ENGLISH TEXT
SUMMARY

TRADE IN POTTERY IN BARCELONA IN THE 16th-17th CENTURY: ITALY, FRANCE, PORTUGAL, POTTERIES IN THE RHINE AND CHINA

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Archaeological excavations in Barcelona in recent years have unearthed material from the Mediterranean, northern and central Europe and the Orient, demonstrating the dynamism of this city open to the world. The diversity and volume of goods arriving in Barcelona from elsewhere reveals a rich panorama, as can be seen in period documentation, though at the level of surviving pieces we can only talk of pottery, glass and pipes.

Italian pottery from the 16th and 17th centuries was widely distributed around the entire Mediterranean, but also reached northern Europe (the Low Countries, Britain and the regions around the North Sea), Morocco, Egypt and Turkey, as well as the Americas, in particular the area of the Caribbean (Santo Domingo and Haiti), Mexico, Florida and South Carolina, and the English colony of Virginia in North America.

The most abundant pieces found in Barcelona without question those from the various production centres in Italy. Tableware from Italian potteries filled the markets in the city, to such a degree that Spanish production centres suffered financial loss, prompting the enactment of protectionist measures.

In the area of the Valdarno, between Montelupo and Pisa, numerous potteries produced the well-known *marmorizzate* and *graffita*—though normally it is Pisan pottery that is mentioned—both of which are well represented in Barcelona. The forms documented in the city are basically open pieces, various kinds of plates and *catini* and a closed form used as a bottle.

Pottery from Montelupo presents a wealth of different types of decoration, amply attested to in Barcelona. Most of the items are polychrome pieces decorated with geometrical, plant or figurative motifs done in a combination of colours from a broad palette that includes green, blue, yellow, orange, brown and red. All the pieces are tableware items and consist of plates of the usual type in different sizes. There are also *crespine* and *catini*.

The oldest pieces attributable to the potteries of Faenza are two *boccali*. The decoration consists of a central medallion that fills much of the vessel and which is surrounded by a double circular band with a *scaletta* motif in blue. The most numerous group consists of the series known as *bianchi* (whiteware) decorated in the compendiary style. This pottery represented a return to the traditional values of tin-glazed earthenware and its classic forms, in which much of the piece was left undecorated in order to draw attention to the white. With regard to the types of pieces, most are tableware items and closely resemble the range of forms from Montelupo.

In Barcelona, Ligurian pottery—from Savona, Albisola and Genoa—reigned supreme over pottery from other production centres in Italy. Pottery from Liguria was widely distributed in Italy itself and has been found in a number of European countries, in Cairo and in the Americas in 16th-century archaeological contexts.

With regard to the pieces found in Barcelona, there is a clear predominance of open forms, basic tableware items. The Ligurian pottery from the 16th-17th century and the opening years of the 18th century (*terminus ante quem* 1716) that has been considered in detail consists of: *blu berettino, bianco e blu, calligrafico naturalistico, calligrafico a tappezzeria, scenografia barocca,* pottery *alla francese* and *taches noires* with painted decoration.

Very little pottery made in France has been found in Barcelona, though pieces did come from Provence and the Languedoc-Roussillon. However, we believe this is not representative of the trading circumstances of the time but related to the difficulty of identifying it.

The existence of trade relations with northern Europe is demonstrated by pieces from German potteries in the area of the Rhine, such as stoneware that includes the famous bottles known as *bellarmines*, which filled every European market in the 16th century.

Portuguese pottery is barely known in Catalonia. Its presence, though rare, is archaeologically documented in Barcelona, which is unsurprising given that Lisbon was an important point on the Amsterdam-Cadiz route. In the late 17th century, Catalan ships focussed their maritime trade on the Atlantic and the somewhat neglected cabotage routes in the western Mediterranean from Marseille to Sicily, North Africa and the Iberian Peninsula to Gibraltar. In maritime commerce around the Atlantic, Lisbon became a key port for trade with Dutch merchants. Their goods travelled from Lisbon on to Cadiz, a route often plied by Catalans in trade with the Americas. With regard to Barcelona, mention must be made of *pucarinhos,* Portuguese pottery typical of the 16th and 17th centuries made principally in Estremoz. These highly characteristic items were inspired by precious metalwork and are very baroque. Their lavish decoration includes inlays of fragments of quartz, an unmistakeable feature of such pieces.

