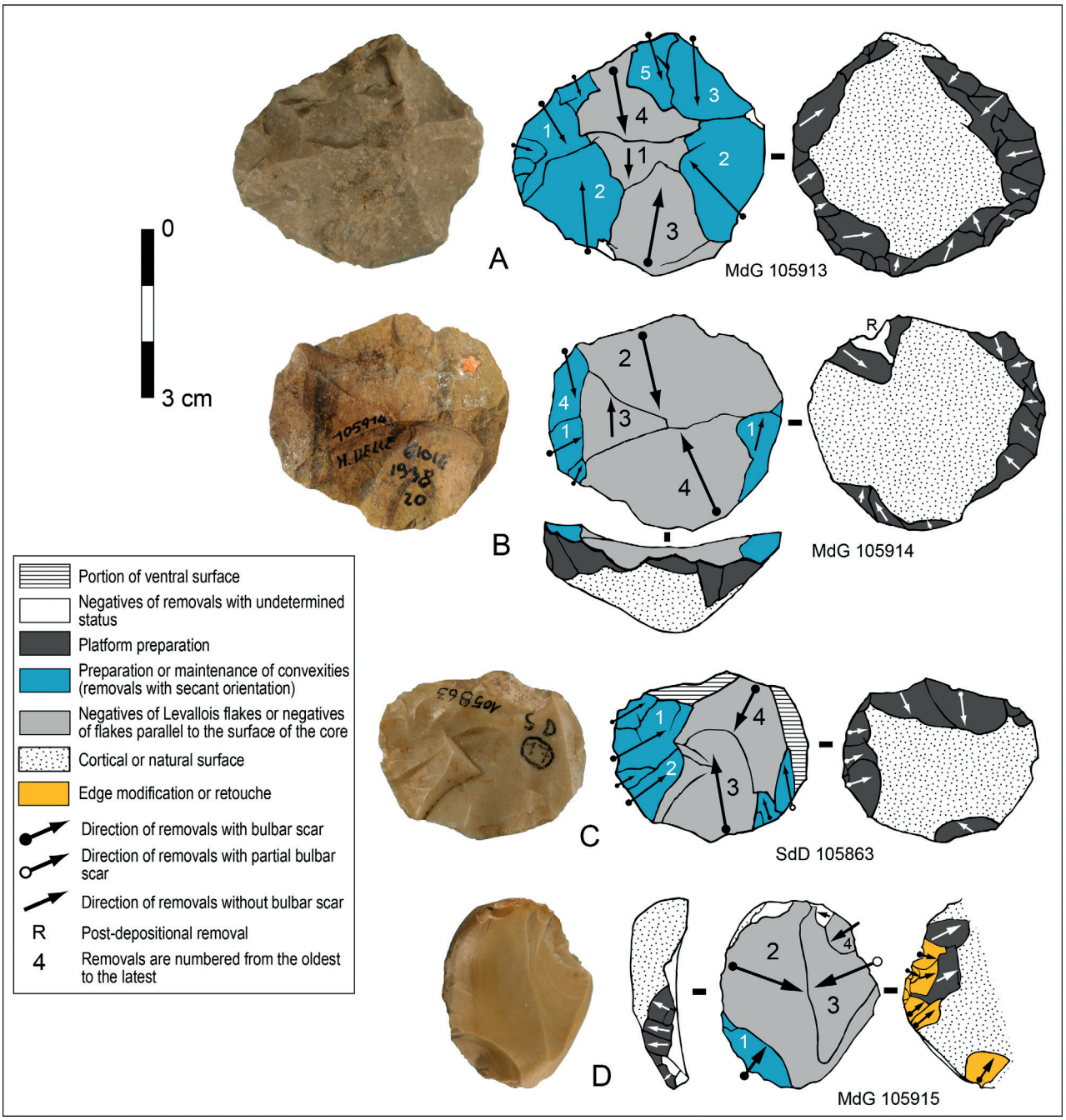

Fig. 2 - Levallois cores from Sedia del Diavolo. From Soriano and Villa 2017, figure 3. CC BY 4.0.

