

Chapter 1

The Alas Sites – Geography, History and Cultural Heritage

The Polichnitos site (Lesvos, Greece)

Theodora Petanidou

Lesvos, with 87,151 inhabitants and an area of 1,636 km², is the second largest island in the Aegean after Crete. Even today the island has a traditional rural character, with little industry (olive groves, fishing and livestock; oil and some soap and fish-salting plants). The traditional natural resources of the island, mainly olive oil, have resulted in several constructions of cultural value, mainly olive presses and soap factories, some of them restored in recent decades, many left in ruins. Because of its traditional food products, Lesvos has been listed as a “*site remarquable du goût*”, a European label linking a product with a site. It is still famous for its *ouzo*, a locally produced liquor made of alcohol distilled with anise, as well as two gastronomic delicacies related to the use of salt: the salted sardines of Kalloni gulf, and cheese-making all over the island. Endowed with a unique local cuisine and specialties of chiefly local appeal, the island could well be a notable destination for gastronomic tourism.

All of the above has been always related to salt, which is produced in two salinas, those in Kalloni and in Polichnitos, while there was a third one at Perama in Yera that ceased to be exploited in the second half of the 19th century. In addition to fish-salting and cheese-making, vast quantities of salt produced in these salinas were used in important local industries, especially oil-making and tanning. As to the first, salt was of vital importance for salting olives before processing them for oil in the relatively underpowered and slow olive presses that existed before the Second

World War. As to the latter, salt was indispensable in the tanning process, an industry that was fairly well developed on Lesvos, making use of the acorns produced in abundance in the island’s extensive oak forests.

Of all the Greek islands, Lesvos belongs to the group with the least tourism. However, there is a potential for ecotourism on the island, which is currently increasing, with a strong interest in bird-watching, especially in the salt marshes. In fact, both the salinas are of major importance for nature conservation on the island. The Kalloni gulf area, and especially the Kalloni salinas, is an important bird area, classified as a Special Protection Area (SPA) under the Birds Directive (79/409/EEC), while both salinas are included in the list of the Natura 2000 network sites to be classified under the Habitats Directive (92/43/EEC).

The salinas of both Kalloni and Polichnitos are located in the gulf of Kalloni, a relatively closed gulf with salinity that may locally reach 3.9° Baumé (°Bé). The climate of the area is typical Mediterranean (very hot and dry summers and relatively cold to mild winters). The mean annual temperature is 17.1 °C and the annual rainfall is 686 mm. However, little of this rain falls in summer: 85% is winter precipitation (October-April), whereas only 15% falls during the 6 summer months. In July and August, the mean precipitation is 3.8 mm per month. It is no wonder that under these climatic conditions and provided that flat areas are available, salt production can be a dynamic business.

◀ Aerial view of the salina of Polichnitos (2002).

Photo: Hjalmar Dahm

The two salinas are known to have operated in an organised mode since early Ottoman times (mid-16th century). Although manually worked before the 1970s, salt produced on the island catered not only for local needs (skin tanning, cheese-making, fish-salting, olive-salting, etc.), but was also exported to other parts of Greece, and even to Asia. Today both the salinas are fully mechanised with very high potential yields of 40,000 (Kalloni) and 10,000 (Polichnitos) tons per year. The salt produced is coarse, relatively pure in NaCl, corresponding to the needs of modern industries. This salt partly satisfies local needs, but only to a very limited extent, because as table salt it is not competitive with that imported to the island. As it has lost its traditional appreciation and use, it is mainly traded to places away from the island, and more than 90% is for uses other than culinary ones. Exporting from the island not only makes the salt expensive at the final destination, but also excludes it from the local economy of Lesvos.

The Polichnitos salinas is the smallest on the island, with the first documented reference in 1581. In 1889 the salinas had a surface of 15 ha producing 2,000 tons per year. By the beginning of the 20th century the production had increased markedly to 5-6,000 tons. In 1912, the year Lesvos was liberated, the Polichnitos salinas had a potential production of 8,000 tons. In the late 1980s it became part of a group belonging to a state-owned company (Hellenic Salinas S.A.), which invested in full mechanisation of the salinas in the early 1990s. As a result, the salinas has attained a potential of 10,000 tons from a total area of 60 ha.

The salinas is situated in Scala, the seaport of Polichnitos, about 4.5 km from the town, in the south-east of the Gulf of Kalloni, near its outlet. Being relatively flat, the Polichnitos area contains some of the most productive soils on the island, constituting the major vegetable garden of the island, together with anise (used to season *ouzo*) and olive

plantations. In addition to agriculture, local occupations include fishing in the gulf, which contains numerous species, but with exquisite delicacies, like the local sardines (*sardélles Kallonís*) and the bivalves known as *chténia* (*Chlamys glabra*, *C. proteus*). Apart from the primary sector, there is little tourism in Polichnitos, with mainly local emigrants returning in the summer. On the other hand, the town, with around 3,000 inhabitants, is one of the most attractive on the island, especially for its built environment and architectural character, which has protected status. Furthermore, there is a famous spa outside the town, of limited exploitation up to now.

Due to the fact that the salinas have been gradually modernised since the 1920s, there is no traditional know-how on salt-making on the island. However, there are some remnants of the technology used until the early 1980s, the most interesting being a diesel engine used to pump the brine, as well as the remains of small iron boats for carrying salt to the cargo ships. Other attractive elements of the salinas are the Decauville wagons, still used during harvesting until the present. Of particular architectural interest is a two-storey house in the salinas area, originating from the beginning of the 20th century. This house, now being restored, is to host the Polichnitos salt museum. It is certain that setting up a salt museum will contribute not only to halting any further loss of local knowledge and craftsmanship, but also to uncovering the losses of the past as to salt-making know-how and related cultural heritage. Further, the museum will be the main actor for the preservation of a very interesting saline habitat. Although the ecological system of the salinas and the surrounding area has not yet been studied, its fascinating natural aspects, with many flowering plants, halophytes, small mammals, and particularly birds, together with the beautiful landscape, will challenge the keepers to do so. There is no doubt that the salt museum will contribute greatly to nature and landscape preservation.

Figueira saltworks: geography and salt history

Renato Neves

Location, climate and topography

Figueira da Foz is located at the mouth of the River Mondego, one of the principal Portuguese rivers (40°08' N; 08°51' W). Its source is at the centre of the Central System, a mountainous region with some of the highest rainfall in Portugal (up to 2,800mm a year).

Climatically, the estuary area may be still considered under the Mediterranean influence, since there is a definite warm dry season, a mild winter and precipitation on 75-100 days a year with semi-torrential characteristics. Because of its importance to salt production, we should note that insolation reaches 2,600-2,700 hours per year, and the prevailing winds are

from the north and northwest, between May and September.

Topographically, the estuary presents a very particular feature, unusual in Portuguese estuaries. It advances in two arms, south and north, that surround an enormous alluvial island – Morraceira Island – and join again in a single branch nearly one kilometre from the mouth of the river. Due to the differences in profile and section, the arms have different characteristics in terms of solid transport and salinity, with salt water up to about 15 kilometres from the mouth at spring tide.