Chinese porcelain was widely distributed and also reached the port of Barcelona in the 16th century. Porcelain pieces were luxury objects that only the wealthy classes could afford. Porcelain ware proved so popular that it was imitated in the East as well as in the West, examples being the pieces made in Syria, Turkey and Italy. In Barcelona, Syrian imitations of Chinese *bleu et blanc* porcelain have been found.

THE EARLY NEOLITHIC GRAVE IN PLAÇA VILA DE MADRID (BARCELONA). A FUNERARY STRUCTURE FROM THE 6TH MILLENNIUM BC

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The early Neolithic grave in Plaça Vila de Madrid is the oldest example of outdoor burial in Catalonia, be it on the coast or in inland areas. The care taken in constructing the tomb and in depositing the corpse reveals a ritual gesture. Though we cannot compare it with other known burials, it evidently has very little in common with the later burials of the early Postcardial Neolithic and Middle Neolithic. The covering of the circular grave with calcareous slabs and the seated position of the corpse are unique and there are no known parallels in these chronologies. Circular or oval graves were used at later dates. In some cases, graves that would initially have served as storage were re-used, and the corpse was deposited in every instance on its side or supine with its legs bent.

The funerary structure in Plaça Vila de Madrid was a cylindrical grave with a diameter of 60 cm and a preserved depth of 30 cm excavated in carbonated clays. The interior was covered with small calcareous slabs that formed a box in which the corpse was deposited. The sediment found inside the structure and which covered the bone remains consisted of dark brown clays mixed with sands and muds. On the remains of the body were calcareous slabs that must originally have lined or covered the grave and which, for reasons that occurred after the burial, fell into the interior of the structure.

The interior of the structure contained an individual primary inhumation, oriented east-west, with the head pointing west. The individual was sitting on the ground with her back against the west wall of the structure and her arms resting on her legs, which were bent up against her stomach. Only part of the postcranial skeleton was preserved: the legs, parts of the arms, part of the pelvis and a fragment of the lower jaw, which, for post-burial reasons, was documented on the base of the grave. The distribution of the jaw might indicate that the tomb was not filled in during the inhumation process.

The skeletal remains recovered consisted of fragments of the diaphyses of long bones, though none of the epiphyses, which are more slender and shorter, were preserved. A fragment of the left mandible and all the mandibular teeth were also preserved. Other recovered fragments were more difficult to identify due to the small size of the sample, such as indeterminate fragments of phalanges and metacarpals of the hand. In the case of other small fragments not identified in the laboratory, such as small fragments of the coxal bone, the notes made by the archaeologists during the exhumation of the remains were relied on. All the remains belonged to a single individual. The anthropological study determined that the corpse was that of an adult individual, possibly female.

The only material items connected with the interred individual are seven lithic tools that were grouped together between her legs. These tools consist of small lithic flakes (some fragmented) that show no signs of being retouched. The fact that these lithic remains were found together might suggest that they were all in a small pouch that the corpse may have been carrying at the time of burial. Analysis of signs of usage shows that none of these flakes had been employed. Consequently, the possibility that this lithic collection was deposited with the individual intentionally or for a ritual purpose cannot be discounted. The raw materials used to make these tools are flint and jasper, both of which were widely employed during this chronology. The functional study demonstrated that the absence of signs of wear, rounding, abrasion or micro-polishing on the cutting edges was because these flakes had not been used. Consequently, this is a burial of an individual left with unused lithic flakes.

The early Neolithic grave in Plaça Vila de Madrid furnishes new data on the Neolithic burial and of the establishment of groups in the area. The data on this early period is gradually increasing and, in the case of the Barcelona Plain, is defining how the occupation and exploitation of the low-lying land on the coast occurred.