and southern Italy. These animals competed for similar resources to those favored by the humans. Generally, the Neanderthals won, even skinning some carnivore carcasses. For example, in northeast Italy at Grotta di Rio Secco in the Carnic Prealps and Grotta di Fumane in the Monti Lessini, the bones of cave bears and brown bears (*Ursus arctos*) of various ages exhibit cut- and percussion marks. They were evidently skinned and butchered for their meat and fur - during late autumn or winter when the bears hibernated in Grotta di Rio Secco, and more opportunistically at Grotta di Fumane (Romandini et al., 2018). But sometimes the tables were turned, perhaps especially by carnivores scavenging abandoned Neanderthal corpses and carrying the largest human bones into their dens (Mussi, 2001). A classic example is provided by Grotta Guattari, located in the Monte Circeo near the present-day Tyrrhenian coast of Lazio. Here, a Neanderthal cranium, belonging to an adult aged around 45 years, was discovered in 1939 among some stones on the floor of the inner chamber. This deposit can be assigned to the early MIS 3 (c. 57,000-51,000 BP) (Schwarcz et al., 1991). The cranium was fractured in the right temporal region in antiquity and shows signs of fragmentation at the base. In some widely cited publications, Alberto Carlo Blanc sensationally claimed that the skull had been deposited within an intentionally

constructed stone circle and that the deceased individual had been the victim of a ritual murder and a cannibalistic mortuary ritual, in which the cranium might even have been used as a cup (e.g., Blanc, 1938-39). However, White and Toth (1991) have since argued persuasively that the circle of stones is simply one of the many natural groups of stones that litter the cave floor, and that the ancient damage to the cranium was caused by carnivore chewing, probably at a time when the cave was used as a hyena maternity den. The activities of carnivores such as hyena, cave lion (*Panthera spelaea*), and wolf (*Canis lupus*) may also explain the presence of other Neanderthal bones in this cave, including a femur with hyena gnaw marks (Arnaud et al., 2015).

3. MOBILITY, SEASONALITY, AND RESIDENTIAL PATTERNS

What was the nature of Neanderthal seasonal mobility and land use? What was the character of Neanderthal occupations of open and caves sites, and how frequently did Neanderthal groups return to them?

Middle Paleolithic sites are quite widely distributed in Italy. During milder climatic phases, Neanderthals made their way to high altitudes in the Prealps, Alps, and Apennines. Their occupations of open sites and a few caves in this zone can be interpreted as evidence of short-term, seasonal forays inland, in the summer months, undertaken by task-specific groups who often carried their toolkits with them. For example, in the Maiella massif in the Abruzzi Apennines, many Mousterian lithic scatters are distributed at various altitudes, including the Valle Giumentina high plateau at an altitude of 600 m and mountain sites such as Passo Lanciano and Rifugio Pomilio extending up to 2050 m (Radmilli, 1977). However, the most intensively occupied zone was the lowland one, at low and middle altitudes up to 600 m; especially the climatically mild and well-watered coastal plains and lower valleys, which also served as refugia during periods of climatic downturn. Numerous small open sites were established here, notably on marine and river terraces and on sand dunes. These lowland open sites represent a series of brief, opportunistic stays, and include evidence of big game hunting (see next section), carcass processing, stone pebble flaking, and woodworking. Their increasing human use in the Middle Paleolithic was facilitated by falling sea levels and probably also by the more skilful use of fire and weapons to eject dangerous predators from them. Selected lowland caves and rock shelters were also sometimes repeatedly and more intensively occupied as seasonal (autumn, winter, and spring) residential hubs. Within these, a range of activities was undertaken, including the maintenance of fires, the processing of animal carcasses and plants, and the manufacture of stone and wooden tools and of occasional shell scrapers and bone points. For example, use-wear analysis of the stone tools from Grotta Breuil in the Monte Circeo indicates a wide range of activities being performed with these artifacts: wood and hide working, both on fresh and dry material; meat cutting and possibly fish scaling; plant processing; and bone working (Grimaldi and Spinapolice, 2010; Grimaldi and Santaniello, 2014). Seasonal movements between lowland and upland territories are also likely to have occurred, as confirmed by recent stable isotope analyses relating to Grotta di Fumane. Here, four deciduous human teeth have been found in the Middle Paleolithic deposits, one of which clearly belongs to a Neanderthal (Benazzi et al., 2014). Strontium isotope analysis on them indicates that Neanderthal children and their mothers utilized not only the lower mountain zone around Fumane cave (at an altitude of 350 m) but that their territorial range also extended down to the river Adige plain (Richards et al., 2021).

