

**ENGLISH TEXT
SUMMARY**

The numerous studies on the historical changes to the Barcelona shoreline reveal the close relation established between the shaping of the shoreline of a Mediterranean city like Barcelona and its historical development. Consequently, awareness of the morphological changes of the shoreline becomes a key element to understanding the socioeconomic history of the plain and city of Barcelona. Thus, since the late 19th century, the shaping of the Barcelona shoreline has been studied, particularly in relation to historical periods. However, most of the reconstructions have been based on the information supplied by historical documents which are difficult to interpret palaeographically. The intense urban development and public works activity carried out in the city of Barcelona in the 1990s and 2000s has resulted in a large amount of information on the subsoil of the plain of Barcelona. Moreover, most of these urban development interventions have taken place in the most littoral sectors of the city, allowing an updated vision mainly of the sectors closest to the shoreline.

Thus, this amount of geotechnical, lithological and archaeological information allows the consideration of a new attempt to interpret the dynamic of the Barcelona shoreline in the past millenniums mainly based on the sedimentological information collected. An interpretation of the evolution of the Barcelona shoreline has been made based on the lithological relations that may be established using the descriptions from 180 geotechnical drillings, complemented with the descriptions in sedimentological profiles, along with a set of 25 C14 radiometric datings. Moreover, archaeological interventions have allowed chronologically locating some more superficial sedimentary deposits. The interpretation of this information allows us to contribute to the preparation of more updated evolution hypotheses, although in Barcelona an in-depth paleoenvironmental study of the sediments is still pending, as is a solid chronological model of the lithological units.

The evolution of the littoral sectors of the plain of Barcelona is closely linked

to the development of the delta plain of the Besòs river, in the north, and the Llobregat river, in the south, and the transfer of sediments from the Besòs delta towards the southwest caused by the longshore drift and the eastern storms.

The maximum marine transgression that occurred around 2,500 years BC is recorded in the southern sector of Montjuïc, when the sea was located close to the level of Cerdà Square. In the Besòs lobe, the maximum inland expansion of sands at an absolute 0 MASL height reached the current Santander Street, in the north, and Diagonal Avenue-Can Ricart, in the sector of Poblenou. In the Born sector, the maximum marine transgression expansion has been recognised at the level of Princesa Street. The progradation of the delta plains from this moment of stabilisation of the sea level took place through the successive annexation of the offshore bars that can form depressed inland areas with wet environments such as marshes and lagoons. One of these wetland formations took place in the north sector of the Besòs (Via Trajana marsh) and another in the sector of França railway station-Ciutadella, the latter in the medieval period. Seemingly, some of these offshore bars occupied a reduced area over a long period of time. The annexation of these successive offshore bars during the Holocene seems to have experienced a change in their dynamic from the Roman time. Thus, Roman burials in sand in the areas of the shipyards (Drassanes), the Military Government and Santa Maria del Mar, and the bar located in the Diagonal in the sector of Poblenou seem to have involved a period of stability of the Barcelona shoreline, at least until the moment when a new prograding episode took place that would form a new sandy bar in the Early Middle Ages.

From the 15th century, the prograding episodes of the centre-north sector of the plain were closely influenced by the construction of breakwaters that retained the sediments brought by the Besòs river and transported towards the south by the drift currents. By the 18th century, these sediments

retained by the successive breakwaters shaped the neighbourhood of the Barceloneta.

Despite the lack of C14 chronologies in the sediments, everything seems to indicate that most of the big marshes in the plain were filled to overflowing or their surface area had already notably decreased in the Roman era, as deduced in Can Ricart, Cagalell and wetland areas in the southern side of Montjuïc. Moreover, in the most littoral sectors we see the formation of another set of marshes from the Early Middle Ages, as revealed França railway station-Ciutadella and the lake of Mare de Déu del Port, linked to the progradation process of the delta plain.

In the sector between Montjuïc and the plain of the Llobregat, we have proof of the flow of the Llobregat river very close to the mountain. One of these paleochannels has been documented in the subsoil of the former Philips factory dating to 2,300 cal BC, although at least two more paleochannels have been documented, one undated and the other dated between 750 cal BC and 650 cal AD. It should be noted that the littoral sands found in the Passeig de la Zona Franca had already been occupied in the 2nd century BC, which proves the presence of a backshore area in this sector at the beginning of the Roman period.

