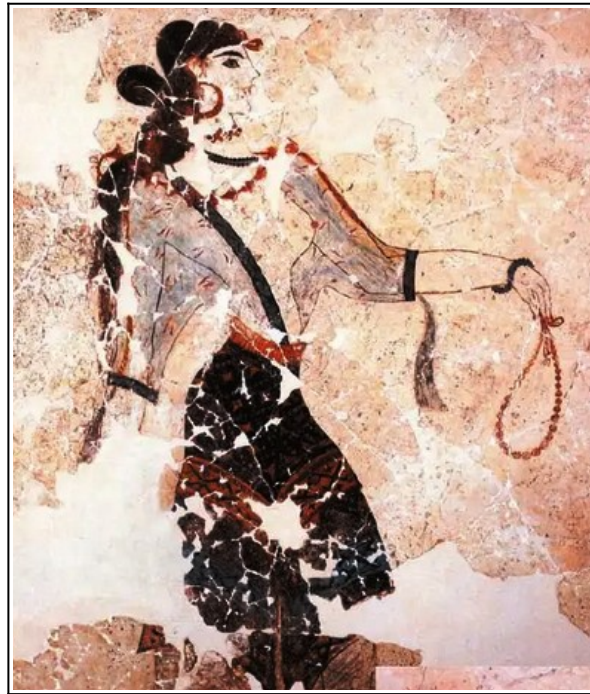


MA in Greek and Eastern Mediterranean Archaeology

The Archaeology of the Bronze Age in the Aegean



PURPLE DYE:

When literary evidence evades us,
can a shellfish secretion disclose the spirit
of Minoan aristocrats?

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Introduction

There is the sea — its caverns who shall drain?

Breeding of many a purple-fish the stain

Surpassing silver, ever fresh renewed,

For robes of kings.

Aeschylus, Agamemnon

Purple is the vest of Theseus emerging from the sea, which the goddess Amphitrite graced him with alongside a crown of gold. This is how Theseus advances to confront Minos, the Cretan king and son of a Phoenician princess. Purple often is portrayed in the first literatures of the Mediterranean as the embodiment of regality, affinity with the divine. A purple cloak cost King Ptolemy of Mauretania his life when Caligula (40 AD) appreciated it as an act of imperial outrage (Suetonius, Caligula 35.2).

Homeric heroes tend to wear purple spun by queens (Odys. VI), and references to the preciousness of the fabric start to appear from the mid-second millennium BC, found in the lists of tributary exactions on the Levantine coast (Schneider 2011). By baptising the Canaanites as ‘Phoenicians’, Ancient Greek sources inadvertently eternalised the link between these people, expert traders on robust cedar ships, living along the Syro-Palestinian shore, and the purple dye, ποῖνιξ. Royal purple, in fact, is also known as purple of Tyre, a Phoenician center where, according to Pliny (NH, IX, 127) the dye was brought to perfection. Nevertheless, archaeological evidence to this day suggests this story began much earlier. It is the story of the extraction of the hypobranchial gland of a predatory mollusc out of its sturdy shell. It coincides with a novel perception of colour and a crucial leap in the history of textile. We have reason to believe that the earliest examples of dye making comes from earlier than the fifteenth century Minet el-Beida, port of Ugarit, and could be as early as the second millennium BC in Minoan Crete.

This essay revolves around the significance this innovation wields for the Minoan world and for our endeavours to penetrate a culture whose language has so far not yet been deciphered. We can ascertain the existence of Minoan dye workshops preceding the evidence of the Canaanite trading network, and might fully rejoice in the hypothesis of the shellfish purple maculating the European

coasts of the Mediterranean, yet cannot help sighing at the deep chasm between our reconstructions and the elusiveness of Minoan civilisation. We can offer suggestions on the role of what royal purple must have played, but the question of whether purple was intended to be royal is beyond our knowledge in the absence of a shared code. Is it possible that the genesis of an idea does not coincide with the locus of its viral spreading: to think of purple dye without purple mania? Was purple actually the colour blue? These are only part of the viscous questions animating this essay on the most sought-after mucous of the mollusc that wrote a chapter of history while words were lost in the sand.

