Introduction

Stone is an element that can be found everywhere, from ancient domestic and funerary architecture to modern buildings, and not only in construction: stone is fundamental for the construction of large urban works (roads, motorways, railways, coastal protection elements, dams, etc.). This centuries-old, extensive use has required extraction procedures from carefully selected deposits that, initially using manual and then mechanical methods, have generated large cavities characterised by vertical walls and marks left by the tools used. These places have always fascinated, so much so that they have become, in some cases, an element of community identity.

In Thucydides' narrative (VII, 86), the Greek historian uses the word *λιθοτομίαις* to refer to the stone quarries that were used as a detention place for Athenian prisoners in Syracuse. The word was adapted into Latin and, only later, would be accompanied by the term *lapicidinæ*. In archaeology, a latomia refers to a place of stone quarrying conducted by manual percussion tools that act directly on the rock surface causing the detachment of specific portions or predefined blocks. Therefore, we are not talking about a building, nor can we consider this evidence to be - one might say - positive: if anything, it is negative in so far as what counts above all is what has been taken away. The archaeological analysis of a quarry is therefore based on an interpretative focus on the extraction process, which may have continued for a long time, even to the point of being contaminated by late or modern exploitation. What is examined is, in other words, what is no more, as well as what is left: the information, however, that can be obtained from elements is not insignificant.

The subject of this book is the coastal quarries located in the south-eastern coastal strip of Sicily between the Cassibile River and Portopalo di Capo Passero, described and compared with similar monuments in other parts of the Mediterranean. Research on ancient quarries, as is well known, requires an overview of the processes of material exploitation: extraction, transport and use in the monuments for which the material is intended. Approaching the subject from this perspective, the case study presented here reveals its peculiarities. In fact, the opening of a quarry on a coastline has historical, topographical and management implications specifically determined by its location: except in special cases, an understanding of the phenomenon must include the intention to transport the extracted material by nautical means. Even this information, however, is not sufficient. The use of land in ancient times was aimed at all the economic opportunities it could offer: sustenance, commercial production and infrastructure. Not only, therefore, stone and building processes but rather the geomorphology of the coastal territories also, with their swamp areas and river mouths connecting them with the sea, offered a wide range of economic opportunities, often concomitant. This coastal strip also shows a productive capacity in ancient times. Despite all the difficulties of quantification, it is evident that coastal and maritime production contributed to the prosperity of the main Greek and then Roman settlements.

The coast, however, is not easily defined on a theoretical level: it has always been affected by human action and by natural processes, modifying its geomorphological, physical and biological characteristics. From an archaeological point of view, the conception of the coastal territory remains unchanged; it is characterised by forms of settlement, housebuilding and infrastructure based on specific techniques with distinctive building and production processes that have impacted the environment, although in less aggressive ways. It is for this reason that the productive opportunities of the coastal environment have favoured the formation of societies and cultures specialised in their generation.[25] Nowadays, coastal territories are those most occupied by urban settlements and economic and productive activities that modify the landscape and contribute to the destruction of the context ("contesto").[26] The specific case of south-eastern Sicily, in fact, encapsulates Broodbank's reflections on the Mediterranean basin in relation to the development that is compromising elements of cultural heritage, namely urban, agricultural, industrial and tourist activities that for years have been contributing to damaging the area to the detriment of the archaeological evidence. These factors are having a considerable impact on the coastline and its immediate surroundings, which are being safeguarded through protection measures implemented thanks to legislation enacted in recent decades.[27]

The Syracusan coastline presents the researcher with various limitations and problems. Nonetheless, it shows considerable archaeological potential, well known for its settlements and their port infrastructure. There are four Greek cities along the coastline, as well as several ancient sites whose exact location is still unknown. A number of specifically coastal productive activities took place in the non-urbanised areas, largely comprising rocky coastline but also spotted with shores, river mouths and lagoons: salt cultivation, tuna fishing, purple dye production and, indeed, quarrying of building stone. These ancient methods of exploitation made otherwise unproductive spaces profitable, and, to an undeterminable but certainly

