The Early Neolithic mine of Defensola “A” (I 18): flint exploitation in the Gargano area

S. Di Lernia, G. Fiorentino, A. Galiberti and R. Basili

The authors present the results of research carried out on the Neolithic mine of Defensola. The main features of the structure, together with excavation techniques and finds collected, are described. The intensive flint exploitation at Defensola allows a connection to an “industrial-type” activity, along with a probable “surplus” production.

The high level of complexity and extension of the mine are part of a composite regional frame, in which flint exploitation lasted over three millennia, from the VI to the III BC.

In this direction, both the Defensola mine and the Gargano area played an important role in flint-trading activity in south-eastern Italy.

KEY-WORDS: Gargano, chambers and pillars mining structures, Early Neolithic, mining phenomenon.

The study of flint exploitation in the Gargano area was for many years limited to the study of the abundant worked flint flakes discovered on the surface in so-called “workshop sites”. Some of these sites were related to hypothetical mines by the presence of mining tools, particularly flint picks. The first discoveries of underground structures began in the thirties, when Rellini, who had already reported a site linked to mining activity (Valle Don Matteo — Rellini 1932), excavated the Eneolithic mine of Tagliacantoni (Rellini 1934). In the fifties discoveries of other sites linked to mining activity followed, such as Monte Pucci (Zorzi 1949–50), Scarcafarina (Palma di Cesnola 1957a) and Valle Sbernia (Palma di Cesnola 1957b).

In 1971 another underground structure was identified near Mattinata (Palma di Cesnola and Mezzena 1971), but it was only in 1981, with the discovery of Defensola (Galiberti 1984a, 1984b), that a thorough series of investigations was undertaken, starting in 1986 with a project aimed specifically at flint extraction activity in the Gargano promontory: the “Gargano Prehistoric Flint Mines Project” (Di Lernia,

---

* Dipartimento di Scienze Storiche, Archeologiche e Antropologiche dell’Antichità, Università di Roma “La Sapienza”, Italy
b,c,d Dipartimento di Archeologia e Storia delle Arti, Università di Siena, Italy
Fig. 1. I 18 Defensola “A”. Mining debris fans on the south-western slope of the Intreseglio hill.

Fiorentino and Galiberti 1990–91; on this topic see also: Galiberti 1987, 1988; Galiberti and Guarascio 1990; Di Lernia and Galiberti 1993; Galiberti et al. 1993, in press; Di Lernia, Fiorentino and Galiberti in press; Di Lernia et al. in press).

THE DEFENSOLA MINE

The Defensola mine is located near Vieste, on the south-western slope of the Intreseglio hill, about 40 m a.s.l. It was discovered by accident in 1981 in a Middle Eocene limestone formation with flint nodules, slightly tilted to the north. The structure is composed of two overlapping levels and is excavated into two distinct calcareous layers, nearly 40 cm thick. The upper level has been the subject of systematic searches since 1986 and, as far as is known, has an extension of over 6000 m², with very irregular morphology appearing to develop from east to west. It is an underground structure developed almost horizontally, composed of chambers and rock pillars. The chambers are at present filled, sometimes to the ceiling, with calcareous and siliceous mining debris of varying dimensions. Within this debris numerous galleries have been left or excavated, often delimited by dry stone walls. The structure of these walls varies considerably both with regard to the dimensions of their constituent elements and to their height, ranging from simple alignments of
Fig. 2.18. Defensola "A". Exterior cross-section with mining debris and excavated chambers.
Fig. 3. 18 Defensola “A”. Plan view of the mine (upper level).
Fig. 4. I 18 Defensola "A". Gallery with rock pillars and fallen limestone slabs from ceiling on the floor.

Fig. 5. I 18 Defensola "A". Extraction step with flint nodules in the rock face.
stones to more sophisticated structures whose height can reach the ceiling. In one case a dry-stone wall is covered with calcareous plaster on which the hand prints of the people who built it are still visible. The main function of these dry-stone walls was to contain the finer debris, and make the use of galleries easier. These galleries now allow us to explore the structure and to identify the changes in use to which the interior spaces were put during the various phases of exploitation.

At the current stage of research it is possible, on the basis of the relationship between these galleries (i.e., galleries intersected by subsequent ones), to distinguish at least two different working areas, which were probably differentiated chronologically. The gallery B-D, which crosses the structure from east to west, seems to separate these two areas and intersects a series of shorter galleries running from north to south.