As in most Portuguese estuaries, it is a strongly dynamic system that has undergone profound

♥ Salt harvest in Figueira da Foz (1950's)

Photo: Figueira da Foz Municipal Photographic Archives





► Map from Figueira da Foz in the late 19th century – note the salinas on the north bank

Photo: Figueira da Foz Municipal Photographic Archives

changes over time, leaving a vast quantity of documentary and material evidence. The most striking of these consists of the traces of a Phoenician port on Santa Olaia hill, at present separated from the banks of the river by an alluvial deposit several hundred metres wide. This silting phenomenon blocked the connection between Coimbra – long one of the most important Portuguese cities – and the sea, because we know that even in the Middle Ages navigation on this branch of the Mondego was extremely difficult.

History of the salinas

Though the presence of salinas in Figueira da Foz is in fact very old – there is a document from 1116 mentioning the donation of a salina at the mouth of the Mondego – the evolution of the region into one of the most important salt-producing regions in Portugal, by the middle of the 20th century, was fairly slow.

Until the middle of the 17th century, production was concentrated on the north bank, in the area of Tavares. Existing documentation shows the presence of salinas on some inland areas of the north bank, of which there are no physical traces left, which stands as evidence of the changes occurring in the estuary area.

Though local production might supply the needs of the *Terra Nova* (Newfoundland, Canada) fisheries, it was not enough for domestic demand, and Customs records show some significant imports. This may be explained because Morraceira Island was at the time a marshland, used mainly as pasture. Only after 1712-1714 did the island begin to be converted into a salt-producing area, from where, together with Lavos on the south bank, most of the production then came. This increase caused production to rise, after 1753-1757, to more than 1,000 *moios* (1 *moio* = 750 Kg) a year.



From then on, salt became one of the main bases of the local economy. By the end of the 17th century, Figueira was already the third most important Portuguese salt-producing region, after the rivers Tagus and Sado. About 1,500 to 2,000 people lived directly from salt production, a figure that continued until the second half of the 20th century.

The intense working of the salinas and their importance in the economy gave a true 'salty' character to the identity of Figueira, which is familiar to most of the Portuguese population. As still happens with Aveiro, when the town or its region are mentioned one immediately calls the salinas to mind.

► Aerial photo from the late 1980's showing no traces of the north bank salinas

Photo: IPCC – Portuguese Institute for Cartography

The salinas of Piran¹

Robert Turk & Boris Križan[†]

The short, 46.6 kilometre-long coast of Slovenian Istria contained many salinas in the past. Earlier flat lands, full of marshes and lagoons by the mouths of rivers, were transformed into salinas over the centuries. The Piran salinas were the largest and economically most important, but only a small part of them have been preserved due to the constant effect of urbanisation: the miniature salinas in Strunjan and the more extensive ones in Sečovlje. The third Piran salinas, in Lucija, have now been transformed into a modern marina.

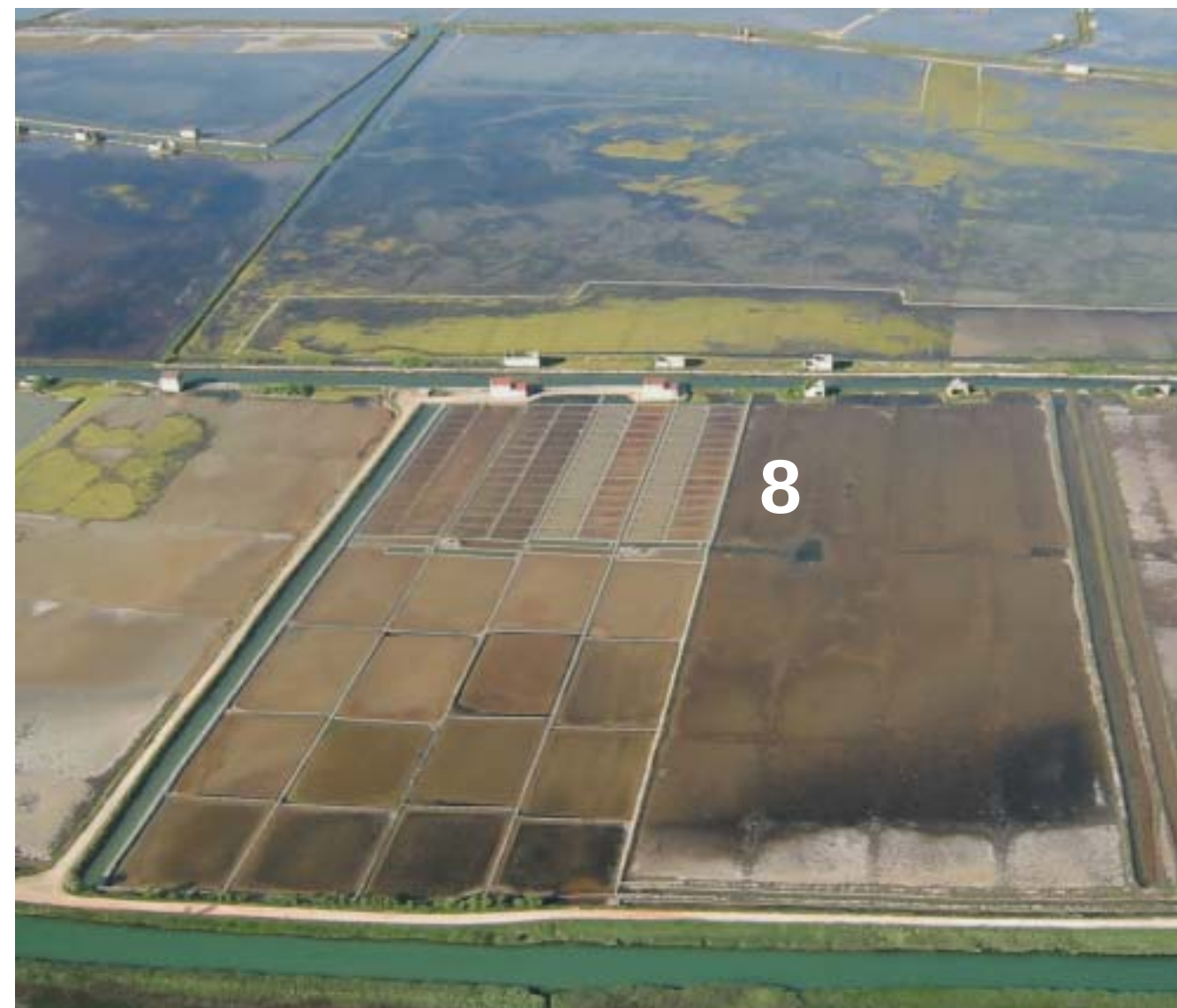
We do not know exactly when the Piran salinas began. The first record of them can be traced back to the second half of the 13th century, in a partly preserved Statute of Piran, during the period of Venetian rule, when salt became a state monopoly and an extremely important commodity, thereby giving rise to more numerous historical sources. More data on the salinas can be traced back to the second half of the 14th century, when Piran and Venice agreed to partly renovate the salinas. This period was also a significant turning-point for the salinas. The renovation of the salinas, which lasted until the 17th century, was closely connected with changes in the technology of harvesting salt brought about by the introduction of the *petola*, an artificially cultivated crust in the crystallisation pools. The secrets of cultivating this miraculous, 1 to 2 centimetre-deep sheet were passed on to the Piran salt miners from the island of Pag. Because of *petola*, Piran salt is pure, white and sweet.

When the renovation ended in the 17th century the salinas were transferred to the marshes of Lera and Fontanigge, where they can be found today. When the Venetian republic collapsed, the salinas were taken over by Austria. Salt was declared an exclusive state monopoly in 1814 and production was vastly expanded in the early years. At that time the salinas were developed rapidly by the owners, and they reached their present dimensions.