4. PRECISELY HOW DID NEANDERTHALS STRATEGICALLY EXPLOIT ANIMAL, PLANT, AND OTHER MATERIAL RESOURCES?

Around these sites, Neanderthals utilized a range of resources, some of which fluctuated seasonally. There is now good evidence that they undertook hunting, although it remains possible that they did also scavenge. Short-range ambush hunting was practiced with hand-delivered (thrusted or thrown), stone-tipped wooden spears, both on open grasslands and in more forested environments. There was a clear preference for ungulates, especially red deer (*Cervus elaphus*), and prime (adult or young adult) specimens were often targeted. But plenty of other species were also exploited, ranging from large pachyderms to wild boar, game birds, tortoises, and shellfish, as and when the opportunity arose. A good example is provided by the open site of Pagnano d'Asolo, situated on the edge of the Prealps (Mussi and Villa, 2008). The carcass of an adult female woolly mammoth (*Mammuthus primigenius*) was found here in alluvial deposits of the Erega stream, estimated to date to MIS 4 or 3. It was associated with five Mousterian flint artifacts. One of the tools is a Levallois point, with a probable impact fracture. This has plausibly been interpreted as the remains of a stone-tipped spear used by a Neanderthal hunter to kill the mammoth. Such animal resources were thoroughly butchered for their meat, brains, marrow, fur and pelts, bones, feathers, and so on, although often the limbs of large bovids were selectively transported from kill sites. Grass seeds, and probably other plant foods, helped to balance this protein-dominated diet. Other locally available raw materials-generally found within a 15 km radius of individual sites (an area that could have been exploited daily) included wood (for fires and tools), stone (of variable quality), seashells, birch-bark tar, and red hematite. In stone-working, different reduction techniques were used according to the nature of the raw materials and the nature of the tasks expected to be undertaken with the finished products (e.g., preforms, cores, flakes, scrapers, and points). More strategic forward planning is also evident in the transport

of preformed blocks of stone, finished tools, and a fossil shell (see next section) over longer distances of up to 160 km, particularly during the late Middle Paleolithic.

5. SOCIAL RELATIONS AND COMMUNICATING

What forms did Neanderthal social relations and communication take? To what extent did Neanderthals engage in symbolic behaviour?

It may be difficult to say much about the social lives of Neanderthal groups, but certainly these involved both bodily and material resources (Gamble, 2011). Cooperative decision-making and teamwork are implied by the hunting of large game, and a degree of rule-bound behaviour is suggested by the growing evidence of the spatial ordering of activities in the largest caves and rock shelters. Body ornamentation may have played a part in attracting breeding partners to ensure long-term biological survival but could also have contributed to the construction of cultural and social identities. A key piece of evidence here is a fragmentary fossil marine gastropod shell (*Aspa marginata*) from Grotta di Fumane, which was arguably modified and suspended by a thread for display as a pendant (Peresani et al., 2013) (Fig. 3). The shell would originally have measured around 3.4 cm in length. It was found in a well-sealed Mousterian layer (A9) at the back of the cave, dated by radiocarbon and Electron Spin Resonance to c. 47,600 BP. It was probably deliberately transported from a fossil exposure more than 110 km southwest of the cave, either in the Lombardy Pre-Alps or south of the Po Valley. Clusters of striations appear on the inner lip, which has been interpreted as the result of friction produced by a cord rich in abrasive particles, such as sinew. Traces of a dark red substance have also been persuasively interpreted as the pigment that was smeared on the outer shell surface, presumably to enhance its aesthetic impact. Dispersive X-ray and Raman analysis identify the pigment as pure hematite, which could have been obtained from sources situated between 5 and 20 km from the site. Interpreted as a body ornament, the shell can be regarded as a rare Italian example of Neanderthal visual culture, which adds to a growing body of comparable evidence from France and Iberia for the use of 'symbolic' materials by Neanderthals (e.g., Hoffmann et al., 2018). The widespread (albeit locally variable) use of the Levallois stone working technique (characterized by prepared cores, retouched flake forms, and flake tools) also implies the existence and maintenance of extensive communication networks, right from the start of the Middle Paleolithic. So too does the shared use of the contrasting Quina technique (characterized by thick asymmetric flake blanks and by transverse scrapers with scaled and deep retouch) used by highly mobile groups across and beyond the upper Adriatic and Sub-Alpine area during the cold MIS 4 phase (Delpiano et al., 2022). These networks would have been particularly important if, as seems likely, Neanderthals were relatively thin on the ground (Broodbank, 2013, 105).