[25] Felici 2020a, pp. 11-32.
[26] Refer to the definition in Cambi 2009, p. 349: "contesto" as a «determined geographical space, produced by a long series of historical experiences» (author's translation).
[27] Broodbank 2013, in particular p. 46, estimates that almost one fifth of Mediterranean coastal territory has been affected by anthropisation.

significant extent, they contributed to the economy of the coast, as references in the sources confirms. This is especially reflected by the activity of the tuna fisheries and the saltworks, which has continued almost to the present day. A distinctive feature of this economic system was the interconnection between its different elements. Saltworks and tuna fisheries were interdependent, just as the production of purple dye required salt. Tuna fisheries, as ethnography demonstrates, required stone blocks for the laying of fixed nets on the seabed (the *rusasi* or *mazzere* of modern tuna fisheries). Stone, therefore, represented the common denominator of these activities as an auxiliary element for the identification and interpretation of peculiar economic–productive processes. This inseparable network of 'industrial' relationships necessitates a holistic perspective that is not limited to individual dynamics. A complete view of the coastal production process of a given area requires its examination using the methodology of ancient topography (in this kind of context, coastal and underwater topography).[28]

By combining a multidisciplinary examination of topographical, metrological and, wherever possible, geological aspects, an attempt is made to derive historical information, which is precisely what ancient topography does.[29] However, problems remain, precisely because this peculiar type of context is numerous and severely limiting. Archaeological survey is hardly practicable on the latomie, except in selected cases of high scientific content and limited surface area, as this would require considerable human and economic resources. Nevertheless, the extensive surfaces of the latomie have been subject, precisely on the eastern coast of Sicily, to experiments with photomosaic photographic surveys and more recently with the widespread use of photogrammetry surveys with unmanned aerial vehicles (UAV, drones), especially for the stretch of coastline between the Cassibile River and Capo Passero. These operate fully autonomously, saving significant amounts of time without compromising further analysis, while direct survey can be conducted in a targeted manner on the most important sections. Based on these assumptions, recent new investigations have been conducted on the latomie of the Syracusan coastline through prospection, both indirectly by aerial photography and directly by surveys, including aero-photogrammetric documentation as well as detailed archaeological surveys and technical analysis. In addition, of course, the interpretation of literary and historical sources, including travellers' descriptions and maps produced from the Renaissance onwards, has also provided a basis for investigation.

The exploitation of latomie in the coastal strip under examination has not only yielded sites of archaeological interest but also circumstances that have had a strong and long-lasting impact on the area. The systematic activity of stone quarrying has created enormous cavities that have often altered the morphology and indelibly affected the original appearance of the landscape.[30] Favignana's numerous tuff quarries, for example, are open-cast and underground mining sites and have provided the island with stone material for various uses. Today, they represent an example of landscape transformation of an area of significant importance for the local culture and identity, of which several reuses by the local population are documented: they are reconverted into vegetable gardens and orchards, rehabilitated for tourist and cultural uses and even functional spaces.[31]

Approaching this phenomenon in the present day, it is necessary to consider that the extraction of minerals from quarries today represents a primary activity with a high environmental impact but also the foundation of all other productive activities. It represents an important sector of the Italian economy with related activities that have had (and continue to have) strong repercussions on the environment. An indicator of this is the recent proposal by the Regione Siciliana (Assessorato Regionale dell'Energia e dei Servizi di Pubblica Utilità - Dipartimento dell'Energia) to propose a plan for the recovery of quarry beds through various interventions: agricultural recovery aimed at the creation of an ecosystem whose balance is guaranteed by cultivation activities, projects for solar farms located within the quarry areas or quarry lots or sectors that cannot be further exploited.[32] Modern developments aside, the stone supply in ancient times is a subject that requires an overview of transformations in the area and research into the evidence attesting to them. The continuation of quarrying activities in fairly recent times with mechanical equipment confirms how calcarenite - an apparently scarce stone but one with good mechanical properties - played a fundamental role in various building processes until just a few decades ago, with stone quarrying activities persisting slowly and tirelessly.