Up until the beginning of the 19th century, when the Austro-Hungarian administration set in motion the modernisation of the salinas in the areas of Lera and Strunjan, the basic production unit all over the Sečovlje salinas was a salt basin, divided into several square pools, connected by a system of channels, banks and dams. The old structure of the salinas was preserved in the area of Fontanigge and was unchanged until it was completely obliterated in 1967. The only important innovation was the introduction of wind pumps, which were used for pumping salt water in the second half of the 19th century.

The salinas in Lera and Strunjan were modernised in 1903. The State bought 525 salinas, consolidating the smaller salinas into larger ones. The crystallising pools were concentrated in one common area, which facilitates salt production and transport. Salt water was moved with motor pumps. Both salinas complexes are still active, although the quantity of salt produced in them decreases from year to year.

¹ This text is a summary of the article written by the late Boris Križan, director of the *Medobcinskega zavoda za varstvo naravne in kulturne dediscine Piran* and collaborator in the ALAS project. The article, titled "The mesmerizing white crystal", was published in *Flaneur* magazine in 1993 (Year 1, No. 3, February 1993, pages 6-11). We chose it because of its approach, which considers the salinas as a whole, with indissoluble ties of cultural and natural heritage. Only new events occurring after 1993 and which are mostly related to the Salinas Museum were added.



Some years after salt production was abandoned in the Fontanigge pool, channels were built on the banks at the mouths of the Curto and Giassi in order to prevent further destruction by the tide and flooding of the deserted salinas. In 1963 construction of the sports airfield of Sečovlje began on the eastern part of the salinas. But those parts where human activities did not interfere were affected by nature. Today the deserted Fontanigge salinas are composed of various more or less salty biotypes which are interlinked and compose a complete ecosystem, a rich treasure-trove of flora and fauna not known anywhere else in Slovenia.

When we approach the salinas in Fontanigge, our gaze comes to rest on the ruins of former homes of saltworkers. In the middle of the 19th century there were 439 houses at the salinas, while from the records taken in 1984 we could find only 118 ruined houses. The houses were erected next to navigable channels. It is hard to determine when these houses were built, because none have been preserved in their original state. The houses were built from various materials found in the vicinity of the salinas: most of them from cheap sandstone, but the most beautiful elements of the architecture were formed from white Istrian stone.

▲ An aerial view from Fontanigge salinas

Photo: Hjalmar Dahm



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▲ Salt harvest in Sečovelje (1961)

Photo: Josip Rosival

Because of their rich cultural tradition and wonderful natural heritage, the salinas were made a landscape park in 1989. The salinas in Strunjan became a part of the landscape park in 1990. In 1993 a Resolution on the importance of the Sečovelje landscape area salt pans was accepted by decree. All three documents were promulgated by the Municipality of Piran. In the Sečovelje salinas, some of the ornithologically and botanically extremely rich biotopes within the park, important for preserving the ecological balance and rare fauna – mostly birds – and rare or threatened plant species, have been transformed into a nature reserve. In April 2001 the Government of Slovenia promoted a decree which nominated the salinas museum as a Cultural Monument of state importance. Included under Museum supervision are the Giassi canal and Cavana 131 with hills, houses and plateaux, museum sali-

nas and all important areas which surround the monument.

Two houses and two salinas have already been restored, with a common canal for supplying sea-water. The main goal is to present the area of the Salinas Museum in its totality. In this way a typical salinas environment can be preserved, although unfortunately the other areas of the Fontanigge pools have been abandoned and are consequently degraded. This could be realised by introducing new activities, which at the moment have not been defined. We are thinking of widening the museum's activity, instituting training programmes and, if consent can be obtained, introducing some tourism.

Pomorie – Pomorie salinas: geography and salt history

Milcho Skumov

Pomorie is situated on a narrow peninsula jutting 3.5 km into the sea north of the Bay of Burgas. To the south, east and north-east the town is surrounded by the sea and to the north is Pomorie Lake. Until 1934 the name of the town was Anchialo.

The climate in the Pomorie region is strongly influenced by the sea. The winters are mild, with little snowfall, the snow only remaining for 5 to 7 days. In January the average temperature is 2.3 °C and in July it is 23.6 °C. There is comparatively little rainfall during the summer and autumn. The winds shift round from landward to seaward and vice versa; there is 2,360 hours a year of sunshine. The climatic conditions and geographical situation of the Pomorie region compared to the Burgas region offer a number of advantages in terms of salt production. The salinas in Pomorie are more exposed to the wind and the annual rainfall, especially in the working months, is considerably less.

The oldest written information on Anchialo is given by the Greek geographer Strabo (63 BC-19 AD). Contemporary explorers considered that the establishment of the town took place in the 6th-5th century BC. Established as a Hellenic colony on the Black Sea coast, Anchialo was later annexed to the Roman Empire. During this period it was one of the largest towns in the region and was the chief military and trading port on the west Black Sea coast. After the establishment of the Bulgarian state in the 7th century, Anchialo was at one time Bulgarian and at another Byzantine. It came under Turkish domination along with Constantinople and other towns in the south Black Sea in the mid-15th century.



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From the late 19th century it was on the borders of the re-established Bulgarian state.

▲ Harvesting in Pomorie (1950's)

Source: unknown

Salt production in Pomorie dates back to time immemorial. Some authors mention the 2nd century AD, but others consider that there is

▲ Salt piles in Pomorie

Photographic Archives of Pomorie Municipal Museum

historical evidence from the beginning of the second millennium. The reason for the relative lack information is that the history of salt production on the Bulgarian Black Sea coast has not been thoroughly investigated by either Bulgarian or foreign historians.

Until 1922 Anchialo was the only region for salt production in Bulgaria. Later, salt production was established in the region of Burgas. There were attempts in other regions on the Bulgarian Black Sea coast but they only lasted for a short time and were of no economic importance.

In different periods sea salt produced in Bulgaria met different parts of the needs of the State. Only in 1927, 1928 and 1934 did national production fully meet requirements. Later the development of the chemical industry considerably increased the demand for salt and most of the salt consumed has been imported. In recent years salt production has been 20,000-25,000 tons. This is 16% of total consumption. The main exporters of salt to Bulgaria are Israel and Tunisia. Total consumption in the year 2000 was about 150,000 tons.

The market for the salt produced in Pomorie in the past and at present is the territory of Bulgaria. But in different periods salt was exported to what are now Turkey, Greece, Romania and even Georgia. The fact that salt was exported to salt-producing countries can be explained by the specific qualities of Pomorie salt. Present and future perspectives focus on the national market.

Until 1947 the salinas in Pomorie were private property, with two-thirds of owners possessing less than a fifth of the total area of the salinas. In the period 1947-1949 nationalisation took place without changes in the production technology. These salinas had crystallising pans 80-100 square metres in area and the salt was

harvested many times in a season. There were also larger crystallising pans – 600 square metres – in which the salt was harvested twice a season. This type of salt production functioned until 1981. Later the salinas were constructed out of town and the industrial salinas were established. The salinas near the town were abandoned in the 1960s and their area was built upon.