6. IN WHAT WAYS DID NEANDERTHAL BEHAVIOUR CHANGE OVER TIME?

We can also discern some behavioural changes over time, especially during MIS 3. At a few Late Mousterian (c. 47,000-43,000 BP) caves and rock-shelters, Neanderthal groups appear to have used space in a more structured manner, leaving traces of somewhat distinct activity areas, including hearth zones, discard zones, and areas for working, socializing, and sleeping. Good evidence comes from the excavations of the Late Mousterian (late MIS 3) deposits at Riparo Bombrini, which comprises part of the Balzi Rossi cave complex at Grimaldi in Liguria (e.g., Arobba and Caramiello, 2009; Riel-Salvatore et al., 2013) (Fig. 4). The deposits have been radiocarbon dated to c. 47,000 BP, although problems with the radiocarbon method at this timescale may have rendered this date too recent. Within the rock-shelter, analysis of the spatial distribution of the stone artifacts and animal bones indicates a structured use of space: with sleeping and socializing areas - kept warm by hearths and relatively free of debris - generally positioned at the back of the shelter; in contrast to refuse, including discarded and rotting animal remains, which accumulated outside, beyond the dripline of the rock-shelter. Changes in occupation have also been identified stratigraphically at Riparo Bombrini. In the deepest levels (M7-M6), the site appears to have been used initially as a 'residential base camp', by mobile groups which undertook a limited range of tasks and accumulated a relatively small quantity of debris in the shelter. By contrast, in the upper levels (M5-M1), denser lithic assemblages were deposited containing proportionately fewer retouched pieces, suggesting that the site was now occupied for longer periods of time as a 'logistical base camp'. Finally, in the uppermost level (MS), indirectly dated to c. 42,750–42,000 BP, the sparse deposits suggest a series of ephemeral, task-specific uses of the rock-shelter by the last Neanderthals (Riel-Salvatore et al., 2022). Over time, Neanderthal food procurement activities probably became less opportunistic and more strategic. The technological objectives of Late Mousterian knappers also began to change, to judge by assemblages from stratified cave sequences such as that of Grotta Breuil, where behavioural changes have been identified over the course of the Later Mousterian occupation (late MIS 3), with a shift in emphasis from quantity to quality. In the lower layers (8-7), the anvil percussion technique was used to produce as many blanks as possible, regardless of their overall morphology. But, in the upper layers (6-3), anvil percussion decreased in use as the production of long cutting edges became one of the main technological objectives (Grimaldi and Spinapolice, 2010; Grimaldi and Santaniello, 2014). Late Mousterian groups also procured greater quantities of non-local lithic resources over longer distances (up to 160 km), transporting them as preforms and finished artifacts.

