

The Importance of Emery in the Cultural, Social and Economic Development of Naxos Island, Cyclades, Greece

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Introduction

The establishment of permanent habitation in Naxos Island, since Prehistory, is strongly linked to the exploitation of the Islands' natural resources. In ancient times, the population of the island tended not to endeavour so much to engage in a seafaring trade like other populations from islands in the Aegean. In general, a sizeable proportion of Naxians remained restricted to agricultural or mining activities and trading activities between different communities. It is entirely possible that the amplitude of agricultural produce and the income generated from emery export lead to the development of a relatively different and somewhat isolationist culture, which is also reflected on the folklore of the island. In this research the aim is to delineate the effect of emery exploitation in the socioeconomic development of the Island from Ancient Greece to the present day, demonstrating how geology contributed to the formation of an insular community.

Geology of Naxos Island and Emery Formation

Naxos is the largest island of the Cyclades complex and belongs to the Atticocycladic belt of the Hellenides. The Island comprises a metamorphic core complex intruded by a granodiorite during Late Miocene. Sedimentary rocks and ophiolites are tectonically emplaced upon the granodiorite and the metamorphic rocks. The metamorphic rocks of the island are believed to have been affected by at least four metamorphic events. The emery deposits of the Island are the results of bauxites' metamorphosis. There are widespread metabauxite deposits in Naxos, most of which have a lenticular shape. They are found most commonly inside marbles and sometimes in sheet-like form inside schists. The tectonic deformation is evident and it is believed that the metabauxite lenses were an initially more or less continuous body, torn apart by tectonic procedures (Feenstra, 1985). There is still no consensus on the exact emery reserves of Naxos or the initial amount of emery reserves prior to any exploitation. The general term «emery» is used to describe any rock rich in corundum. The Greek term for emery is «smyris», and is derived from the port of Smyrna, which was the focal point for emery distribution in ancient times. On the other hand, the term «emery» is derived from the Emeri peninsula, where the emery mines of Naxos are located. The principal mineral of emery, corundum, is believed to have been named from the corruption of the Indian word «*kauruntaka*» which was used to describe the same mineral (Holroyd & McCracken, 1996). The most common mineral assemblage of emery worldwide comprises corundum (Al_2O_3), magnetite ($\text{Fe}^{2+}\text{Fe}^{3+}\text{O}_4$), hematite (Fe_2O_3), hercynite ($\text{Fe}^{2+}\text{Al}_2\text{O}_4$), and trace impurities such as mullite [$\text{Al}_{(4+2x)}\text{Si}_{(2-2x)}\text{O}_{(10-x)}$], titania, silica and magnesia. The typical quality of «commercial grade» emery contains less than 10 wt. % silica and is therefore rich in corundum. The commercial grade emery of Naxos contains around 50-80 wt. % corundum and a sizeable percent of FeTi-oxides, while margarite [$\text{CaAl}_2(\text{Al}_2\text{Si}_2\text{O}_{10})(\text{OH})_2$] is the most common silicate mineral (Feenstra, 1985).

Regional Use and Export of Naxian Emery from Ancient Greece to the 18th Century

The first documented use of emery in tool manufacturing is during the Neolithic period. It is believed that emery was of crucial importance in the creation of the famous Cycladic statues which are amongst the most well known artefacts of the Cycladic Civilisation. Emery is described also in the work of Theophrastus, «*Peri Lithon*» (Bourdakou, 1997). While under the scope of this research it is difficult to quantify the exact effect of emery exploitation in the economy of ancient Naxos, it is remarkable that Naxos was so wealthy so as to maintain a fleet of four triremes, which took part in the naval battle of Salamis in 480 BC, at a time when most Aegean Islands did not have the ability to maintain even a single warship (Papadopoulos, 1961). In 466 BC Naxos was destroyed by Athens and subsequently very little evidence of the development of Naxian economy is available. No mention of emery mining or export is made during Roman times or the Byzantine era. In 1207 AD Naxos and other Cycladic Islands were conquered by the Venetians, who established the Duchy of the Aegean, with the Island of Naxos as its capital. The first reappearance of emery in historical texts can be traced in 1304, when in Venetian texts it is mentioned that emery was transported to Crete and then on to Venice in small amounts for as yet unspecified uses (Slot, 2008). It was Italian traders who exported emery after 1625 AD, first transporting it with small ships to the port of Smyrna, from where it was transported by ship to other European ports, or by roads to locations in the interior of Asia Minor (Zevgolis, 1947). During this period emery was used for cleaning rusted sword blades. In 1665 C. Huygens mentions that the use of emery dust from Naxos is indispensable in cleaning telescope lenses. It may be no overstatement that had emery from Naxos not existed then lenses of such accuracy would not have been developed at such an early stage (Slot, 2008). During the 18th century, along with its other notable use, emery dust was used for the abrasion of heavy duty sailmaking needles. The alternative was to use a hammer to perfect the shape of every needle individually but this was more time consuming and raised the price of the needles. The emery mines in the NE of the Island, between the gulfs of Moutsouna and Lyona, were exploited by the villages of Apeiranthos, Koronos, Danakos, Mesi, Skado and Keramoti. The inhabitants of these villages alone had been granted exclusive exploitation rights, both by the preceding Venetian administration and by the Ottomans (Glezos, 1989). During the Ottoman occupation of Naxos, there was no tax imposed on emery mining or