After 1989 the process of restitution began – restoring the property of the former owners. A small part of the salinas will probably remain state property, but the procedure is still not finished. In terms of production the interest is in the salinas out of town, as the urbanisation of the town salinas is irreversible. There are expected to be about 250 owners of the salinas, most of them in their 80s. Their heirs, in most cases, are far removed from the salt business and are unlikely to take the initiative. On the other hand the state of the facilities requires complete reconstruction. Here the possibilities are different in terms of salt production technology and in ways of organising the property. The main hope for rapid and effective solutions for these problems is local work, financed within the ALAS Project. However, there is a need for inward investment for the planned building and reconstruction work.

With the change of ownership of the salinas from the state in the days of the Ottoman Empire to the hands of the people of Anchialo at the end of the 19th century, the salters realised the need for common efforts against natural disasters and for new building works connected with salt production. For this purpose the “Anchialo Salinas Fund” was established in 1894, with the producers saving a proportion of the salt produced and sold, and with these funds they reinforced the sea coast against flooding. This reinforcement was quite impor-

tant because of the danger of flooding in the low parts of the town. Later the Decauville railway and the new warehouses were built. New equipment was bought, and new paths, a wall around the salinas and a canal to drain the rainwater into the sea, were built.

In the 1930s the Pomorie Salinas Fund was transferred to the state, but its financing remained with the salters. The management of the Fund was handed over to trained personnel who began to take measures to raise the quantity and quality of the salt. These measures included the flow of more concentrated water into the crystallising pans, the removal of lye after salt crystallization, keeping the salinas

free from dust, control of the whole chain of production, etc.

Sea salt production in Pomorie is an inseparable part of the notion of this town for Bulgarian citizens and foreign guests. An interesting fact is that at the time of the renaming of the city, one of the proposed names was “Salt town”. Along with the other traditional professions of the people of Anchialo, such as vine-growing, trading, and fishing, salt production is an occupation that has been handed down from father to son for centuries, whatever the political, economic or ethnic changes. And even today it is a reason for self-confidence among the inhabitants of the town.

What do you need to make sea salt?

Theodora Petanidou

Since antiquity people have been aware of the salinity of the sea, while nations living in coastal areas have always satisfied their needs for salt by allowing sea-water to evaporate, weather permitting. Sea-water contains on average 3% salt, but this figure varies. As Aristotle had already noticed, the differences are often striking as salinity fluctuates between 1% (polar seas) and 5%. Sea basins, like the Mediterranean or the Red Sea, with an evaporation rate beyond fresh water recharge from precipitation and rivers, have a higher concentration of salt than open seas at the same latitude. However, not all the salt in sea brine is common salt. Regardless of the origin of brine, the dry salt remainder obtained after simple, uncontrolled evaporation usually consists of three quarters sodium chloride (77.8%). It also contains magnesium chloride (10.9%), magnesium sulphate (4.7%), calcium sulphate (3.6%), potassium chloride (2.5%), magnesium bromide (0.2%) and calcium carbonate (0.3%).

Producing common salt from sea-water is a simple and complicated process at the same time. The simple part consists of letting the brine evaporate either under the sun's heat (solar salinas) or through ebullition until the salt crystallises. The first methods, using a ‘soft’, inexpensive and renewable form of energy, has been widely used in the Mediterranean, from the Atlantic Ocean to the Black Sea. Hence, the complicated part of the process is not how to crystallise salt, but how to obtain the purest possible salt, considering that natural brines also contain other salts apart from sodium chloride (see above), as well as various diluted organic and inorganic substances. This is achieved through skilful handling of concentrating brines, which requires knowledge and long experience. Gradually,

people realised that the solution to this problem was step-by-step controlled water evaporation. This process ensures the fractional precipitation of the mixture of salts according to their solubility, and therefore the distinct crystallisation of NaCl that thereafter precipitates free from the other substances dissolved in the brine.

During the evaporation of brine, the first to deposit is calcium carbonate (CaCO₃), followed by gypsum (CaSO₄), at 13° Baumé (°Bé). At 25° Bé, common salt (NaCl) begins to crystallise, whereas the bitter magnesium salts (MgCl₂ and MgSO₄) do so from 32° Bé onward. In the salinas fractional crystallisation is based on the regulation of evaporation so as to ensure the practical elimination of calcium salts (completed in the evaporation ponds of high concentration) and prevent the precipitation of magnesium salts before the complete crystallisation of NaCl (taking place in the *crystallisers*). Magnesium and potassium remain in the brine, which never crystallises and form the unwanted bittern to be emptied at the end of the process. However, this does not mean that the target product (NaCl) is entirely free from other salts occurring in sea brine. Hence, salt always contains traces of other salts, even under ideal production conditions.

In order to control the procedure and ensure a continuous circulation of brine until common salt crystallises, large expanses of flat areas are needed, where the fractional precipitation of salts occurs in successive evaporation ponds before the brine concentrates and enters the saltpans. As the circulation of brine throughout the salina may take a week or so, salina soils must be impermeable, in order to avoid any loss of brine and salt yield. This explains why all the large Mediterranean salinas were (and still are) located on flat alluvial coasts with natural lagoons, which have been silted up by rivers, such as the Ebro (salinas of Tortosa), Rhône (Peccais, Arles), Tiber (Ostia), Po (Chioggia, Comacchio, Cervia), Acheloos (Messolonghi) or the Nile (Damietta), not forgetting those in the Black Sea. Even small streams created similar landforms on islands, such as the salinas of Potamos (meaning river) in Corfu.

Further, introducing sea-water into a salina and making it circulate from pond to pond are energy-intensive procedures. When possible, brine transportation was brought about by *passive inflow systems*, i.e. hydraulic solutions combining gravity, even modest sea tides, whereas *active brine collecting and transporting systems* employed basically simple, yet admirable solutions combining man, animal, wind and, recently, oil and electrical power. In all cases, included those of salt transportation in the salinas, a series of improvements achieved through the centuries made working in salinas easier, at the same time creating a rich cultural heritage. In this way, the restless and innovative Mediterranean people managed to enrich the technology and know-how of salt-making in the Basin.

Salt in Classical Greek and Roman Times

Theodora Petanidou

“Those who do not know the sea ... never eat their food mixed with salt”

Homer, Odyssey

In Homeric times salt was already considered to be above humans and to belong to the sphere of the divine. According to Ulysses’ confession, ignorance of the use of salt and its flavour-enhancing properties was considered to be a sign of barbarism. In all sites, even in the most remote ones, salt was

a highly esteemed seasoning, as documented by the Greek scholars, especially Aristophanes, Arches-tratos, and Athenaeus of *The Deipnosophists*. Among all salts of antiquity, the most praised one, starting with Pliny, was Athenian salt, renowned for its whiteness, fine texture and pleasant taste. Even in Venetian times, Attic salt (*sal Athenarum*) was always used as a synonym of *satine*, *satum*, *satun*, *satineis* etc., and was eventually called by this name.

According to the scholars Herodotus, Aristotle and Strabo, several methods of salt-making were already known in antiquity, including the use of rock salt. One oddity was the ebullition salt of inland salt-springs, like the Chaonian spring cited by Aristotle in Epiros. It is most unlikely, however, that the ancient Greeks were aware of any techniques of salt-making on an industrial scale, as naturally produced sea salt in *self-formed saltpans* (*aftofyí alopígia*) satisfied their needs. One of the most renowned saltpans of antiquity was the Tragassaeon one, by the Halesian plain towards Hamaxitus, in the Troad. It was so productive that around the year 300 B.C., Lyssimachos, one of the epigones of Alexander the Great and subsequent king of Thrace, attempted to levy taxes on the salt harvested there.