We will begin by scrutinising the earliest traces of purple dye extracted from murex.

Mucous in the shell

The excretion of this mollusc, known as *murex* and now identified in three species – *Murex Trunculus* (Hexaplex), *Murex Brandaris* (Bolinus) and *Purpura Haemastoma* (Thais), constituted the raw material (Stieglitz 1994) of the dye.

A detailed recipe for obtaining the pigment is offered in *Historia Naturalis* by Pliny (IX, 126), but scholars who recently recreated ancient textile dye production discredited his account as not being the fruit of first hand experience (Ruscillo 2002). The procedure consists of hand-collecting the sea snails and keeping them alive up to the moment the fabric is ready to be immersed. The shell is then pierced and the hypobranchial gland of the mollusc is isolated. The mucous secreted by this gland then oxidises and the pigment is diffused in the water. Ruscillo and her team noticed that steeping for three days produced a brilliant purple, and that the concoction should never be brought to the boil and does not need any mordant, unlike most vegetal dyes. The shades of colour could range from dark purple to light blue. The dye would be used with wool which was the only receptive fibre available during Minoan times. As it is known the colour was resistant to the washing, and so was the notorious stench of shellfish secretion. ‘The hands of the dyer reek of rotting fish’, so recites the Greek papyrus of Anastasi.

Overall, the process is presented as simple yet laborious due to the the fetid odour and the maggots swarming over it, over hundreds of snails need be eviscerated to treat the woollen trim of a

garment. The estimate varies depending on the saturation to achieve, but approximately ‘one and a half grams of dye required 12,000 snails’ (Van De Mieroop in Schneider 2011).

The profligacy of mollusc waste has always been seen as one of the factors that contribute to its high cost, and also to the shaping of hermeneutic schemes in archaeology. The image of middens of crushed murex shells never did pass unnoticed.

Evidence on Crete

In 1903, R. C. Bosanquet was the first archaeologist to unearth a deposit of purple shells on the small island of Kouphonisi, southeast of Crete. He was the first to advance the theory of the ‘Minoan origin of the Tyrian purple’ the following year when he discovered another deposit in Palaikastro in Eastern Crete. All the fragments dated to the Middle Minoan period, around 2000-1600BC, therefore preceding the Phoenician trading routes by several centuries (Stieglitz 1994). Successive explorations of Palaikastro confirmed the presence of additional remains of pierced shells ‘associated with MM IIB pottery’ (Reese 1987) in the proximity of a ‘well-built stone structure’ thought to be the remains of industrial facilities (Stieglitz 1994). Among pottery shreds and shells, obsidian flakes often complete the frame on the background of carved stones. According to Ruscillo, obsidian tools or hypothetical bronze awls could have served to disclose the secret of the shell. ‘Holes of approximately five millimeters in diameter can be seen on some of the archaeological specimens’ she promptly highlights from her experiments on the coast of Kommos in Southern Crete. Other scholars (Spanier and Karmon 1987, in Burke) rejected the idea of manually pierced holes on the *trunculus* tough shells, ascribing them to a cannibalising tendency of the molluscs: only a murex can penetrate a murex with similar dexterity. However, as it has been recently proven, this eating pattern occurs exclusively when the molluscs are kept in captivity, which is not incompatible with the tasks of a shellfish dye workshop.

Murex debris constituted above thirty percent of all the marine invertebrates found in the Middle Minoan layers of Southern Kommos, north of Matala. The excavation of Kommos began in 1976 with the team of J.W. and M. Shaw unearthing the hilltop. The south is renowned as the ‘civic area’ and was excavated from 1990 to 1997. Kommos, also called the harbour of Phaistos and Agia Triada, seems to have hosted one of the earliest workshops of royal purple (Ruscillo 2005). The common trait of all of

these sites is the distance of the workshops from residential areas. Moreover, evidence of Canaanite jars has been associated with trade contacts since the fifteenth – fourteenth centuries BC (exhibit at the Archaeological Museum of Heraklion).

