



# The Geography of the Chios Mastic Trade from the 17th through to the 19th Century

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## Research

### Abstract

Chios, one of the largest islands in the Eastern Mediterranean, became internationally known during the 13<sup>th</sup> century due to the production of the Chios mastic in twenty one villages on the south, the resin of the mastic tree (*Pistacia lentiscus* L. var. *chia* (Desf. ex Poiret) DC.), to which many beneficial properties and uses had already been attributed in the antiquity. The international demand for mastic led the various conquerors of Chios to prohibit free trade and lay down a system for monopoly distribution. After the island was conquered by the Ottoman Empire in 1566, following a period of almost two centuries of Genoan rule (1346 to 1566), the valuable product of Chios Mastic constitutes one of the monopolies of the Ottoman State.

The present article aims firstly to present the botanical aspect of Chios Mastic, the mastic tree (*P. lentiscus* var *chia*), as well as the cultivation and harvesting methods of the produce. Secondly, by investigating the historical sources it aims to present the geography of the mastic trade in the East and West from the 17<sup>th</sup> through to the 19<sup>th</sup> century, while at the same time analyzing the monopoly trade system established by the Ottoman State. Thirdly, it analyzes the international demand for the Chios mastic during this same period in the international markets, focussing on the beneficial qualities attributed to it. Finally, it examines the validity of the information published in geographical and traveller's journals during the period in question, evaluating the conclusions of the relevant modern scientific research.

This article is based mainly on studying sources such as geographical and traveller's manuscripts dated back from the 17<sup>th</sup> until the 19<sup>th</sup> century, which are kept in the "Korais" Central Public Historical Library, as well as other historical sources examining the period in question.

### Introduction

The Chios mastic (**μαστιχα**) is the transparent substance, also named "tear", which flows from the mastic trees that grow in southern Chios. Its odor is slightly balsamic, pleasant, while the taste is astringent. The "tear" is pale green at the beginning, later turns transparent, and in the end it becomes lemon-colored. It contains essential oils, mainly masticin or resin, masticinic acid in various forms, alcohols and other substances to a smaller percentage. It is insoluble in water, soluble in ether, in carbon tetrachloride, in acetone and in benzene (Kokkinakis 2000:32).

The mastic tree (*Pistacia lentiscus* L. var. *chia* (Desf. ex Poiret) DC.) belongs to the Anacardiaceae family, with *Pistacia atlantica* Desf., *Pistacia chinensis* Bunge *Pistacia palaestina* Boiss., *Pistacia terebinthus* L., and *Pistacia vera* L. (Savvidis 2000:36-37). All six species have a resinous bark, and are either dioecious or cespitose, however only the resin acquired from *P. lentiscus* L and *P. atlantica* have seen various uses since ancient times. De

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Candolle was the first to define the mastic tree, in 1825, naming it variety *chia*. Consequently, Orphanides named it *P. lentiscus* var *mastichophora* while in 1914 Wiesner cited the mastic tree as *Pistacia lentiscus* var *chia* DC. Recently, Meikle (1954), Yaltrik (1967) and Zohary (1972) mentioned that the mastic tree is a variety of *Pistacia lentiscus* L., which belongs to the Anacardiaceae of the Sapindales order, producing a resinous substance called "mastic" (Savvidis, 2000:34-35).



**Figure 1.** The island of Chios in the Aegean Archipelago.

The mastic tree is a caespitose tree, perennial, with dense foliage. It keeps its foliage throughout the year, its height is 2 to 3 meters, reaching 5 meters at most. Its trunk is low, not straight, with irregular scales similar to those of the pine. At younger ages its color is light ash, becoming brown as it gets older. Its branches are not proportionately long and point downwards; its roots reach 20 meters in depth while its foliage is dense and dark green. The plant branches, after an intervention by the cultivator, into 2 to 4 stems which branch further, creating a dense canopy. The leaves are composite with three or four couples, with a smooth surface and shaped like myrtle. It thrives exclusively on the ground of the **mastichochoria** of Chios, with particular growth on thick and calcareous soil (Vios 1938:96). It grows very slowly, reaching full growth between the 40<sup>th</sup> and 50<sup>th</sup> year. It

starts producing mastic in the 5<sup>th</sup> year, reaching a normal yield of more than 320 grams from the 12<sup>th</sup> year on, eventually reaching a maximum yield of 1 kilo. Its age reaches 100 years, with recorded cases of trees reaching 200 years (Perikos 1990:13).

The mastic tree requires diligent cultivation and care. It is dug each year, in October or March, and fertilized with animal fertilizer which is placed at a depth of one meter. During digging, the ground should not be moist, because this has negative consequences to tree growth and productivity (foliage becomes yellow, mastic extraction is delayed). Reproduction of the mastic tree is done using the "eye" (bud) method; such "eyes" are placed on new branches. These are consequently planted at a depth of 80 centimeters, on parallel lines, at a distance of 3 to 4 meters from each other (Vios 1938:96). The collection of mastic is divided into two phases, scoring and gathering. The scoring (called **kendima** or **kendos**) is the process required to extract mastic from the mastic tree bark, and it takes place from July until August. Specifically, a preparation of the ground surrounding the trunk takes place initially, which includes the flattening and cleaning of the ground of any stones, pieces of wood and weeds. White soil is consequently placed on this surface. After these preliminary processes, the scoring begins, where twice weekly the cultivator scores each tree, from the trunk to the branches, at a distance of approximately 20 centimeters, with a special tool called **kenditiri**. After this procedure, a resinous substance starts to flow, in the form of a tear; it is the mastic, which takes various shapes as it falls on the ground and dries after 15 days. Often, the mastic does not drop to the ground immediately, but rather hangs down from the



**Figure 2.** The Chios mastic trees.

point of piercing, resembling a long crystal, which the cultivators call **kandilera**, meaning candelabra in Greek. The scoring procedure lasts throughout the following 5 to 6 weeks, at the end of which period it is interrupted to allow for the last mastic tears to dry. The first gathering period is concluded at that time, and the second and final one begins. Some of the cultivators do not interrupt gathering, thus making no distinction between gathering periods, but they continue and conclude the scoring, leaving the gathering of the mastic tears for the end.

Gathering the mastic grains is done with the use of a special tool, which is called **kamotiri** or **timitiri**. This **kamotiri** is a metal disk with a wooden handle in the shape of a triangle or square. The **kamotiri** is used to gather the grains one by one, holding the handle of the tool in the palm of the hand, so that the index finger above the disk. After the gathering comes the cleaning of the mastic, which is done as follows: initially, the mastic grains are sieved, to remove any dirt, then they are washed with plenty of water so as to remove any dust and finally they are spread on sheets and left to dry. After having dried, they are cleaned one last time to remove any foreign particles that may remain and they are divided into various categories of mastic, which are known as **fliskari**, **pitta**, **dachttilidopetra**, and **psilo** or **kylisto**. **Fliskari** is the name for mastic grains that are shaped like tears, and are dull and translucent. **Pitta** is mastic in flat pieces. **Dachttilidopetra** is mastic in the shape of a ring-stone, and it is used for chewing, along with **pitta** and **fliskari**. **Psilo** or **kylisto** is called the type of mastic that consists of irregularly shaped, non transparent grains, and it is destined for industry.