A very important salt-producing area for the ancient Greek world was the Black Sea, especially the north, which supplied the Athenians with excellent quality salted fish. Salinas existed around the Tauris peninsula (the modern Crimea) located on the river estuaries (Vorysthenes – today’s Dnieper, Hypanis – the Bug, Tanais – the Don) and extended lagoons (lake Sapra – today’s Sivas). Herodotus described the mouth of the river Vorysthenes as a site where “plenty of salt crystallises naturally” and “huge fish with boneless fins, the so-called sturgeons, lend themselves to dry-salting”. On the western coast of the Black Sea, in what is now Bulgaria, there were the huge salinas of Anchialos (nowadays Pomorie) extending towards Messimyria. Their exploitation constituted the main revenue for the town of Anchialos, since its merchants were the main salt suppliers to the Thracians.

Unlike the Greeks, the Romans had to find ways to increase the production of salt, for the sake of their immense cities, primarily Rome. For the Romans, salt was indispensable to life, and the phrase “*Nihil est utilius sale e sole*” meaning “nothing is more useful than salt and sun” became a commonplace. Another legend that underlines the importance of salt is that, during the late Imperial era, salt constituted part of the congiaries, i.e. the *panem et circenses* (“bread and circuses”) policy and was distributed to the people free, as a gesture of largess on behalf of the state (Lat. *congiaria*).

The first artificial salt-fields were created in Ostia, by the estuary of the river Tiber, in 641 BC by King Ancus Martius. These primitive salt-gardens were the main sources of salt for Rome during both the Republic and the Imperial era. However, the immense demand for salt of the crowded city and the Roman army necessitated an increase of the number of salinas in the Roman dominions (*Salinae Romanae*). Due to a rise in sea level in the Mediterranean after the end of the 1st century AD, the salinas of Ostia were relocated further inland, together with the ports of the Tiber in the 3rd and 4th century during the reign of the emperors Claudius and Trajan. This rise in sea level continued until approximately 400 AD, consequently flooding many important salinas of antiquity, such as those of Salamis in Cyprus.

There is no doubt that Roman salt was mainly sea-salt. Further, in parallel to the standard evaporation with solar energy, the Romans also used ebullition techniques, which they took from the conquered territories to the north. According to Pliny the Elder, in addition to sea brine, the Romans exploited all types of salt resources of the Empire: salt rock, salt-springs and lakes, lagoons, hallophytic plants. For instance, five centuries after Pliny, Venice still used the *briquetage* method, i.e. ebullition of

brine in the famous clay cylinders, known throughout Europe since the time of the Celts. In general Roman solar salinas consisted of a simple basin, filled with sea-water, which was then left to evaporate in the sun. This method was definitely more advanced than that applied to the ancient lagoons of Athens and Alexandria, which produced salt naturally. Nonetheless, the Roman design was not as advanced as the communicating ponds which were developed later, during medieval times. According to the poet Rutilius Namatianus (circa 416 AD), in Vada, situated on the western coast of Italy, south of Livorno, sea-water reached a higher level through canalisation and flooded numerous pools. Salt crystallised on the hot bottom of these pools. Despite the primitive nature of such methods, salt production must have been quite high: it met the needs of 2 million Romans, who required 5,000 tons of salt per annum, not to mention the inhabitants of the area further north-east and elsewhere in the hinterland.

The *garum* of the Greeks and Romans

Theodora Petanidou

Garum was one of the most renowned delicacies of the ancient world, and, like wine, became a regular commodity. The most famous cities producing *garum* in classical antiquity were Klazomenes, in the Lydian region of Asia Minor, and ancient Tripoli, on the Libyan coast. Much archaeological evidence points to sites in Spain and the Black Sea where the *garum*-making industry existed as early as the 8th and 7th centuries BC. In fact, *garum* factories, as far as we know, comprised the only large-scale industry of the ancient world.

The Greeks of the Black Sea coast were the first producers of the most famous fish sauce, a costly gift of salt and fish, called *gáros*, which, little by little, conquered the kitchens of all the Greeks and Romans. Although originating from Greece, large quantities of this spicy relish were produced on the Atlantic coast of Lusitania (Portugal) and Gaul, an important site of *garum* production during Roman times. The recipe was widely known through Pliny's *Naturalis Historia*, which describes how the inhabitants of Bythinia (Asia Minor) made this exquisite preparation, so sought after in antiquity: *gáros* was basically made from picarel, or, in its absence, anchovy, horse mackerel, mackerel or a mixture of all these. Whole fish and innards were mashed up, mixed well with salt in a proportion of 9:6 and left to ferment in a ceramic pan for up to 2-3 months under the sun and stirred regularly. The resulting liquid was strained off and bottled, thereafter being used in large quantities in many dishes. The smell given off was so bad that the playwright Plato refers to it as "rotten". For this reason the making of *garum* in urban areas was sometimes outlawed. This is evident in archaeological sites where *garum* factories are situated far from inhabited areas, near a beach or harbour, like the one in Cabo de Gata, Almeria. Despite its putrid smell and image of a decaying substance, *garum* was not exactly rotten: the decomposition process was not combined with bacterial action because of the abundant salt added to the fish. In fact, what is taking place in this case is enzymatic proteolysis, a similar process to salting. Because whole fish were used, the enzymes of the fish's digestive tract reacted with the salt, thus producing pungent brine. This shows that the fish entrails were mainly responsible for the smell. After the *garum* was strained off, a solid residue was left behind, called *halecum*, which was used as seasoning or applied in medicine (e.g. on burns).

Besides its well-known taste, the wide success of *garum* points up the common desire of all Mediterranean seamen of the ancient world to make good use of natural resources and to avoid waste. This is especially true if we consider that, in ecological terms, the Mediterranean is a relatively non-productive area. Small fish were difficult to transport from the fishing grounds to the cities, especially when caught far from sites of consumption. At the same time, the insides of larger fish, otherwise useless, were a valuable source of animal protein that the Mediterranean peoples wished to keep. By using small fish and entrails to make *garum*, the Greeks could transform these materials into a commodity that was less likely to rot, and hence exploit marine resources in the Black Sea and the wider Mediterranean.

The Roman and Byzantine *garum* (or *liquamen*) was a strongly flavoured salty relish, thin and superb. It was traded in amphoras, which are sometimes found with descriptive labels. This sauce continued to be used in the broader Aegean throughout the Middle Ages until Ottoman times, as evidenced by travellers to the Levant. Thereafter the track of *garum* was lost. However, there is a contemporary flavour comparable to the ancient *garum*: the Vietnamese or Chinese *nuoc mam*, the Thai *nam pla*, even the Chinese soya sauce. *Garum* could be even compared to padek (from Laos and north Thailand), which also contains small pieces of fish, like many *garum* amphoras of antiquity evidenced by recent excavations.

Historical Salt Routes

*Salt routes - Pomorie and the Turkish Empire (15th-19th centuries)*¹

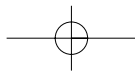
Milcho Skumov

In the period of Ottoman rule the salt produced along the Bulgarian Black sea coast satisfied from one third (at the end of the 19th century) up to slightly more than half (15th-18th centuries) of the salt needed in the Bulgarian lands. The rest was imported mainly from Walachia, Transylvania and Moldova. Nevertheless, following official Ottoman policy, throughout the whole period, Anchialo salt was sold beyond the borders of the Bulgarian lands, most of it in the capital Istanbul and its region.