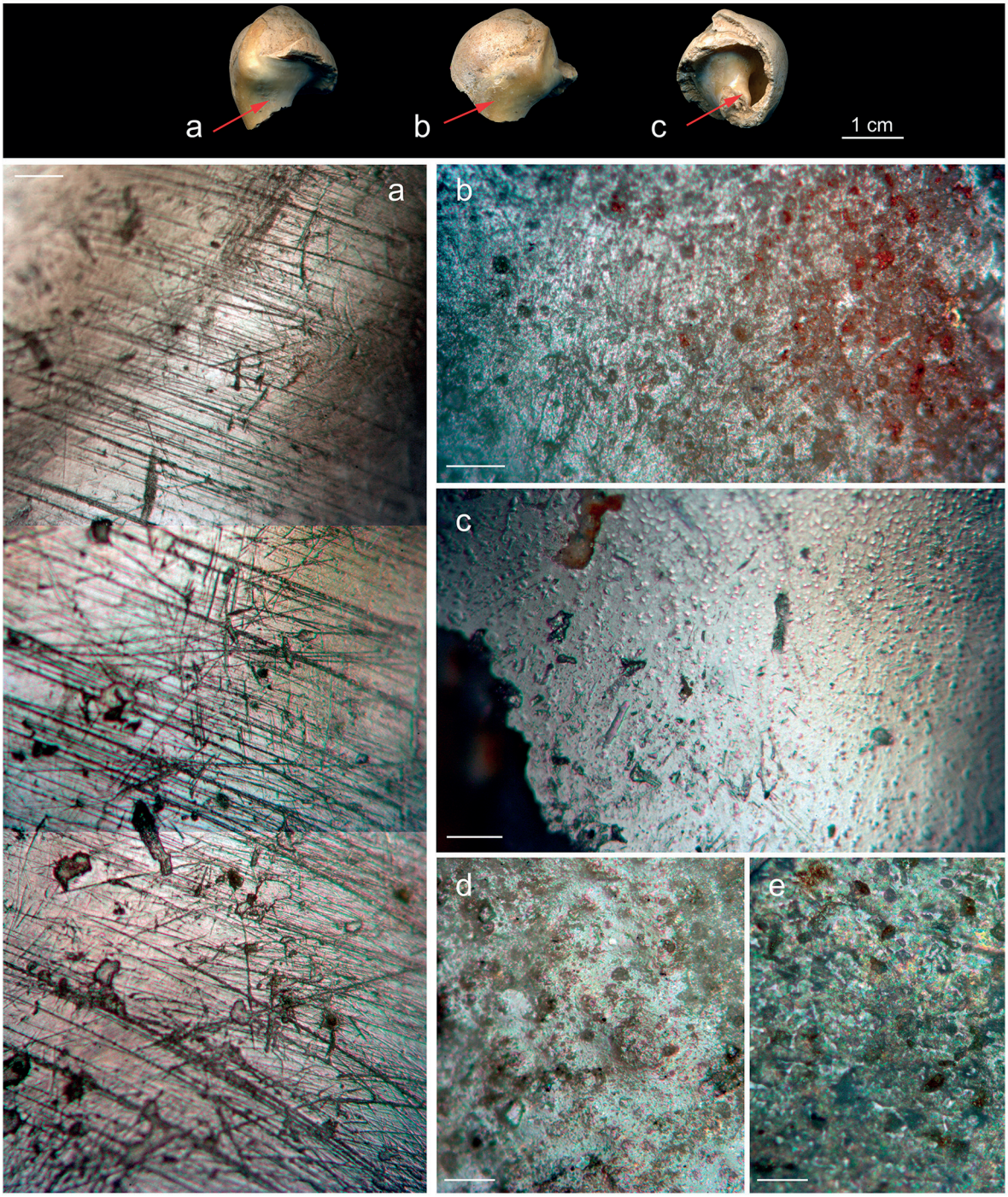

Fig. 3 - Micrographs of ochred fossil marine shell from Grotta di Fumane (a-c). From Peresani et al., 2013, figure 5. CC BY 3.0.

7. NEANDERTHALS AND ANATOMICALLY MODERN HUMANS

When and how did Anatomically Modern Humans colonize and recolonize Italy? Did the earliest Anatomically Modern Humans and the last Neanderthals co-exist and even interact? What happened to the last Neanderthals?