The area to the north of this gallery is probably associated with the earliest phase of exploitation and has few extraction faces and scarce flint nodules in the rock wall. Few large galleries communicate directly with the exterior. In general ceramic fragments (those found have archaic character), lithic mine tools and lamps are scarce, and the stone walls have sometimes been built using different techniques (such as the use of calcareous plaster).

The area to the south of gallery B-D (which probably also includes parts of the previous extraction phase) has a larger number of extraction faces and is richer in flint.
nODULES; SEVERAL LARGE GALLERIES GIVE SWIFT AND EASY ACCESS TO THE OUTSIDE. IN THIS SECOND AREA WHOLE CERAMIC VESSELS HAVE BEEN FOUND ON THE SURFACE, SOMETIMES IN THEIR FUNCTIONAL POSITION (CERAMIC WITH MORE ELABORATE TECHNICAL AND TYPOLOGICAL CHARACTERS); LAMPS AND NUMEROUS PICKS AND HAMMERS HAVE ALSO BEEN FOUND.

Fig. 7. 18 Defensola “A”. Vessel 133 in its original position.

In both areas the same exploitation methods and the same extraction techniques were used. The calcareous layer was excavated in different directions in the search for flint nodules. The advance of the exploitation face was probably determined by the quantity of raw material visible in section, and so the direction of the face changed continually.

During the mining work of calcareous layers, rock pillars to support the ceiling of the large cavities were left. The debris stacked inside appears in some cases to have served the same function. Flint was generally extracted from the stratum by removing the limestone above the nodules. A characteristic excavation step was produced from which the nodule, or part of it, was subsequently removed, probably with the help of wooden or flint wedges. Less often used, and limited to areas with extraordinary concentration of nodules, was the “fall” technique, in which limestone was excavated from beneath the nodule, which consequently fell through gravity.

The tools used in the various phases of mining work and extraction are mainly represented by picks, hammers and striking tools, which clearly had different
functions. Picks are generally spindle-like with pointed ends and on average are 15–25 cm long. They are made of rough flint with wide and scaly knapping, sometimes overlaid by a characteristic “pecking” over their entire surface, to reduce the resistance on striking the rock (and consequently the risk of fracturing the piece). They frequently exhibit two hollows opposite each other in their middle section, sometimes a real “narrowing”, which was almost certainly intended for attaching handles.

The hammers, subcylindrical in shape and with convex ends, were knapped from rough flint and, more rarely, pecked; the narrowing in the middle is not very frequent. The striking tools are generally spheroidal in shape and vary in weight and dimensions; the smaller ones could have been used for retouching other tools (picks and hammers), whereas the larger ones were used to break the limestone. The presence of stone wedges, probably used both for excavation work and detachment of nodules, has also been noted.

The lighting of the deepest parts was probably provided by portable lithic lamps, of which nine specimens have been found. These lamps are made from soft limestone with variously shaped external surfaces and have a central hollow of variable shape and depth. To date no evidence concerning fuel is available, although some kind of animal fat or vegetable oil was probably used.

Artefacts not directly connected with excavation activity were found; for example bone punches, small obsidian blades and *tranchet*-type tools, probably linked to subsidiary activities (repair of containers for flint transport and of clothes, wood manufacture, *etc.*).

The presence of a *débitage* area (still to be studied) on the inside near an entrance, shows the raw material underwent a first stage of manufacture while still in the mine.

Another type of artefact, which is chronologically and culturally valuable, is represented by ceramic finds, both whole or fragmentary (Di Lernia 1993, in press; Di Lernia, Franchi and Pallecchi 1993). Two different ceramic classes have been identified, on the basis of the fabric, the colour and morphology. The first class, of which there are fewer examples, is mainly comprised of rough fabrics, with calcareous vegetable tempers, considerable thickness (9–15 mm), variable orange colour, porous and uneven surfaces. The samples are mainly of “open shapes” and are of large dimensions. There is one hemiellipsoidal vessel with foot and impressed linear decorations, all over the external surface. On another vessel the nail impression decoration is limited to a part of the surface. A second class, on the other hand, consist of finer fabrics, of lesser thickness, darkish brown colour and smooth surfaces. This second class includes a greater variety of shapes, either open or slightly closed, with convex bottom or distinct foot: hemispherical vessels with convex bottom, hemiellipsoidal vessels with distinct foot, and some
Fig. 8. 1–3 Defensola "A". Flint mining implements: 1–3 — picks; 4 — wedge; 5 — hammer stone.
Fig. 9. 1 18 Defensola “A”. Limestone lamps: no. 114 is a peculiar object with two opposing and cone-shaped communicating hollows.
Fig. 10. I 18 Defensola "A". Ceramic vessels: the first (no. 3) and the second typological classes (no. 7).
carinated bowls with convex bottom. The larger part of these samples are totally or partially restorable vessels, sometimes found in the original position, with residues of their contents.