Other traces of murex deposits on Crete were found in the Palace of Zakros, Makrygialos, Chryssi, Knossos, and others¹. Additionally, the prevalence of *brandaris* is also reported in the Middle Minoan layers of Thera and Kythera (Reese 1987)². The hypothesis of the ‘Minoan origin of the Tyrian purple’ had fascinated many but did not manage to convince the most recalcitrant among the historians. In 2005, Z. Koren defined it ‘inconclusive’. A pile of edible shell refuse and scattered traces of pigment on wall paintings³ could not take the leap out of the realm of speculation. It remained in the realm of ‘indirect evidence’, because no residue of the dye had ever been discovered in a ‘dyeing context’, for example on textile installations or pottery.

This very evidence visited us a few years later, in the workshop of Alatzomouri Pefka.

Royal Workshop

Chi cerca, trova.

The excavation of the site of Alatzomouri Pefka began in 2007 in a pine grove, not far from the settlement of Gournia.

Dips carved out of limestone in the ground, initially believed to be tombs, turned out to be a series of seven rock-cut basins in a line. This arrangement has been unanimously proclaimed to be a dye workshop dating to Middle Minoan IIB (Apostolakou, Brogan, Betancourt 2020). What distinguishes this site from the previous research is the naturalness of the narrative. Here middens of *Hexaplex trunculus* crowning the basins sculpted into the bedrocks are directly correlated to the operations of the site. Residues of madder for red, weld for yellow and murex secretions were revealed by gas chromatography analysis in the vessels found on the site. Moreover, the vats contained traces of lanolin, the oil produced by sheep. The Lanolin would be washed away before dyeing the wool, but could be

1 A complete list of the sites with considerable aggregations of crushed murex shells is included in ‘Alatzomouri Pefka: A Middle Minoan IIB Workshop Making Organic Dyes’, Chapter XVI.

2 Evidence is also known from the Middle Helladic (17th century) on the Argolid, Aegina and recently Eleusis (Ruscillo 1995 in Ruscillo 2005).

3 Traces of purple dye on the frescoes of Akrotiri.

used further in the treating of leather. As stated above, before the introduction of silk, wool was the fibre which could best absorb pigments. ‘*Pefka was engaged in the manufacture of large quantities of coloured dyes, some of which were used to dye wool on the spot and others that were a surplus that was placed in jars in preparation for shipment elsewhere*’ (Betancourt, Brogan, Apostolakou 2020). This discovery has certainly altered the preexisting considerations of Minoan textile industry (‘wool and linen processing... took place at a household level, outside direct Palatial control’, without engendering surplus, Militello 2007), but seems to fit another portrait of Minoan society meticulously devoted to the exaltation of beauty and natural resources. More importantly, the unearthing of the workshop of Pefka dispelled every doubt regarding the textile application of the shellfish pigment.

Minoan dying activity preceded the Phoenician, however, this cannot attest to the Minoan exportation of the technique. We cannot even declare them as the inventors of the purple dye recipe. A team of Italian researchers have been excavating the Apulian site of Coppa Nevigata, located by a lagoon, now drained, on the southern area of Gargano. The canonical middens of murex shells (*Hexaplex trunculus*) dating to the nineteenth century BC if not even earlier have been unearthed in Coppa Nevigata, alongside a centre of olive oil production. Was the Italian Bronze Age settlement in contact with the Minoans? Is this an occurrence of ‘multiple discovery’, the concept by which the same idea will arise in different places which are independent from one another, given similar circumstances (e.g. geological configuration, climate)? In absence of literary and iconographic sources, one cannot even attempt to speculate.

In the Greek dictionary of the second century AD, *Onomasticon* by the orator Julius Pollux, not rarely honoured in the publications on royal purple, the discovery of the pigment is credited to Heracles’ hound biting a murex snail on the seashore of Tyre. Some versions of the myth end with this Heracles endowing a nymph with the magnificence of violet-shaded shellfish ordure, other versions this homage is paid to the king of Tyre. Perhaps, one of the possible interpretations of this myth is the irrelevance of the authorship. All the attention converges in the observation of natural phenomena and the possibility of turning the oddities of nature into gifts. We feel this description could reflect Minoan sensibility. In the following paragraphs, we will endeavour to define how this Minoan sensibility could have been impacted by the novel colour or symbol of power.

