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SÉANCES DE LA SOCIÉTÉ PRÉHISTORIQUE FRANÇAISE 5

RESSOURCES LITHIQUES, PRODUCTIONS ET TRANSFERTS ENTRE ALPES ET MÉDITERRANÉE

ACTES DE LA SÉANCE DE LA SOCIÉTÉ PRÉHISTORIQUE FRANÇAISE NICE 28-29 MARS 2013

Textes publiés sous la direction de
Antonin Tomasso, Didier Binder, Gabriele Martino,
Guillaume Porraz, Patrick Simon et Nicolas Naudinot

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5

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The Prehistoric Quarry of La Pietra (Roccastrada, Grosseto, Tuscany)

Copper Age Lithic Workshops and the Production of Bifacial Points in Central Italy

Adriana Moroni, Biancamaria Aranguren, Alessandra Casini, Armando Costantini, Giuditta Grandinetti, Sem Scaramucci and Paolo Gambassini

Abstract: The authors present the preliminary results of the research carried out at the prehistoric quarry of La Pietra, which is located in the Farma valley (province of Grosseto, Tuscany), within the 'Tuscan Mining Geopark'. From a geological perspective La Pietra is a Late Jurassic radiolarite outcrop belonging to the Ligurian Domain. The present paper is concerned with the lithic material collected from the surface during a field survey in the 1990s. However, an excavation project of the site is currently in progress.
Evidence for intensive exploitation of the quarry by prehistoric communities is attested to by the huge amounts of discarded material covering a large area surrounding the outcrop. Among the artefacts collected during the field survey there are different kinds of blanks and transformed products such as unifacial and bifacial preforms, abandoned at different stages of their manufacturing, slabs at an initial stage of the knapping process, a few tools, and a lot of technical flakes.
La Pietra shows characteristics that are very similar to those of the radiolarite quarry of Valle Lagorara in Liguria and it was exploited, as was Valle Lagorara, during the Eneolithic/Early Bronze age period for the manufacture of preforms devoted to the making of flat retouched artefacts, mainly projectile points for weapons. Both the large amount of processed material and the small number of unbroken and finished artefacts suggest that most of the finished preforms was produced for trade.
In the surrounding area several Chalcolithic and Early Bronze Age cave sites yielded leaf-shaped points made from radiolarite, mostly associated with burial contexts. Radiocarbon dating results from these sites range from 3650 to 2351 cal. BC and form a good chronological point of reference for La Pietra. At present no archaeometric study has as yet been carried out to establish the origin of the artefacts recovered from these sites but a characterisation project of the radiolarite from the different Tuscan outcrops has been undertaken, using completely non-invasive methodologies. According to the authors, this massive production of flat retouched tools could be connected to specialised craftsmen who worked on commission, as is also suggested by the high quality of the lithic components among grave goods.
In the final discussion the authors provide a synthesis of current knowledge about Eneolithic settlements, burial contexts and lithic workshops in central Italy, extending the field of investigation to the remainder of the Italian Peninsula, as far as workshops are concerned. According to data emerging from this account a large number of sites defined in the past as 'Campinian' can now be identified as workshops devoted to the production of leaf-shaped arrowheads. The authors argue that a critical revision, based on technological and functional analyses, of the old concept of 'Campinian' is needed. Equally, the assemblages from the Gargano and the Monti Lessini areas should be revisited from a comparative perspective based on an adequate interpretative framework.
This paper highlights the way in which the new scenario that has progressively emerged from the discovery and the study of workshops such as Valle Lagorara and La Pietra could substantially change the social-economic framework related to the Eneolithic/Early Bronze Age communities from several standpoints.
Although the phenomenon of the Copper Age/Bronze Age knapping workshops needs to be further investigated, it is nonetheless obvious that the emergence of several production centres, mainly aiming at armature production from the Late Neolithic/Early Eneolithic on, is recorded across the Italian territory. This innovative explanation of the function of these workshops, combined with the occurrence of a large number of weapons in the burial evidence, can be seen from a new social, behavioural, and economic perspective, with particular emphasis on the role played by the development of projectile points as a proxy for increasing bellicosity during the Copper Age and the ensuing Early Bronze Age.

Keywords: Eneolithic, radiolarite quarries, workshops, production of bifacial points, specialization.

Résumé : Les auteurs présentent les résultats préliminaires des recherches conduites par l'université de Sienne et la Soprintendenza per i Beni Archeologici de la Toscane dans la carrière préhistorique de La Pietra, située dans la vallée du torrent Farma (province de

Grosseto, Toscane), dans le parc national technologique et archéologique des collines métallifères de Toscane. D'un point de vue géologique, le site de La Pietra correspond à un affleurement de radiolarites du Jurassique supérieur appartenant au domaine ligure. Les premières explorations à La Pietra remontent aux années 1990, lorsque l'université de Sienne effectua une série de recherches en surface pour comprendre la fonction, l'extension et l'état de conservation du site. Cette étude décrit le matériel qui a été recueilli en surface dans ces années-là. En 2013 un projet de fouille stratigraphique a été mis au point.
Ce site préhistorique s'étend sur environ 3-4 hectares. Jusqu'à présent, il n'a pas été trouvé de céramique et on n'a pas pu reconnaître de zone assignée à des activités en particulier, à l'exception de la partie supérieure de l'affleurement où, dans une sorte de petit abri, on a identifié une aire de débitage. Une exploitation intense de la carrière par les communautés préhistoriques est cependant attestée par l'importante quantité de déchets présents en surface sur une extension considérable. Au cours de l'activité de la carrière, on a naturellement choisi les couches de roche de meilleure qualité. La technique utilisée était très simple : pour isoler les niveaux les plus adaptés, on procédait à la démolition des couches supérieures ; ensuite on détachait les blocs de radiolarite par percussion directe, provoquant la création de nombreuses concavités qui sont encore visibles sur la paroi de la roche.
Les artefacts découverts lors des ramassages de surface appartiennent à différents types de supports et de produits transformés : des pièces unifaciales et bifaciales (préformes), laissées à différents stades de fabrication, des plaquettes à une phase précoce du débitage, quelques outils, des percuteurs et une grande quantité d'éclats techniques. On n'a pas trouvé jusqu'ici de véritable outil, comme des flèches ou d'autres objets à retouche plate. Les préformes pouvaient être obtenues directement sur plaquette ou sur éclat. Dans le premier cas, on a observé l'utilisation de plaquettes d'épaisseurs différentes, correspondant à différentes façons d'aborder la phase initiale du débitage.
La Pietra présente des caractères très similaires à ceux de la carrière de radiolarite de Valle Lagorara, en Ligurie, et, comme Valle Lagorara, le site a été exploité principalement au cours de l'Énéolithique, pour la fabrication de préformes destinées à la réalisation d'objets à retouche plate, surtout des armatures pour les armes de jet. Le contraste entre la quantité importante de matière travaillée et le faible nombre d'outils entiers suggère que cette masse de préformes a été produite pour être exportée.
Aux alentours de La Pietra se trouvent plusieurs sites en grotte, des contextes funéraires principalement datés de l'Énéolithique et du Bronze ancien, dont il est connu qu'ils ont livré des pointes foliacées en radiolarite. L'âge radiocarbone de ces sites se situe entre 3650 et 2351 cal. BC, ce qui représente un bon point de référence pour la chronologie de La Pietra.
Jusqu'ici, il n'a pas encore été fait d'étude archéométrique afin de déterminer l'origine des outils trouvés sur ces sites mais, récemment, un projet a été entrepris pour analyser, avec des méthodes non invasives, les caractéristiques des radiolarites connues dans les différents affleurements de Toscane.
Le nouveau scénario, qui se dessine peu à peu à partir de la découverte et de l'étude de sites d'atelier comme Valle Lagorara et La Pietra, pourrait impacter considérablement nos représentations du cadre socioéconomique de l'Énéolithique et du Bronze ancien.
Dans la discussion de cet article, les auteurs présentent un résumé des connaissances actuelles sur les sites, les contextes funéraires et les ateliers lithiques de l'Énéolitique de l'Italie centrale, en élargissant l'étude à toute la péninsule Italienne en ce qui concerne les sites d'atelier. Selon notre étude, les nombreux sites définis auparavant comme « campigniens » peuvent désormais être identifiés comme des ateliers de fabrication de pointes de flèches foliacées.
Selon les auteurs, il faudrait faire une révision critique de l'ancien concept du « Campignien », en se basant sur l'analyse technique et fonctionnelle ainsi que sur une interprétation appropriée, ce qui concerne toute la péninsule Italienne, y compris les ensembles lithiques des Lessini (où les ateliers de production de pièces foliacées semblent utilisés jusqu'à l'âge du Bronze tardif) et du Gargano. Bien que le phénomène des ateliers de l'âge du Cuivre et de l'âge du Bronze doive être étudié plus en détail, il apparaît néanmoins évident qu'en association avec l'introduction de la métallurgie, l'émergence, à partir de la fin du Néolithique voire du début de l'Énéolithique, de nombreux centres de production notamment d'armes, est documenté sur la majorité du territoire italien. Cette interprétation fonctionnelle innovante des ateliers lithiques, avec la présence d'une grande quantité d'armes dans les contextes funéraires, nous amène à examiner cette question sous un angle différent lié à de nouveaux comportements sociaux. Il faut donc considérer le rôle joué par le développement des armatures comme une indication possible de l'augmentation de la belligérance à l'âge du Cuivre et par la suite à l'âge du Bronze.
Ainsi, la production d'outils à retouche plate, dont les premières étapes sont documentées dans les ateliers, pourrait être liée à des artisans spécialisés qui travaillaient sur commission, comme cela est aussi suggéré par la grande qualité des pièces lithiques provenant des sépultures.

Mots-clés: Énéolithique, carrières de radiolarite, ateliers, production de pointes bifaciales, spécialisation.