This article aims firstly, to the botanical presentation of the mastic tree as well as the cultivation and harvesting methods of Chios Mastic. Secondly, by investigating the available historico-geographical sources it aims to present the geography of the mastic trade in the East and West from the 17<sup>th</sup> through to the 19<sup>th</sup> century, while at the same time analyzing the monopoly trade system established by the Ottoman State. Thirdly, it analyzes the international demand for the Chios mastic during this same period in international markets, focussing on the beneficial qualities attributed to it. Finally, it examines the validity of the information published in geographical and traveller's journals during the period in question, evaluating the conclusions of the relevant modern scientific research.

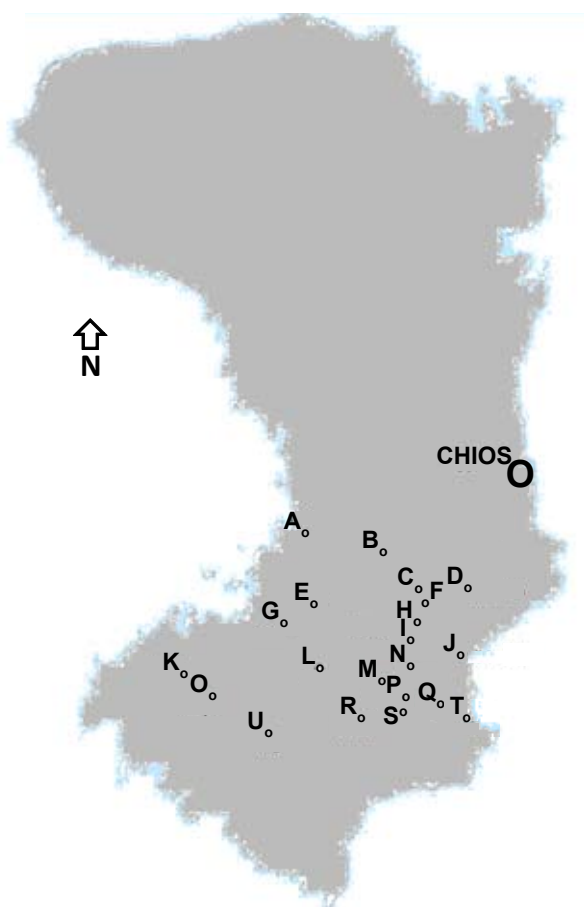
## Methodology

Researchers trying to study the history of Chios during the Ottoman rule have always faced major difficulties finding the historical sources required for the scientific argumentation of their work. This was due both to the many destructions that the island experienced, i.e., the massacre ordered by the Ottomans in 1822, the big earthquake of 1881, and to the events related to the 1912 liberation, which made it impossible to keep historical sources on

the island, especially those concerning Ottoman rule on the island. For this reason, this article evaluates all kinds of historical sources available for the period examined. Therefore, apart from some articles related to the local history, which were published in Greek, the rest of the available historical sources are geographical and travellers' sources written by Western travellers who visited the island at that time.

Methodologically speaking, this article is based mostly on research conducted among geographical and travellers' sources dated back from the 17<sup>th</sup> through to the 19<sup>th</sup> century, which are kept as part of the "Argentis" Collection at the "Koraes" Central Public Library of Chios.

At the same time, it utilized all available historical sources referring to the aforementioned period's history of trade in the Eastern Mediterranean, the history of Chios as well as any commercial dictionaries, manuscripts, letters, etc.



**Figure 3.** The twenty-one "Mastichochoria" (Mastic-Villages) of Chios. A. Lithi, B. Aghios Georgios Sikousis, C. Tholopotami, D. Kalimasia, E. Vessa, F. Mirmigi, G. Elata, H. Mesa Didima, I. Exo Didima, J. Kataraktis, K. Mesta, L. Armolia, M. Kini, N. Pagida, O. Olimpi, P. Vouno, Q. Kalamoti, R. Patrika, S. Flatsia, T. Nenita, U. Pyrgi.

Such sources include also travellers' references, which can be found in the three-volume work of Argentis and Kyriakidis (1946), *Chios as described by Geographers and Travellers of the 8<sup>th</sup> until the 20<sup>th</sup> Century*.

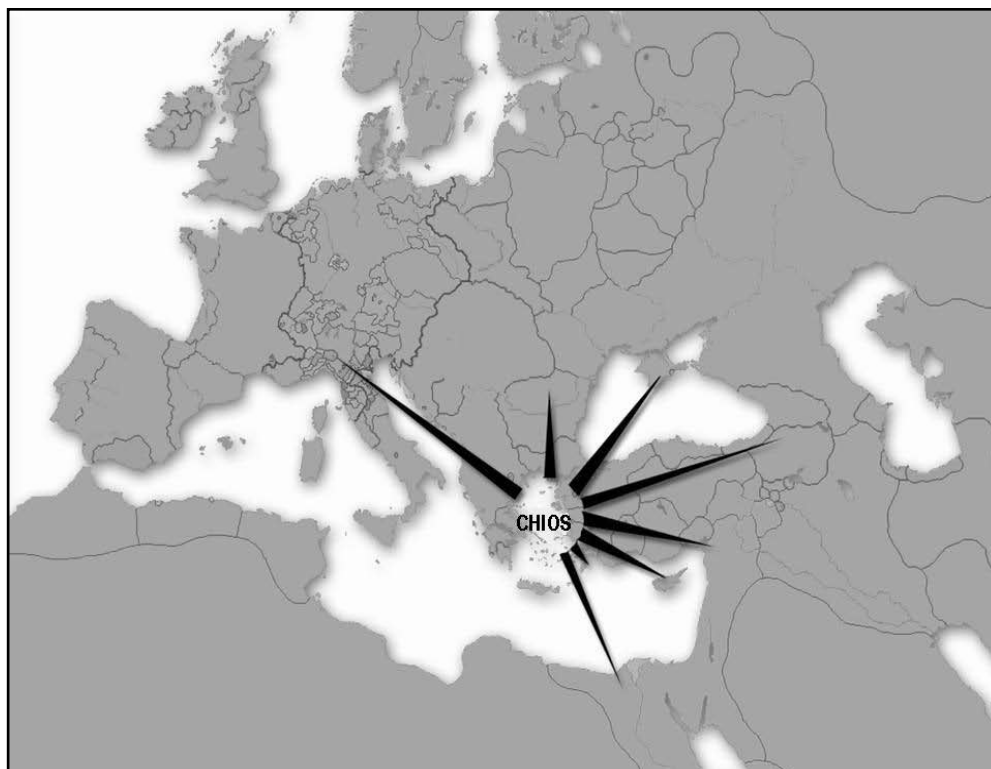
## Historical Background

A new era begins for the development of the international trade of mastic, after Chios was conquered by the Genoans in 1346 and the stock company of Maona was established, which took over the government of the island, thus placing the foundations for the systematic exploitation of the island's profitable resources. As di Tucci characteristically mentions "the Genoans rebuilt the island by means of controlled colonization and repeated and constant care for land cultivation... They revitalized the marble industry as well as the cultivation of mastic, a particularity and exclusivity of Chios, the trade of which was more profitable than anything else" (Di Tucci 1933:418). According to Di Tucci, "the Genoans and Florentines" played a major role in the trade of mastic throughout Europe.