The two ceramic classes have a different spatial distribution: the finer one is present exclusively at the south end of the gallery B-D, in the area considered to be the more recent; the primary position and the integrity of the vessels found here support this conjecture and suggest that the structure was abandoned very quickly. The presence of ceramic vessels in the mine must be explained mainly in relation to the use of foods during the working hours, probably in rest areas, far from the extraction faces.

A large quantity of charcoal fragments of small size (3–5 mm), mainly inside fine debris, is present; they are probably partially linked to the introduction of vessels from the outside. Anthracological analysis revealed the presence of at least fourteen taxa, principally belonging to woody species of a mixed oak-grove and of a river environment, such as: Quercus sp. (of the deciduous type), Fraxinus cf. ornus L., Ostrya carpinifolia Scop., Populus/Saix, Ficus carica L., etc. (Fiorentino in press a; press b). The first information about the spatial distribution of the taxa groups appears to confirm a distinction between the northern area and the southern one of the B-D gallery.

Attention must be drawn to some engravings of a geometric type on the ceiling, the interpretation of which is rather problematic, also considering that they are probably linked to extraction activity (exploitation project, excavation face direction, etc.). An engraving of this type has also been found on a calcareous block, in the exterior fan of mining debris.

A series of $^{14}$C dating on the vegetable fragments has made it possible to date a part of the mine between the end of VI and the beginning of V millennium BC:

1) Utc-1342 6990 ± 80 BP (southern area)
2) Utc-1411 6630 ± 40 BP (southern area)
3) Beta-71143 6820 ± 80 BP (northern area)
4) Beta-71144 6670 ± 70 BP (northern area)

Until now, $^{14}$C dating does not support the above mentioned idea of a chronological difference between the two areas of the mine. This picture may alter when we have more radiocarbon dates; it is possible that the difference in dates of the two phases of activity was shorter than the standard error of our dates. Nevertheless, it is clear that the structure was used for more than three hundred years, even though its use dynamics is far from having been thoroughly understood. However, these dates allow a first chronological estimation of the beginning of mining activity in the Gargano region; recent discoveries of several mine structures expand the research prospects.
THE MINING PHENOMENON IN THE GARGANO AREA

The above presented Defensola mine is part of the complex network of Gargano mines. At least 23 more mines have also been discovered in this region (see Basili et al. 1995, this volume, for description of the mines and their grouping) and are generally of the shaft, gallery and chamber types. From this composite territorial network, different raw material exploitation features and probable work organisation strategies arise at different levels of complexity.

At a first level of observations, some relations between the type of structure and the mechanical features of rocks can be suggested: slumped layers seem to be associated to shaft systems, whereas the compact and regular ones to gallery and more frequently to chambers and pillars systems. In fact, different systems of exploitation sometimes coexist within the same formation and even at a very short distance. Relationships between exploitation techniques and features of rocks exploited are discussed in detail in Di Lernia et al., in press.

The age of the entire network of mines spans from the Early Neolithic (Defensola) to the Eneolithic (Tagliacantoni — Rellini 1934; Calattini and Cuda 1988; Valle Guariglia — Tunzi-Sisto 1991), i.e., at least from the VI to the III millennium BC.

The intensive character of flint exploitation during the Early Neolithic, as well as the complexity and extent of Defensola, suggest an “industrial type” organisation of mining activity, maybe with a “surplus” production. Both storage and trading at middle-long distance of raw materials can not be excluded. Thus, in the Early Neolithic flint trading might have spread mainly toward the south-east (Tavoliere and Apulo-Materana regions). At many of the other mine sites, flint exploitation was not so intensive and suggests, by comparison, an activity mainly devoted to supply local needs. However, macroscopic features of flint and the estimated length of mining activity (at least three millennia) do not allow, at the present stage of research, further deductions about trading.

REFERENCES