With its settlement in the Balkans the Ottoman state imposed its right to control the marketing and sale of the salt produced in or imported into the country, as well as to fix prices and taxes. From the end of the 15th until the beginning of the 17th century, within the borders of the empire salt could be sold only: a) on the spot at the salt-producing centre, b) in specified towns and villages and especially in the state warehouses situated there, or c) as obligatory purchases of set quantities for specific groups of the population. A certain softening of these strict limitations took place in the 19th century.

The trade in sea-salt was of great importance to the population of Anchialo. A special salt market operated in the town, and there were many shops and warehouses with stored salt. The state, however, imposed strict regulations and restrictions on who was allowed to trade in salt and how. Not everybody was allowed to trade, nor in all markets, especially at prices not set by an official ruling.

¹ Adapted from the book by E. Grozdanova and S. Andreev, "Salt production along the Bulgarian Black Sea coast in the 15th-19th centuries"



To ensure a constant supply for the different territories of the vast empire, the central authorities instituted a division into districts in such a way that each region was assigned to one particular salt-producing centre. The region supplied by the Anchialo salinas was vast, including Walachia and Georgia. The export of Anchialo salt to a region like Walachia (15th century), which had been known as a traditional supplier of rock-salt, could probably be explained by the difference in the qualities of the two kinds of salt. According to 17th century records, 75 tons of Anchialo salt were sent to Istanbul each year for the needs of the sultan's kitchen. The documents show that this was a permanent arrangement, as for years, decades and probably even centuries, the Anchialo salinas delivered exactly the same quantity of salt to the palace each year. Besides the sultan's palace, Anchialo salt was delivered to Istanbul bread-makers, pasty-vendors, grocers, dairymen, bakers, grillers, chick-pea-sellers, leather-workers, etc., as well as to other institutions in the imperial capital, for example the kitchen of the state shipyards, Muslim cloisters, etc. After the mid-18th century the established position of the capital Istanbul as the main consumer of Anchialo salt, with almost exclusive rights, underwent some changes; the salt trade was already allowed everywhere in the empire, but higher taxes for the state treasury were charged.

The Salt Route from Setúbal to Holland (16th-18th centuries)

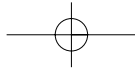
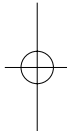
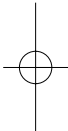
Renato Neves

By the end of the 13th century, production from the salt marshes of the Sado estuary (Setúbal and Alcácer do Sal) exceeded local requirements, and some of the salt was sent to Lisbon and from there exported to inland regions of the Iberian Peninsula and to various ports in Galicia, Asturias and England. From around 1520-1530, the military-religious Order of Santiago, the largest landowner in the Sado basin, increased the number of land grants and leases of marshland for the construction of saltworks. On payment of a fixed sum annually, together with a commitment to operate and maintain the saltworks, the producers would become the owners of the land at the end of a certain number of years. These measures led to an increase in salt production; the owners usually belonged to the middle classes, with links to trade or to the government.

At this time, at the height of the Discoveries, there were strong trading links with Flanders and the Baltic, and as well as a thriving trade in light cargo such as spices, silks, precious stones and wood, and the ships carried products of Portuguese origin such as salt, olive oil, wine and cork.

A series of historical events, especially the Hundred Years' War, which weakened the economy and affected the trading routes in the regions involved, and the emergence of the Netherlands as a major mercantile power, led to considerable changes in the European salt routes. The Dutch expanded the trade in salted fish and salt itself, most of which came from Setúbal, around the North Sea and the Baltic. On their return, the ships brought grain, of which Portugal had a chronic shortage, as well as a number of manufactured goods that Portuguese industry, still in its infancy, was incapable of producing.

This strong demand naturally had an effect, and saltworks came to be regarded as important sources of income. The powerful Order of Santiago proceeded with the granting of ownership rights, establishing a comprehensive land register that included measurements with the aid of a compass. Another interesting development was the creation of the *Roda do Sal* ('Salt Circle'), a market regulatory body that annually fixed prices and regulated the whole process of selling and transporting the salt to the ships, so that all producers were in a position to sell their salt.



This organisation survived up until the 19th century and talk of its abolition became a subject of national interest and much debate in parliament, since critics of the *Roda* saw it as a relic of the old regime and contrary to the liberal principles of free trade.

A salt route from Sweden to Sicily in the 18th century

Hjalmar Dahm

Sweden is one of the few countries in the world that does not have any salt production of its own and has therefore always depended on imports.

In the 18th century the demand for salt rose significantly, mainly due to the change in methods for conserving foodstuffs. Previously most food had been preserved through drying, smoking or fermentation, but the seasonal production of butter, meat and fish required an efficient preservative. There were similar requirements for the huge amounts of salted herring that Sweden started to produce, a large proportion of which was exported to other countries.

The importation of salt influenced the country's whole trade policy. During the first half of the 18th century most salt was carried on Dutch vessels. But already in the 1720s many large ships were being built in Sweden mainly for the transport of salt. These "Spain-goers" brought Swedish iron, timber and furs to Lisbon. In Lisbon they took on goods from the Portuguese colonies and sailed on to Trapani (Sicily), Cagliari (Sardinia) or Ibiza (Balearic Islands). Here they traded the goods either for salt or – more often – for wheat that they brought back to Lisbon where new salt could be fetched. Indeed, at the beginning of the 18th century the salt that came to Sweden was Atlantic salt, either from Portugal (mainly Setúbal) or France (Brouage). The coastal trade between the Atlantic and Mediterranean harbours carried on by the Swedish boats during their long voyage was necessary to make the long trip economically viable.

After 1760 the French salt was replaced by more salt from Portugal, Spain and Italy. From 1790 onwards, 98-99% of the salt that was imported to Sweden came either from Portugal or from the Mediterranean.



During the coastal trade, Swedish boats came to buy salt in Trapani (Sicily)

Photo: Hjalmar Dahm

Non-typical salinas and salt harvesting in the Mediterranean

Theodora Petanidou

The greater part of the salt catering for the needs of the Mediterranean people came from organised salinas scattered throughout the basin. However, almost everywhere, particularly in remote places and small isolated islands, people frequently collected self-formed salt, mainly to cater for local needs. This was a necessity in periods when salt was not regularly available (e.g. in periods of war) or as a rebellious response against a heavily taxed commodity or a monopolised market. Anyway, this *flower salt* was valued much more highly than shipped salt (*afrálatso* vs. *karaválatso*, as they were respectively called in Mani, Peloponnese). Easy communications between islands and the mainland, and the end of state monopolies in most Mediterranean countries around the 1980s, both favoured marketed salt and discouraged people from producing salt in non-typical salinas. However, in many places there are still remnants of such activity, while in some of them, such as Mani and Kythira (Greece), the market seems to be growing.

There are two major types of atypical salinas: those on a silt or clay substrate (i.e. a lagoon) and those on a stony substrate (naturally existing holes or artificially carved on calcareous rock or even marble). Both these primitive forms of salinas are normally a simple pond filled with sea-water during storms. In periods of more systematic exploitation these ponds were filled with brine either directly from the sea or from

› Saltpans carved on the rocks of Mani (Greece)

Photo: Hjalmar Dahm



another pond functioning as a pre-basin. The self-formed salt is harvested regularly, before the brine evaporates completely and the salt gets bitter. The salt is normally harvested with very primitive tools such as spoons or, more frequently, is collected with the fingers.