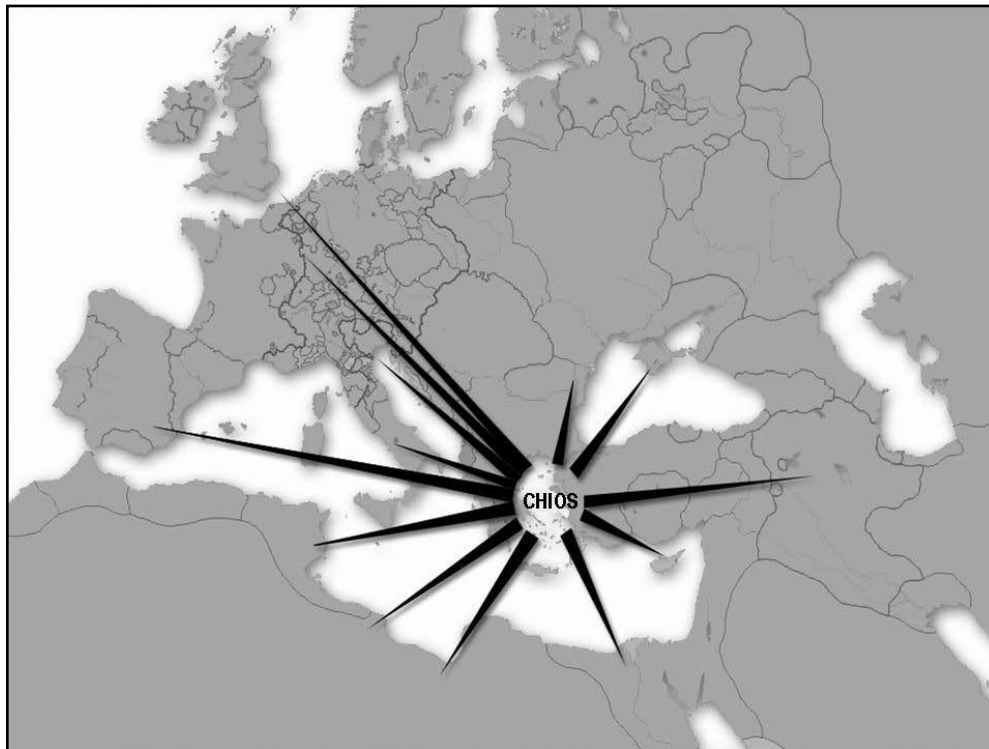
Ever since the first years of the foundation and establishment of Maona in Chios, a special system of distribution of the product was implemented. Aiming always at maintaining a high price, Maona had set a specific quantity to be produced, and when a surplus was produced, that was either to be burnt or kept in storage for next year (Katlak 1908:149). At the same time, a system of international trade for the product was introduced, according to the information provided by N. de Nicolay. Specifically, after the mastic was collected, the Genoan governors of Chios distributed the quantity produced each year among four ministers: the first minister was ordered to supply the whole Greek territory, the next one the West, that is Italy, France, Spain and Germany, the third one was to distribute his allotment to all of Asia Minor and the fourth one to Syria, Egypt and Barbary (the cities of north and west Africa). These four

Ministers had underlings which distributed the mastic to each main state under their jurisdiction (Argentis & Kyriakidis 1946:62). A new company was founded in 1350, the new Maona, and the international trade of mastic was in a manner "divided" among them. Specifically, in 1359, the two companies, the old Maona and the new Maona formed a new company, within which the new Maona maintained the exclusivity of trade of the product in the markets of the Pera district of Constantinople, Romania, Turkey as far as Rhodes, and the markets of the West, while the remaining markets stayed within the jurisdiction of the old company (Pistarino 1993:84). However, as the years went by and the company's cash needs rose, the right to sell the product or the quantity produced was transferred to third parties, usually private companies, at the same time asking for advance payments on the next harvest.

Concerning the geography of the international mastic trade during this period, the greatest part of the quantity produced continued to come from the central storehouse **Casa del Mastic** located in the city of Chios and the two smaller storehouses of Genoa for the West and Rhodes for the East (Pistarino 1993:84). The markets of Rhodes, Cyprus, Egypt, Syria, Armenia, the Middle East and Greece absorbed two thirds of production, while the West barely managed to consume one third (Heyd 1886:290). This is corroborated by the invaluable information pro-



**Figure 4.** International destinations for the Chios Mastic exported during the 14<sup>th</sup> century, after Ierapetritis 2009.



**Figure 5.** International destinations for the Chios Mastic exported during the 15<sup>th</sup> century, after Ierapetritis 2009.

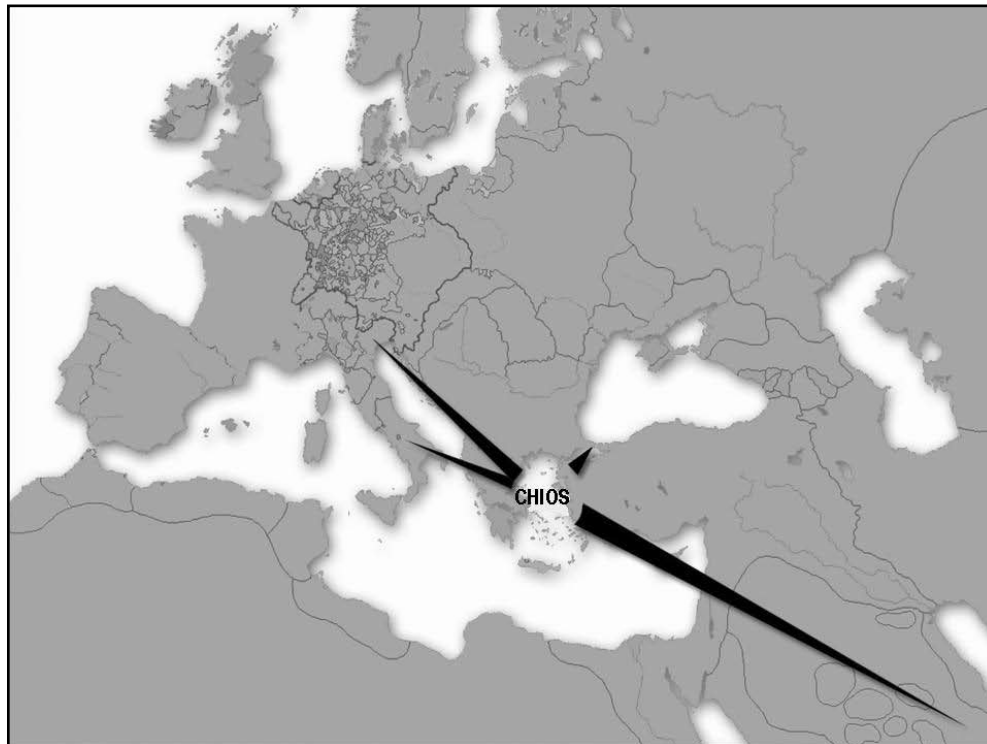
Geo Pistarino offers very valuable information on the main European markets for mastic in Barbary and Italy (Sicily, Calabria, Puglia, Marche, Tuscany and Lombardy). He also mentions that Genoa was the largest European market, whence mastic was consequently transported to Sicily, Catalonia, Ceuta, Oltremonte, Paris, Bruges and London (Pistarino 1993:84). More specialized information is provided by Argentis, who adds that in 1431 mastic was sent to Mallorca and Cadiz, while during the 1448 to 1497 period small quantities were sent to Flanders, Gaeta

vided by Hopf (1888), who mentions that at the end of the 14<sup>th</sup> century the average annual quantity of mastic traded by Maona rose to 430 **kantar** (100 **libres** of gold), of which 120 **kantar** were sent to the countries of the West, 114 **kantar** to the ports of Armenia, Cyprus, Rhodes, Syria and Egypt, while 200 **kantar** were sent to the ports of the Middle East and Romania, which included those of Greece, Constantinople and Crimea (Argentis 1958:484), as much as by G. Pistarino who records that in 1410 a specific quantity was defined as the maximum allowed to export annually to the international markets, rising to no more than 114 **kantar** to Syria and Egypt, 206 **kantar** to Turkey and Romania and only 120 **kantar** to the European markets.

and Tripoli, Sicily, Barbary, Bruges, London, little Armenia, Valencia, Malaga, Tortosa and other cities in Spain, to Ancona, Orange, Tunis, Venice and Naples (Argentis 1958: 487, 508). The monopoly distribution in combination with the high international demand for mastic led many local and foreign entities to smuggling activities<sup>1</sup>.