‘Molluscraçy’

From the occurrence of murex purple in the Minoan repertoire of crafts, there sprouted two main constructions. The first concerning the economical strategies of Minoan *thalassocracy*, the other revolving around the costumes of Minoan aristocracy, which will be later addressed.

In the workshop of Alatzomouri Pefka, a rather complex drainage system stands out, but the facilities to raise the sheep and pluck the wool seem to be located elsewhere. As remarked by Burke (2010), spinning equipment is rarely mixed with weaving tools on the sites dating to the Bronze Age. At Alatzomouri Pefka, neither of these activities seem to have taken place: no spinning, no weaving. Beyond the presence of a few scattered discoid loomweights, archaeologists found it safe to affirm the workshop was exclusively devoted to dye crafting.

Historians saw in this prototype of textile specialisation, later perfected by the Mycenaeans, the indicator of a flourishing trade network operated by the Minoans, intent in exporting the harvest of their expertise and agricultural surplus in exchange for metals, which the island was in need of (Burke 2010 et alia). Other lines of research have highlighted other contexts attesting to intense contacts with the élites of the Near East based on a *palatial gift exchange route*. ‘Of special interest are a number of texts from the archives of the Mari palace — contemporary either with the Cretan late Old Palace period or the very beginning of the New Palace period — which list objects of Caphtorian (Cretan) manufacture, including ostentatious weapons, metal vases, clothing and leather shoes’ (Niemeier 1998).

Precious crafts had no clear lucrative connotation, but their manufacture was certainly to be appreciated by the kings of the Near East. Jewellery, vessels, fabrics, and ideas were circulating ceaselessly among the influential élites of the Mediterranean. In support of the suggestion of Minoan craftsmanship abroad, the frescoes of Tell El-Dab’a, Alalakh and Tel Kabri in Egypt are often reexamined (Niemeier 1998). It is generally accepted to this day that Minoan art contributed to shape the worldview of the Mediterranean.

The people of Keftiu (identified as Crete) were also depicted in the tombs of Theban viziers of the eighteenth dynasty of Egypt (fifteenth century BC). Aside from the long-standing debate on whether the objects carried by the Cretans were diplomatic gifts or tributes, the iconography remains suggestive. The dark long hair and the richly embroidered kilts rather surprisingly mirror our imagery.

Nevertheless, where is royal purple adorning the figures of the élites?

I have never seen Minoan (Keftian) princes in purple cloaks, yet neither do we ever see them wear monochrome attire. Their garments are always minutely decorated. Are those elegantly contrived embroideries purple dyed? Was this fashion more appealing to their senses than the rigour of one hue: the synergy of colours, the virtuosity of knitting new colourful patterns out of the yarns?

Textile sophistication constituted a pillar of the socio-economical assets of Bronze Age Crete, as seals from Knossos seem to suggest (Burke 2010), and Palatial art reveals a great taste for vivacious colours. However, the significance given to the extraction of a mollusc's entrails remains obscure. How could we infer the primacy placed on shellfish dye over a vibrant red made out of madder? The only textual evidence at our disposal referring to purple on Crete comes from the thirteenth century BC. In this Linear B tablet found on Knossos during Mycenaean administration, scholars read the association of pu-pu-re-jo and wa-na-ka-te-ro⁴ (Burke 2010, Thavapalan 2019, et alia) as 'royal purple', based on *wanax* – intended as the 'king' – and the assonance of the first syllables with the Greek word *porphura*.

Overall, it is not unexpected to find new words to name new crafts: one day it will become possible to compare Linear B to still undeciphered Linear A, just as we compare Linear B to Ancient Greek and Ancient Greek to modern languages, but the syntax of ancient man eludes us every time. The only pathway we could attempt is visual, in the hope that 'a picture is worth thousand words'. Or at the very least better preserved, if lying under layers of lava like the frescoes of Akrotiri on Thera (Santorini).

Stupor mundi

Stripes of what seems purple grace the garments of men and women depicted on a sarcophagus of the fifteenth century, found in Agia Triada. Various shades of purple are the decorations on the dresses of the ladies on the frescoes of Thera, dating to the sixteenth century BC (Stieglitz 1994). The paintings adorning the House of the Ladies in Akrotiri, in particular, have been of crucial importance to reconstruct the 'Minoan festal costume' (Immerwahr 1990): the known short-sleeved open bodice with the greatly decorated flounced skirt. In contrast to the simple rendering of the women's figures, the raiment is of refined taste, not sparing the representation of intricate embroideries.