This article seeks to show the evolution of the city of *Barcino* from the 5th century AD until the 7th century AD based on the amphorae documented in each period. Although we are unable to be chronologically specific or undertake a comparison with other similar sites because of dating problems and counting systems, we can provide an overall picture on imports in the city of *Barcino* and its level of trade. At first sight, it seems that the city enjoyed one of its best economic periods, with a growth in trade which is also seen in the public works in the city.

During the 4th and 5th centuries AD, like other urban centres in the northeast of the Peninsula and Southern Gallia, it seems that North African imports controlled the city markets reaching percentages of over 50%, although there are other products from the East, South of Hispania Baetica and Lusitania which achieved a lower level. Within North African imports, the Keay XXV and XXXV types are the best represented, which is not surprising if we compare it to the case of *Tarraco* (Remolà, 2000). Nevertheless, at first sight, imports from Baetica amphorae from the Guadalquivir are lower than in *Tarraco*, a detail which may suggest different ports of call on the trade routes from Hispania Baetica in the Western Mediterranean.

In the 6th and 7th centuries AD, the city of *Barcino* not only lacked any sign of economic decadence but actually seemed to be a period of growth, mainly in the second half of the 6th century AD. We do not know how far this is explained by the political situation of the time in the Western Mediterranean after the Byzantine conquest. It seems that the Visigoth ecclesiastical and political power in the city maintained its economic dynamism in Late Antiquity.

During this period, the city still mainly received products from North Africa with levels above 50% of the total amphorae, and had other suppliers from the East, South of Hispania Betica – except the valley of the Guadalquivir – and Lusitania. Nevertheless, products from Palestine and the Italian Calabria also arrived, although none of them exceeded 5% of the total. In terms

of types, it seems that the most common amphorae of this period were two other African vessels: Keay LV and Keay LXII. They are even more common than in the city of *Tarraco*.

Within the overall panorama of the northeast of the Iberian Peninsula, the economic situation of *Barcino* was quite buoyant during this stage of Late Antiquity. Although the public works had provided a great deal of data on the dynamism of this period, the evidence of amphorae confirms this point. Unfortunately, the differences in the quantification methods make a rigorous comparison with other urban centres in the Peninsula and Southern Gallia unfeasible. However, everything seems to indicate that the city assumed an economic leadership it had hitherto lacked and perhaps took over from other urban centres.

The interrelation between the medieval city and the port is an interesting observation point of some events that affected the city in the 15th century.

For much of the medieval centuries, Barcelona lacked major port infrastructures. It was during the last medieval century when the city allocated resources and efforts to this task.

This article attempts to advance in the knowledge of the medieval port, both during the time prior to the construction of the quays and when they were built. Therefore, the aim is to continue the path opened by the article published in issue 6 of this journal.

This article leaves aside some issues such as the quay of 1439, the archaeological materials, the ships that arrived in Barcelona or the economic dynamics that can be deduced from the port activity. The data provided by the excavation of the old railway station in the Pla de Palau, some documentary data such as the anchorage rights or the re-reading of some sources, perhaps somewhat overlooked, offer an image of late medieval Barcelona from a perspective of one of its economic bases and points of entry and exit for merchandise, men and ideas.

The first section, placed chronologically before the construction of the quays, approaches the issue of the Barcelona shoreline and its port area. These were protected by a large sandbar called in the documentation *Tascha* or *Tasches*.

The revision of some written sources, in combination with archaeological and geological data, allows greater precision about its shaping and topography.

The second section focuses on the construction of the first quay from 1439, which was probably the result of a wider-ranging project than what had previously been considered.

Finally, the last quay project of 1477 is approached fundamentally from the perspective of the remains of recovered moveable material. The comparison of the pottery pieces related with two of the quays, that is, between 1439 and 1477, allows an understanding of some of the economic processes in which the city was immersed.

From this study we can deduce a possible fall in imports of Valencian pottery at the end of the century, as well as the

more than likely strengthening of exports of local pottery. Especially notable is the percentage fall of Barcelona pottery containers, *alfàbies*, experienced from 1477 with clear economic connotations.