After the Genoans lost almost all of the areas that used to lie within their sphere of influence (characteristic examples of which being Kaffa and Pera in Constantinople), Chios was their single trade colony in the Orient, and for this reason it became the center of their trade activities, as well as of the activities of merchants from almost ev-

1. The conquerors, however, in an attempt to stifle the mastic contraband imposed strict and inhuman penalties on those who participated in such activities. With regard to these penalties Katlas mentions that "... he who would steal 10 liters or less would be punished with a fine of one to six hyperpyra per ounce or would be subjected to flagellation and ear cutting, should he not be able to afford the fine. He who would steal 17 to 25 liters would be stigmatized, he who would steal 25 to 40 liters would have his nose cut off, he who would steal 40 to 50 liters would have his nose and ears cut off, he who would steal 50 to 80 liters would, aside from nose and ears cutting, be stigmatized, he who would steal 80 to 100 liters would have his nose and ears cut off and be stigmatized, he who would steal 100 to 200 liters would have, aside from all mentioned above, his eye gouged or his hand or leg cut off according to the Commissioner's wishes. He who would steal more than 200 liters would be hanged. Furthermore, a death sentence would be inflicted upon the one who would, having once been punished for theft, be again arrested for stealing 100 liters or upon the perpetrator of a double theft of 50 liters. Said penalties would be also inflicted upon the fence, sometimes even harder ones, whereas the plaintiff was compensated corresponding to the stolen quantities" (Katlas 1908:153-154). Along with the strict penalties it had established, Maona kept a small fleet of 38 small ships which had the duty to pursue the ships that participated in the contraband mastic (Mitsis 1998:28).



**Figure 6.** International destinations for the Chios Mastic exported during the 17<sup>th</sup> century, after Ilerapetritis 2009.

ery nation, including the French, English, Italian, Spanish, Egyptian, Syrian and Arab.

At the same time, it was a port for the trade ships coming from Genoa and heading to Syria, Egypt and Jerusalem. Additionally, the port of Chios was included in the routes Ancona – Euboia – Adrianople – Chios and Genoa – Chios – Alexandria or Genoa – Chios – Pera (Constantinople) and consequently to all of the trading cities in southern Russia as well as to central Asia via the Black Sea. Also worthy of mention is the local trade network between Chios and Izmir, Rhodes and Crete (Argentis 1958:483).

#### ***Chios mastic distribution under the Ottomans***

In 1566, the Ottoman State under Suleiman the Magnificent ends the Genoan occupation of Chios, and as a result it also ends the existence of the only western vanguard for almost fifteen years in the Ottoman sea<sup>2</sup>. The Ottoman state had economic and political reasons to delay the taking of Chios. The economic reasons are mainly related to the income of a tribute levied on the Genoans which in 1415 rose to 4,000 ducats annually, in exchange

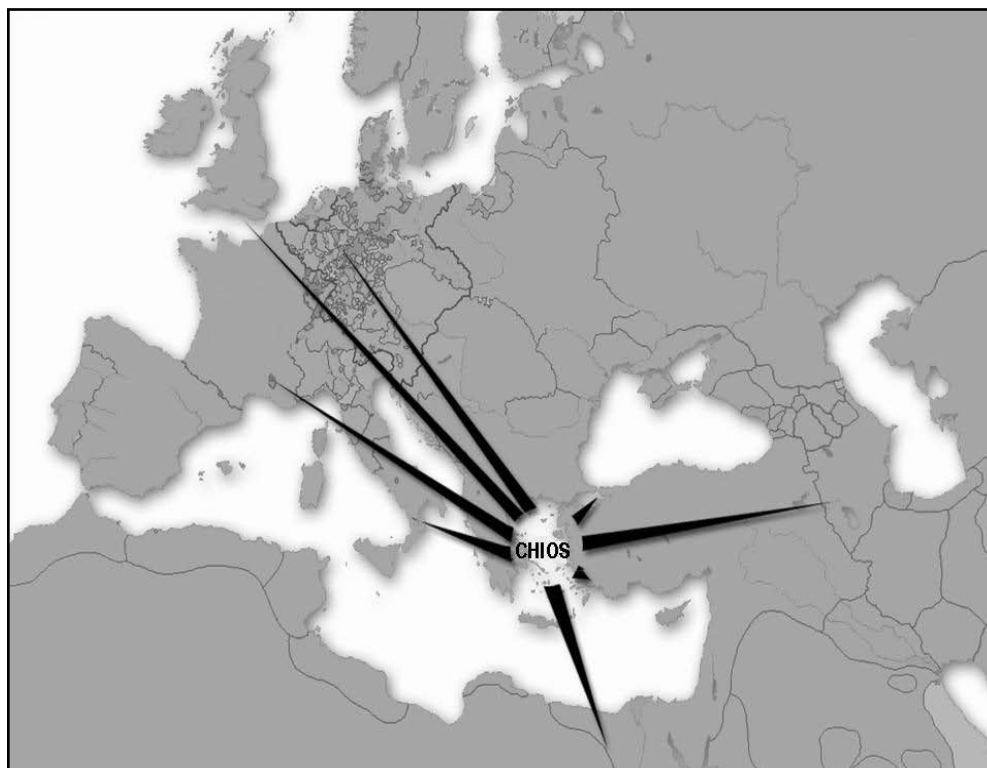
for commercial rights in the Ottoman state (Stephanopoli 1912:50). In 1418, this tribute rose to 6,000 ducats, while in 1456, in order to stop the campaign of Mehmet II and the taking of Chios, the Genoans living in Chios agreed to the payment of a tribute rising to 10,000 ducats. Among the political reasons, one can include the will to keep up a non hostile western vanguard for commerce in the Aegean area, as well as the existing good relations of the Genoans up until 1528, when Genoa went from the French camp into the Spanish one (Frangakis

-Syrett 1995:14). The inability of the Genoans to pay this tribute, due to the dire financial straits that the economy of Chios was in, was the excuse for the Ottoman conquest of Chios without a fight in 1566, thus ending the Genoan rule and governance of Chios (Kattas 1908:115).

After the conquest of Chios in 1566, the Ottoman State wanted to keep Chios as a commercial center of trade with the Europeans in the West, since the latter maintained a gather point for goods from the Middle and Far East in Cesme, the city across the sea from Chios. This view is substantiated by a relevant imperial decree that required, from 1528 and 1529, the passage of all valuable goods (silk, etc) from the customs house in the port of Cesme and then through Chios, while the agricultural products, cereals, fruit and other of lesser economic interest would pass through the customs houses of other ports<sup>3</sup> (Goffman 1985:24). The Sublime Porte, aiming to maximize state gains from the distribution of mastic, put the twenty one Mastic villages of Chios under special governance, at the same time giving a series of special advantages to their inhabitants, in exchange for the collection and delivery of the quantities of the valuable mastic that were produced

2. The Ottoman Empire had already taken possession of Lesbos (1462), Euboia (1470), Rhodes (1522) and Samos (1550).

3. During the second half of the 14<sup>th</sup> century constant battles in the larger area of Smyrna, which created various problems by shaping an environment of insecurity and uncertainty, resulted in the transfer of Smyrna's commercial hub in Cesme, the town located exactly across the island of Chios, thereby making this hub the center of all foreign trade transactions in the East (Frangakis-Syrett 1992:23).