Many places in Greece, especially the Aegean islands, employed such primitive *góurnes* in order to cover their local needs, sometimes even to supplement their income, and indeed some still do. A recent study by the Department of Geography of the University of the Aegean showed a large number of them all over the country (44 in lagoons, 308 on rocky substrates), many of them still in use (3 and 175, respectively). Although we have no evidence, we expect that such primitive salinas, like the Aegean ones, are to be found in all the Mediterranean peninsulas and islands from the west to the east.

The best examples of systematic salt exploitation in non-typical salinas are known from Mani, Malta and Bañaderos (Canaries). In all three cases, salt is formed in beautifully carved ponds in the rock (Mani, Malta) or built on volcanic soil (Bañaderos). Because they represent one of the most splendid Mediterranean landscapes which is entirely handmade and of unique charm, these salinas deserve particular attention.

Salty remnants in the Mediterranean language

Theodora Petanidou

*Ó mar salgado, quanto do teu sal
são lágrimas de Portugal!*

Oh salted sea, how much of your salt
may come from the tears of Portugal!

Fernando Pessoa, in Mensagem

Thousands of years ago, salt acquired a prime significance, first by leaving an indelible mark on human taste, and further, by improving the quality of human life. Its essential role in human life probably led all European peoples to search for it from the early stages in the development of their civilisations.

It was probably this interrelation reflected in the convergence of all linguistic expressions referring to the product and question. Amongst all Indo-European languages, we only know two roots for salt, which in fact are one in the same. The first, the ancient Greek *álas*, was initially *als* (also meaning ‘sea’ in the female gender), since in Greece salt came exclusively from the sea. The second Indo-European root, the Latin *sal*, is merely an anagram of the Greek, which aimed to facilitate the pronunciation of the word (in English and Swedish *salt*, in French *sel*, in Italian *sale*, in Spanish and Portuguese *sal*, in Slavonic *solj*). As for the German language, it has affinities to both Latin and Greek and has kept both roots (*Salz* and *Hall*).

The importance salt has had in human history and everyday life is proved by innumerable well-known expressions, idioms and customs, as well as ‘salty’ remnants in all European languages, all in use up to the present. These include the words *salary* (En.), *salaire* (Fr.), *salàrio* (It.), *salario* and *salarial* (Sp.)

and *salário* (Pt.), originating from the Latin word *salarium*, which was the ration of salt given to Roman soldiers as a form of payment for their services. There is also *saldo* (It., Pt.) and *sàldo* (Sp.), meaning balance, bargain, sales.

Ancient Greeks, Romans and Byzantines used many comestibles named after salt, in which salt was one of the basic ingredients. Some of them are still in use today, as remnants in modern languages, as well as in modern cooking. Examples are the Greek *alípasta* (salted meat and fish), *almaía* (pickled vegetables – the Roman *salgama*), *armaiá* (pickled cabbage), *almádes* (olives kept in brine), *saláta* (English *salad*, French *salade*, Spanish *ensalada*, Portuguese *salada*, all from the Italian *insalata*, meaning “in salt”), *sáltsa* (Italian *sàlsa*, Spanish *salsa* and *salmorejo*, English *sauce*, i.e. the most basic flavour-enhancing preparation of all), and *sarmádes* (rice prepared in wine or cabbage leaves kept in brine). Eating food preserved by salting was very common in Byzantium. There was even a special category of grocers, called *saldamárii* or *sardamárii* (Latin *salgamarii*, pl.). Another common preparation, the sausage (Italian *salcìccia*, Spanish *salchicha*, Portuguese *salsicha*, French *saucisse*), together with the *salami* and its different language versions (*salame*, *salume*) also have their origin in salt (from the Latin *salsicium*).

The telephone directory (2002) of the Lisbon metropolitan area contains 412 people directly named after salt-making and salinas: *Salgado* (salinas), *Salinas*, *Salino* (saline), *Marinhas* (also meaning salinas), *Marnoto* (saltworker). The number of terms originating from salt in modern Greek is incredibly high: a recent study mentions more than 1,000 terms compiled from all over the country, hundreds of expressions, riddles, proverbs, sayings, even songs and all types of recipes using salt as a basic ingredient. Further, the same study mentions 20 modern family names directly related to salt and its production, more than 10 ancient names of persons and heroes and around 170 place-names with more than 200 sites named after salt all over the country. Among these place names are *Alai*, *Alikí*, *Alatsies*, *Alatsaries*, *Artsi*, even *Tuzla*, i.e. the Turkish name for salina. The once famous Tragassean saltpan in the Ionian region of Asia Minor today lies at the mouth of the river Tuzla, near the village of the same name. Comparable cases are the Roman *Salinae*, later the French *Salins*, the German *Halle*, the Austrian *Hallstatt*, *Hallein* and *Salzburg*, while many others offer reliable proof for the involvement of these places in salt production. Such physical landmarks named after salt, as well as others like lakes, capes and streets, carry lasting memories for future generations.

Portuguese boats for transporting salt

Renato Neves

As salt production is an activity associated with rivers and estuaries, until relatively recent times the final product was transported mainly by river and sea. Given the fact that the salt-producing regions of Europe stretch all the way from western France to the Black Sea, each with their own culture, it is natural that there should be great variety in the types of vessels used. Interestingly enough, one can sometimes find different designs even within the same country. For example, even though Portugal is a relatively small country, it has five distinct salt-producing regions,

often located only a few dozen kilometres apart, and four different types of boat of purely local design were used.

With the exception of Aveiro, which still has some salinas on islands within the lagoon, all the other regions began using land transport from around the 1950s, following the construction of access-ways for trucks. Nevertheless, in 1957 Figueira da Foz still had around 209 salinas that were only accessible by boat (whereas another 12 were accessible by truck and another 8 by oxcart), which well illustrates the importance of this means of transport in the local salt economy.

There are considerable differences in the salt boats used in Portugal. In the Aveiro lagoon we find the *mercantel*, whose name derives from the Portuguese word for goods (*mercadoria*); these are cargo boats in the wider sense of the term, as they are used to carry goods other than salt. They travel between the islands, taking cattle and horses to summer pastures and carrying the workers who repair the walls of the salinas and cut the rushes. Their bows are decorated with geometric or floral designs, or sometimes depict sayings, humorous scenes or religious motifs, depending on the personality of the owner. They have a carrying capacity of around 12 tons, and are the only boats that can still be seen going about their traditional tasks.

Figueira da Foz, with its long narrow creeks, adopted the *barca do sal* (salt barge), a vessel that could easily carry 10 tons and was able to operate and manoeuvre in extremely difficult conditions. The Tagus river valley, which in the past was the main salt-producing region in Portugal, with a sea port opening onto the world, had large capacity cargo boats, called *fragatas*, coasters which travelled up river to ports that supplied goods from the vast territories of the interior: cork, cereals, fruit, charcoal, lime and many other goods. They were also used to transport salt, carrying up to 80 tons per load, destined for freighters and the cod fishing fleet. However, in contrast to the vessels employed in other salt-producing areas, they were unable to navigate the smaller creeks; they would load up at wharfs located on the main waterways, to which most of the salt produced would be delivered.

Finally, there were the *galeões* (galleons) of the Sado river, elegant vessels used both as cargo boats all along the river between Setúbal and Alcácer do Sal, performing the same function as the *fragatas* of the Tagus (albeit of smaller capacity – between 20 and 25 tons), and as coastal fishing boats, going out beyond the inlet to the sardine fishing grounds.