4 Linear B Tablet from Knossos: KN X 976+.

These depicted women, beyond the problem of their identification, could have seemingly embodied the spirit and appreciation of Minoan aristocracy: immersion in nature and dedication to their crafts. There is an aspect to the frescoes, however, of harder interpretation.

Recent physicochemical analyses (High-Performance Liquid Chromatography coupled with Raman Spectroscopy) have revealed the presence of 6,6'-dibromoindigo, corresponding to murex dye, on the walls of Xeste 3 in Akrotiri. The pigment was used to represent only a few details of the frescoes: the crocuses, the pearls of the necklace, a ribbon and a headdress (Sotiropoulou 2004). This enigma, far from being solvable, is indissolubly linked with the significance of the crocus picking.

In Xeste 3, the scene unfolds as follows: a seated figure named the 'goddess' in several contexts (Marinatos 1993), guarded by a griffin, is surrounded by girls 'in the stage of puberty', all of them are gathering crocuses. A blue monkey is offering the buds to the 'goddess'. In another section, three girls in different age groups face the shrine with the horn of consecration. Marinatos in her beautiful pages of 'Minoan religion' reconstructs the scenes of what he baptised as a 'puberty rite', where these women are 'sent out to the hills to collect large numbers of blossoms for the divinity'. Here the voice of nature captures them, surprising them in their metamorphosis. The woman on the left, the oldest and 'fully initiated', is peacefully extending a swinging necklace of pearls. It is rather bizarre that those pearls are painted with murex dye. The stereotype looming over archaeological hypotheses hits once more: the pearls and the flowers of saffron nurturing the fertility imagery. The rite of saffron gathering seems to be explicitly connected to the sphere of women's life. Pliny regards the spice as a remedy for 'all kinds of inflammations', in particular for the eyes and the 'hysterical suffocations' (*vulvarum strangulatus*, NH XXI, 81). Cleopatra believed it to be an aphrodisiac with relevant cosmetic properties. Once again we fumble in the dark as we attempt to decipher the allusions to the beliefs of the Minoan world. We can only imagine a vivid enthusiasm in investigating the mysteries of nature and the transformation of the bodies. This is what shines through the frescoes⁵. The recurrence of crocuses and lilies was interpreted by Marinatos as the complementarity of autumn and spring, both seasons, respectively, heralding the 'renewal of nature' after the drought of summer and the dormancy of winter. The emphasis is on the sacrality of each transition. Could the shellfish dye on the paintings have served a similar association of ideas? A predatory mollusc is predated by man to achieve a prodigy of nature: the

5 In the London papyrus there is a reference to an 'incantation in the language of Keftiu'. If Keftiu is unanimously identified as Minoan Crete, this constitutes the first archival evidence at our disposal of the corpus of Minoan medical knowledge.

excretion produced by a gland turning from yellow into several shades from red to dark purple. A shell which pierces other shells is pierced, and after the dye extraction, its shell serves a new scope⁶. The young girl gathers the crocus as the offering to the goddess who let it sprout. Nature is cyclical and manifests herself through the creation of new designs, at times complex embroideries, at other times simple ones like pearls from a shell.

Is purple blue?

Another question far from being easily dismissed is whether the murex dye was held in the highest esteem by the Minoans above any other dye. The workshop of Alatzomouri Pefka was specialised in dyes, in particular red from madder or bugloss, yellow from weld and purple.