THE WATER CYCLE IN BARCINO. A REFLECTION ON THE LATEST ARCHAEOLOGICAL DATA

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Researching the water-related infrastructure of a Roman city entails more than archaeological investigation: the study of the entire process of collecting, channelling and redistributing water is an interdisciplinary undertaking that calls for contributions not only from historians and archaeologists, but also from engineers and architects. This article seeks to bring together all the documentation generated to date in order to posit new hypotheses on the colony's water collection and the course of its aqueducts, as well as the distribution of the water within the city upon its arrival. These conclusions have been reached following a review of historiographical texts, a consideration of recent archaeological interventions, and the use of the latest 3D GIS technologies.

It should be noted that there is a close relationship between the courses of the aqueducts and the road structure: firstly, a road was required alongside the channel to facilitate possible repairs or cleaning; and secondly, it should be borne in mind that aqueducts followed the easiest route, as did the centuriation and the network of roads and paths established by the Romans.

The colony of Barcino had at least two aqueducts from the time of its foundation in the time of Augustus: the Besòs aqueduct and the Collserola aqueduct. The course of the first of these has been approximately established. Water was collected from near the Montcada mines and transported by the aqueduct through what is now the district of Sant Andreu, where, in the area known as El Molí de Sant Andreu, a 90-metre-long, 60-centimetre-wide stretch of underground aqueduct has been excavated, coinciding with the stretch documented in Plaça Duran i Bas and in the Casa de l'Ardiaca. In addition, the route it followed through the Ciutat Vella district, from its entrance in the area of the old Convent of Sant Francesc de Paula and along Carrer Magdalenes and Carrer Ripoll to Plaça Nova, has been determined. There are significant material remains of this water channel, such as the pillars on Carrer Magdalenes and, above all, the four arcades with intact *specus* in Plaça Duran i Bas. Extending for approximately 20 metres, this is the longest stretch of *arcuationes* of the aqueducts of Barcino recorded to date.

With regard to the aqueduct from Collserola, it should be noted that there are no new data that confirm its existence: its course has been reconstructed using written documentation, the old plan and historiographical sources. The collection of water began in the area of Sant Genís dels Agudells, where the aqueduct took water from various sources and then carried it down, closely following the route of Passeig de Gràcia today as far as the area of Portal de l'Àngel, Carrer dels Arcs and Plaça Nova.

The two aqueducts entered the city running parallel to each other at Plaça Nova, next to one of the gates in the Roman walls. It has been suggested that the *castellum aquae* might have stood here, inside what is now the Casa de l'Ardiaca, though this possibility has been dismissed due to the type of documented constructions belonging to the structure of the door, as well to the fact that water could not be distributed in the colony from this point, since it stands at the foot of one the two small hills that made up the city in Roman times, Mount Taber.

Once inside the city, the aqueducts continued to the area of the temple in the forum, which is where we place the *castellum aquae*. From here, the water was distributed along pottery pipes or lead *fistulae* to the various fountains, *domus* and other places where there was a need for running water. In addition, some of the water was transported by means of an inverted siphon system to a second distribution cistern in Plaça Sant Just. This cistern served to distribute water to the baths, many of which were in the eastern part of the Roman city. Another notable feature was a large vaulted conduit that passed under Carrer Palma de Sant Just. It is believed that this pipe, once regarded as the *cloaca maxima* of the colony, is an *aqua ductus*, which channelled water to the various bath complexes and which is perhaps part of the aqueduct which, according to an inscription, was built by Lucius Licinius in the colony of Barcino.

It is thought that the aqueduct remained in service until the 10th century, when the Romanesque cathedral was built and the entire urban structure of this part of the city was altered. It is likely that the Roman water pipes continued in use until an unknown date in the 9th or 10th century, when some of the arcades of the old aqueducts were incorporated into the end walls of the houses then being erected in the newly-formed district of Els Arcs, and when the city found an alternative water supply system. During the course of the Middle Ages, many public fountains were built to provide people with access to drinking water. According to the book on fountains written by the water engineer Francesc Socies, the medieval distribution conduit began on Collserola and descended along Passeig de Gràcia. A length of pipe, known as the 'large pipe', emerged from the water tower and extended towards what is today Plaça Sant Jaume.

To sum up, the water cycle in the colony of Barcino was consistent with the size of the city, its needs and the distribution of the archaeological structures in the urban layout.