**Figure 7.** International destinations for the Chios Mastic exported during the 18<sup>th</sup> century, after Ierapetritis 2009.

in his works” (Mavropoulos 1920:218). The mastic tax was a special tax which burdened each village separately and it was preferably paid in a quantity of mastic<sup>4</sup>. The mastic tax imposed made the village a civic entity responsible for paying it; consequently, within every such entity a tax was placed on the inhabitants of the village. Relative to this, the lessor of the mastic tax disposed of and kept a summary of all the trees exploited by each individual producer in the village (Pougeois 1869:243)<sup>5,6,7,8</sup>. In the case where the yield was not as good during a year, the producer was required to

as a levy. It belonged to the Valide Sultana and was administratively directly dependent on the Seraglio, surpassing the state administration authorities and the structures of the Chios *sanjak*. The administration of these villages was handled by the Aga of the mastic, or Sakiz-Emin, who was the lessor of the mastic tax. According to the imperial decree by Osman III issued in 1755, he had “absolute power over them and nobody has the right to intervene

take out a loan, in order to pay one’s contribution to the public fund, usually at a high interest, even mortgaging his yield for a price much less than the yield was actually worth. If during the next year the producer was still unable to pay one’s obligations, one would even proceed to uproot his trees, preferring to lose one’s fortune than work without pay (Testevuide 1878:364). The quantity of mastic destined for sale and export to each international

4. The twenty one mastic villages include the village of Armolia, Elata, Exo Didima, Flatsia, Kalamoti, Kalimasia, Kataraktis, Kini, Lithi, Mesa Didima, Mesta, Pyrgi, Aghios Georgios Sikousis, Mermigi, Pagida, Patrika, Nenita, Olympi, Tholopotami, Vessa, and Vouno (see Figure 3).

5. With regard to the quantities of the mastic provided G. A. Olivier (1801-1807) informs as follows: “This product reaches and exceeds the average annual quantity of 50.000 oka (measure of weight equal to 1282 grams). Of those, 21.000 belong to the Aga, who is the rentee of this product, and are delivered by the cultivators as payment of their personal tax. Any surplus quantity is sold for 50 paras per oka (approximately 16 soldia per libre), whereas they are forbidden, under the threat of a strict penalty, from selling or giving to anyone else except the rentee, (in Argenti & Kyriakidis 1946:849).

6. J.Galland (1754) notes that: “In order to collect all this mastic, each and every one of the producing villages shall be burdened with the sum of oka corresponding to the larger or smaller number of trees he owns, as they know approximately how much each tree produces. As not all years are equally good or bad for all regions, where such trees grow, those who collect more than they are obliged to give shall sell to those who have collected less than prescribed for 60 aspra (silver coins) per oka, because those who can help each other. Otherwise they would have to buy from the customs officer for two grosses per oka”.

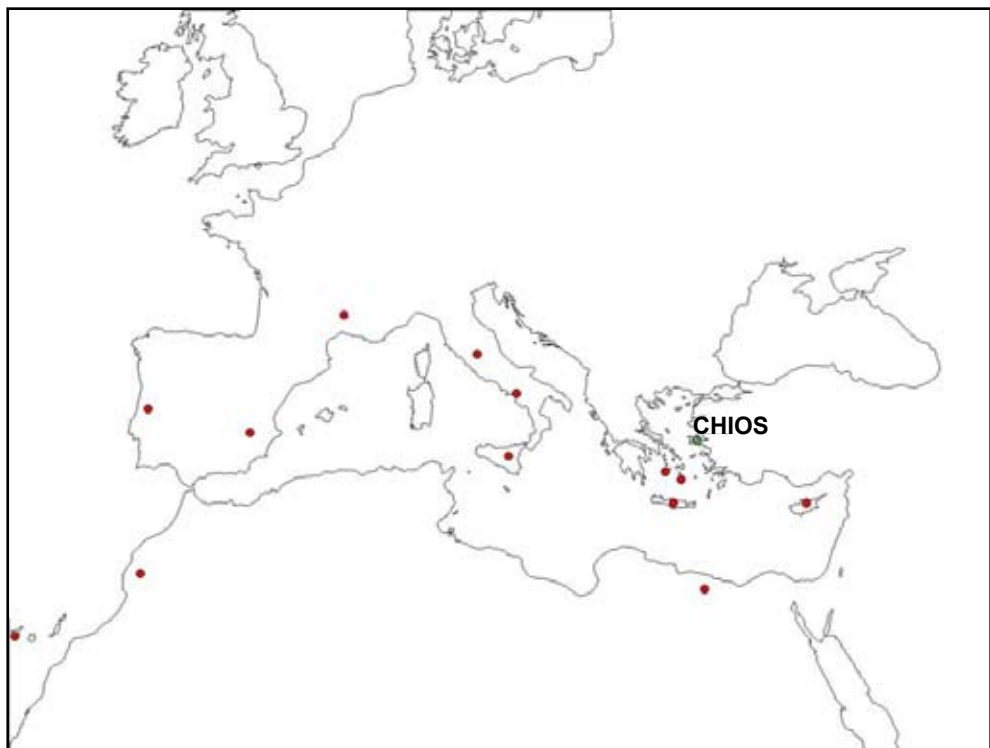
7. The same information is mentioned by B. De Monconys “... the owners on the other hand are obliged to individually supply according to the price prescribed for him and corresponding to their number of trees or pay two grosses per missing oka” (Argenti & Kyriakidis 1946:199-200).

8. Relative to this is also the record of the Italian geographer F. Piacenza: “... the trees that exceed in quantity the 100.000 taking into account that each of the mentioned villages, which are not more than 22, shall be taxed for the whole harvest with a specific number of oka corresponding to the larger or smaller count of trees he owns, because they do not exactly know how much each tree safely produces, as all harvests do not produce this quantity. Moreover, trade is not allowed on the island on the penalty of death, as well as the storage of the harvest except for the customs officer or the one who obtained the license to purchase ...” (Argenti & Kyriakidis 1946:486-487).

market was placed into crates or sacks which bore a special seal of the Sultan, a necessary element for the free and unhindered exportation of goods from the port of Chios (Argentis & Kyriakidis 1946:564). As recorded by A. De Barres, any quantity found without the relevant seal was considered to be stolen (Argentis & Kyriakidis 1946:248). Since the end of the 16<sup>th</sup> and the beginning of the 17<sup>th</sup> century one can see the Ottoman Empire's intentions to maintain but also further develop the trade of mastic in the international markets. However, there are no indications that the systematically organized network for the distribution of mastic established by the Genoan predecessors was maintained, since the distribution to the international markets was apparently handled by independent merchants. During the period in question, mastic was found in every known market in the East and West. The exported quantity of mastic was transported in crates, from Chios directly to the international markets. J. Somer recorded that in 1641 "mastic is sent from Chios in small crates, to India and Italia" (Argentis & Kyriakidis 1946:1432), while Magni added in 1673 that "after it is carefully collected it is exported to the most distant places" (Argentis &