The work presented here is based on some results from previous research on some coastal sections, focused on the latomie and other archaeological themes on the south-eastern coastland of Sicily.[33] Among the various subjects, latomie are a characteristic feature of the rocky coastline, particularly that of Syracuse, where stone exploitation is frequently found. The various sites, distributed along the articulated coastline from the territory of Lentini to Capo Passero, are often characterised by their considerable extension. Despite the sudden impacts caused by anthropisation, the problems of accessibility and the difficulties caused by the nature of the contexts, the latomie still represent a case study that offers considerable scientific opportunities. The topic covers a broad chronological period starting from the archaic period, coinciding with the foundation of the Greek city of Eloro,

[28] Felici 2024.
[29] See the definition in Felici, Lanteri 2012, p. 57: «La latomia non è un edificio […]».
[30] Pliny XXXVI, 1.
[31] Fiora, Alciati 2008, pp. 31-35.
[32] Proposal to update the "Piani Regionali dei materiali da cava e dei materiali lapidei di pregio", Norme Tecniche di Attuazione, 2023.
[33] Buscemi *et alii* 2020.

ending with the cessation of tuna-fishing activities during the 20th century. Thus, the exploitation of stone is linked to various events that contributed to the reconstruction of the coastal territory in ancient times.

Research on stone sites does not have a scholarly history firmly anchored in solid exegetical foundations; ancient sources rarely mention the qualities of stone and the exploitation of quarries, except in an indirect way. When a quarry site is examined, the topographer immediately asks the crucial questions: whose quarry was it? Where did this stone go? The topic of reconstructing the route of the material was already posed by authors from the Renaissance period who, describing antiquities, only tangentially asked the question of where the material came from. These scientific questions have generated more awareness over time.

Tommaso Fazello foresaw the potential of research on stone quarries: during his travels around Sicily, he came across a number of quarrying sites that he mentioned with passionate interest, establishing the relationship between the construction processes of the main Greek cities and the sources of the necessary stone.[34] Later, numerous other travellers contributed with their descriptions by indicating latomie, sometimes by noting the locations of the main stone quarries or toponyms relating to them in cartographic reproductions of Sicily. Archaeological research in the south-eastern cusp of Sicily were initiated at the end of the 19th century by Paolo Orsi and continued with excavation projects under the supervision of the Soprintendenza. The amount of information accumulated over this time has outlined a profile of the territory in antiquity; the region has great potential, although there are numerous difficulties with this archaeological research, which was conducted without a well-defined topographical project and was severely limited by the agricultural work of the last century. In spite of progress, however, severe methodological limitations in the past did not permit the scientific interpretation of mining sites in a broader sense.

In the last century, some theories based on autoptic investigations, by evaluating certain similarities of the stones, had hypothesized transfers of material between even distant colonies. This interesting hypothesis, although unverified, has nevertheless generated considerable topographical consequences and raised historical questions. Amongst these, widely accepted opinions have long affirmed a scenario in which a demand for stone from the Syracusan quarries would have increased in the 5th century BC, which would have implied export programmes that were not negligeable in volume but indeterminate in causality (economic? political?). Syracusan stone, in fact, was considered the best for the construction of temples, so abundantly in demand that it was scarcely available until the period of the Deinomenids.[35] In the last century, a distribution of Syracuse limestone towards temple factories in Magna Graecia was hypothesised: the Marasà Sanctuary in Locri,[36] the rocks of the Punta Stilo Sanctuary in Caulonia, and the Temple of Hera in Croton.[37]

These proposals were later disproved with the use of the topographical method. The latomie in the territories of those Greek colonies, identified through coastal and underwater prospecting, demonstrated the exploitation of local deposits: the stone, subjected to petrographic analysis, proved to correspond to that in Calabrian temples. These data put aside the legends about stone-building transfers between cities and instead outlined a technical and historical process whereby each colony exploited first of all the stone resources that were available in their own *chora*. Building stone was shipped and brought to the city when river and/or sea travel was the easiest and most economical solution. This is demonstrated by the naval route of the La Couronne stone to Massalia, owner of the latomie, as certified by petrographic analyses and the identity of the quarry marks on the city walls with those on the shipwreck of Carry-le-Rouet.[38] The same method is found in Leontini, which used to obtain stone on the coast between Punta Castelluccio and Brucoli, by transporting the stone on boats with a maritime route and then up the River *Terias*.[39]