Archeological evidence now places Anatomically Modern Humans' first appearances in Italy firmly within MIS 3, contemporary with the Late Neanderthals. However, the dating and nature of the arrival of Anatomically Modern Humans in Italy (associated with a succession of Uluzzian, Proto-Aurignacian, and Aurignacian techno-complexes), and of the demise of the last Neanderthals (linked with a Mousterian technology), remains difficult to define, much debated, and poorly understood. The scarcity of human remains for this period certainly does not help. Radiocarbon determinations for this period are also problematic: because they lie at the limit of reliability of the radiocarbon dating method, because there is an awkward wiggle in the relevant section of the calibration

Fig. 4 - The Balzi Rossi caves. From Thilo Parg. Wikimedia Commons. CC BY-SA 4.0.

curve, and because sample pre-treatment chemistry of charcoal samples (to remove contamination) using the routine acid-base-acid method has been found to have produced erroneously young determinations compared to the more rigorous and reliable acid-base-oxidation/stepped combustion method. For example, an estimated 70 per cent or more of the 53 radiocarbon determinations from Grotta di Fumane produced using the routine pre-treatment method have been found to be too young (Higham et al., 2009). However, a new program of radiocarbon dating on Late Pleistocene archeological material undertaken at the Oxford Radiocarbon Accelerator Unit has sought to overcome these problems and has provided some valuable new data for a number of key Italian sites. Working with this new chronology, which pushes the first appearance of Anatomically Modern Humans in Italy back to c. 45,000 cal BP, a more complex, messy transition scenario now needs to be developed - one that goes against the grain of clear-cut traditional Italian stone tool typologies and stratified type-sites. Sarah Milliken (2007, p. 351) wrote some years ago, 'In Italy, modern human behaviour appeared in a piecemeal fashion'. What this means today is that there was significant regional (and even local) variability, with successive (and sometimes drawn-out) influxes of the modern human population carrying and developing diverse cultural packages, which at certain times and places probably overlapped with continuing Neanderthal occupations and adaptations. This perspective is reinforced when we consider the powerful new evidence from Grotte Mandrin in the middle Rhône valley in southern France of repeated modern human incursions into a Neanderthal site and territory from around 54,000 BP (Slimak et al., 2022). With this, we can now envisage pulses of Anatomically Modern Humans moving along the Mediterranean coast and its major river valleys, including those of Italy, throughout the time span of the MIS3 climatic phase with its succession of relatively mild and warm oscillations (57,000-29,000 BP). By around 40,000 BP, this turnover between Late Neanderthals and Anatomically Modern Humans was complete (Higham et al., 2014), marked by a set of cultural practices (including the use of more effective composite stone tools and bone tools, new ways of extracting more resources from animal carcasses, and strengthened intercommunicating between dispersed human groups), which arguably gave Anatomically Modern Humans a competitive advantage over Neanderthals in food procurement, territorial control, and breeding. Precisely what happened to the last Neanderthals remains an open question.

The complexity of the Italian archeological data and debate on which this overview rests are exemplified well by Grotta del Cavallo in Puglia. It remains one of the key sites at which to consider the Middle to Upper Paleolithic transition in southern Italy. The cave contains a deep series of stratified archeological deposits (e.g., Palma di Cesnola, 1965-66). A thin layer of volcanic material separates the Mousterian deposits from the Uluzzian stratum (E). This is followed by an Aurignacian stratum (D) originally defined by the excavator as evolved or final Uluzzian but redefined as classic Aurignacian by Patrizia Gioia (1990), due to the presence of some typical Aurignacian-style retouched bladelets and end-scrapers. This is capped by a culturally sterile layer of volcanic