Catalan historiography has considered the question of the port of Barcelona on many occasions. The connection between the harbour, and by extension the seafront, and the city's commercial growth in medieval times has aroused considerable interest from the 18th century, when Antoni Capmany produced his important work, through to the present day, with contributions from Francesc Cabestany and Jaume Sobrequés, Claude Carrère and Jordi Alemany, as well as scholars of the standing of Salvador Sanpere i Miquel and Francesc Carreras i Candi.
Unfortunately, the lack of physical evidence of this situation has led on occasions to a certain fossilisation in our knowledge of the harbour complex of Barcelona.
The discourse of this article, then, is directed towards two issues. Firstly, it presents the results from the archaeological work that resulted in the documenting of the breakwater begun in 1477 by Statius the Alexandrian and of a marine stratigraphic sequence of more than seven metres. Secondly, it posits a number of cautious reflections on the issue of the harbour by comparing and contrasting the archaeological data with the documentation and bibliography on the subject.
The oldest archaeological level that it has been possible to document, situated at a depth of approximately seven metres, is a level of gravel and sand which, given the presence of a Roman amphora, we can link to a mooring area dated to between the late 3rd century and the 4th century of our era. It should be noted that this kind of sediment is typical of a marine environment without any kind of protection. During the excavation of these levels, a layer of silt over more than a metre and a half thick was documented. This must be related to a restricted very low-energy environment and presupposes a space that is relatively protected from the influence of the sea. This lagoon bottom has been the subject of geological and palynological analysis by Santiago Riera and Ramon Julià, whose results are published in this issue of this journal. They put forward the hypothesis that the origin of this formation is connected to the deforestation and rise in agriculture in the plain of Barcelona that began in the late 9th century. Radiocarbon dating places the start of the formation of the lagoon bottom during this chronology. It seems logical, then, that this formation can be interpreted as the space between the city's beach and the area that period documentation terms *tascas*, sandbars that would have provided a relatively protected space for much of the Middle Ages. The first attempt to construct a stone port was perhaps responsible for their disappearance, which occurred during the first half of the 15th century, as confirmed by both carbon-14 dating and the archaeological material retrieved.
Two of the most unusual elements recovered during the excavations were located on this lacunar formation: two wrecks dating from the late Middle Ages in different states of conservation. It should be noted that both these ships are now in the process of being restored at the CASC (Catalan Underwater Archaeology Centre) and there is still more to be learned from them. Consequently, the article presents a brief consideration of them. Not only is this a new find but the ships were clinker-built, a system of Atlantic origin and not typical for the Mediterranean. Bearing in mind the historical context, it is suggested that the two wrecks may be from the area of the Cantabrian coast and that they belong to the cog or *barxa* class of vessels. Their position in the stratigraphic sequence makes it possible to date the moment they sank to between the time of the construction of the first port, in 1439, and the construction of the breakwater of 1477 located at the site.
The works to build the wharf begun in 1439 were a failure and were eventually abandoned. The project was revived, however, in 1477. The involvement of experts from abroad, such as Statius the Alexandrian, demonstrates the links that had been forged between the various cities around the Mediterranean, links that extended beyond trade relations. The archaeological excavations revealed a stretch of this structure measuring 79 metres, built by tipping into the water large blocks of stone quarried from Montjuïc mountain. This breakwater, like the wharf of 1439 before it, led to a significant alteration in the rate of sedimentation, with sand accumulating in the eastern area, whereas the beach to the west reduced, effects that were documented during the excavations.
The data obtained from the archaeological work has prompted a number of reflections on the reasons why the municipality decided to invest in constructing a wharf at a time of economic difficulties. Firstly, the gradual increase in the tonnage of ships would have presented depth problems in ports such as Barcelona that lacked adequate infrastructure. Moreover, this lack of sheltered space would have added to the difficulty of the already arduous work of loading and unloading goods. Secondly, cities around the Mediterranean basin were technically capable of undertaking this kind of work, contrary to suppositions that they lacked the technical skills required. Lastly, the article seeks to draw a connection between the construction of the wharf and questions of a financial nature, and assesses the ability of the Council of One Hundred to finance the works and the municipality's aspirations as regards the collection of taxes on vessels using the port.