**Figure 8.** International destinations for the Chios Mastic exported during the 19th century, after Ierapetritis 2009.



**Figure 9.** Areas where the production of goods similar to the Mastic of Chios has been recorded.



Kyriakidis 1946:263). A few years later, in 1688, O. Dapper from Holland recorded the strong presence of mastic and other products from Chios in the international trade scene, serving English and Dutch interests (Argentis & Kyriakidis 1946:427). During the period when the Venetians conquered Chios in 1694, mastic was sold in the Venetian market as well as in the other markets of Europe as noted by A. Zeno (Zeno 1694:41). During the whole of the 17<sup>th</sup> century, the best quality produced was sent to Constantinople, and “after supplying the imperial court to a sufficient degree they pile up the worst to be sold” as noted by an anonymous traveller (Argentis & Kyriakidis 1946:541-542)

There are indications that during the 18<sup>th</sup> century the transportation of that valuable good was made over the sea to the markets of the West and to other cities important to international trade, such as Constantinople for the Oriental markets and Marseilles for the Occidental markets. During the 1711 to 1712 period, M. O. Eneman recorded the European markets to which the product is exported: “... every foreigner shall be supplied with mastic, which is transported to Italy, England, Holland, and elsewhere” (Argentis & Kyriakidis 1946:1586). The same writer made the commercial practice implemented during the period of Genoan occupation known, the selling in advance of the yield, mentioning the case where “a few minutes ago an English merchant from Constantinople bought all this mastic from the Sultan for 16,000 Swedish thalers. Such a thing can easily be done since this type can be kept for a series of years” (Argentis & Kyriakidis 1946:1586). Mastic was sold on the European markets during the following decades of the 18<sup>th</sup> century as well. The English traveller Maihows noted that in 1750 “the greatest part of this medicine which is used in Europe comes from the produce of this island...” (Argentis & Kyriakidis 1946:733-736). Mastic reaches the markets of the West via Marseilles (Philibert 1761:371) in crates. Concerning the packaging of these crates, Du Citoyen noted that at the bottom of these one could find the common mastic, at the middle the average quality mastic and at the top the best quality mastic (Du Citoyen 1761:120).

During the 19<sup>th</sup> century it was discovered that the valuable product of mastic was “offered for trade throughout the Orient, from Algeria to Russia” (Rougou 1892:497). Its transportation to the markets of the Occident took place over land as well, as information reported quantities of mastic transported via Thessalonica and Trieste bound for the French markets. The consul Bourvilles, in a hand-written letter to the Foreign Minister of France mentioned that he sent a quantity of mastic via ship which disembarked three barrels of Chios mastic, that these specific ones bore a certificate of origin from Chios, and that they were at the port of Thessalonica destined for France via Trieste

(Bourvilles 1811:173). After the development of Izmir as the main transportation hub during the end of the 19<sup>th</sup> century (1900), it is found that the transportation of mastic, to the markets of the Occident as much as to the markets of the Orient, was made via Izmir as well as to France, to the United States, to England, to Austria, to Russia, to Holland, to Spain, to Belgium, to Italy, to Greece... ” (Verney & Dambmann 1900:641).

#### *Substitutes for the Chios mastic*

A bibliographical examination of the production of products similar to mastic, which in some cases were sold concurrently to mastic in the international markets are found in: the reports of Pliny, concerning the production of mastic, except for Chios, in India and Arabia (Pagidas 1946:21-22), Galenas saying that he found it in the Komi tou Gialou village in Cyprus, and Orphanides who said that he gathered mastic similar to that of Chios in the islands of Amorgos and Antiparos, which belong to the Cyclades. Later on, between the 12<sup>th</sup> and the 13<sup>th</sup> century, I. E. Beithar mentioned that the best mastic (**mastaka**<sup>9</sup>) could be found in Chios, implying that mastic could also be found elsewhere (Argentis & Kyriakidis 1946:1297). Bellovacensis presented mastic (**kokkomastichi**<sup>10</sup>) as being produced in India as well in the year 1244, while acknowledging the superior quality of the mastic of Chios. Since mid 13<sup>th</sup> century, it could be seen from descriptions by travellers, such as R. Von Ems, that the exclusivity of its production in Chios was more widely known (Argentis & Kyriakidis 1946:1297).

While seeking the true causes of the mastic produce's exclusivity of the south Chios' twenty-one villages, it is worth noting an interesting scenario depicted by S. Xenos in his scientific paper “History of stafidokarpos”, as re-printed by D.L. Zografos. More specifically, in the respective paper, S. Xenos justifies the unique produce of mastic at Chios island, as the result of the underwater volcanoes' presence and activity in the wider area of the island (Zografos 1924:313).

Furthermore, it is also worth mentioning a popular people's religious belief at that time, according to which the phenomenon of the resin tearing of the precious gum product was assumed as gift and blessing of Saint Isidore, who had been martyred in 253 A.D. following a brutal pulling through thorny shrubs and stones in the narrow streets of the twenty-one villages' region. The aforementioned belief is further evidenced in the reports of foreign travellers, such as J. Maurand, C. Magni and C. Cerbani who visited the island and recorded information on the valuable product of Chios mastic (Argentis & Kyriakidis 1946:32,263,275). Particularly C. Cerbani in his scripts implicitly refers to a well known (in those days) tradition-

9. One of its possible names in the Arab states.

10. Another name for mastic in the international markets.

al belief as per which the shrubs cried tears in the form of mastic gum after watching Saint Isidore being drawn through stones and shrubs by his nasty executioners.

There exist however foreign writers who mentioned the production of goods similar to mastic in other places except Chios, which had similar qualities. So, according to the recorded writings of the travellers and geographers in the period in question, products similar to mastic were produced in Crete (Pococke 1946:673, Zeno 1694:41); in Milos, Amorgos and Cyprus (Pococke 1946:673); in the coastal areas of the Tyrrhenian Sea, and more specifically from Tuscany to the outskirts of Naples (Champagnac & Olivier 1858:2251, Zeno 1694:41); in France (Champagnac & Olivier 1858:2251, Laurent 1946); in Egypt (Thompson 1744:319); in Spain (Champagnac & Olivier 1858:2251, Mayes 1956:139); in Sicily and Portugal (Choiseul-Gouffier 1790); in India, (Argenti 1958:477); in Palestine (Pococke 1946:673) and in the Canary Islands (Mayes 1956:139), specifically Tenerife (De Salabery 799:254) and the coast of Morocco (Chambers 1882:362).

#### ***International Differentiation of the Demand During the Period from the 17<sup>th</sup> to the 19<sup>th</sup> Century***

The international use of the mastic in demand during the period of the Ottoman reign, as can be ascertained by studying the sources, is not homogenous. By dividing the international markets into Occidental and Oriental, one can conclude that the interest of the public in the cities of the Oriental Mediterranean (Constantinople, Izmir, Cairo, Chios, etc.) focused mainly on the consumption of unrefined mastic for chewing, and to a lesser extent on its use in bakery, confectionery, perfumery, distillery and the production of perfumes.