INTRODUCTION

The site

The prehistoric site of La Pietra is located in the Farma valley (municipality of Roccastrada, province of Grosseto, Tuscany) in the National Park of the Grosseto Metalliferous Hills, which joined the European network of the Unesco geoparks with the label 'Tuscan Mining Geopark' in 2010 (fig. 1). La Pietra is the name of an isolated rock spur corresponding to a radiolarite outcrop (442 m a.s.l.) that arises on the left side of the Farma river (fig. 2). Large blocks that had collapsed from the outcrop are strewn about the whole area around the spur. This site is a 515-hectare-wide nature reserve and recently the Tuscan regional government considered its incorporation into the regional geosites archive, both for its geological relevance and for its natural beauty. However, the interest of La Pietra lies also in its archaeological importance since this place was exploited as a radiolarite quarry and a lithic workshop devoted to the production of preforms for flat retouched bifacial items, mainly during the Copper Age.

Survey and excavation

La Pietra was visited and briefly described for the first time in the 1990s by Paolo Gambassini and Giuliano Marroni

Fig. 1 – Geographical localisation of the prehistoric quarry of La Pietra (yellow dot), of the main radiolarite outcrops in Central-Southern Tuscany (red dots) and of the main burial sites quoted in the text (black dots). 1: artificial hypogeic cavities of Colle Val D'Elsa; 2: Grotta Prato; 3: Grotta della Spinosa; 4: Grotta di San Giuseppe; 5: Grotta del Fontino; 6: Grotta dello Scoglietto; 7: Buca di Spaccasasso.

Fig. 1 – Localisation géographique de la carrière préhistorique de La Pietra (points jaunes), des principaux affleurements de radiolarite en Toscane centre-méridionale (pointes rouges) et des principaux sites funéraires cités dans le texte (points noirs). 1 : cavités hypogéiques artificielles de Colle Val D'Elsa ; 2 : Grotta Prato ; 3 : Grotta della Spinosa ; 4 : Grotta di San Giuseppe ; 5 : Grotta del Fontino ; 6 : Grotta dello Scoglietto ; 7 : Buca di Spaccasasso.

(Gambassini and Marroni, 1998) of the University of Siena. This investigation was limited to some surface surveys, in order to understand the function of the site, its extent and preservation degree. On this occasion, a large number of lithic artefacts were collected.

In 2013 a joint research project was launched (and is currently still in progress) by the Archaeological Office of Tuscany and the University of Siena as part of an integrated programme of field survey, environmental reconstruction and excavation of radiolarite outcrops and lithic workshops in the territories of Siena and Grosseto that aimed at enhancing the 'Tuscan Mining Geopark'. Consequently, additional surface surveys and two excavation campaigns were carried out at La Pietra in 2013–2014.

Evidence for intensive exploitation of the quarry by Eneolithic communities is provided by the huge amounts of knapping waste covering a large area surrounding the outcrop (fig. 3). During the surface survey, lithic material was recovered from three main areas: the top, close to the outcrop, the plateau beneath and the surrounding area. The lithics collected are comprised of several selected pieces as hammers, roughouts of preforms and grinding stones. Interestingly, only in a small area, called 'Pianoro Ovest C', were artefacts with completely different features discovered. These are blade cores and a few blades which can clearly be assigned to the Gravettian/Epigravettian period. Not a single piece of pottery was discovered within the investigated area encompassing more than three hectares; nor was it possible to recognise different activity areas at this stage of the research, except for the top-site close to the outcrop where a small excavation trench (four square metres)

Fig. 2 – View from the south of the radiolarite outcrop of La Pietra.
Fig. 2 – La carrière de radiolarite de La Pietra vue du sud.

Fig. 3 – La Pietra. Radiolarite layers covered by debris and knapping waste.
Fig. 3 – La Pietra. Niveaux de radiolarites couverts par des débris et des déchets de taille.

was opened. The place to be excavated was chosen just close to the outcrop where the wall showed clear traces related to quarrying activity. Here, as a result of the breaking apart and the collapse of a large rectangular block, the radiolarite wall forms a sort of rock shelter enclosing, on three sides, a small area of about 20 square metres (fig. 4). A large part of the shelter surface was completely covered with debitage material. This was probably due to the presence, in the eastern section, of a plundered pit, of about one square metre, which had unfortunately disturbed and reworked part of the prehistoric deposit. A lot of artefacts and waste material such as debitage and detritus were recovered from the trench, revealing the presence of a knapping area. Moreover, despite the small size of the excavated surface, it is beyond doubt that the high density of lithics and their horizontal and vertical distributions reflected different stages of the same production sequence. Each square metre was divided into nine sectors 33 × 33 cm wide and was excavated by 5-cm-deep cuts. All the flakes were collected, including the smallest ones, and all the detritus resulting from the intense quarrying activity was weighed before it was disposed of. The features of the lithics changed according to the depth. Whilst the lower cuts (6, 5 and 4) principally produced debris, cortical flakes and prepared slabs (often already tested as shown by the detachment of a single flake), the upper cuts (3, 2 and 1) predominantly contained thinning flakes as well as a few broken preforms. Scattered charcoals were retrieved from each cut of the trench and samples were selected for radiocarbon dating, which was performed at the Curt-Engelhorn-Centre for Achaeometry in Mannheim, Germany.

Another trench, 50 cm deep, was opened at the foot of the outcrop on its southwestern side where the radiolarite layers displayed deep and large artificial cavities. This area produced only raw material blocks with subtle and sometimes unclear traces related to human activities.

GEOLOGICAL SETTING

The ‘jasper’ (diaspri) of the nature reserve of La Pietra

The radiolarite outcrop known as ‘La Pietra’ is a late Jurassic formation belonging to the Ligurian domain. It is almost circular in shape measuring 500 m in diameter and up to 90 m in height. Radiolarites of La Pietra are of the red-liver type, sometimes with light green veins, which is very common and widespread in Tuscany.

This formation belongs to the ophiolite unit of the Palombini shales, one of the tectonic units that formed the Tuscan Apennine chain. This unit is comprised of the following formations, listed here according to their stratigraphic position from top to bottom: Palombini shales, ‘Diaspri’, basalts, gabbros, and serpentinites.

Fig. 4 – La Pietra. The excavation of the rockshelter.
Fig. 4 – La Pietra. La fouille de l’abri.

Serpentinites, basalts and gabbros can be seen upstream from the outcrop of 'Diaspri' located along the Farma river. It is likely that the pebbles used as hammer stones in the workshop originate from these outcrops.

The Diaspri unit is made up of thin layers of radiolarites 4 to 10 centimetres thick, usually red, sometimes light green, which are intercalated by centimetre-thick/several centimetre-thick levels of siltstone (fig. 5). The 'radiolarite' layers often have a mat aspect, but sometimes, with a frequency of approximately one out of ten, they appear like luster vitreous strata because of the varying amount of silica (fig. 6). Those showing higher siliceous content were chosen by prehistoric craftsmen because they were more suitable for knapping. The 'Diaspri' formation of la Pietra was involved in the intense tectonic processes of the Apennine orogeny. Consequently, it outcrops at the core of an overturned anticline strike N50, with axial plane dipping NW of approximately 40 degrees. As would be expected for the most tectonised part of this formation (folds, thrust and faults; fig. 7), strata are strongly fractured and disarticulated in many prisms. Along the Farma river bed, the 'Diaspri' formation passes stratigraphically upward, alternating with the Palombini shales formation.

The Palombini shales unit is mainly made up of grey shales, which are intercalated with discontinuous layers of dark grey silicified limestone.

Origin and paleo-environmental interpretation of the 'Diaspri' formation

During the Upper Jurassic (Malm Epoch), in the Ligurian and Tuscan domain, the environmental conditions were suitable for the accumulation of widespread deposits of radiolarites. Accordingly, they can be virtually coeval, as in the Ligurian and Tuscan successions, with the same formation name ('Diaspri').

G. C. Parea carried out a study of more than 500 samples of siliceous Italian rocks (Parea, 1970). He discovered that all of them are composed of microcrystalline quartz and that, in particular, radiolarites show a clear clastic-detrital texture. All the examined siliceous rocks, radiolarites included, acquired their mineralogical characteristics during diagenesis, "by the metasomatic replacement of the limestone originally present in the sediment with silica" (Parea, 1970, p. 692). From a paleoecological point of view, the native radiolarite sediments were deposited in marine basins at a depth close to the compensation of the carbonates, but without reaching it. Radiolarians are present, generally, with percentages ranging from 20 to 40%, even if they may reach 80%. For this reason the author suggests that the most generic term 'cherts' should be used for these rocks and not 'radiolarites'. For the scope of this article, however, the term radiolarite has been maintained in view of an in-depth characterisation of the raw-material variability at La Pietra.

Fig. 5 – La Pietra. Radiolarite layers with intercalated several-centimetre-thick siltstone layers.
Fig. 5 – La Pietra. Couches de radiolarites avec des niveaux de siltites intercalés, épais de plusieurs centimètres.

Fig. 6 – La Pietra. Radiolarite layer exhibiting vitreous luster (below the end of the hammer head).
Fig. 6 – La Pietra. Niveau de radiolarite avec éclat vitreux (sous l'extrémité du marteau).

Fig. 7 – Folds in the 'jasper' formation of La Pietra.
Fig. 7 – Plis évidents dans la formation des « diaspri » de La Pietra.

LITHIC TECHNOLOGY

A preliminary technological study has been carried out only on the artefacts recovered from the surface by P. Gambassini and G. Marroni in the 1990s (Gambassini and Marroni, 1998). A more detailed analysis on the material from the shelter is planned for the following years after the excavation has been completed.

Artefacts belong to different kinds of blanks and transformed products. Apart from the debris, the following types were recovered both from the top and the plateau: several unifacial and bifacial pieces, discarded at different stages of their manufacturing, slabs at an initial stage of the knapping process, a few tools sensu Laplace (Laplace, 1964), exclusively scrapers, and a large number of technical flakes.

Other items, such as smaller flakes, were almost completely missing because of the recovery procedure. This did not enable us to wholly reconstruct the reduction processes carried out at the workshop, especially the last stages.