export as it was not considered valuable enough. Only in 1824 did the Ottomans impose such a tax and this led the people of Naxos closer to joining the revolution in the ongoing War of Greek Independence.

Emery in the Economic and Political Life of the Greek State

Worldwide demand for emery reached its peak around the end of the 19th century, following the Industrial Revolution. During the same period, the incremental increase of the iron industry led to a widespread demand for emery. Emery, whether natural or artificial, is essential for the abrasion of steel tools and machine parts. Among the major emery deposits worldwide in Bavaria, America and Asia Minor, the emery of Naxos stands out in having the highest corundum percentage. This means that comparatively to other emeries, the Naxian emery has the highest value as an abrasive. The importance of this mineral resource for the national economy was recognised early enough by the nascent Greek State which, between 1845 and 1920, regulated the commercial exploitation of emery through a series of «mining law edicts». During those years and afterwards, the quarries belonged to the Hellenic State, which conceded the right for their exploitation to the inhabitants of the Municipalities of Koronis and Apeiranthos. In the first decades of the 20th century, Naxos did not have any ports suitable for loading deep draught cargo ships, and emery was transported using smaller boats to Syros, where it was then transhipped to larger cargo ships. The cost of transporting emery to Syros was borne by the Greek State. It was deemed necessary for the emery mines to be state-controlled, for the better organisation of production, as well as for marketing reasons. At the same time, the State lacked the funds necessary to expand the mining tunnels and finance the proper maintenance and improvement work so as to ensure their structural integrity. In 1922 it was decided to build an aerial cable railway system, so as to alleviate the cost of transporting emery from the mines to the loading station at Moutsouna Bay. Up until then miners had been transporting bags full of emery from the mines to the Bay, on their backs or using donkeys. In 1923, it was decreed that emery would be sold directly to foreign markets, with no mediators, with a fixed percentage of the profits being used for infrastructural improvements. Along with the aerial railway system, wharfs and storehouses were built in Moutsouna Bay, so as to gather and load the emery to barges directly for export, obviating the need, and the associated cost, for transport to Syros. This aerial cable railway system was constructed between 1926 and 1929, for the easier transportation of emery, from the mines, to the bay of Moutsouna; it remained in operation until 1982 when it was replaced by trucks which took advantage of the improving road network. Today, the mining of emery has practically come to an end. The development of artificial abrasives, which are much cheaper than emery, after the 1970s, signalled the gradual decline and eventual halting of systematic mining in the Island. The much greater purity and physicochemical uniformity of synthetic abrasives and their lower cost does not leave any market share for the emery of Naxos.

Discussion and Conclusions

From the aforementioned it becomes evident that the existence of exploitable emery deposits has been a key factor in shaping the economy and even the culture and the society of the Island. Since antiquity, Naxos had a robust and growing economy which was in large part attributed to its mineral wealth. During the Venetian and Ottoman occupations, the economic importance of emery led to its exploitation; this was then systematised by the Greek State. For over 2000 years the inhabitants of NE Naxos have maintained their mining rights over the quarries. Over the years, emery miners became a distinct socioeconomic class of the island, while the need for exporting emery gave rise to an extensive trading network, between Naxos, Syros and Smyrna, and other major ports. The economic value of emery was an important contribution to the Greece's gross domestic product up until the 1970s. There is no doubt that without emery Naxos would not have been such a wealthy Island in Ancient times, and would maybe have relied more on commerce. This would in turn have resulted in development of coastal communities with different folklore, traditions and social classes. In addition, in a state level, it is doubtful that the developing Greek State, between 1831 and 1940 would have maintained a viable import-export balance, without the significant profits of emery trade. This is one characteristic example of how ore deposits can be instrumental in shaping the cultural and socioeconomic profile of small insular societies and at the same time in influencing state economy.

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