The French nobleman A. Barres, while visiting Chios in 1673, recorded in his work that mastic was primarily consumed in Turkey (Argenti & Kyriakidis 1946:248), while the German wanderer and theologian J. M. Wansleben, who visited Chios somewhat later (1673 to 1674) recorder its consumption in Chios despite any limitations on internal consumption placed by the Ottoman state (Argenti & Kyriakidis 1946:290). Of a similar vein were the reports of the Dutch traveller and painter C. de Bruyn who observed in 1678 that the product is primarily consumed by Greeks as well (Argenti & Kyriakidis 1946:331-332). The particular demand for the primary consumption of unrefined mastic in the Sultan's **seraglio** and throughout Constantinople in general during the end of the 17<sup>th</sup> century is noted by foreign visitors to Chios. Specifically, the Dutch geographer and doctor O. Dapper, while visiting Chios in 1688, named the women of the Seraglio as the final consumers (Argenti & Kyriakidis 1946:217-219)<sup>11</sup>. Other available sources dating from the 18<sup>th</sup> century present the

dissemination of primary consumption of mastic for chewing into other regions of the Ottoman empire, such as in Izmir, Cairo, Palestine and Greece (Tancoigne, De Busiere, Galland, Pococke and Olivier in Argenti & Kyriakidis 1946:906, 1142, 697-698, 849 and 674, respectively, Borthwick 1881:35, De Kay 1833:40, Depping 1946, Murray 1855:28, Thompson 1744:318-319).

Making the chewing of mastic more popular in many regions of the Ottoman Empire during the 18<sup>th</sup> and 19<sup>th</sup> century was accompanied by the simultaneous distribution of information worldwide concerning its beneficial qualities (Lithgow 1770:99). The Italian geographer and jurist F. Piacenza (Argenti & Kyriakidis 1946:485) as well as Marechal (Marechal 1838:196) and Wilkinson (Wilkinson 1806:356-257) noted the contribution of mastic to achieving a pleasant and fragrant breath. Additionally, the knowledge about the contribution of mastic to dental and oral hygiene was common (Du Citoyen 1761:120, Mislin 1858:178). Dapper mentions that the contribution of chewing unrefined mastic to oral hygiene is certainly known to the women of the Seraglio (Dapper 1703:54-55).

Other beneficial qualities attributed to chewing and consuming unrefined mastic were the strengthening of the heart, the expulsion of phlegm and combating catarrh and fever. Characteristically, the German traveller and theologian J. M. Wansleben (1677) mentioned that mastic has the advantage of strengthening the heart when one swallows three or four grains in the morning (Argenti & Kyriakidis 1946:290). Concerning the expulsion of phlegm, chewing unrefined mastic is mentioned by the English merchant Randolph (1687:49), while F. Piacenza noted that chewing mastic helps alleviate catarrh (Argenti & Kyriakidis 1946:485). Additionally, Dapper mentioned the attributes of mastic in the relief of the stomach, specifically that mastic was widely used in medicine and provided great service against many ailments, especially those of the stomach, since when taken orally it alleviated pain and the tendency to vomit, it restored the appetite, helped digestion and strengthened the stomach (Dapper 1703:219-220). Elsewhere, he mentioned that mastic, applied as a plaster on the temples of the head is an analgesic countering dental pain (Dapper 1703:219-220), while when smoked it fought headaches (Argenti & Kyriakidis 1946:567-681). Of great importance are the reports by Pope and Thompson, mentioning the therapeutic qualities of mastic against tuberculosis, which was in expansion during the end of the 18<sup>th</sup> century (Pope 1780:114, Thompson 1744:319).

Parallel to the dissemination of information on the beneficial qualities of mastic in geographical and traveller's writings, the doubt about the beneficial qualities attributed to Chios mastic is also recorded. The English traveller Grif-

11. This is mentioned by de Salaberry as well (1799:392).

fiths (1805), knowing of the internationally disseminated beneficial qualities of mastic for the human organism in general, added that "... many other wonderful qualities attributed to it (mastic) by the inhabitants of Chios are very much to be doubted" (Griffiths 1918:46-51)<sup>12</sup> while the French orientalist J. Galland, after a four month stay in Chios, mentioned the protection of the teeth that "... given time the teeth of the inhabitants of Chios are dug around and look too long. In general one can say that there exists no woman in Chios that has beautiful teeth..." (Argentis & Kyriakidis 1946:698).

Ever since the 1<sup>st</sup> century CE, the use of mastic in the production of pharmaceutical compounds was known to combat a series of illnesses<sup>13</sup>. Foreign travellers or visitors to the Eastern Mediterranean and Chios from the 17<sup>th</sup> century on mention that the invaluable mastic was a necessary component of the medicine produced (Argentis & Kyriakidis 1946:248). Of interest is the information that mastic was used in the production of ointments for wounds (Argentis & Kyriakidis 1946:1570). During the 18<sup>th</sup> century, mastic continued to be an important element of a series of medicines, including analgesics for stomach pains (Choiseul-Gouffier 1823:89). It is worth mentioning that the Chios historian, Zolotas, makes a connection between the protection that the inhabitants of the twenty-one **mastichocho** enjoyed thanks to the Valide Sultana and the production of a specific medicine made with mastic (Zolotas 1926:217). This knowledge is enriched by the foreign travellers and visitors to the Eastern Mediterranean and Chios since the 16<sup>th</sup> century; J. Pelerne, A. Barres, L. Chevalier (Argentis & Kyriakidis 1946:80, 248, 1570 respectively).

The use of mastic in baking and confections was especially wide-spread internationally since the 17<sup>th</sup> century. Important mentions are made concerning the use of mastic in the production of bread, which was considered healthier for the stomach for the inclusion of mastic. Characteristic is the report of the Belgian nobleman de Stochove (1946) concerning the use of mastic in baking in the limited environment of the Seraglio's kitchen (Argentis & Kyriakidis 1946:176-177). J. M. Wansleben did not limit its use to the confines of the Seraglio, while at the same time he provided another dimension to the use of mastic in baking. Specifically he mentioned that "wealthy individuals mix it in the dough to make the bread taste better..." thus making the use of mastic in the production of bread a privilege of the nobles, which would make bread taste better (Argentis & Kyriakidis 1946:290). The traveller's and geographical re-

ports that speak of the mastic sweets are very recent, the first being the travelogues of the 1830s (Horton 1929:192, Pauli 1881:13, Testevuide 1878:367). Of interest are also the views of Haggard, who transported his impressions of Chios, the **mastichocho** and the mastic confections (Haggard 1886:600).

Concerning the use of mastic in alcoholic drinks, the first information about this is found in travelogues of the 18<sup>th</sup> and 19<sup>th</sup> century (Findlay 1868:340, Horton 1929:192, Rodenberg 1898:93-94, Rougon 1892:501, Slade 1832:62, Vom Rath 1888:324). A noteworthy mention of a mastic drink, **raki**, is made in the work of the French doctor Testevuide. He visited Chios in 1877 and recorded the way it is produced as well as the destination markets to which it was headed. **Raki** is consumed in areas of the West as well: "it is sent in large bottles from Marseilles to Constantinople and throughout the Orient" (Testevuide 1878:366). During the last decade of the 19<sup>th</sup> century, one could discern the importance of mastic **raki** for the economy of Chios. The English clergyman Tozer, while visiting Chios in 1886 records: "the main product for exportation is this alcoholic drink, called **masticha** liquor, famous throughout the Aegean, later on we saw very large flasks of it transferred to the steamer we returned on" (Tozer 1890:144-145).