The consequences of these dynamics are remarkable. Firstly, the homology of the stone certifies the extension of the *chora* of cities at least as far as the latomies. Secondly, the stone suggests its role as a fundamental heritage for the settlers, so much so that it is cautiously proposed as one of the main elements in identifying geographical determinism in the choice of foundation site.[40] The temple factory was therefore designed from the beginning on the basis of the local availability of the required building material. In fact, the building employed simple cut stone in its foundations; the visible architectural members, the most valuable parts, required marble instead, in which case it was transferred by ship from the quarries, an operation that was undoubtedly complex due to its numerous nautical, logistical, infrastructural, economic, etc. implications. This process of hierarchical differentiation of materials led to interesting design methods, which are currently being investigated.[41] The coastal quarries clearly show the intention to take advantage of the opportunity offered by the sea transport of blocks. The factory of the temple of Apollo at Claros was supplied at Proconnesus, transported over long distances as evidenced by the shipwreck of Kizilburun.[42] The marble covering of Hera Lacinia's temple in Croton was still in place in 173 B.C. (Livy 42, 3), when the censor L. Fulvius Flaccus removed about half of it, sending it to the temple of Equestrian Fortune in Rome by loading it on ships, a solution that was opposed

[34] Fazello 1558.
[35] Dunbabin 1948, p. 257.
[36] Gullini 1987, p. 373.
[37] Orsi 1916, cc. 831-832.
[38] Long 1986.
[39] Buscemi, Felici 2004a-b.
[40] Greco 1996.
[41] Spicuglia 2021, pp. 41-61.
[42] Carlson, Aylward 2010, pp. 145-159.

by the Senate by ordering the return of the roof tiles (a provision that was never carried out).[43]

Back on the coast of south-eastern Sicily, we can say that a system of lithic material transportation was implemented only on a local scale, involving different modes of transportation (land, sea, river) and sometimes a combination of them. The coastal morphology rarely offered the quarrymen the possibility of a land route, which was in any case onerous, as recounted by Diodorus (IV, 80, 5-6) on the construction of a temple 100 stadia from Agira, which required considerable resources, including a multitude of animals for the transport.[44] Research on the coastal territory between the Cassibile River and Portopalo di Capo Passero has identified and documented infrastructures for land transport. For the destination of the material, on the other hand, we consider settlements and monumental remains whose building techniques were based on the use of cut stone in different periods: between the various metrologies of the blocks, we look for dimensions compatible or coinciding with the dimensions measured in the quarry.

The presence of the Greek settlement of Eloro, along the south-eastern coast of Sicily, provides an opportunity in this volume to investigate related lithic resources. The ancient Syracusan subcolony is located about 30 km to the south. It is a scarcely known Greek settlement, mentioned only indirectly in ancient literature and for which documentation is poor, despite the excavations conducted until the 1980s and the amount of material found. Eloro is located on a rocky promontory on the left of the homonymous river; it was discovered at the end of the 19th century by Paolo Orsi, who conducted two successful excavation campaigns there, uncovering various areas of the city. The archaeologist conducted an autoptic analysis of the stone material in situ and considered it to be, in general, of low quality and of local origin, indicating the extensive latomie of the promontory 300 metres to the north as the main deposit. Orsi himself noted in the walls stone of a higher quality (fine, white compact limestone), for which he suggested an origin from more distant quarries, indicating locations both 14 to 15 km away: the quarries of S. Corrado di Fuori near Noto or the area known as Palazzi on the left of the Cassibile River.[45] Surveys along the river could provide insights into river transport as well as an area of spatial demarcation.[46] These topics, moreover, involve the complex matter of territorial boundaries between the various Greek cities settled along the coast, Eloro in this case in particular. Stone, in fact, represented an important resource that often fell within the boundaries between *chorai*, indirectly suggesting indications of the extension of their territory.[47] Moreover, in this wide coastal strip, characterised by a productive vocation that has continued without interruption over the centuries, with tuna nets and saltpans in use until the last century, it is not only the impact of stone in building processes that is evaluated. The geomorphology of the coastal territories offers a range of productive opportunities where quarries are configured as a propaedeutic element for the accomplishment of unique activities.