A comprehensive history and description of vessels employed around the Mediterranean coasts of Europe still remains to be written – Portuguese, Spanish, Sicilian and Slovenian boats will certainly have different origins. The geographical distribution of the different designs will obviously be linked to the various trading centres that controlled the production and commercialisation of salt.

Portuguese cod fishing – epic and myth

Renato Neves

The importance of salt cod in Portuguese culture is not confined to the country’s cuisine. Throughout Portugal’s history, it has played a major role in the economy; it has even been at the centre of political crises, and was one of the elements of Salazar’s “New Portugal”. Indeed, no other food has been such a symbol of national identity, to the point of being dubbed a “faithful friend”. Salt cod thus became



Barcas do sal in Figueira da Foz harbour (1960’s)

Photo: Figueira da Foz Municipal Photographic Archives

much more than a mere food resource, taking on almost mythic status. However, while the origins of cod fishing are well known, as is its link with salt production, its survival in modern times is a historical and economic paradox, in fact an anachronism.

The history of cod fishing in Portugal dates back to the Middle Ages, to a time when Christian doctrine dictated abstinence from eating meat for around 150 days a year, thus creating a need to find alternative sources of protein, of which a major one was salted fish. The nature of cod fishing, in which the average weight of individual fish caught is over ten kilos, as opposed to the small sardines, mackerel and herring of European coastal waters, led to most countries bordering on the Atlantic becoming involved in fishing in distant waters.

Portugal, with its long coastline, abundance of salt and regular contacts with maritime peoples from various parts – Basques, Bretons, Valencians, Catalans and Genoese – was also well-equipped in technical and material terms to embark on such an enterprise. As in many other areas, its geographical location, bordering on both the Atlantic and the Mediterranean, enabled it to pursue activities characteristic of both these environments. In the case of fishing, the cod fishing grounds of Newfoundland and the tuna fishing traps of Portugal's south coast are two good examples of this.

The first authenticated document related to cod fishing is dated 1353 and refers to a treaty between Portugal and England governing Portuguese fishing in the North Sea.

From 1500 onwards, numerous documents began to appear concerning fishing for cod in Newfoundland (Canada). As with other coastal areas under Portuguese control, notably West Africa and Brazil, the Crown established a port authority to represent royal power in this area, and documents refer to the existence of several colonies all around the coast that were engaged in a form of *pesca sedentária* (land-based fishing) in which catches were processed on land.

With at least 50 ships sailing every year, mainly from the ports of Aveiro and Viana do Castelo, cod fishing prospered up until the time Spain annexed Portugal (1580 -1640) and subsequently incorporated the Portuguese ships into the Spanish fleet. The long, unrelenting war with England for control of the seas finally drove the Iberians from Newfoundland, and the English, Dutch and particularly the French came to dominate the fishing banks. France, as a salt-producing country, had a clear economic advantage over all other competitors. Antoine de Montchrétien stated in 1615 in his work *Economie Politique* that France had 600 ships a year involved in cod fishing, employing between 15,000 and 20,000 people.

However, despite the almost total absence of Portuguese ships in the cod fishing banks, the link between Portugal and cod fishing did not disappear over the following centuries. Cod was imported throughout that period, which demonstrates how deep-rooted dietary habits had become; at the same time, the French and the Dutch recognised the superiority of Portuguese salt for preserving the catch and sought out Portuguese ports for their supplies. At times, the French fishing fleet made a detour from their normal route to Newfoundland, coming down to Portugal to get supplies of salt for the season, a situation that was still common up until the beginning of World War II.

The Portuguese cod fishing fleet revived around 1830 following legislative reforms and financial incentives. Cod fishing ports are usually located in salt-producing regions: Aveiro, Figueira da Foz, Lisbon, and Fuzeta, and the drying facilities are also found in these areas. The fishing process begins and ends in these places, with the ships taking on their supplies of salt, and returning laden with salted fish, which is then dried in the open air on giant frames – located in the estuaries and lagoons and sheltered, as are the salinas themselves, from the moisture-laden winds coming off the ocean. To make



the circle even more complete, some of these places also have shipyards where the boats are built and repaired between seasons.

For over a century fishing practices did not change, all processing being done at sea, known as *pesca errante* (wandering fishing), with no support facilities on land. The ships, 3- or 4-masted sailing vessels of various types, with a crew of 30 to 35 men, used to set sail in mid-May for the Azores, and at the westernmost island of this archipelago, the island of Flores, they said farewell to Portuguese territory and set a course for Newfoundland, the whole voyage taking a total of 25 days. The ships carried on board between 12 and 18 small boats, called *dóris*, each 4.5 metres long, from which the men line-fished. These boats, equipped with oars, a triangular sail and a compass and each with a carrying capacity of 300 kg of fish, were lowered from the ship in the early morning and left to the mercy of all kinds of dangers, the most formidable of which was the dense fog, very common in these parts, which obscured the mother ship from view and led the small boats dangerously close to treacherous icebergs and shipping routes. At the end of the day, the *dóris* returned to the ship and the process of preparing the catch would begin, a task that went on well into the night. The ships stayed in Newfoundland for over three months,

▲ Figueira da Foz “cod fleet” during the winter (1960’s)

Photo: Figueira da Foz Municipal Photographic Archives



Workers in a *seca*

Photo: Figueira da Foz
Municipal Photographic Archives

only returning to Portugal around the middle of September. Cod fishing was an extremely arduous occupation under these conditions, and accidents and deaths were by no means uncommon.

In the late 1920s Portugal underwent a political change, with the establishment of an authoritarian regime that was to last for more than 40 years. The regime, strongly nationalistic in character, proclaimed itself the *Estado Novo* (New State), and set out to glorify the accomplishments of the Portuguese, particularly the epic adventures of the Discoveries, which became a constant element in the government's discourse and imagery. Against this background, expanding the cod fishing fleet was presented as the return of Portugal to the sea, and up to 70 ships came to be involved in this activity. The annual departure of the fleet from Lisbon was an important event: dozens of ships painted white – the official colour of the Portuguese cod fishing fleet – and bedecked with multicoloured flags, received the blessing of the Church and the State and set sail for the icy waters of Newfoundland, gliding down the river in the bright sunshine of the Lisbon spring like swans.

Despite the depletion of stocks in the Newfoundland fishing banks, which led Portuguese fishermen to seek out new sources around Greenland, the quotas imposed on catches by the countries with jurisdiction over the fishing grounds, and technological advances in fishing and preservation processes, Portugal continued to use traditional methods: sailing vessels, line-fishing and salting. The majority of countries abandoned



the use of salt as a method of preserving the catch, as being uneconomic when compared to refrigeration. Fishing began to decline towards the end of the 1970s, but the Portuguese did not abandon their salt cod. They began buying the fish from the countries of origin and preserving it in Portugal. However, the new techniques required less salt, which in turn had a negative influence on Portuguese salt production, which also began to decline sharply from that time onwards.

Most regions of Portugal maintain a high per capita consumption of salt cod: 16 kg/year. In many regions, boiled with potatoes and cabbage, it is the traditional dish for supper on Christmas Eve, the most important family celebration. Every restaurant, from the humblest to the most sophisticated, includes at least one salt cod dish on its menu. The long association with cod fishing and the fish itself has meant that salt cod plays a central part in the popular imagination of the Portuguese, and is nowadays an anachronistic tradition that few other peoples have maintained and none with the same fervour as the Portuguese.

A large *seca* in Figueira da Foz

Photo: Figueira da Foz
Municipal Photographic Archives