Archaeologists working on the site hypothesised other vegetal sources which, requiring a mordant unlike the others, result in being less permanent and did not survive the analysis by gas chromatography. It was not specialised in dyes from gastropods. The amount of snails needed to treat a garment was exorbitant, but up to this day we have no evidence of Minoan aristocracy clad in purple vests. Was the dye extraction too laborious? Was the monarch's family not worth the effort? On the frescoes noble women seem to favour yellow. Purple tones appear only in the embroideries. Again we read in Pliny (NH, XXI, 22) that yellow was the most appreciated colour in ancient times, but reserved exclusively for brides, which is what led him to believe it lost its importance over time: 'it is the circumstance of [the colours] being used by both sexes in common that gives them their rank as principal colours'. This could stand for a precious hint to understand the diffusion of purple mania: its allure does not lie in the hue, nor in the simpler deeper saturation, but in its 'alchemic properties'. Murex dye is both male and female, it appeals to both sensibilities. It is derived from the ordure of a mollusc and attracts the components of the higher order of society. It is not a hue, but the possibility of attaining different nuances.

⁶ It is proven the empty shells were melted into lime (Brysbaert 2007). For the presence of murex made plaster in Kommos see Ruscillo 2006.

Tyrian purple shares the same source of the Biblical blue, the *tekhelet* colour. When ‘making fringes (tsitsit) in the corners of their garments throughout their generations’⁷ is essential to add a thread of *tekhelet* obtained from a *hillazon*, marine gastropod or murex.

Ruscillo and her team in Kommos reproduced the blue of the Jewish tradition by immersing the swatch in the unsteeped and unheated concoction and hanging the fiber to dry after only ten minutes. Sterman⁸, advocating for a resurgence of *tekhelet* from murex in current times, claims the difference in the hue is determined by the exposure to sunlight: cloudy days give back a purple tint to the fiber, sun paints it blue.

To what degree were the Minoans mastering light exposure? What was the exact colour they mostly delighted in? The Jewish tradition emphasised the importance of fringes dangling from the prayer shawls, and the magico-medical rituals in Ancient Babylonia often involved ‘amulets of coloured wool’⁹. Could the Minoan production of murex dye have envisioned a similar scope, which contributed to the spiritual sphere of well-being more than to mercantile needs? The Phoenicians spurred by the latter attained the completion of the craft and were credited for the establishment of the trend. The Minoans were moved by the former: so they wove dyed yarns like crocuses through the rocks. In the renowned passage of *Naturalis Historia* (IX, 60), Pliny refers to murex purple as the colour which ‘asserts the majesty of childhood; that distinguishes the senator from the man of equestrian rank’, and above all, the colour men resort to as a prayer ‘to propitiate the gods’.

7 Book of Numbers, 15.

8 Sterman Baruch, *Tekhelet*. Found on his website: tekhelet.com

9 ‘Strings of coloured wool’ are often listed in medical texts of Ancient Mesopotamia, either as amulets or as pessaries. Stol 2000. Birth in Babylonia and the Bible, pg. 49.

Conclusion

Paria nunc componuntur, et natura atque luxuria depugnant.

Pliny the Elder

As in any science, or life in general, Minoan history does not concede a single answer without raising a multitude of questions. The problem we face here, however, is aggravated by the lack of any textual evidence.

In the course of my essay, I have examined the archaeological findings attesting to the production of murex dye on Crete, dating to the Middle Minoan Period (first centuries of the second millennium BC). The first intuition, that arose from the examination of the middens of crushed shells, finally found confirmation around a decade ago with the aid of new technologies such as gas chromatography. Traces of shellfish dye were found on the vats of an ancient workshop which mostly specialised in textile completion. Textile sophistication is without a doubt an intrinsic feature pertaining to Minoan culture. In support of this view, Egyptian art depicting Keftiu people and the Minoan frescoes of Akrotiri constitute intriguing and eloquent cases, despite the ambiguities that still linger. In particular, the religious landscapes of Minoan iconography remain unfathomable. We can merely affirm their predilection for complex embroideries, vivacious colours and observance of the rhythms of nature.

We cannot glean the secret of how the murex gastropod passed from devouring other gastropods, to being devoured by humans, to ultimately have its secreted mucous embellish figures in the uppermost levels of society in the Mediterranean for around two millennia. This is yet another prodigy of nature, which did not pass unnoticed to the Minoan eye.

Overall, I do agree with Stieglitz on the inexistence of a shellfish dye monopoly: neither on Minoan Crete nor along the Levantine coast could we find the ‘absolute inventors of the dye’. The discoverer might as well have been the canine fellow of a man holding the royal title of Heracles. More research on the findings of the Early Bronze Age site of Coppa Nevigata in Apulia, Italy, is also needed.

