

# Analysis of the Ceramics from Oukaïmeden: Technology and Context

## *Análisis de las cerámicas de Oukaïmeden: Tecnología y contexto*

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### ABSTRACT

*The present work describes the study of the ceramic materials recovered in Oukaïmeden Valley, and its results. In this set of archaeological sites, we obtained information mainly from Aougnin n'ait Ourigh, and so we will examine it in detail. The site is located in one of the western platforms that access the mountain valley of Oukaïmeden. This settlement comprises a rock shelter, probably used only during the summer months. This site has provided the oldest chronologies for the presence of humans in the Moroccan High Atlas, between the late Fourth Millennium- the beginning of the Third Millennium calBC. In this shelter we recovered a small ceramic assemblage that, despite its limitations, gives us certain insight into the technological and cultural features of the Neolithic groups in an area where very little research in this particular field has been conducted so far. Other findings belonging to the Bronze Age are also examined and compared to other North African sites.*

**KEY WORDS:** *Neolithic, High Atlas, impressed ware, cardial ware, grooved ware.*

### RESUMEN

*Este trabajo presenta el estudio de los materiales cerámicos de cronología prehistórica conocidos hasta la fecha en el Valle de Oukaïmeden. La información procede esencialmente del abrigo de Aougnin n'ait Ourigh, que es estudiado en detalle. Este sitio se sitúa en una de las plataformas que permiten el acceso al valle desde el Oeste. Se trata de un abrigo en un gran bloque aislado de roca, ocupado con toda probabilidad solo en los meses estivales. El yacimiento ha proporcionado las fechas más antiguas conocidas hasta ahora para la ocupación humana del Alto Atlas, entre mediados del IV e inicios del III milenio calBC, y de él procede un pequeño conjunto cerámico, cuyo análisis nos proporciona algunos datos sobre las características tecnológicas y culturales de las pequeñas comunidades neolíticas, muy poco investigadas en la región. Asimismo se estudian otros hallazgos correspondientes a la Edad del Bronce y se comparan con sus paralelos en el Norte de África.*

**PALABRAS CLAVE:** *Neolítico, Alto Atlas, cerámica impresa, cerámica cardial, cerámica acanalada.*

## Introduction. Neolithic Moroccan Pottery

Like other European countries, Spain has been cooperating in the research of the Neolithic of Maghreb, encouraged -among other reasons- by the prospect of a possible correspondence between the ceramic assemblages of both areas. Specifically, the former dating from northern Morocco and the existence of pre-Cardial sites again aroused the interest in these studies, suggesting the need for new interpretation models (Linstädter 2010: 229; El Idrissi 2012: 335).

Moroccan Neolithic pottery has been compared to the ceramic collections from southern Iberia since the 1930s. This led to the hypothesis that these artefacts were a main *fossil directeur* of the process of Neolithic introduction. These comparisons firstly established similarities between the rich assemblages from the eastern coast of Spain and those from northern Africa. Moreover, more similarities have been revealed recently that would better connect the North African collections with the correlated assemblages from Portugal and Andalucía (Manen *et al.* 2007).

So far, data on Neolithic pottery from southern Morocco is scarce: most of the studies have been conducted in the north. Until the nineties, research was focused on the regions closer to the largest cities on the Atlantic coast (Tangier-Tétouan, Rabat-Casablanca). Something similar happens when we look for information about the different chronological phases: data for the early Neolithic phases is broader than the existing information about the Fourth millennium BC.

Cardial Neolithic in the area starts developing around 5300 BC. Nevertheless, the first Neolithic remains in northern Africa could belong to the early phases of *Caf Taht el Ghar*, in the Seventh millennium BC. This site revealed many ceramic vessels of considerable size, with incised and plastic decorations (Daugas and El Idrissi 2008b: 789).

## Material characterization

More than two hundred fragments of pottery remains were unearthed in *Aougnin n'ait Ourigh* during the 2010 excavation campaign. Available dating suggests that these fragments date from the Late Neolithic. Later, during the 2012 campaign, the site revealed more remains of similar characteristics. Thus, we conducted the study over a total amount of 426 fragments.