During the quarrying activity layers showing rock of better quality were obviously selected. The technique used was very simple. In order to isolate the desired layer, overhanging strata were demolished; then radiolarite blocks were detached by direct percussion with hard hammers, thus generating the formation of the numerous concavities still visible on the rock wall of the outcrop and on the blocks nearby.

Actuallly many percussion tools have been found including large diabase cobbles, whose source can be found in the Farma river bed; cobbles could be used without modification or their edges sharpened by flaking. These hammer stones can weigh up to 2.5 kg. Unfinished discarded artefacts are represented by preforms of different sizes (fig. 8) mainly characterised by flat-rough retouch (or a scaled flat retouch, according to Azzati et al., 1969 and Calattini, 1981).

At the moment no finished pieces such as arrowheads, dagger blades or other types of implements with flat retouch have been found at the site.

Preforms could be obtained both directly from slabs and from flakes, these latter generally being the smaller ones. In the first case we observe the use of slabs of varying thickness, from 15 to 30 mm, corresponding to different systems for tackling the initial break of the raw material. Thicker slabs normally show scars attesting to the detachment of transversal, oblique or longitudinal opening flakes in order to remove the natural ridges of the slabs and to create a more suitable striking platform (fig. 9, no. 2). Such opening flakes, both of the dihedral and of the trihedral type (fig. 9, no. 4), are highly abundant at the site. Thin slabs also display a preparation of the edges by faceting them before the removal of cortical flakes from the two faces (fig. 9, no. 1).

Many objects were abandoned at this very initial stage of manufacture; or they were abandoned before their decortication procedure was completed. Moreover most preforms were discarded at an early stage of their shaping because of debitage accidents, such as hinge removals and breaks, due to shocks or, more frequently, to the presence of thin crystal veins. Preforms in the last stages of manufacture are extremely rare. Technical flakes are

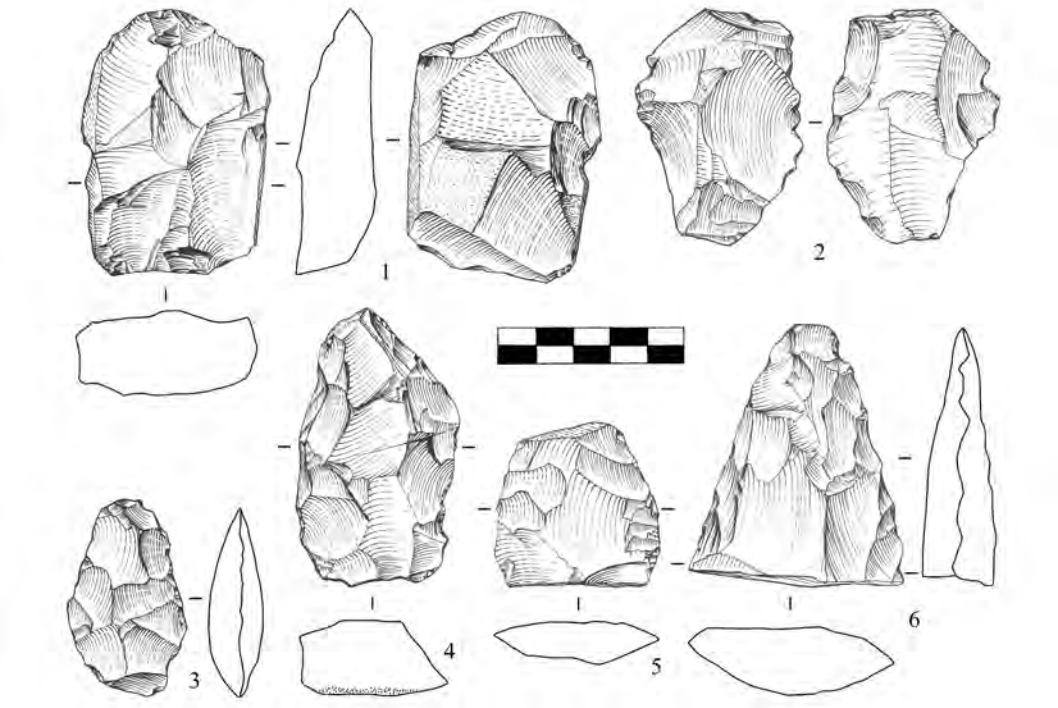

Fig. 8 – La Pietra. Bifacial preforms at different stages of their manufacturing recovered from the surface surveys.
Fig. 8 – La Pietra. Préformes bifaciales à différentes étapes de transformation prélevées lors de prospections de surface.

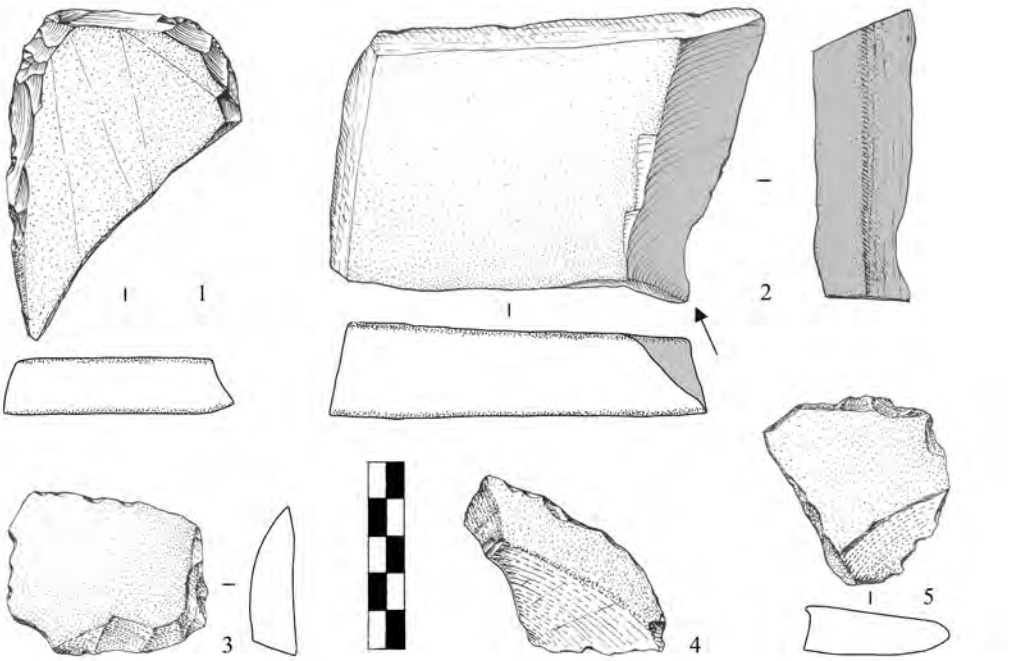

Fig. 9 – La Pietra. 1-2: different methods of approaching the initial stage of debitage of thinner (1) and thicker slabs (2); 3: cortical flake; 4: trihedral flake; 5: cortical flake.
Fig. 9 – La Pietra. 1-2 : différentes méthodes pour débuter le débitage sur des plaques minces (1) et plus épaisses (2) ; 3 : éclat cortical ; 4 : éclat trièdre ; 5 : éclat cortical.

mostly opening flakes, as described above, cortical flakes (fig. 9, nos. 3 and 5) and thinning flakes. Cortical flakes include several lateral specimens (fig. 9, no. 5). On average they are very large and display prominent bulbs as well as large and tilted flat or natural butts.

Rare broken picks are also present. The proportionally small number of preforms retrieved from both the surface and the excavation suggests that the risk of accidents and of abandoning semi-worked pieces was low.

Taking into account a loss of raw material according to the reconstruction by G. Calegari and G. Veronesi (Calegari and Veronesi, 1989), the preform sizes are consistent with the average size of the Tuscan Eneolithic arrowheads. However, preforms for javelin points and, maybe, dagger blades were also made at La Pietra, as testified by the recovery of larger specimens, including some slabs at the very initial stage of their manufacture.

CULTURAL AND CHRONOLOGICAL FRAMEWORK

Chronology

The radiocarbon dating performed on charcoal collected from the lower cuts of the excavated area in the shelter gave the following result: lab. no. 19352: 4226 ± 26 BP, 2895–2779 cal. BC (1σ), 2903–2703 cal. BC (2σ). This date fully places the knapping activities of the shelter within the Copper Age.

La Pietra shows the same characteristics as the quarries of Valle Lagorara, in Liguria, (Campana and Maggi, 2002) and Ronco del Gatto, Monte Lama in Emilia, (Ghiretti, 2003), with regard to both the extracting technique and the lithic production. At both sites radiolarite was exploited for the making of preforms devoted to the manufacturing of flat retouched artefacts, mainly points for weapons. At Valle Lagorara, the authors (Briois and Negrino, 2002; Campana and Negrino, 2002) identified the main phases of the preform production system, thanks to a systematic analysis and a detailed techno-morphological study combined with experimental activity. Based on several reduction stages, which produced different kinds of rough-flat retouched artefacts, ogival preforms and, lastly, finished flat retouched tools (mostly arrowheads) were obtained. Although the prehistoric occupation of Valle Lagorara and Ronco del Gatto probably covers a long time span—from the Final Neolithic to the Early Bronze Age—the most intensive quarrying activity is attested during the Copper Age (Valle Lagorara: dates ranging from 4580 ± 50 BP, 3500–3100 cal. BC (2σ) to 4060 ± 50 BP, 2850–2470 cal. BC (2σ), Campana and Maggi, 2002, p. 321; Ronco del Gatto: 3630–3120 cal. BC (2σ), Ghiretti, 2003, p. 116).

In the surroundings of La Pietra several Chalcolithic and Early Bronze Age cave sites yielded leaf-shaped points made from radiolarite, mainly associated with burial contexts. Among these, Grotta della Spinosa (Aranguren et al., 2004b; Aranguren, 2006), investigated by the Archaeological Office of Tuscany, is one of the best known and more completely published sites.