ash derived from the Campanian Ignimbrite eruption, which provides a well-dated *terminus ante quem* of c. 39,850 BP for the underlying layers. A new series of high-quality radiocarbon determinations on samples of shell beads provide a date range of c. 44,000-42,700 BC for the Uluzzian stratum (the start of which, with Bayesian modeling, can be pushed back to c. 45,010 BP, and with tephrostratigraphy to 45,500±1000 BP) and of c. 41,100-39,300 BP for the Aurignacian stratum (Benazzi et al., 2011; Douka et al., 2014; Zanchetta et al., 2018). The Uluzzian deposits at Grotta del Cavallo have produced some important cultural remains. Three teeth found here were originally classified as Neanderthal. However, recent morphometric analysis has redefined the two deciduous molars as belonging to Anatomically Modern Humans, while a deciduous central incisor is now not thought to be human at all (Benazzi et al., 2011; Ronchitelli et al., 2014). Two more teeth, both deciduous molars, have since been re-discovered in the excavation archive of the Uluzzian deposits, and both have been identified as Anatomically Modern Human (Moroni et al., 2018). This has profound implications for our understanding of the makers of Uluzzian artifacts here (which range from distinctive backed lunates to bone points to seashell beads), who can no longer be regarded as late Neanderthals; unless we regard the modern human teeth as more recent, intrusive elements within stratum E (Zilhão et al., 2015), a position which has in turn been refuted. Indeed, scholars are now increasingly distancing the Uluzzian from the Mousterian, chronologically and culturally (e.g., Benazzi et al., 2011; d'Errico et al., 2012; Moroni et al., 2013). In southern Italy, then, the 'Uluzzians' might be regarded as an early influx of Anatomically Modern Humans (c. 45,000-41,000 BP), who were later followed by further inflows of human groups from northern Italy using Aurignacian-style lithic industries (c. 41,000-39,300 BP).

8. DISCUSSION: CURRENT LIMITATIONS AND FUTURE RESEARCH AREAS

The limitations of the current dataset upon which this synthesis is based must, then, be acknowledged (e.g., Kuhn, 1992; Milliken, 1999-2000; Peresani, 2011, p. 249). In doing so, it is possible to highlight five research areas that stand to benefit from further research.

8.1. DATING

The dating of sites is problematic, due to a traditional reliance of archeologists on relative chronologies, based especially on animal species and on the types of retouched stone tools identified in excavated deposits. This makes it difficult, for example, to correlate phases of human activity at sites with different stages of climatic and environmental variability. Greater use of more reliable absolute dating techniques is therefore required before we can meaningfully tie the cave sequences in any real detail to wider environmental and cultural processes. More specifically, the radiocarbon dating of final Mousterian contexts needs to be revisited, since some of the existing date ranges seem to be too recent (see above). The complexity and benefits of this are clear in the case of Riparo Mezzena in the Monti Lessini, where the re-dating and re-identification of claimed Neanderthal and Anatomically Modern Human remains have challenged old interpretations (Condemi et al., 2012; Condemi et al., 2013; Longo et al., 2012). This small rock-shelter contains Late Mousterian deposits, which, based on a radiocarbon determination on a bovid bone from the lowest layer (III), date to c. 39,900-38,400 BP. Fragments of human bone were found in a disturbed upper layer (Ib) also containing Mousterian lithics, faunal remains, and later prehistoric artifacts. Two undated human bone fragments are claimed to carry Neanderthal-like mitochondrial DNA, although these data have been challenged, while other human bones date to the Mesolithic and Neolithic, including a mandible originally designated as Neanderthal (Talamo et al., 2016).

8.2. CAVE AND OPEN SITES

There has been a strong traditional bias towards the archeological excavation of Middle Paleolithic cave deposits in Italy, despite the widespread discovery of Mousterian open-sites. In Ligiuria, for example, the archeological record for the Middle Paleolithic is dominated by cave sites, although a few open sites are known (Del Lucchese et al., 1985). To the west, there is the famous Balzi Rossi cave complex at Grimaldi, just inside the Italian-French border (with Mousterian occupations identified in Grotta del Principe, Barma Grande, Grotta del Caviglione, Riparo Bombrini, Riparo Mochi, Riparo Lorenzi, Grotta dei Fanciulli, Grotta Costantini), together with two adjacent open-sites (Ex-Casinò, Mortola Superiore) (Rossoni-Notter et al., 2017) (Figure 4). Further along the west Ligurian riviera, sites are known around San Remo (San Francesco, Grotta della Madonna dell'Arma), Erli (Arma Veirana), and Finale Ligure (Grotta del Colombo, Grotta Superiore di Santa Lucia, Caverna delle Fate, Arma delle Mànie). A few open sites are also known in eastern Liguria (Bargone, Drina). To counter the traditional bias of fieldwork towards cave sites, greater numbers of open sites with well-preserved archeological deposits therefore now need to be excavated.