As evident from this brief description, the book is structured on various levels that gravitate around the topic of stone, from the location of the quarries to the phases of extraction and placement. A few notes about structure follow.

First of all, Chapter I deals with the history of research in the Greek setting in particular, looking for the earliest approaches to the theme and the way in which the interest in stone deposits developed thanks to travellers in the Renaissance period up to pioneering scientific research in the 19th century on the major Greek contexts, some of which are mentioned in ancient sources. An attempt is made to outline a path of development that, through the study of the great Greek architectures of the classical period, eventually led to an interest in sources of supply with the inclusion of further aspects, for instance the investigation of stone quarries at smaller sites and the contribution of archaeometric analyses. From the brief analysis proposed, we can appreciate the relative 'youthfulness' of the topic even in the Italian tradition of studies, with a more marked interest in the marble stone used widely in the Roman period.

Chapter II deals in particular with the research tradition in Sicily, where it can be seen that the theme of stone quarries has usually been dealt with superficially, with the exception of the south-eastern coast of Sicily. In this part of the island, topographical surveys have been conducted that include a synoptic view of the latomie and some coastal activities.

Chapter III describes the research area and its main topographical features, including the geomorphological aspects that have in part preserved a particular character almost uninterruptedly from ancient times to the present day.

The methodology of the investigation is discussed in Chapter IV, which is in fact the mainstay of the entire research. In synthesis, since research on the latomie is research on the landscape, all sources of information concerning the area of investigation, including archaeological research, local scholarly production and ethnography, provide a diachronic overview of the use of stone even in modern times.

[43] Orsi 1911, p. 100.
[44] Dworakowska 1975; Gianfrotta, Pomey 1981, pp. 50-51; Rockwell 1992.
[45] Orsi 1965, c. 282.
[46] Cfr. Bernabò Brea 1987.
[47] Buscemi, Felici 2004b, pp. 159-188. For the research context, moreover, the identification of some peripheral sanctuaries might suggest further evidence of territorial boundaries and the allocation of resources, including stone. For the temple San Lorenzo Vecchio: Agnello 1948, pp. 63-68. A proposal to locate a sanctuary along the Cassibile River in Caruso 2020, pp. 149-165.

Chapter V illustrates the results of the prospecting carried out in the coastal strip in the territories of Avola, Noto and Pachino. These exploration activities permitted documentation of several latomie grouped into eighteen contexts in order to catalogue some of the main parameters and to provide a detailed description, sometimes supported by unpublished drawings where the main morphological features are indicated.

Chapter VI deals with stone quarrying techniques, with an introduction on their origins and the identification of the technical characteristics of the latomie: quarrying systems, types of extraction, techniques used to extract parallelepiped blocks and transport methods are, in fact, basic elements to determine the antiquity of a quarry and to suggest a chronological break.

Chapter VII represents an ambitious attempt to chronologically place the stone quarries of this work through the identification of particular topographical and metrological elements. In fact, by taking into consideration data of a different nature and combining them, an attempt is made to narrow the period of exploitation and to suggest, if not an absolute chronology in which to place the operations, at least a relative temporal space through the identification of *terminus ante* and *post quem*.

Secondly, Chapter VIII discusses the subject of the ownership of stone through the association of the quarries examined with a number of monuments that have large parallelepiped blocks of various sizes in situ. A special focus is on the Greek city of Eloro, a Syracusan subcolony founded at the mouth of the homonymous river. In order to establish the relationship between stone deposits and monuments, the settlement of the territory is considered over a wide period, however devoting greater attention to the Greek period and the building development phenomena that affected the Sicilian colonies. Later settlement dynamics are also not excluded, because they left a specific mark on the territory through unique architectural monuments.

Chapter IX, finally, discusses the presence of coastal industries scattered along the coastline – tuna fisheries and saltpans, some of which continued in operation until recent decades – which are part of the stone supply network. These activities, unique to south-eastern Sicily, have been shown on the basis of recent research and ethnographic comparisons to be linked to stone quarrying for productive purposes.