Six radiocarbon dating results obtained from the Eneolithic layer of this cave in two different times (Dolfini et al., 2011) yielded, respectively, a cumulative age 2σ cal. BC of 3650 to 2570 (4640 ± 110; 4170 ± 70 BP) and of 3485 to 2907 (4371 ± 32; 4364 ± 33; 4555 ± 34 4503 ± 33 BP), highlighting a broad time span for the use of the cave as a burial place, which is consistent with the dozens of individuals retrieved during the excavations. Further south, a couple of ^{14}C dates from bone samples are available also from the Eneolithic/Early Bronze Age ritual site of Buca di Spaccasasso (Cavanna, 2007), again in the Grosseto-Siena area. These dates (4142 ± 45 BP, 2878–2617 cal. BC (2σ); 4023 ± 40 BP, 2636–2466 cal. BC (2σ)) only partially overlap with the time range covered by the more ancient chronology of Spinosa, confirming the occupation of the Buca di Spaccasasso until the Early Bronze Age.
A large number of radiolarite arrowheads have also been found at the burial site of Grotta del Fontino, near Montepescali, that produced the following dates: 4500 ± 50 BP, 3362–3027 cal. BC (2σ) and 4100 ± 100 BP, 2908–2351 cal. BC (2σ) for the Eneolithic and the Bell Beaker layers respectively (Vigliardi, 2002).

Regional setting

As has already been pointed out for Valle Lagorara, both the large amount of processed material and the small number of unbroken and finished artefacts allow us to assume that the mass of finished preforms of La Pietra was produced with a view to export.

In Central-Southern Tuscany and especially in the Metalliferous Hill district there is most of the evidence of the radiolarite outcrops of the region (fig. 1). How many of these outcrops were exploited by prehistoric populations is still a matter of investigation. Surveys carried out in the area demonstrated that not all of them show traces of human activities. This is probably due to the different quality of raw material from each outcrop. Hence the assumption that the whole of this region could have been a large extraction and manufacturing centre still needs to be carefully weighed up. Moreover sporadic findings prove that prehistoric groups often exploited small unmapped outcrops instead of the larger ones.

At present no archaeometric study has been carried out yet. Consequently we do not know whether a characterisation of the radiolarites from the different Tuscan sources is practicable. However, raw material sampling and analyses have been planned in order to test this possibility. The aim of the project is to identify the circulation routes of the semi-worked products and, eventually, to reconstruct a trade network model, by examining both the raw material from the outcrops and the archaeological artefacts from the Eneolithic/Early Bronze Age sites in central southern Tuscany—obviously with completely non-invasive methodologies. In the future this programme could be extended to the radiolarite formations in Northern Tuscany.

In Central and Southern Tuscany, apart from the workshops, the Copper Age and Early Bronze Age are exclusively recorded by funerary contexts. Burial sites are very numerous (Quagliolo, 1993; Negroni Catacchio, 1993 and 2006; Aranguren, 2001; Aranguren et al., 2004a; Cocchi Genick, 2008) but, unfortunately, most of them were discovered and excavated many years ago. Consequently they are scarcely documented and, to make matters worse, some of the material was lost over time. These problems are intertwined with difficulties due to the incomplete editing of data, particularly those regarding lithic raw material.

As far as we can reconstruct from the available evidence, radiolarite arrowheads are absent in the sites located in the extreme south of Tuscany, whereas they are typical of the western part of the region between the Albegna and the Cecina and Elsa valleys. It is worth noting that stone daggers are only occasionally present among the grave goods and are mainly recorded in the northern part of Tuscany where they are generally made from exotic flint (at least those the raw material of which has been published).

Interestingly, even in cases in which radiolarite predominates within a given lithic assemblage it rarely exceeds 50–70%, the remaining raw material being mainly flint also from exotic sources.

Against this backdrop reliable information can be collected only from a few sites, most of which have already been mentioned above. These are also the most recently excavated and integrally published assemblages (fig. 1).

Grotta della Spinosa is located in the municipality of Massa Marittima (Grosseto), not very far from La Pietra. The Eneolithic horizon (25–35 cm thick), overlying a Neolithic occupation, was a veritable ossuary, almost completely formed by a chaotic pile of human remains and grave goods, which was sealed by an artificial layer composed of regularly arranged travertine stones covering the entire surface of the cave. Anthropological studies have highlighted that this accumulation was due to the displacement of the corpses after their decomposition. Among foliate points twenty-one out of twenty-three were radiolarite arrowheads. The burials were also accompanied by pottery, a copper dagger and several ornaments composed of perforated wild boar teeth and shells, all these showing features belonging to the 'Grossetana funerary facies' also known as 'facies of Sassi Neri' (Aranguren et al., 2004b; Aranguren, 2009).

Near Colle Val d'Elsa (Siena) the remains of two artificial hypogeum-like cavities were discovered. A single vessel and a set of eight arrowheads, six of which were made from radiolarite, were associated with at least eight individuals whose bones had been deliberately disarticulated, except for a skeleton still in anatomical connection (Calattini, 1990). From these human remains a date of 3610–3148 cal. BC (2σ) has been obtained (Pacciani, 1995).

Southward, near Alberese, two cave sites, Grotta dello Scoglietto (Ceccanti and Cocchi, 1978; Cavanna, 2007) and Buca di Spaccasasso (Cavanna, 2007), have yielded burial remains accompanied by pottery, metal implements, ornaments and lithic artefacts including several arrowheads most of which were made from radiolarite.

However the most impressive evidence is yielded by Grotta del Fontino (Montepescali, Grosseto) both as regards the large number of burials (no fewer than one hundred and eighty-five individuals) and the wealth and outstanding quality of the associated grave goods. The cave was used as a burial site throughout the Copper Age, including the Bell Beaker period (Vigliardi, 2002). In addition to pottery, bone tools, copper daggers and ornaments, a few of which were made from precious metals (silver and antimony), grave goods contained a spectacular set of arrowheads and javelin points (Bachechi, 2002), including some of the most beautiful items of the Italian Chalcolithic (fig. 10, nos. 1 to 5). Taking into account specimens both from the disturbed and the in situ deposits these projectile points number three hundred and sixty-four, two hundred and thirteen of which were made of radiolarite.

A similar pattern is displayed by Grotta di San Giuseppe on Elba Island where about eighty burials were accompanied by bone and metal artefacts, several intact vessels and a remarkable set of sixty-four arrowheads and javelin points (Grifoni Cremonesi, 2001), forty-two of which were made from radiolarite (fig. 10, nos. 6 to 9). At Grotta di San Giuseppe radiolarite was perhaps local, given the presence of an outcrop in the northern part of Elba Island.

The idea that La Pietra and possibly other outcrops nearby could supply a territory equivalent at least to Central-Southern Tuscany does not seem to be supported, for now, by the available archaeological evidence. One of the key points to emerge from our preliminary account is the systematic non-negligible presence of a flint component even in sites located close to the workshop. In this respect, for instance, the fact that Grotta Prato (Grifoni Cremonesi, 1982–1983)—located like Grotta della Spinosa in the municipality of Massa Marittima—yielded only four radiolarite arrowheads out of thirty-six can hardly be explained by a simple territory model and probably implies a more articulated management of the distribution networks. Moreover, current archaeological data from Tuscan burial sites, taken on the whole, reveal a production volume very far from the bulk quantified for Valle Lagorara and the Ligurian area, in spite of the striking evidence displayed by La Pietra.

Detecting what lies behind such visible 'contradictions' will be one of the aims of La Pietra project.

DISCUSSION

The phenomenon of lithic workshops cannot be completely understood without considering a broader framework which includes a coherent interplay between the workshops and the remainder of the coeval archaeological evidence, such as settlements and burial sites. Recently, studies on Eneolithic/Early Bronze Age lithic assemblages were remarkably enhanced, thanks to the new methodologies, which have completed the more traditional typological criteria. These are essentially use-wear analysis and technological studies, mainly devoted to the understanding of the dynamics concerning flat-retouched tool production systems. This integrated approach allows us to decode the information emerging from the archaeological evidence from an alternative and more complete perspective, even if interpretation is often complicated by difficulties in establishing a chronocultural connection between burial facies and settlement facies.

Workshops

What is a workshop? According to M. Forenbaher, "A 'workshop' is not just a place where something is being manufactured. It is an area where a specialized labor force performs a limited set of activities, in order to produce

Fig. 10 – 1-5: foliate points from Grotta del Fontino (Bachechi, 2002, p. 179, fig. 47); 6-9: foliate points from Grotta di San Giuseppe (Grifoni Cremonesi, 2001, p. 162, fig. 37).
Fig. 10 – 1-5 : pointes foliacées de la Grotta del Fontino (Bachechi, 2002, p. 179, fig. 47) ; 6-9 : pointes foliacées de la Grotta di San Giuseppe (Grifoni Cremonesi, 2001, p. 162, fig. 37).

items for exchange, that is, for consumption outside the production unit…. The key to the identification of workshops is the demonstration that many more of an item were produced than could have been locally consumed" (Forenbaher, 1998, p. 58).

The discovery of Valle Lagorara and La Pietra and the results of the technological studies on the lithic assemblages from both these sites and the settlement of Conelle di Arcevia, in the Marches, (Albertini, 2003) contributed to scholars' refocusing on the long-standing problem of the Eneolithic workshops, by shedding new light on the function of such archaeological evidence and, in particular, of the several Central Italian sites defined in the past as late 'Campinian' sites (Rellini, 1904; Calzoni, 1928; Maviglia, 1949; Baldelli et al., 1987-88; Percossi and Silvestrini, 1986; Moroni Lanfredini, 1995; Percossi et al., 2006). These are mainly surface sites, which are located in areas naturally rich in flint, and which have produced huge amounts of discarded material including broken flat retouched tools and bifacial artefacts with scaled flat retouch. In publications semi-finished products from these sites are commonly defined as 'generic Campinian implements' (i.e. without a large cutting base) and placed in the categories of discoids, ovaloids and ellipsoids (fig. 11, nos. 1 to 3) depending on their different length/width ratio, according to the typology introduced by Palma di Cesnola and Calattini (Azzati et al., 1969; Calattini, 1981). Several workshops have been reported in Umbria, near Abeto di Norcia (personal communication by Maria Cristina De Angelis and information obtained from the Museo Archeologico Nazionale of Perugia) and in the Marches, where they are distributed along the courses of the Metauro, Misa and Potenza rivers and their tributaries, the beds of which abound in flint originating from the erosion of the Apennine formations. Leaving aside for the raw-material procurement strategies, which are different depending on the regions, these assemblages share common features with Valle Lagorara, La Pietra and Conelle:

– the presence of huge quantities of waste material and of numerous artefacts with rough-flat retouch at different thinning stages;

– variable quantities, depending on the sites, of finished flat-retouched items bearing knapping accidents (except for La Pietra);

– the low incidence of tools sensu Laplace (Laplace, 1964), generally of an opportunistic type;

– the presence of rare picks;

– the absence of the classic Campinian shapes with large cutting bases (i.e. veritable tranchets, axes and chisels).