To complete the partial vision offered by the study of the pottery materials, the results are complemented by an extract of data obtained from the anchorage rights books. This tax was granted to the city by Alfonso the Magnanimous in 1439 to fund the port works. The explicative potential of this documentation lies in the detail with which it records, day after day, all the ships entering the port. Despite the gaps in maintaining these documentary registers, a relatively long-lasting global image can be built up of port activity in 15th century Barcelona. Throughout the period studied, between 1439 and 1491, the fall in all the variables considered is clear: number of ships with tonnage higher than 50 barrels, the amount collected and the total number of barrels. Given the processes of a marked negative character deduced from the study of the port, the vitality of some sectors and especially the city itself can also be noted. The interpretative contributions made by S. R. Epstein are an interesting method for understanding the economic failure deduced from the study of the port of Barcelona, as a process of integration and restructuring of the medieval economy. This is visible both through the changes of nautical and geo-economic models or even through some material remains of great commercial success, such as Valencian pottery. However, it must be noted that the economic vitality of the future modern city was preceded by an economic adjustment that, at least in the case of the port, is quite impressive and even dramatic.

Shipping jars are the tangible exponent of a trade activity linked to the expansion of the Crown of Aragon. Their manufacturing centres were located in Valencia and Barcelona. The existence of a trade in empty pottery containers and the circulation of these full containers often complicate their identification with a determined workshop. Moreover, jars with dried or salted fish arrived in Barcelona from Seville, and quite probably from other places not yet identified. Barcelona acted as a distribution centre, which does not mean that all pottery containers were only made in Barcelona. There could have been other centres at greater or shorter distances from the city that, following the municipal regulations, also manufactured them, complicating even further the identification of the workshop. In this respect, archeometric studies applied to containers have begun to open many possibilities.

The find of a closed set of pieces in the excavations in Avinyó Street in Barcelona, with a large amount of pottery material (*alfàbies*, green tableware, archaic earthenware, coarse glazed ware and reduced ware) allows us to locate the manufacturing of *alfàbies* in the first half of the 13th century in Barcelona. Moreover, the archeometric studies conducted confirm their local origin. From this set it is possible to establish type I, with characteristics more specific to the amphorae of Late Antiquity than the “classical” late medieval containers linked to the expansion of the Crown of Aragon. It corresponds to a container with a completely fluted ovoid body, a well-differentiated long neck and a narrow rim with a thickened lip. The base is flat and slightly concave. It has two very strong vertical handles on the upper part, which bear one or two deep flutings. Archaeological discoveries allow us to locate it in the first half of the 13th century, a shape that would no longer be manufactured at an undetermined moment in the second half of the 13th century.

Type II is defined by a piece found in the church of Santa Maria del Pi. It is globe-shaped, with a fluted body and high robust handles. It has a straight neck and a reinforced rim. The base has a concave tendency.

An identical piece has been found in the church of Sant Miquel de Cardona, together with another *alfàbia* of type I. We believe that it could already have been manufactured in the first half of the 13th century, and continued in the second half.

Type III is defined by the discovery of an almost complete piece in the excavations in the former medieval port of the city which has allowed us to establish another shape for the local production, given that the archeometric analysis also indicates a Barcelona workshop. It is a piece with a largely globe-shaped body, although with well-marked carinations, with wide flutings. On the upper part of the body, there are strong circular handles, very similar to those of type I. It has a long neck, with a convex inside surface which opens at the end of a wide reinforced rim where there are marked mouldings. The shape was probably manufactured in the second half of the 13th century. The presence of stamps – a characteristic lacking until then – and the formal variants lead us to establish type IV, which is characterised by having an ovoid rather than a globe-shaped body and somewhat elongated with two high vertical handles, of the same characteristics as the previous types, and located in the same place. The neck is long and vertical with a wide rim and a final moulding, closer to type V. The base has a reinforced flat bottom, similar to the previous one, but very much narrower in size, which now coincides with the width of the mouth, a characteristic which will be maintained in type V, making these pieces quite unstable. This shape can be related to the emergence of the early workshop stamps, printed near the rim or under the neck. We believe that types III and IV were mainly manufactured in the second half of the 13th century and did not continue beyond the first quarter of the 14th century, given that the shape is no longer found in the pottery sets known from the backfills of the vaults of the Gothic buildings beyond this date. The most characteristic and numerous shape of this production, manufactured throughout the 14th and 15th centuries, is what we have called type V. It corresponds to a piece with an ovoid profile, a little elongated,

with a short neck or no neck, a small flat base, usually narrower than the mouth and often a little thickened. The rim, with very characteristic moulded strip, is usually turned slightly outwards, which made it easier to place the top.