A negative aspect of these ceramic assemblages is the small size of the fragments recovered, which average around 2 cm for the larger fragments.

Thus, any results yielded by the analysis must be considered with caution. We did not find any complete vessels and only 20% of the cases allow us to speculate about the original shape and size. The great fragmentation of ceramic containers seems to be a frequent characteristic of Moroccan Neolithic sites, which has drawn greater attention to the study of decorations (Daugas and El Idrissi 2008b: 799).

The small fragments recovered at the site are also very fragile and easy to destroy. We think that this may be the result of low-fired pottery, the high atmospheric temperature range in the area and the freeze-thaw cycles where the site is located.

The study of the ceramic sherds was conducted by observation with a Konus Diamond 5420 (40x) stereoscopic microscope with a binocular head. The remains were classified and studied with the microscope, and then a sample was selected to be analysed chemically.

The majority of the remains were covered in a compact mixture of dirt and mineral salts that hid their decorations totally or partially. After the first observations had been conducted, the first ceramic assemblage from the 2010 campaign was restored by Pilar García using mechanical cleaning. Other treatments were not used due to the extreme level of disintegration observed in the superficial layers of the fragments on which the cleaning tests were performed. In some cases, due to the severe fragility mentioned above, the restoration required a consolidation treatment. This consisted in the complete immersion of the fragments in an acrylic resin.

We performed an energy-dispersive X-ray spectroscopy (EDXRS), an X-ray diffraction (XRD) and thin film (TF) analysis with the express purpose of determining the technical features of the assemblage. The analyses were conducted by Christian Dietz, from the Arqueometry and Archaeological Analysis Research Centre, at the Complutense University of Madrid.

The number of recovered fragments was 426. Nevertheless, the great fragmentation and fragility of the sample gave us a false impression. A preliminary exam concluded that several fragments could be reassembled in a single vessel. To calculate the minimum number of vessels of the assemblage, we counted on 202 entries in the database. To create an entry we evaluated many evident aspects of each element, such as reconstructable vessels, and other aspects that required a combination of features, such as surface treatments, decoration, thickness, firing, size and type of temper.

The sherds were documented photographically and were also drawn by Sergio Alfonso and Angel Santos.

### Ceramic fabric Composition

The fragments of *Aougnin n'ait Ourigh* ceramics were tempered with non-refined materials. If we classify the samples presenting grains with a thickness around or below 1 mm as fine tempered, and those above 5 mm as coarse tempered, we detect a mixture of grain sizes and densities for the same ceramic body. We observed different distributions: there is a minority of coarse tempers, while a mixture of fine and medium tempers prevail (40%). Medium sizes are the most frequent values. The presence of only coarse tempers is scarce. The presence of the bigger tempers in general is coincident with walls of medium or high thickness (over 7 mm) (fig. 1).

There is a predominance of high density tempers among the ceramic fabrics, which generally indicates high porosity vessels and high firing resistance. Nevertheless, the porosity of the fabric is partially compensated with surface treatments that reduce its permeability, such as burnishing and -to a lesser extent- smoothing.

The absence of bone industry or faunal remains in the Oukaïmeden assemblage could be due to soil acidity, but this cannot be assured. Should this be the case, this factor could have affected possible organic temper as well by destroying it. However, this seems highly unlikely due to the dense structure of the ceramic fabrics.