Fig. 11 – 1-3: generic 'Campinian' tools recovered from the Gargano promontory (Cuda and Giunti, 1997, p. 66, fig. 2); 4-10: preforms and foliate points from the Ca'Balzano site (Baldelli et al., 1987-88, p. 277-278, fig. 3, 4).
Fig. 11 – 1-3 : outils « campigniens » retrouvés (Cuda et Giunti, 1997, p. 66, fig. 2) dans le Gargano ; 4-10 : préformes et pointes foliacées du site de Ca'Balzano (Baldelli* et al.*, 1987-88, p. 277-278, fig. 3, 4).

The chronology of such old collections is still imprecise. However, most of the production activity can very likely be dated to the Copper Age.

Within the Tyrrhenian area, the phenomenon of lithic workshops seemed to be less evident when compared with the Adriatic area, as, till today, this concerned only La Pietra. In the whole area of the Metalliferous Hills recent surface surveys have instead evidenced a much larger number of quarries/workshops the locations of which generally correspond to the radiolarite outcrops.

Whilst la Pietra and Valle Lagorara are essentially extraction sites, we may presume that the contexts of the Adriatic area, or at least some of them, display a different functional pattern.

In the Marches we know workshops that are located inside or very close to the village area, such as Conelle di Arcevia or the surface findspots of Ca' Balzano and Casa del Sardo. Here in addition arrowheads and javelin points, dagger blades and sickle blades are present (fig. 11, nos. 4 to 10). Hence, in these cases, the whole operative sequence was performed in situ.

Moreover sites such as Ca'Balzano and Casa del Sardo have yielded pottery which was assigned to the Middle/Late Bronze Age, thus possibly attesting that workshops devoted to the manufacturing of flat retouched implements lasted, in the Marches, until this period, as recorded in the Monti Lessini area in Veneto (Barfield and Cremaschi, 1991-1992).

Broadly speaking, our critical reflections obviously also involve the other Campinian assemblages found in Italy. Major extraction and production areas occur in Veneto, in the Monti Lessini region (Chelidonio 2007; Longo and Tagliente, 1997), in Apulia, on the Gargano promontory, and in Sicily, on the Monti Iblei.

The Monti Lessini evidence covers a very broad time span, lasting until the Late Bronze Age. For the Sicilian sites a chronology from the Middle Neolithic to the Early Bronze Age has been proposed (Nicoletti, 1996 and 1997). In the Gargano, the 'Campinian' technique appears simultaneously with the Early Neolithic occupation and does not exceed the threshold of the Bronze Age.

The findspots on the Gargano promontory were the subject of in-depth analyses by A. Palma di Cesnola and his collaborators in the 1980s (Azzati et al., 1969; Calattini and Cresti, 1980; Calattini, 1981 and 1987; Palma di Cesnola, 1981a and b, 1982 and 1987; Calattini and Cuda, 1988). These studies suggest a diachronic framework of the Campinian on the basis of its typological and structural features, thus identifying several phases as being correlated with the different cultural aspects which developed in the Gargano area during the period considered.

As for the Eneolithic and Early Bronze Age assemblages, two components can be detected at the level of the end products: the former typically Campinian, including implements with a large cutting base, i.e. tranchets, axes and chisels, the latter being composed of pieces with flat retouch. This means that at least two different reduction sequences were performed. Among the assemblages from the Gargano promontory the preforms (alias discoids, ovaloids and ellipsoids) played, therefore, a double role, since such artefacts could be variously used as blanks for both foliate pieces and chipped or polished axes (Irribaria, 1995; Campana and Maggi, 2002). Referring to published material, such observations can be extended to the assemblages of Sicily and Lessinia in which both a Campinian and a foliate component are detectable.

Therefore the obsolete concept of 'Campinian' needs to be placed in an appropriate perspective through a complete critical review focused on up-to-date technological analyses and interpretations. Inevitably this new range of information raises new questions on the homogeneity and synchronicity of lithic materials from the so-called 'Campinian' sites. Whatever the result of future analysis and fieldwork, a chronological development of the Campinian based on the percentage of artefact categories is no longer acceptable. Differences in the numerical content of each category, in fact, are due to contingent factors of the technical type, such as knapping accidents, rather than to chronocultural reasons.

Settlements

Leaving out surface remains and sporadic findings, the Eneolithic period in Central Italy is known from a number of settlements located in Tuscany, in the Marches, in Latium and in Abruzzo, although many of these regions remain blank areas with scarce new information (Martini and Morandi, 1986-87; Martini and Di Lernia, 1989-90; Cazzella and Moscoloni, 1994; Silvestrini and Pignocchi, 1998-2000; Sarti et al., 1999-2000; Bulgarelli et al., 1993 and 2000; Anzidei and Carboni, 2000; Manfredini, 2002; Radi, 1995 and 2003; Cazzella et al., 2003; Di Fraia, 2003; Brilli, 2005; Manfredini et al., 2005; Aranguren and Perazzi, 2006; Aranguren et al., 2009; Cocchi Genick, 2008).

Lithic assemblages from settlements exhibit regional variations (especially between the Adriatic and the Tyrrhenian areas) and some of their features evolve according to the different chronological phases (Baglioni et al., 2008).

Raw-material procurement is mainly local even in those sites in which good-quality lithotypes are missing. Small quantities of obsidian are generally attested.

Flat-retouched bifacial items invariably play a significant role and systematically include tanged arrowheads, javelin (?) points and, occasionally, a few dagger blades (rather typical of the Adriatic area). This abundance of weapons takes on greater importance if we consider that arrowheads are possibly underrepresented in the dwelling sites as they belong to a category devoted to off-site activities away from the settlements. Tanged points are varied in shape and size, often because of frequent repairing of impact fractures. These adjustments can radically change the delineation of the edge and the wing and/or the body/tang size ratio (Cavulli et al., 2006). Use-wear analyses (Conati Barbaro and Lemorini, 2000) evidenced that broken points could also be recycled for other purposes.

Arrowhead sizes change over time. Whilst very small specimens (maximum size about 2 cm) are totally absent

during most of the Copper Age, they become frequent at the end of this period, with the Bell Beaker, and particularly during the Early Bronze Age, suggesting changes in bow technology and, possibly, in hunting and war strategies (Moroni Lanfredini and Longo, 2011; Alberti et al., 2013).

Evidence for leaf-point manufacturing on site is provided by the presence of generic roughouts and sometimes of veritable preforms in several settlements. The large number of debitage products found at the sites, occasionally used as opportunistic tools, may presumably be connected to this activity. Some bifacial stone pieces, more or less well-refined, should also, in our opinion, be classified as uncompleted artefacts (Baena Preysler, 1998, p. 159).

Judging by these data and by the fact that such objects are generally made of local raw materials, a twofold trend can be detected, corresponding to two different distribution and consumption modalities: on the one hand a specialised and more standardised (?) production due to craft specialists operating in the workshops, mainly devoted to funerary contexts, and on the other hand a production organised at a local, probably household, level (settlements) involved in subsistence-related activities.

Funerary contexts

In Central Italy, Copper Age funerary practices are complex and they vary regionally. Attempts to identify a definite pattern in the different facies existing on the territory are currently hampered by two main obstacles: the lack of a detailed and up-dated absolute chronological framework and the general difficulty of correlating settlement and burial evidence. In addition, burial sites are normally 'open contexts' used during a long period for a large number of individuals, as displayed by the evident disarticulation and manipulation of the bones and of the artefacts associated with them.

According to a recent synthesis (Cocchi Genick, 2008) two main funerary aspects have been identified in Tuscany on the basis of the ritual processes: the burial features and the typology of the grave goods.

The 'Rinaldone facies' (Negroni Catacchio, 1993 and 2006), the 'nuclear' geographic distribution of which is limited to the extreme south of Tuscany (Fiora and Albegna valleys), seems to have lasted for a long time (throughout the Eneolithic, including the Bell Beaker period). The most paradigmatic characteristic of this facies is the use of artificial hypogeum-like cavities (the so-called 'tombe a forno' or 'tombe a grotticella artificiale') and of strict burial rituals including the deposition of specific vessels exclusively devoted to the world of the dead. Actually this category is comprised of tombs with a strong degree of diversity, as regards both their size and architectural features.

The second aspect is characterised by the systematic use of natural caves as collective burial sites. For this aspect a partition into four geographically differentiated 'groups' has been proposed (Cocchi Genick, 2008). Except for the 'San Giuseppe group', which is formed by a single site on the Elba Island, each of the other groups is represented by several sites. All the caves in the province of Grosseto, also known as 'Grossetano group' or 'Sassi Neri facies' (Negroni Catacchio, 1993), belong to the 'Fontino group', which witnesses a chronological development extending up until the Bell Beaker period. A series of caves in the Siena territory mainly devoted to cult practices were assigned to the 'Sarteano group' (or 'Siena group'). The burial caves of North-Western Tuscany have been grouped together under the label 'Vecchiano group'.

This second aspect reveals a less strict custom and more variability with regard to the funerary rites. Pottery associated with the dead is often composed of common vessels used in daily life. Both the Fontino and the Vecchiano group are characterised by the presence of a large number of ornaments such as beads, shells and lithic pendants.