These pieces were marked with the workshop stamps, as indicated by the municipal regulations. We have been able to identify 37 workshop stamps; they are circular printed marks and some of which bear the name of the master potter. Once the shipping jar was put in circulation, the presence of the stamp made it possible to link it to the manufacturing workshop, which was responsible for any problem attributable to the container's quality. These jars often bear marks painted in black or red. These are merchant signs identifying ownership in the ports and in general throughout the distribution network.

The medieval shipping *alfàbies* can finally be as important a dating element as the amphora is today for the Roman and Late Antiquity period. They correspond to a very limited period, because with the outbreak of the 1462-1472 civil war, which put an end to Catalan trade expansion, the production of Barcelona *alfàbies* considerably decreased until their complete disappearance. Everything seems to indicate that when the activity was resumed after the war the shipping jars were made in Valencia. The number of Barcelona *alfàbies* in the backfills of Gothic buildings from the second half of the 15th century decreased considerably and, by the late 15th and early 16th centuries, they had practically disappeared except for some isolated pieces.

The archaeological intervention carried out at plot number 25 in Ripoll Street in Barcelona provides new data about the process of expansion of one of the oldest boroughs in Barcelona, Vilanova dels Arcs Vells. The most important discoveries are focused on a large number of structures from the early medieval era previously unseen in the area and related with the organisational process that took place in the suburban territory in the north of the city around the Roman aqueduct of the Besòs river. The documented archaeological remains allow us to establish up to three different phases of occupation in a highly determined chronological context from the 9th to early 11th centuries. The set of pottery materials found in this period is very homogeneous and undoubtedly the typology of these pieces forms part of the material characteristic of the Carolingian period. The earliest stage of occupation attributable to the low medieval period is characterised as having a defined territory based on the presence of silos distributed throughout the existing spaces in an organised way. Despite the lack of construction elements associated with this stage, the distribution of the silos indicates that at that time the territory was arranged around some structures, possibly made of perishable materials, which would have shaped the territory according to a preconceived arrangement but have not survived. The main factors that characterise it are the increasingly greater existence of silos. Another factor to bear in mind is the presence of different hearths. These minor combustion structures are placed directly in the ground without any kind of associated construction and have very diverse shapes and sizes. To discover the origin of these hearths we must go back to the later phases of the Roman period, although their presence in this period is very occasional, almost anecdotal. The consolidation of the presence of hearths occurred in the early medieval era and is a new element to consider in terms of its increasingly greater influence on the area. Moreover, this is still an occasional kind of occupation, albeit more frequent, and the location of the hearths is possibly related with moments

of occupation linked to the use of the silos.

At some moment between the 9th and 10th centuries there was an important change in the organisation of these areas near the walled enclosure from an occasional or seasonal occupation to a settlement with a solid structure. The intervention has allowed the documentation of numerous walled structures that determine well-defined and purposefully-arranged spaces. The area is made up of small plots formed by walls of stone and clay that delimit interior spaces housing numerous storage structures, minor walls and water wells. Therefore, the first constructions that make up Vilanova dels Arcs must still be related with a strongly agricultural territory, with a well consolidated occupation but with a non-domestic typology. The main difference with the previous phase is that now they are located in delimited spaces, which obliges a greater concentration of storage structures. This plot arrangement is accompanied by a more productive complexity, shown by the fact that, together with the silos, we also find circular parts where it was possible to place pottery containers. The pits are associated with wooden structures, of which now only the post holes made in the earth remain. This area, arranged based on diverse plots, is also structured around a road, so that we find a territory structurally-defined and well-connected with its surroundings.