8.3. PLANTS

Further evidence of the exploitation of plants as food and fuel needs to be actively sought, using state-of-the-art archeological science techniques. For example, dental macrowear analysis (using three-dimensional digital models to study wear facets) of Neanderthal teeth from Saccopastore in the Agro Romano and Grotta Guattari in the Monte Circeo confirms the use of diverse sources of food, including plant foods - the latter especially during warmer climatic stages (Fiorenza, 2015) (Fig. 5). Microscopic analysis of dental calculus on Neanderthal teeth from Grotta Guattari also takes us one step further, with the identification of starch grains, phytoliths, spores, and pollen (Power et al., 2018). Although not all these

plant materials need to have been ingested intentionally as food, starch representing a Triticeae grass seed is thought likely to have been eaten.

Fig. 5 - Cast of Saccopastore 1 Neanderthal cranium, displayed in the National Museum of Natural History, Washington, D.C. From Adam Foster. Wikimedia Commons. CC BY 2.0.

8.4. NEANDERTHAL HUMAN REMAINS

Continued re-study of known Neanderthal human remains is required, particularly to establish their taphonomic status in cave deposits. For example, at Caverna delle Fate in Liguria, the question of whether the Neanderthal human remains found in this cave, represented by fragments of the skulls and mandibles of three individuals (two children aged 8-10 and 9-10 years, and an adult) (Giacobini, 1984), were brought here by carnivores or left behind by other members of human groups requires further consideration.

8.5. BEHAVIOURAL CHANGES DURING MIS 3

Further attention also needs to be given to defining and discussing the behavioural changes seen during MIS 3, with less emphasis on hindsight from the arrival of the first Anatomically Modern Humans. For example, the carefully excavated stratigraphic sequence at Riparo l'Oscurusciuto in Puglia is revealing gradual transformations in the scale and organization of Late Neanderthal groups and activities. This favorably south-facing rock-shelter is located about 20 km inland from the present-day Ionian coast. Its Late Neanderthal occupation can be assigned to between 55,000 and 40,000 BP, during MIS 3. Neanderthal groups briefly occupied it during Ischia's 'Mount Epomeo Green Tuff' volcanic eruption, whose ash fall-out had a widespread detrimental impact on ecosystems in southern Italy, undertaking limited sequences of pebble reduction and mammal butchery activities (Marciani et al., 2020). Subsequently, they re-occupied the site and formed longer-term activity areas in Stratigraphic Unit (SU) 13, with a central alignment of regularly spaced small hearths (median diameter 26 cm) dividing the occupied area into two parts. The outer part is marked by several multi-purpose activity areas mostly associated with the combustion features, and with the most intense production and use of lithic tools and butchering and consumption of animal resources taking place in the southern sector, along with cleaning of working areas and refuse dumping. In contrast, significantly fewer finds come from the inner part, between the hearths and the rock-shelter wall, which is interpreted as having been used as a sleeping/resting area (Spagnolo et al., 2019). A comparable spatial analysis has been undertaken for the overlying SU 11 (Spagnolo et al., 2020). Here, Neanderthal groups continued to divide the space into two sectors but constructed hearths that were larger (with the largest having a median diameter of 54 cm), spaced slightly further apart, and aligned diagonally relative to the shelter wall, perhaps reflecting gradual transformations in the scale and organization of groups and activities at this historic place.

9. CONCLUSIONS

Despite my intention to critique, what I have found as a consumer of archeological data, particularly in studies published over the last decade, is growing cause for optimism regarding our understating of Neanderthals in Italy. Recent work is challenging old stereotypes about Neanderthal behaviour (as cave-dwelling scavengers, for example). It also reflects a shift in scholarly interest towards more science-based absolute dating, bioarcheology, taphonomy, tool use, and the spatial patterning of cultural remains on various scales. All this plays well into the hands of a more integrated and contextualized interpretative archeological approach, applied in-depth across different climatic stages and Italian regions.

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