With regard to the research field related to the funerary record, significant and innovative information can be derived from functional (use-wear traces) and anthropological studies, unfortunately still not very widespread.

Anthropological studies (Cencetti et al., 2005) carried out on skeletons from the necropolis of Fontenoce di Recanati in the Marches, have highlighted the presence of pathologies connected to repetitive stresses caused by the use of throwing weapons (bow and javelin). This confirms the actual link that exist between the social identity of the dead in their lifetime and the grave goods contents.

Use-wear analyses carried out on artefacts stemming from a number of Eneolithic burial contexts have shown that weapons included both used (Lemorini, 2004; Moroni Lanfredini and Longo, 2011) and new (Bistolfi and Muntoni, 2000; Anzidei et al., 2003; Moroni Lanfredini and Longo, 2011) items, independent of the funerary practice that was chosen.

The picture emerging from the interpretative models put forward so far is still strongly connected to the concept that burial evidence simply mirrors social behaviour.

In the new light offered by the size and the spread of the workshop activities, we argue that funerary practices on the whole (not only those connected to the lithic component) should also be analysed considering the physical role they played within the economic strategies connected to goods manufacturing, circulation, consumption and use/function, both at the household and the community level. Material goods were produced for the immaterial world: evidently the link between the domain of the living and the domain of the dead was of a tangibly practical nature as well.

CONCLUSIONS

The scenario that has increasingly been emerging from the discovery and the study of workshops such as Valle Lagorara and La Pietra could essentially change the social-economic framework related to the Eneolithic/Early Bronze Age communities from several standpoints.

As a matter of fact, it could be demonstrated that the phenomenon of the Copper/Early Bronze Age workshops is much more extended than expected and that it involves the whole Italian territory. In the light of these data such a pattern does appear to be much more conceptually meaningful and rich in implications. The attribution of a large number of lithic assemblages to a production system (and no longer to the Campinian sphere) that mainly aimed at the manufacturing of weapons—combined with the clear evidence provided by the grave goods—compellingly raises the problem of the role played by the development of the arrowheads as a proxy for increasing bellicosity during the Copper Age and the ensuing Early Bronze Age. Direct proof of armed conflicts within the Eneolithic communities is provided by a number of burial contexts in France and Spain, which yielded projectile points still embedded in the bones and male skeletons with evidence for traumata caused by interpersonal violence (Márquez et al., 2008). This evidence is also confirmed by the discovery of enclosures and defences in several European Late Neolithic and Eneolithic settlements, Italy included, (Brink, 2004; Nielsen, 2004; Cerqua, 2011; Valera, 2012), not forgetting the emblematic Italian example of the mummy of the Similaun Man.

At present we do not yet have enough data to calculate the bulk of the exported material, nor are we able to define the precise extent of the catchment area related to each workshop. Several hypotheses have been advanced for Valle Lagorara where authors estimated that "the inhabitants of Eastern Liguria absorbed the production of Valle Lagorara as well as of other quarries" (Maggi, 2002, p. 377). The same authors suggest the presence of "a cohesive social structure that supported the activities of individuals who were experts in mining activity" (Maggi, 2002, p. 377). In our case, the current archaeological record from burial sites in the surrounding area of La Pietra site is insufficient, as seen above, to establish an exhaustive and reliable framework.

Going beyond this, we assume that this massive production of flat retouched artefacts could have been regularly performed by specialised craftsmen who worked on commission, as also suggested by the high quality of the lithic component from grave goods.

Even though the issue of the workshops needs to be investigated in more detail, it is nonetheless evident that the emergence of several production centres since the Late Neolithic/Early Eneolithic, which mainly aimed at the production of weapons, is recorded in most of the Italian territory. Such a phenomenon, the significance of which is still to be widely estimated at the economic level, is certainly remarkable from a social perspective. The workshop evidence supports and amplifies data from burial contexts, by setting from a different angle, the problem of stone weapon distribution co-occurring with the introduction of metallurgy; to such an extent that the foliate arrowhead can be considered the very symbol of the Copper Age.

We conclude by stressing that research on the Copper/Bronze Age lithic workshops is just in its infancy and that the importance and articulation of the processes at stake largely exceed the skills of this study.

In order to exploit the information potential of this particular kind of archaeological record it would be worth planning new investigations as well as a multidisciplinary revision of the old assemblages. Our preliminary analysis emphasises the existence in central Italy of more than one production model and we are convinced that a research project carried out on this issue may remarkably enhance our understanding of the social and economic behaviour of the Copper/Bronze Age communities.

BIBLIOGRAPHICAL REFERENCES

Alberti F., Arrighi S., Borgia V., Gennusa R., Moroni A., Occhi S. (2013) – I rinvenimenti dell'Eneolitico finale/antica età del Bronzo (San Cassiano 3), in A. Moroni (ed.), *Caprese prima di Michelangelo*, Roma, Edizioni Kappa (Quaderni di Caprese Michelangelo, 13), p. 28–36.

Albertini D. (2003) – Tecnologia della lavorazione bifacciale, in A. Cazzella, M. Moscoloni and G. Recchia (eds.), *Conelle di Arcevia: I manufatti in pietra scheggiata e levigata, in materia dura di origine animale, in ceramica non vascolari; il concotto*, Soveria Mannelli, Rubettino (Conelle di Arcevia: un insediamento eneolitico nelle Marche, 2), p. 1–92.

Anzidei A. P., Carboni G. (2000) – L'Eneolitico del territorio di Roma: aspetti culturali e ambiti cronologici, in M. Silvestrini (ed.), *Recenti acquisizioni, problemi e prospettive della ricerca sull'Eneolitico dell'Italia Centrale*, proceedings of the congress (Arcevia, 14–15 May 1999), Ancona, Soprintendenza Archeologica per le Marche, p. 215–230.

Anzidei A. P., Carboni G., Catalano P., Celant A., Lemorini C., Musco S. (2003) – La necropoli eneolitica di Lunghezzina (Roma), in *Le comunità della preistoria italiana, studi e ricerche sul Neolitico e le età dei metalli*, proceedings of the XXXVth Riunione Scientifica dell'Istituto Italiano di Preistoria e Protostoria (Castello di Lipari, 2–7 June 2000), Firenze, Ministero per i Beni e le Attività Culturali, p. 379–391.

Aranguren B. (2001) – Il comprensorio delle Colline Metallifere in età pre-protostorica, in *Preistoria e Protostoria della Toscana*, proceedings of the XXXIVth Riunione Scientifica dell'Istituto Italiano di Preistoria e Protostoria (Firenze, 29 September–2 October 1999), Firenze, Edizioni ETS, p. 489–502.

Aranguren B. (2006) – Primi dati di cronologia assoluta dal livello funerario eneolitico di Grotta della Spinosa, Massa Marittima, in N. Negroni Catacchio (ed.), *Pastori e guerrieri nell'Etruria del IV e III millennio a.C: la civiltà di Rinaldone a 100 anni dalle prime scoperte*, proceedings of the 7th meeting 'Preistoria e Protostoria in Etruria' (Viterbo, 21 November 2003 and Valentano-Pitigliano, 17–18 September 2004), Milano, Centro Studi di Preistoria e Archeologia, p. 481–489.

Aranguren B. (2009) – Il territorio di Massa Marittima *in età protostorica, Etruria e Italia preromana, Studi in onore di Giovannangelo Camporeale, I*, Pisa and Roma, Fabrizio Serra, p. 27–34.

Aranguren B., Perazzi P. (2006) – L'abitato di San Lorenzo a Greve (Firenze): dati preliminari sulla fase di occupazione eneolitica, in N. Negroni Catacchio (ed.), *Pastori e guerrieri nell'Etruria del IV e III millennio a.C: la civiltà di Rinaldone a 100 anni dalle prime scoperte*, proceedings of the 7th meeting 'Preistoria e Protostoria in Etruria' (Viterbo, 21 November 2003 and Valentano– Pitigliano, 17–18 September 2004), Milano, Centro Studi di Preistoria e Archeologia, p. 215–226.

Aranguren B., Perazzi P., Mariotti Lippi M., Minniti C., Mori Secci M., Pallecchi P. (2009) – Firenze, San Lorenzo a Greve: l'insediamento eneolitico, *Notiziario della Soprintendenza per i Beni Archeologici della Toscana*, 4/2008, p. 98–121.

Aranguren B., Bagnoli P., Negri M. (2004a) – Il progetto "grotte di interesse archeologico nel territorio di Massa Marittima", in N. Negroni Catacchio (dir.), *Miti, simboli, decorazioni, ricerche e scavi*, proceedings of the 6th meeting (Pitigliano-Valentano, 13–15 September 2002), Milano, Centro Studi di Preistoria e Archeologia (Preistoria e Protostoria in Etruria, 6), p. 439–457.

Aranguren B., Guidi R., Iardella R. (2004b) – Prime campagne di scavo nella Grotta della Spinosa di Perolla (Massa Marittima – GR), in N. Negroni Catacchio (dir.), *Miti, simboli, decorazioni, ricerche e scavi*, proceedings of the 6th meeting (Pitigliano-Valentano, 13–15 September 2002), Milano, Centro Studi di Preistoria e Archeologia (Preistoria e Protostoria in Etruria, 6), p. 460–466.

Azzati P., Cresti G., Palma di Cesnola A. (1969) – Il Campignano del Torrente Macchia nel Gargano, *Rivista di Scienze Preistoriche*, 24, p. 145–161.

Bachechi L. (2002) – L'industria litica della Grotta del Fontino, in A. Vigliardi (ed.), *La Grotta del Fontino. Una cavità funeraria eneolitica del Grossetano*, Firenze, Edifir (Millenni, 4), p. 167–182.

Baena Preysler J. (1998) – *Tecnología Lítica Experimental. Introducción a la talla de utillaje prehistórico*, Oxford, Archaeopress (BAR, International Series 721), 236 p.