In the late 10th and early 11th centuries, there was a new structuring of this territory that involved a change in the arrangement established until the time. The road, the plots and the related structures are infilled by a series of layers that give way to a broader space and with few signs of structural remains. It changed, therefore, from a highly compartmentalised area resulting from the presence of small portions of land to a territory that was possibly structured around bigger enclosures, following a spatial rearrangement rather than a change in the territorial concept. The presence of structural remains linked to the third phase of the early medieval occupation in relation to the previous phase are scarce, given that there are only two walled structures

**THE KILN IN CARDERS STREET.
A 13TH CENTURY PRODUCTION
CENTRE IN THE EASTERN SUBURBIUM
OF BARCELONA**

Esteve Nadal Roma

and a water well, and the number of silos has been greatly reduced. It is important to note that there was no break with the preceding stage and no signs of elements of destruction or abandonment and the lack of data on this does not necessarily imply that there was a depopulation of the area. A clear continuity in the constructive typology is documented, the structures are made of stone and clay, and in terms of distribution the walls maintain the same orientation as in the previous phase. So this is a territory outside the city with a well-consolidated occupation that evolved internally according to its needs but continued to be organised around spaces defined according to the presence of plots and always based on a pre-existing arrangement. It was not until the 13th century that the Roman aqueduct of the Besòs was incorporated into the medieval constructions, possibly within the urban process in which this area was immersed with the construction of the first domestic properties. The new houses were built maintaining the same spaces previously occupied by the walls that formed the different plots, thus preserving the territorial arrangement established in the early medieval period.

A preventative intervention in plot number 39-41 in Carders Street unearthed the remains of a 13th century pottery workshop. The establishment of the pottery workshop in Carders Street took place in the urban development process of the neighbourhood of Sant Pere, located in the eastern *suburbium* of the city of Barcelona. The archaeological excavation has helped identify several work areas and the remains of a kiln for the manufacturing of burnished coarse ware and glazed green and honeyed coarse ware. It is a circular-shaped kiln, with a vertical flue of which it has been possible to recover the firing chamber and the charging throat. Inside the firing chamber, an axial-shaped central pillar leaning against the back wall that would support the grill has been identified. It is, therefore, a well-known type of kiln in terms of the medieval world, with parallels in workshops as notable as Cabrera d'Anoia or the neighbourhood of *Sainte-Barbe* in Marseilles. We should note that it was possible to clearly identify two areas and the remains of several walls allowing us to glimpse the existence of four more areas linked to the workshop. It is worth pointing out that the numerous structures built in later stages have to a large extent damaged the surfaces of these four areas, which does not allow a reliable interpretation. Thus, the efforts have focused on areas 1 and 2, which are work areas related either with the manufacturing of the materials to put in the kiln or with tasks related to its operation.

The pottery materials studied come from the infilling strata of the kiln and from the different levels of the workshop. They are pieces for the kitchen and storage, both in open and closed shapes, with a predominance of reduction firing materials. These pottery pieces have morphological and decorative particularities allowing an unequivocal identification. A burnished finish on the whole surface of the piece gives it a very glossy appearance. Also notable is the use of the spatulated finishes and decorative applications as the most notable decorative motifs, which are identified separately or in combination and which denote the purpose of producing elaborate ornaments. Moreover,

it has been possible to establish a formal repertoire which reveals the discord of the pottery production in the workshop in Carders Street in comparison with other known Barcelona manufactured pieces from the 13th century.

In contrast, it has been possible to identify many similarities both in the shapes and the techniques used in the surface finishes and the decoration applied to the pottery pieces produced in the workshop, unlike production from the Almohad period in the Peninsula. The numerous coincidences with workshops in which the presence of artisans from outside Barcelona is clearly documented (such as the neighbourhood of *Sainte-Barbe* in Marseilles) leads us to suggest hypotheses on the presence of a potter from al-Andalus who would run the workshop in Carders Street.

Moreover, the poor circulation of pottery materials produced in this workshop (given that there has been little identification of similar pottery materials in archaeological interventions conducted in the city) leads to several hypotheses about the reason. A first hypothesis would be a poor commercial success bearing in mind the morphological and decorative difference of the pottery pieces manufactured in the workshop in contrast to most common pieces in the context of 13th century Barcelona. Another hypothesis, more likely bearing in mind the similarities with Almohad pottery, is that it would be aimed at the population of al-Andalusian culture living in the city. This would have limited the commercial scope of the workshop and its presence throughout the city.

The construction of a new building in the area where the workshop was located allows us to determine the end of the pottery production of the workshop in Carders Street in the last third of the 13th century, whose origins are found in the urban development of the neighbourhood of Sant Pere at the beginning of the same century. Thus, the data provided by this study represents the appearance of an additional element added to the previously produced studies on the Barcelona pottery of the 12th and 13th centuries.