LAND USE AND PRODUCTIVE ACTIVITIES IN BARCELONA, BASED ON PALAEOENVIRONMENTAL ANALYSIS OF THE MEDIEVAL COASTAL LAGOON OF PLA DE PALAU

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The natural evolution of coastal sectors is complex per se, because it is the result of the interaction processes between marine and continental dynamics. When human management is superimposed on these natural processes, these environments become very labile and dynamic. There have been many, often contradictory, hypotheses posited in Barcelona since the 18th century on the configuration and evolution of the city's seafront and its port. These theories are mainly supported on written sources and topographic surveys. More reliable evidence of this configuration based on geological and archaeogeological studies remains scarce.

The archaeological survey on the site between Plaça Pau Vila and Dr. Aiguader and Marquesa streets have provided an opportunity to describe the lithological composition of this stretch of the Barcelona seafront located at Pla de Palau, at the foot of the Baluard del Migdia bastion. The excavation of the site cut into a series of coastal sediments 8 metres thick, down to 7 metres below the sea level (b.s.l.), characterised by a predominance of sandy levels. At 6.2 m in depth (an absolute 5.2 metres b.s.l.), grey and brown silt and clay layers appeared, interbedded with layers of sand. The lithological sequence of silt and clays is 177 centimetres thick, 67 centimetres of which consists of six inerbedded sandy layers. The sedimentation of organic-rich silts in coastal areas are related to the development of restricted depositional environments sheltered from wave action and coastal drift currents. These muds were deposited in a column of water between 7 and 5.4 metres. The only possibility of low-energy sedimentation is the presence of an environment protected from the sea, such as a lagoon or bay with an extremely narrow entrance, in this area of the seafront. In coastal areas with rocky promontories, such as the mountain of Montjuïc, and river mouths, coastal longshore currents trigger the formation between them of spits, coastal bars and barrier islands in the mouth of the bay. These sandy deposits enclose lagoon depressions. Consequently, the existence of a lagoon on the seafront of Barcelona is necessarily linked to the presence of a bar related with the so-called *tascas* (sandbars) that made access to the city's port difficult. The presence of sandy layers interbedded with organic-rich silts indicates the proximity of this bar, and the development of washover fan deposits as a consequence of storms.

The chronological model of the silty sequence, based on the integration of four carbon-14 dates with the archaeological and historical data, indicates that this sedimentary unit was deposited between the late 9th century AD and the year 1440, the time when the attempts to construct port infrastructure in the city of Barcelona were carried out. Complementary analyses of palaeoenvironmental proxy data, mainly palynological, sedimentological and geochemical, have been conducted in these organic-rich siltty levels.

Intercomparison of this set of data provides evidences of paleoenvironmental changes and allow to establish the evolution of farming and artisanal activities in Barcelona and its plain during the Middle and the Early Modern Ages.

During the second half of the 10th century, and probably as a result of Barcelona's position as a border city, there was a decline in farming activity, though the heavy metal content indicates that production and artisanal activities remained in the city. The modest rise in farming in the late 10th and the first half of the 11th century is related to a period of economic expansion, though artisanal activities dwindled in the city between 970 and 1000, before subsequently recovering. The expansion in agriculture during the second half of the 11th century confirms the economic growth, already indicated by historiographical information. The retrenchment in farming and the rise in artisanal activities during the 12th century are probably the consequence of the urban consolidation of Barcelona and the growth of the artisanal district in the coastal area close to the lagoon.

During the 13th and the first half of the 14th century, agriculture expanded, focusing on olive production. Artisanal activity reached a peak between 1200 and 1280, a period of economic and political growth in the city, as well as a time of activity in the former shipyards. The decline in farming and manufacturing that began around 1340 confirms the economic recession that stemmed from demographic crises. However, the palaeoenvironmental data show that the city recovered from this setback quite quickly and by the end of the 14th century there was an appreciable rise in agriculture and artisanal production. Urban and farming activity in the plain began to fall into a permanent decline around 1420.