In this brief excursus on a peculiar craft from the past, it is amusing to see how the purple of the sea of Homer coincides with the blue of the sky of the Bible. I also suggested that strings of purple wool could have served a medical purpose, as the coloured yarns mentioned in Mesopotamian medical

texts, or wielded a religious value, as the tekhelet in the Bible, before taking over the fashion industry. Yet, this idea cannot be verified at the moment.

It has often been claimed that the 'Ancients had a synaesthetic approach to colour', which means not restricted to wavelengths hitting the retina, but also affecting a plethora of senses.

This particularly holds true in the case of murex dye, for which the insufferable odour could have latently played a crucial role in its appraisal. You could obtain a purple pigment by indigo or alkanet and the usage of a mordant, as the Holmiensis Papyrus of the fourth century BC instructs you to do, but the purple of the sea produces a sensation that cannot be replicated by mere visual stimuli.

The malodorous trail left by the garment dyed in murex is said to have propelled the rise of the perfume industry. The stench was definitely a source of inspiration, and the rarest aspect pertaining to the dye.

Forbes (1953) speaking of the relation between the origin of alchemy in Mesopotamia and colour perception in the Ancient World says:

'The importance of color to the ancients is manifest from the ancient syllabaries. Thus the 16 Akkadian terms for gold embrace no less than nine that refer to a peculiar color or shade. This color was not only important for the artistic effect to which it was put; it had magical meaning as well. Here we touch a most important aspect of ancient technology. In antiquity scientific and experimental knowledge was never collected as a body of data from which conclusions were drawn as from modern chemical data. Religion, philosophy, and science were still one. Then every bit of chemical knowledge meant deeper knowledge of the Cosmos as a whole, another knot of the "Net of the World," another secret helping to understand the Order of Creation and maybe to master Nature. The name, like any word, could mean power'.

In our age of synthetic colours, we lost this sensibility and cannot help invoking the decipherment of literary sources to further our speculations.

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Illustrations

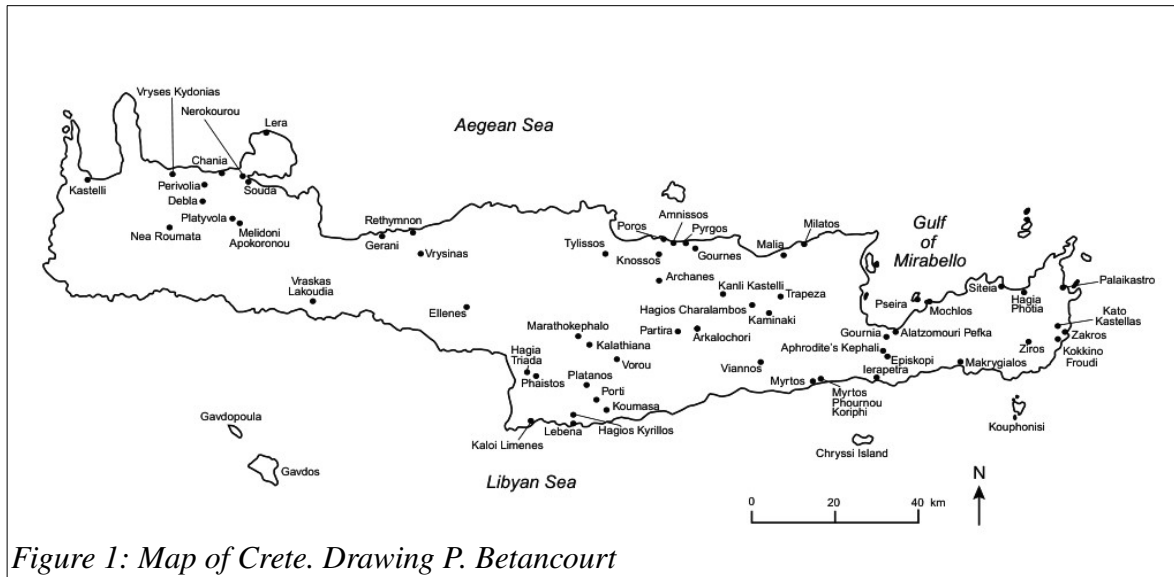


Figure 1: Map of Crete. Drawing P. Betancourt



Figure 3: Basins on Kouphonisi, from Stieglitz



Figure 2: Aerial view of the workshop at Alatzomouri Pefka. By Papanikolopoulos



Figure 6: Linear B tablet X 976 from Knossos



Figure 5: Middens of crushed murex shells from Alatzomouri Pefka, Papanikolopoulos