The excavation undertaken in plot number 39-41 in Carders Street in 2004 enabled the documenting of a series of structures related to an area of arts and craft production, including a kiln from the 12th century – third quarter of the 13th century (Nadal, in this issue). This discovery is of key importance to understanding pottery production in Barcelona, as it is the second workshop found and excavated in this city from the period between the 12th and 13th centuries, after the find of the kiln in Hospital Street. Thus, to date, the only two kilns discovered and studied in Barcelona are located far from each other, which would quite probably mean the use of different raw materials. Based on this premise, the objective of this study is to characterise the production of the kiln in Carders Street, at a chemical and petrographic level, based on the study of 31 specimens (Table 1) and their comparison with Hospital Street to check whether the two workshops used raw materials and a similar process of clay paste preparation; moreover, the Reference Group (RG) in the Carders workshop will be defined, enabling us to see the possible spread of these materials in the city. The results of the chemical analysis (Figures 1 and 2) have enabled identification of a large group comprising most of the specimens from the excavation in Carders Street, group E, which can be considered the specific production of the workshop (Table 2). Moreover, two specimens from the excavation in Hospital Street are related to this workshop, or to the possible production area in which it would be located. Moreover, it has made it possible (Figure 3) to relate two specimens recovered from the excavation in Carders Street in the possible area of production of the other 13th century workshop discovered so far in Barcelona, that of Hospital Street. It should also be noted that two other specimens have been identified, which remain isolated and should be considered as two types of manufactured pieces differentiated from each other and from the production in Carders Street and Hospital Street. Moreover, the results of the petrographic study (Plates 1 and 2) fully corre-

spond to those derived from the chemical analysis. Thus, petrographic group 1, characterised by the presence of an abundant bottom mass with equally abundant inclusions, would fully coincide with chemical group E, which we have defined through the production specific to the workshop in Carders Street. Although we have not seen a high variability in the degree of firing and oxidation of the clay pastes of this group, it is worth recalling that we have studied waste production: that is, faulty pieces not suitable for marketing. In its turn, petrographic group 2, which differs from the main production by the low presence of inclusions both in the matrix and in the major fraction, would correspond to chemical group A3 from the workshop in Hospital Street. Finally, for the specimen BCN311 the petrographic analysis also suggests it belongs to a production differentiated from the previous but also compatible with a local or regional origin. This study allows us to deduce that for the preparation of the paste used by the potters in Carders Street to make their products, they would have chosen an alluvial ferric clay with an internal mass formed mainly by medium-sized grain siliceous inclusions and, therefore, suitable for use in the kitchen. The textural characteristics do not allow us to exclude intentional addition of the sandy fraction, probably also of alluvial origin. Given the petrographic characteristics observed, we can assume the use of raw materials near the workshop area. Moreover, the metamorphic inclusion can be related to the Palaeozoic substrate in the area of Barcelona (Collserola and La Rovira hills) formed by granodiorites, schist and metavolcanic rocks. Quaternary clays are found throughout the plain of Barcelona from the mountain range of Collserola to the coastal area, including the Llobregat and the Besòs river deltas. Moreover, some inclusions, particularly fragments of concretions of chalcedony and grains of feldspars with authigenic overgrowths, quite probably have a close relation with a component of the Miocene sedimentary series of the horst of Montjuïc. In the case of Hospital Street, for the prepara-

tion of the pastes the potters would have mainly used calcareous clays; moreover, the characteristics of the inclusions and the good condition of oxidation coincide with the use of these pieces as tableware. However, it should be noted that the study of the kiln in Hospital Street identified potteries which would not correspond to the specific production of this workshop. For two of these specimens, it has been observed that they feature chemical and petrographic characteristics similar to those observed in the studies in relation to the specimens in Carders Street. These similarities, along with making it possible to assign them to the production of the workshop, lead us to suppose that there were other manufactured pieces made with materials similar to those used in the workshop in Carders Street. Thus, as in the workshop in Hospital Street, these would allow us to suppose the existence of production in its surrounding, using similar materials, while the workshop in Carders Street could be found in a second area of pottery production where different workshops would be using the same raw materials. In any case, currently, pottery manufacturing in 13th century Barcelona seems to define the existence of two production areas on the two sides of the city around the former Via Augusta, one of the most important roads in the transport network of the Plain of Barcelona: on the southern side, in the area of the workshop in Hospital Street; and on the northern side, in the area of the workshop in Carders Street.