Baglioni L., Martini F., Volante N. (2008) – Identità, variabilità e interazioni nei complessi litici tra V e III millennio a.C.: evoluzione e tendenze in industrie della Toscana e delle Marche, *Bullettino di Paletnologia Italiana*, 97, p. 91–126.

Baldelli G., Nesci O., Castaldi E. (1987-88) – Prospezione e prospettive a Cà Balzano (Ghilardino di Fossombrone, Pesaro), *Rivista di Scienze Preistoriche*, 41, p. 269–301.

Barfield L., Cremaschi M. (1991-92) – I manufatti di pietra, in D. Cocchi Genick (ed.), *L'età del bronzo in Italia nei secoli dal XVI al XIV a.C.*, proceedings of the conference (Viareggio, 26–30 October 1989), Firenze, All'Insegna di Giglio (Rassegna di Archeologia, 10), p. 177–180.

Bistolfi F., Muntoni I. (2000) – L'Eneolitico nella media valle del Sacco: aspetti funerari e insediativi, in M. Silvestrini (ed.), *Recenti acquisizioni, problemi e prospettive della ricerca sull'Eneolitico dell'Italia Centrale*, proceedings of the congress (Arcevia, 14–15 May 1999), Ancona, Soprintendenza Archeologica per le Marche, p. 265–292.

Brilli P. (2005) – L'industria litica eneolitica dell'insediamento di Volpaia a Sesto Fiorentino, in F. Martini (ed.), *Askategi. Miscellanea in memoria di Georges Laplace*, Firenze, Istituto Italiano di Preistoria e Protostoria (*Rivista di Scienze Preistoriche*, supplement issue 1), p. 529–539.

Brink K. (2004) – The Palisade Enclosure at Hyllie, SW Scania, *Journal of Nordic Archaeological Science*, 14, p. 35–44.

Briois F., Negrino F. (2002) – Riproduzione e verifica sperimentale della catena operativa, in N. Campana and R. Maggi (ed.), *Archeologia in Valle Lagorara. Diecimila anni di storia intorno a una cava di diaspro*, Pisa, Edizioni ETS (Origines), p. 219–233.

Bulgarelli G. M., D'Erme L., Pellegrini E. (2000) – Le evidenze eneolitiche di Poggio Olivastro (Canino – VT), in M. Silvestrini (ed.), *Recenti acquisizioni, problemi e prospettive della ricerca sull'Eneolitico dell'Italia Centrale*, proceedings of the congress (Arcevia, 14–15 May 1999), Ancona, Soprintendenza Archeologica per le Marche, p. 191-201.

Bulgarelli G. M., D'Erme L., Pellegrini E., Petitti P., Tagliacozzo A. (1993) – L'insediamento preistorico di Poggio Olivastro (Canino – VT), *Bullettino di Paletnologia Italiana*, 84, p. 435–480.

Calattini M. (1981) – Metodologie di studio delle industrie bifacciali campignane del Gargano, in *Preistoria - Protostoria - Storia della Daunia*, proceedings of the second congress (San Severo, 28–30 November, 1980), San Severo, Civica Amministrazione, p. 47–53.

Calattini M. (1987) – Industria litica della stazione di Molino di Mare (Rodi Garganico), in B. Mundi and A. Gravina (eds.), *Preistoria - Protostoria - Storia della Daunia*, proceedings of the 5th congress (San Severo, 9–11 December, 1983), San Severo, Civica Amministrazione, p. 135–160.

Calattini M. (1990) – Rinvenimento di tombe a grotticella a Colle Val d'Elsa (Siena), *Rassegna di Archeologia*, 9, p. 239–247.

Calattini M., Cresti G. (1980) – Contributo alla conoscenza del Campignano garganico. Stazioni dell'interno del promontorio, *Atti della Società toscana di scienze naturali*, 87, p. 393–421.

Calattini M., Cuda M. T. (1988) – L'Eneolitico del Gargano: industria litica e sua evoluzione, *Rassegna di Archeologia*, 7, p. 563.

Calegari G., Veronesi G. (1989) – Riproduzione sperimentale di punte di freccia da Fimon (Vicenza), *Atti della Società italiana di scienze naturali e del museo civico di storia naturale di Milano*, 130, 9, p. 125–148.

Calzoni U. (1928) – L'industria di Abeto di Norcia, *Archivio per l'antropologia e l'etnologia*, 58, p. 97–99.

Campana N., Maggi R. (2002) – *Archeologia in Valle Lagorara. Diecimila anni di storia intorno a una cava di diaspro*, Pisa, Edizioni ETS (Origines), 400 p.

Campana N., Negrino F. (2002) – L'industria litica scheggiata: tipologia e tipometria, in N. Campana and R. Maggi (eds.), *Archeologia in Valle Lagorara. Diecimila anni di*

storia intorno a una cava di diaspro, Pisa, Edizioni ETS (Origines), p. 137–211.

Cavanna C. (2007) – La preistoria nelle grotte del Parco Naturale della Maremma, *Atti del Museo di Storia Naturale della Maremma*, 22, p. 271.

Cazzella A., Moscoloni M. (1994) – Il sito stratificato di Cava Giacometti (Arcevia - Ancona) nel quadro degli sviluppi culturali dell'Italia centro-settentrionale dal Neolitico finale all'età del Bronzo, *Quaderni del Museo Archeologico Etnologico di Modena*, 1, p. 89–119.

Cazzella A., Moscoloni M., Recchia G. (2003) – *Conelle di Arcevia: I manufatti in pietra scheggiata e levigata, in materia dura di origine animale, in ceramica non vascolari; il concotto*, Soveria Mannelli, Rubettino (Conelle di Arcevia: un insediamento eneolitico nelle Marche, 2), 568 p.

Cavulli F., Grimaldi S., Pedrotti A. (2006) – Riflessioni per una schedatura delle caratteristiche tecno-morfologiche delle cuspidi neolitiche. L'esempio archeologico da La Vela e Isera La Torretta, in P. Bellintani and F. Cavulli (eds.), *Catene operative dell'arco preistorico*, proceedings of the meeting Archeologia Sperimentale (Fiavè-S. Lorenzo in Banale 30-31 August–1 September 2002), Trento, Provincia Autonoma di Trento and Soprintendenza per i Beni Archeologici, p. 141–166.

Ceccanti M., Cocchi D. (1978) – La grotta dello Scoglietto (Grosseto). Studio dei materiali conservati al Museo Fiorentino di Preistoria, *Rivista di Scienze Preistoriche*, 33, 1, p. 187–214.

Cencetti S., Chilleri F., Pacciani E. (2005) – I reperti scheletrici umani dalla necropoli di Fontenoce di Recanati: indicatori fisiopatologici di stress funzionale, in *Preistoria e Protostoria delle Marche*, proceedings of the XXXVIIIth Riunione Scientifica dell'Istituto Italiano di Preistoria e Protostoria (Portonovo – Abbadia di Fiastra, 1-5 October 2003), Florence, Edizioni ETS, p. 469–479.

Cerqua M. (2011) – Selva dei Muli (Frosinone): un insediamento eneolitico della facies del Gaudo, *Origini*, 33, nuova serie V, p. 157–248.

Chelidonio G. (2007) – Concentrazioni e tracce di officine litiche tardo-preistoriche nei Monti Lessini (Verona), *Quaderni di Archeologia del Veneto*, 23, p. 67–75.

Cocchi Genick D. (2008) – *La tipologia in funzione della ricostruzione storica. Le forme vascolari dell'età del rame dell'Italia centrale*, Firenze, Istituto Italiano di Preistoria e Protostoria (Origines), 367 p.

Conati Barbaro C., Lemorini C. (2000) – Oltre la tipologia: proposta per una lettura tecnologica e funzionale delle industrie litiche della prima età dei metalli, in M. Silvestrini (ed.), *Recenti acquisizioni, problemi e prospettive della ricerca sull'Eneolitico dell'Italia Centrale*, proceedings of the congress (Arcevia, 14–15 May 1999), Ancona, Soprintendenza Archeologica per le Marche, p. 309–317.

Cuda M. C., Giunti P. (1997) – La stazione eneolitica di Colicchio (Vieste), in A. Gravina (ed.), *Preistoria - Protostoria - Storia della Daunia*, proceedings of the 15th congress (San Severo, 24–26 November, 1994), San Severo, Civica Amministrazione, p. 57–68.

Di Fraia T. (2003) – Il sito eneolitico di Roccascalegna (CH), in S. Cosentino (ed.), *Preistoria e Protostoria dell'Abruzzo*, proceedings of the XXXVIth Riunione Scientifica dell'Istituto Italiano di Preistoria e Protostoria (Chieti-Celano, 27–30 September 2001), Firenze, Edifir, p. 267–278.

Dolfini A., Aranguren B., Silvestrini M. (2011) – La prima metallurgia in Italia centrale alla luce di nuove date radiometriche, in D. Cocchi Genick and A. Curci (eds.), *L'età del rame in Italia*, proceedings of the XLIIIrd Riunione Scientifica dell'Istituto Italiano di Preistoria e Protostoria (Bologna, 26–29 November 2008) Firenze, Edifir, p. 171–179.

Forenbaher S. (1998) – Production and Exchange during the Portuguese Chalcolithic: the Case of Bifacial Flaked Stone Industries, *Trabajos de prehistoria*, 55, 2, p. 55–71.

Gambassini P., Marroni G. (1998) – Scoperta di una cava preistorica di diaspro in val di Farma, *Rassegna di Archeologia*, 15, p. 51–54.

Ghiretti A. (2003) – *Preistoria in Appennino. Le valli parmensi di Taro e Ceno*, Parma, Grafiche STEP, 248 p.

Grifoni Cremonesi R. (2001) – *La grotta sepolcrale eneolitica di San Giuseppe all'Isola d'Elba*, Firenze, Edizioni ETS (Origines), 273 p.

Grifoni Cremonesi R. (1982–1983) – La Grotta Prato di Massa Marittima (Grosseto), *Rassegna di Archeologia*, 3, p. 91–124.