Figure 4: Hexaplex Trunculus, from wikimedia

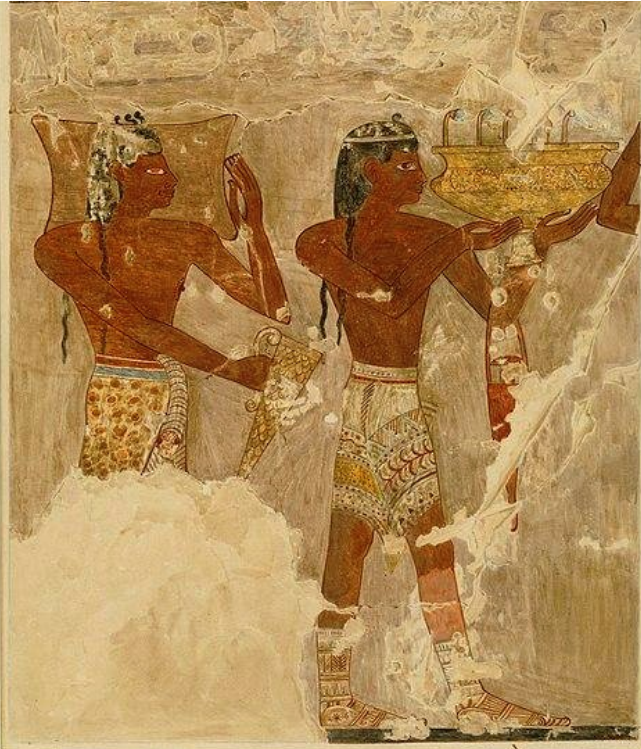


Figure 7: Keftiu bearing gifts, Tomb of Rekhmire, Thebes. Wikimedia

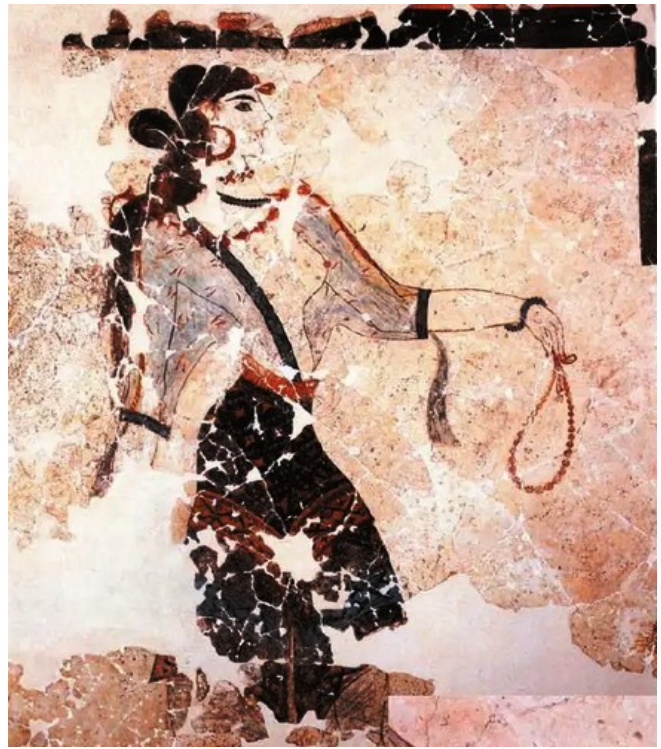


Figure 8: Pearl necklace painted with murex dye on the frescoes of Xeste 3, Akrotiri. Sotiropoulou



Figure 9: Crocuses painted with murex dye on the frescoes of Xeste 3, Akrotiri. Wikimedia