**THE NON-KAOLINITIC CLAY
PIPES FOUND IN BARCELONA:
PRODUCTION AND TRADE
IN THE 17TH TO 19TH CENTURIES**

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The archaeological interventions carried out in Barcelona in recent years have revealed the existence of a large number of clay pipes. The lack of publication of these discoveries along with their contexts and the scarce bibliography of reference from the point of view of archaeology are a real initial problem, largely making precise cataloguing of the pieces impossible. For these reasons, we have chosen to classify them following the criterion of “style”, which enables us to systematically catalogue the large formal variety of the pipes found, although without assigning them to a specific geographic origin. The contribution of the present study lies in the differentiation of several groups which, because of their technical and compositional characteristics, it has been possible to identify as locally manufactured, with a considerable diversity of shapes. Firstly, we have differentiated the *pipes d'escudeller*, given that they were made by potters specialised in manufacturing tableware. Three groups have been distinguished: those featuring a tin-glazed cover decorated in blue, the polychrome pipes, and those with a green glazed surface. The first are decorated with garlands, while the polychrome pipes feature vegetal motifs and, in one case, the depiction of a male character with a long moustache. Glazed green pipes are the most numerous, and it has been possible to establish six variants based on the decorative patterns: boot-like with a prominent heel, ship hull, bowl decorated with mouldings, side rosettes, in the shape of a human head, and blurred motifs. The second differentiated local production is called *obra d'oller* and would have been made by the guild of potters specialised in the manufacturing of glazed kitchenware. These are glazed brown pipes with reddish paste, typical of coarse work pieces, in contrast with the latter, which were of yellowish paste. The decorations are made up of bowls with mouldings, ribs and stippling and some have the shape of a human head. From the second quarter of the 18th century there is documented manufacturing of pipes on the Catalan coast, with Palamós (Girona) as the most important production centre. A remarkable characteristic is the pointed heel

that ends in a small ball. Their decoration consists of garlands and strips and some specimens bear the name of the workshop; the best-known were those of Juan Castella and Esteve Espinet. For a long time, these pieces were considered to be from the Roman period. Apart from white clay or kaolin pipes from Holland and England, which were the object of another previously published study, different pipes from the Eastern Mediterranean, specifically from the area under Ottoman Empire rule, have been discovered. Given the large variety of shapes and types found, the entry of these pipes would not be through shipping organised by consignments, as happened with white clay pipes, but they would instead have had irregular access, possibly linked to personal use by seamen or goods carried by seamen on freight-free ships. Pipes of Greek, Balkan and Turkish style have been documented, most of which are made of black paste, although there are also some of ochre or yellowish tones. Those of Greek style are decorated with ribs, geometric elements, dots and stamped motifs. Among those of Balkan style, we can distinguish the pipes featuring a bowl and an acutely-angled mouthpiece (some of them decorated with cruciform elements or stamped sea shells), the sack-like pipes – one of the best represented groups –, which are decorated with circular motifs and vertical scarification marks, and the so-called faceted or pseudo-decagonal pipes, which are characterised by having a long mouthpiece and a faceted bowl. Pipes of Turkish style feature a large formal variety, which leads us to differentiate seven groups with common characteristics, such as a fairly pronounced mouthpiece and small bowl, decorated with garlands, opposed semicircular printings, diamonds in relief, inverted palm tree leaves, and so on, all incised or engraved. Notable among them is a red polished clay chibouk decorated with ribs, made in Constantinople in the second half of the 18th century and which was imitated in Marseilles by Bonnaud Fils in the 19th century. The study also introduces some specimens worth including but, either because of their morphology or lack

of similar specimens, we cannot contextualise them within any previously mentioned group. The pipes decorated with a stem on the foot and those which have a grill inside the bowl stand out. Moreover, there is a section on tampers, a series of metal or bone objects that have appeared in the Barcelona excavations and which could be linked to tobacco and pipes. They were used to clean and empty the bowl or to crush, move or hollow the tobacco.