The recording of considerable concentrations of intestinal parasite eggs in the sediments in the lagoon, which coincide with increases in phosphorus, indicate that waste water reached the lagoon during certain periods. The parasite egg peaks were recorded between 1340 and 1390, the period when the city was affected by food crises and plague outbreaks. This set of data allows us to hypothesise that the worsening of the sanitary and hygiene conditions in Barcelona must have contributed to the spread of parasitic diseases.

In global terms, then, the palaeoenvironmental data obtained concur with the main economic and demographic trends in Barcelona signalled by historiography. However, the descriptors analysed here provide a detailed view of the complexity of the historical dynamics and demonstrate that palaeoenvironmental analysis is an extremely reliable and valuable source of historical knowledge.

In addition, the work highlights the importance of information extracted from geoarchaeological sequences to the study of the historical morphology of the seafront of Barcelona.

This approach goes beyond the hypotheses based on written sources and repeated in the literature for more than a century, without sufficient advances made to confirm them by means of comparison with empirical data.

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The various archaeological excavations in Ciutadella Park and the surrounding area have revealed the large size of the fortress erected on the site in the early 18th century. They have also demonstrated that the citadel remains in a good state of conservation, reflected in the existence of walls up to six meters thick in certain places.

In order to provide an understanding of why the fortress was built, as well as some of its basic characteristics, the article gives a brief account of the evolution of gunpowder artillery and the necessary adaptations in fortification systems that this prompted. The article describes how advances in armaments, particular iron cannonballs, forced changes to be made in fortifications of the time, a process that culminated in the early 16th century with the invention of the bastion, which proved to be the most effective protection against the new artillery. The birth of the bastion also prompted a new form of defence: the bastioned fortification, which, following successive improvements, remained the prevailing defensive system until the 19th century.

Citadels are the ideal expression of the bastioned fortification and hence of defence against siege warfare in the modern era. These architectural complexes, normally rectangular in layout, were designed in order to defend a city from its enemies without but also to keep the populace within under control. The earliest citadels built to the design of a bastioned fortification were begun in the mid-16th century and include those at Cambrai, Turin and Antwerp.

This article focuses on the specific case of the city of Barcelona and reviews the adaptation of the defences put in place in medieval times and studies those erected in the modern era along the lines of the bastioned fortification by analysing part of the city layout that has survived to the present day.

Mention is then made of various projects to build a citadel in Barcelona in the 17th century, though none of these were put into effect due to the lack of finance. It was not until the early 18th century, after the War of the Spanish Succession, that a citadel was finally built in the city.

Even though the article revolves around the citadel designed by Jorge Próspero de Verboom, it also considers the design of the Count of Lecheraine, who, in contrast with Verboom, suggested a citadel should be built closer to the beach and that it should be square in shape and make the most of the existing eastern bastion in the walls around Barcelona and a stretch of the old walls dating from the Middle Ages that ran below the Convent of Santa Clara and which were no longer in use in the early 18th century.

The article then goes on to examine the implementation of Verboom's citadel design, focusing in particular on the construction model used by this Flemish engineer, the French *toise* and *pied* (approximately 2 metres and 30 centimetres respectively), and the measurements of the fortifications, obtained from plans held in the General Archive of Simancas and confirmed by archaeological findings. The article also makes special mention of the evidence that in order to design the new fortress, a topographic survey of the site where the fortification was to be built was done in 1715, rebutting the view of some authors that a 17th-century plan of this part of city was used. This topographic survey gives us a fairly reliable picture of the Ribera neighbourhood in the early 18th century, so much so that it can be overlaid on a present-day plan by identifying some of the notable features of that area of the city that are still in existence. Consequently, it provides us with information regarding the location of some of the structures in the Ribera neighbourhood of the time that have since disappeared.

In addition, in order to provide an understanding of the true scale of the fortification, the Barcelona citadel is briefly compared with that of Lille, the Castle of Sant Ferran in Figueres, the citadel in Pamplona and the small fortifications in Jaca and the Fort of La Concepción (Salamanca).

Lastly, the article details the data obtained during the archaeological excavations regarding the level of the destruction consequence of the partial demolition of the fortification in the second half of the 19th century.