One of the most popular uses of mastic was as an aromatic substance. The German traveller and theologian J. M. Wansleben mentions that "in Egypt the noblemen use it (mastic) to perfume the containers where they place the potable water of the Nile, which is the sweetest and best tasting water in the world, so that it can be made even more pleasant to the taste" (Argentis & Kyriakidis 1946:290). Concerning the pleasant smell of the mastic and its use as a treat during the 19<sup>th</sup> century as well, mention is made by de Coulanges (1856): "... the women of Izmir and Constantinople chew it to smell nice or they burn it in fragrant censers" (de Coulanges 1856:9-10), while similar mentions are made by others as well (Faucher in Argentis & Kyriakidis 1946:1875, Rodenberg 1898:93-94, and others).

The consumption and the destination of the requisite quantity of mastic in the markets of the West was differentiated as it seems that it was destined for industrial use as an ingredient in the production of varnishes, colors and medicines. Testevuide records: "Europe consumes quite a large quantity for varnishes" (Testevuide 1878:366), a quantity which, according to the available bibliographies, was of very good quality. The German geographer Pauli,

12. It should, however, be noted that these disputes do not pertain to the beneficial qualities of mastic for the mouth hygiene, for which J. Griffiths mentions: "... of the beautiful rows of daises, which decorates the mouths of the island's inhabitants, it is easy to conclude that this thinly sprouting gum is a wonderful teeth protection" (Griffiths 1918:46-51).

13. Pliny (1st A.D.) (N.H. XII, 72) "landatissima autem Chia candida", Scribonius Largus (1st A.D.) «Compositiones, mastic in paste for toache» chap. 6 "mastic in medicine for inflammation of stomach" chpps. 108, 110., Gallenos of Pergamon (2nd A.D.). "Mastic from Chios mixed in antidote against baldness, mange and snake bite", Lib. I, chap. 2, pp. 385, "Mastic of Chios in prescription for inflammation of stomach, intestines and liver", Lib. VII, chap.12, p.6,pp.68-9», (Argenti 1936:100).

in an announcement concerning the island of Chios notes that “The most exclusive, the tear mastic, is used in selected varnishes and marmalades” (Pauli 1880-81:31). Georgiades tried to quantify the exportation of mastic to Europe to be used in the production of varnishes, in his geographical treatise. Characteristically, he mentioned: “Its local utility is limited to the production of **raki**. Mastic is used in this drink as a secondary ingredient that gives a fragrant smell. As revealed by its name, it is a sweet chewing mastic (French: **masticatoire**) used daily by ladies. However, these consumers take in but one eighth of the yield, with the rest exported to Europe for the producers of varnishes” (Georgiades 1885:58).

A radical technological advance, as usually happens, contributed in its way, so as the years went by new chemical substances were discovered which pushed natural mastic away from being the main material in the production of varnishes, reducing demand, as well as the price of mastic in European markets: “The greatest consumption is recorded for the lower quality mastic, which was only used as the main ingredient of varnishes. But Chios was hounded by mischance in this field as well. A new chemistry came forth that boiled in its beakers and vials substances that rendered the expensive mastic obsolete in the production of varnishes and reduced its value so much that the resin of Chios is now worth as many in grosses as it used to be worth in Turkish pounds, that is the one hundredth” (Argentis & Kyriakidis 1946:1252). This is mentioned by the German P. Lindau (1900), when he wandered Chios during the year 1898. The vertical drop in European demand and in consequence the price of mastic was also recorded by Rodenberg “... and the resin trade, a resin which grows nowhere else in the world as well as it does in Chios, which was earlier paid for on a production of 100,000 kilos at 18 franks a kilo, has now dropped in price because it was displaced as a varnish and gloss by chemical substances and is now mainly dependent on the Turkish market” (Rodenberg 1898:93-94).

Over the last years, important progress has been made in scientific research concerning the beneficial qualities of Chios mastic and its ingredients, the results of which confirm that an important part of the historical findings analyzed in the present article. The results of modern research support that the main qualities of Chios mastic are its antioxidant and antibacterial action, the prevention and treatment of illnesses of the peptic system, the healing of wounds and the contribution of mastic to oral hygiene. Firstly, various studies analyzed and revealed the potent protective effect of the phenolic essence of mastic against low density lipoprotein (LDL) oxidation which is inculcated in the appearance of atherosclerosis (Andrikopoulos *et al.* 2002). Despite the fact that this research was conducted *in-vitro*, it is estimated that mastic could be used as a natural antioxidant, reducing the levels of LDL associated cholesterol and sugar in the blood (Petsios 2003:23) Secondly, the advantages of mastic were studied to an im-

portant extent, as a material for the study of the chewing process and as a material to help counter orthodontic and dental or oral problems. Specifically, modern research has shown that chewing unrefined mastic as well as mastic chewing gum contributes to the prevention of caries, periodontal illnesses and other diseases of the oral cavity in general, as it limits the creation of microbe plaques and reduces bacterial growth in the oral cavity (e.g., Heath & Anastasiadou 1997, lauk *et al.* 1996, Koperal *et al.* 2000, Mouhajir *et al.* 2001, Takahashi *et al.* 2003, Topitsoglou-Themeli *et al.* 1984). Added to these results are the scientific findings concerning the particular and hard taste which causes saliva to flow and provides an impressive counter to xerostomia (Rosenberg 2001). Thirdly, of special interest are the results of recent research that connects mastic to the treatment of illnesses of the peptic system, supporting claims stated centuries ago concerning the use of mastic as a means to relieve stomach pains, indigestion, gastric problems, a tendency to vomit and gastric pain. The antibacterial and antimicrobial action of mastic in the digestive system contributes to the hygiene of the gastric membrane while at the same time it relieves from indigestion, local inflammation, illnesses of the stomach membrane and duodenal ulcer (e.g., Al-Habal *et al.* 1984, Al-Said *et al.* 1986). Additionally, clinical trials have confirmed that small quantities of mastic combat *Helicobacter pylori* and in consequence can treat peptic ulcers in a relatively short time span (Huwez *et al.* 1998). Concerning the use of mastic as a healing means for the protection or healing of wounds or surgical scars, recent research has shown that mastic has excellent healing capacities while at the same time causes no undesired side effects to the skin (Lesesne 1992).

## Conclusions

This article highlights the importance of historical geography for ethnobotanical research. Useful information enriching our knowledge about the beneficial qualities and the various uses of the products of a plant found in Chios, which were recorded by travellers and geographers of the Eastern Mediterranean many centuries ago, can still set the directions of modern research. Such geographic and travellers' sources have been proven extremely useful for the discovery of “new” products, means and methods which could be used to meet modern needs and to contribute to safeguarding of human health. At the same time, this historic-geographic research has proven quite useful since it informed us on, and recorded the production of, products similar to the mastic of Chios, which were found in other places all over the world.

An important ascertainment is also the constant interest of those who became acquainted with the mastic of Chios from the 17<sup>th</sup> until the 19<sup>th</sup> century by visiting southern Chios for different reasons and on different missions. Each time their purposes were to inform the internation-

al community primarily on the economic and commercial significance of the product through the disclosure of information aimed for international markets consuming the product and secondarily on the known uses and beneficial qualities of Chios mastic. Their texts contributed further to the promotion and increase of the product's international demand, whereas many potential entrepreneurs were urged to try to cultivate the valuable plant in areas of the West, none were successful.

Finally, this paper encourages the study of the example of the Chios mastic through a detailed research of other relative geographic and travellers' sources referring to the Eastern Mediterranean. The objective of all relative studies should be discovering in the above sources any new qualities and/or new products with recorded beneficial qualities and uses, which had been documented at a time when it was especially popular to search for answers and remedies for difficult problems in products and substances coming straight from nature.

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