Irribaria R. (1995) – Premiers repérages d'une minière d'extraction d'opalite-silexite (silex tertiaire) en Loir-et-Cher, communes de Suèvres et de Mer, in J. Pelegrin and A. Richard (eds.), *Les mines de silex au Néolithique en Europe, avancées récentes*, proceedings of the international round table (Vesoul, 18–19 October 1991), Paris, CTHS (Documents préhistoriques, 7), p. 83–88.

Laplace G. (1964) – Essai de typologie systématique, *Annali dell'università di Ferrara*, 15, 2, p. 1–79.

Lemorini C. (2004) – Studio funzionale delle cuspidi di freccia delle tombe 1-5 del sito di Rinaldone (Viterbo), *Bullettino di Paletnologia Italiana*, 95, p. 265–271.

Longo L., Tagliente F. (1997) – Manufatti campignani da Contrada Antolini, Montecchio. Considerazioni sul Campignano, *La Lessinia – Ieri, oggi, domani*, 20, p. 93–99.

Maggi R. (2002) – The Holocene History of Valle Lagorara, in N. Campana and R. Maggi (eds.), *Archeologia in Valle Lagorara. Diecimila anni di storia intorno a una cava di diaspro*, Pisa, ETS (Origines), p. 374–378.

Manfredini A. (2002) – *Le dune, il lago, il mare. Una comunità di villaggio dell'età del rame a Maccarese*, Firenze, Edizioni ETS (Origines), 292 p.

Manfredini A., Carboni G., Conati Barbaro C., Silvestrini M., Fiorentino G., Corridi C. (2005) – La frequentazione eneolitica di Maddalena di Muccia (Macerata), in *Preistoria e Protostoria delle Marche*, proceedings of the XXXVIIIth Riunione Scientifica dell'Istituto Italiano di Preistoria e Protostoria (Portonovo – Abbadia di Fiastra, 1–5 October 2003), Firenze, Edizioni ETS, p. 433–444.

Márquez B., Gibaja J.F., Gonzáles J. E., Ibáñez J. J., Palomo A. (2008) – Projectile Points as Signs of Viol-

ence in Collective Burials during the 4th and the 3rd Millennia cal. BC in the North-East of the Iberian Peninsula, in L. Longo and N. Skakun (eds.), *Prehistoric Technology 40 Years Later: Functional Studies and the Russian Legacy,* proceedings of the international congress (Verona, 20–23 April 2005), Oxford, Archaeopress (BAR, International Series 1783), p. 321–326.

Martini F., Di Lernia S. (1989-90) – Il Campaniforme di Querciola. I: l'industria scheggiata in selce, diaspro e ossidiana, *Rivista di Scienze Preistoriche*, 42, p. 101–154.

Martini F., Morandi R. (1986-87) – L'Eneolitico di Sesto Fiorentino - Via Leopardi (Firenze), *Rassegna di Archeologia*, 6, p. 217–249.

Maviglia C. (1949) – Nuove stazioni campignane lungo il torrente Nevola e la probabile cronologia del Campignano in Italia, *Rivista di Scienze Preistoriche*, 4, p. 55–70.

Moroni Lanfredini A. (1995) – Casa del Sardo (Arcevia), in M. C. De Angelis (ed.), *Corciano. Materiali preistorici e paleontologici*, Perugia, Quattroemme, p. 170–176.

Moroni Lanfredini A. Longo L. (2011) – Caratteri tecno-tipologici e aspetti funzionali delle industrie scheggiate dell'Eneolitico precampaniforme in Italia centrale: riflessioni e problemi, in D. Cocchi Genick and A. Curci (eds.), *L'età del rame in Italia*, proceedings of the XLIIIth Riunione Scientifica dell'Istituto Italiano di Preistoria e Protostoria (Bologna, 26–29 November 2008), Firenze, Edifir, p. 195–202.

Negroni Catacchio N. (1993) – La *facies* di Rinaldone nel quadro dell'Eneolitico dell'Etruria, in N. Negroni Catacchio (ed), *La cultura di Rinaldone. Ricerche e scavi,* proceedings of the 1st meeting 'Preistoria e Protostoria in Etruria' (Saturnia-Farnese, 17–19 May 1991), Milan, Centro Studi di Preistoria e Archeologia, p. 20–30.

Negroni Catacchio N. (2006) – La cultura di Rinaldone, in N. Negroni Catacchio (ed.), *Pastori e guerrieri nell'Etruria del IV e III millennio a.C: la civiltà di Rinaldone a 100 anni dalle prime scoperte,* proceedings of the 7th meeting 'Preistoria e Protostoria in Etruria' (Viterbo, 21 November 2003 and Valentano – Pitigliano, 17–18 September 2004), Milano, Centro Studi di Preistoria e Archeologia, p. 31–45.

Nicoletti F. (1996) – Le industrie litiche oloceniche: forme materie prime e aspetti economici, in R. Leighton (ed.), *Early Societies in Sicily, New Developments in Archaeological Research*, London, Accordia Research Centre (Accordia Specialist Studies on Italy, 5), p. 57–211.

Nicoletti F. (1997) – Il campignano della Sicilia, in S. Tusa (ed.), *Prima Sicilia. Alle origini della società siciliana,* Palermo, Ediprint, p. 395–674.

Nielsen P.O. (2004) – Causewayed Camps, Palisade Enclosures and Central Settlements of the Middle Neolithic in Denmark, *Journal of Nordic Archaeological Science*, 14, p. 19–33.

Pacciani E. (1995) – Una sepoltura eneolitica in Toscana: la giacitura dello scheletro in relazione al rituale funerario, in N. Negroni Catacchio (ed.), *Tipologia delle necropoli e rituali di deposizione. Ricerche e scavi,* proceedings of the second meeting 'Preistoria e Protostoria in Etruria' (Farnese 21–23 May 1993), Milano, Centro Studi di Preistoria e Archeologia, p. 75–80.

Palma di Cesnola A. (1981a) – Gli studi in corso sul Neo-eneolitico del Gargano. Le ricerche, in *Preistoria - Protostoria - Storia della Daunia*, proceedings of the second congress (San Severo, 28–30 November 1980), San Severo, Civica Amministrazione, p. 19–25.

Palma di Cesnola A. (1981b) – Gli studi in corso sul Neo-eneolitico del Gargano. Osservazioni conclusive, in *Preistoria - Protostoria - Storia della Daunia*, proceedings of the second congress (San Severo, 28–30 November, 1980), San Severo, Civica Amministrazione, p. 55–57.

Palma di Cesnola A. (1982) – Nuovi contributi alla conoscenza del Neo-Eneolitico del Gargano. A: ricerche e studi effettuati durante il 1981, in *Preistoria - Protostoria - Storia della Daunia*, proceedings of the 3rd congress (San Severo, 27–29 November 1983), San Severo, Civica Amministrazione, p. 21–38.

Palma di Cesnola A. (1987) – Studio sistematico del primo eneolitico del Gargano. 1. Dati e considerazioni sulla facies di Macchia a Mare, in B. Mundi and A. Gravina (eds.), *Preistoria - Protostoria - Storia della Daunia*, proceedings of the 5th congress (San Severo, 9–11 December, 1983), San Severo, Civica Amministrazione, p. 85–114.

Parea G. C. (1970) – Ricerche sulla genesi delle rocce silicee non detritiche, *Memorie della Società geologica italiana*, 9, 4, p. 665–707.

Percossi E., Silvestrini M. (1986) – Situazioni abitative, presenze e frequentazione dalla preistoria all'età romana nel territorio di Cingoli,in *Cingoli dalle origini al sec. XVI*, proceedings of the XIXth Convegno di Studi Storici Maceratesi (Cingoli, 15–16 ottobre 1983), Macerata, p. 15–53.

Percossi E., Pignocchi G., Vermeulen F. (2006) – *I siti archeologici della vallata del Potenza: conoscenza e tutela*, Ancona, Il lavoro editoriale, 230 p.

Quagliolo M. (1993) – Osservazioni sulla distribuzione spaziale dei rinvenimenti attribuibili alla "Cultura di Rinaldone", in N. Negroni Catacchio (ed.), *La cultura di Rinaldone. Ricerche e scavi*, proceedings of the 1st meeting 'Preistoria e Protostoria in Etruria' (Saturnia-Farnese, 17–19 May 1991), Milano, Centro Studi di Preistoria e Archeologia, p. 63–67.

Radi G. (1995) – Le Coste: stazioni dell'Eneolitico e della media età del Bronzo nel Fucino (Pescina, L'Aquila), *Origini*, 19, p. 415–445.

Radi G. (2003) – Il sito di Le Coste (Ortucchio, AQ): il livello eneolitico, in S. Cosentino (ed.), *Preistoria e Protostoria dell'Abruzzo*, proceedings of the XXXVIth Riunione Scientifica dell'Istituto Italiano di Preistoria e Protostoria (Chieti-Celano, 27–30 September 2001), Firenze, Edifir, p. 239–252.

Rellini U. (1904) – Scoperta di due officine neolitiche nell'Alta Marca, *Bullettino di Paletnologia Italiana*, 30, p. 85–90.

Sarti L., Carlini C., Martini F. (1999-2000) – L'Eneolitico di Volpaia a Sesto Fiorentino: primi dati sulle produzioni fittili e litiche, *Rivista di Scienze Preistoriche*, 50, p. 189–227.

Silvestrini M., Pignocchi G. (1998-2000) – Gli insediamenti preistorici di Fontenoce di Recanati (Macerata): aspetti del Neolitico ed Eneolitico marchigiano, *Origini*, 22, p. 135–184.

Valera A. C. (2012) – Mind the Gap: Neolithic and Chalcolithic Enclosures of South Portugal, in A. Gibson (ed.), *Enclosing the Neolithic. Recent studies in Britain and Europe*, Oxford, Archaeopress, (BAR, International Series 2440), p. 165–183.

Vigliardi A. (2002) – *La Grotta del Fontino. Una cavità funeraria eneolitica del Grossetano*, Firenze, Edifir (Millenni, 4), 294 p.

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