Although the chemical determination of the sherd's components was not completed, the XRD analysis shows that the sample is clearly dominated by quartz tempered fabrics. Of the samples analysed, 20 out of 22 presented this mineral, and in 6 cases the proportion was higher than 70%. The rest

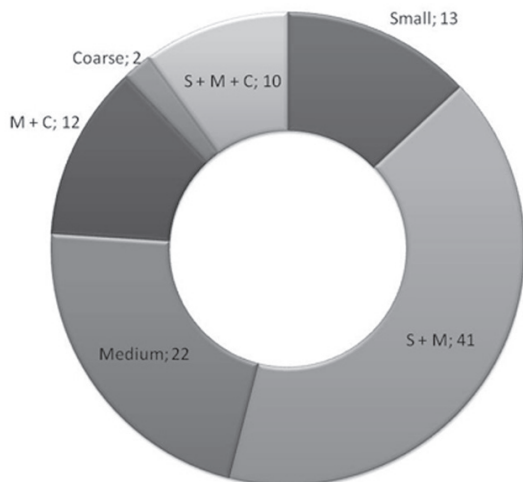


Fig. 1. Tempers classification based on a sampling performed on 100 sherds.

of the detected tempers occur in a significantly lower frequency and percentage. Besides quartz, the most common inclusions are muscovite, anorthite and ferrosilicon. The lack of thin film petrographic studies prevented us from comparing the results obtained in the analysis (figs. 2 A and B).

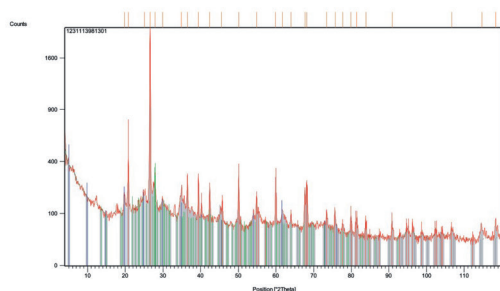
The presence of tiny ochre particles (hematite) should also be noted, although its presence is slightly lower than the tempers mentioned above. The presence of hematite could be due to a firing effect, although it could also belong to the original composition of the clay, or it could have been added to the clay as a temper. Despite the limited statistic value of the 22 selected samples analysed by XRD, we should stress the presence of this mineral only among the decorated fragments (5 out of 8). Macroscopic or even microscopic observations were only able to identify particles that gave no indication of the existence of a superficial slip layer. Nevertheless, we cannot deny the existence of a rather thin layer that could have been affected by the usual alterations of the assemblage which, in this case, would result in the almost complete erasing of the *almagra* layer.

Another small difference in this regard is that the compositions in which kaolinite was detected are exclusively part of decorated vessels. However, muscovite is only present in smooth sherds (6 samples). Once again, it should be noted that the small sizes of the fragments allowed us to unequivocally identify those that were decorated. But this is not so evident in the cases that we consider to be smooth potsherds. Those fragments could belong to less visible parts of the vessel. In other words, a smooth fragment could actually be part of a decorated vessel.

Two potsherds should be specially pointed out, as they do not present the usual dominant presence of quartz. The first one is a smooth sherd recovered on the surface and the second one is a fragment of impressed ware, (OK12/1322/20). However, both cases contain silica (quartz is a mineral made of silica), but no other features justify a different classification than the rest of the assemblage (fig. 3.1).

The presence of different chemical compositions in the assemblage suggests the use of different catchment areas, but the basic components of a ceramic vessel are always the same. Thus, minority elements have to be studied to draw significant differences from the sample. Despite the cases mentioned above and the lack of definitive data, this is unlikely the case in this group. On the other hand, we think that the features and location of this site make the elaboration of pottery in its vicinity highly unlikely. Neither its characteristics nor its location make the settlement suitable for the aforesaid

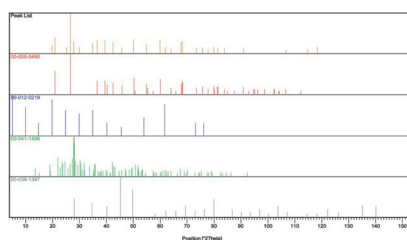
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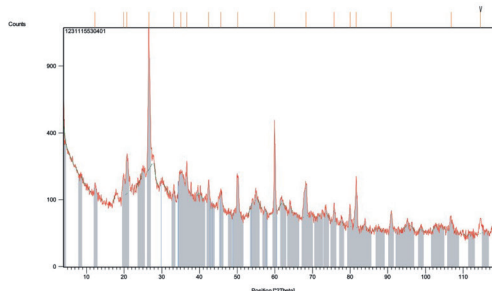
Identified Patterns List:

Ref. Code	Score	Compound Name	Displacement [°2Th.]	Scale Factor	Chemical Formula
00-005-0490	78	Quartz, low	0,000	0,883	Si O <sub>2</sub>
00-012-0219	29	Montmorillonite-18A	0,000	0,074	Na <sub>0,3</sub> (Al,Mg) <sub>2</sub> Si <sub>4</sub> O <sub>10</sub> OH <sub>2</sub> × 6 H <sub>2</sub> O
00-041-1486	28	Anorthite, ordered	0,000	0,121	Ca Al <sub>2</sub> Si <sub>2</sub> O <sub>8</sub>
00-038-1397	12	Ferrihcite, syn [NR]	0,000	0,030	Fe Si

Plot of Identified Phases:

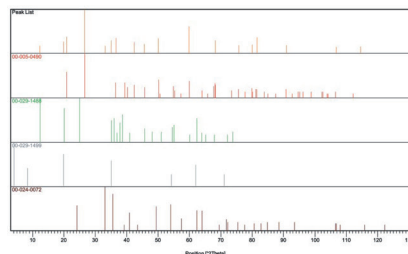


DRX: UE 1322 N° 23 Graphics: (matched data)



Identified Patterns List:

Ref. Code	Score	Compound Name	Displacement [°2Th.]	Scale Factor	Chemical Formula
00-005-0490	63	Quartz, low	0,000	0,647	Si O <sub>2</sub>
00-029-1488	21	Kaolinite-1TMD/RG	0,000	0,045	Al <sub>2</sub> Si <sub>2</sub> O <sub>5</sub> (OH) <sub>4</sub>
00-029-1499	21	Montmorillonite-21A	0,000	0,075	Na <sub>0,3</sub> (Al,Mg) <sub>2</sub> Si <sub>4</sub> O <sub>10</sub> (OH) <sub>2</sub> × 8 H <sub>2</sub> O
00-024-0072	19	Hematite	0,000	0,046	Fe <sub>2</sub> O <sub>3</sub>



**Fig. 2.** A) OK12/1322/6 diffractogram. Smooth potsherd. B) OK12/1322/23 diffractogram. A fragment of impressed ware.

process. Thus, the archaeological findings in the rock shelter would come from a bigger settlement, whose location or connection with Oukaïmeden remains unknown.

The marked angularity observed in the temper of the bodies points to the small rounding of these particles, which would indicate that these inclusions were intentionally added to the clay during its elaboration. There are other indicators, however, such as the different grain sizes and their polymineralized nature.

## Shapes

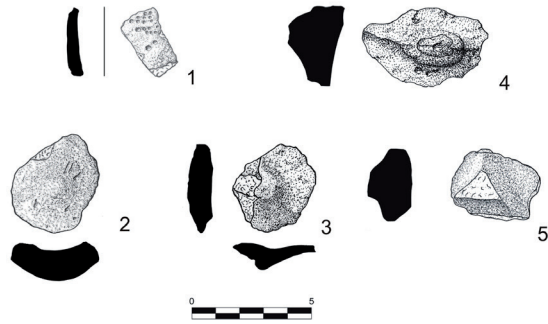
The most frequent shapes in Neolithic sets are spherical and hemispherical. There is also a diversity and great number of handle attachments. Globular, round-based vessels are the most suitable ceramic shapes to be placed directly on the fire. In highly fragmentary assemblages such as Oukaïmeden, the size of the sherds indicates poor diversity and makes it extremely complex to determine many features, such as the distinction between body and

base sherds. All this can lead to an inaccurate interpretation of data.

The average size of Oukaïmeden sherds is 2 cm, and they do not exceed 6 cm in any case: this fact illustrates the homogeneity of the fragmentation. These sizes make it particularly difficult to identify the vessel shapes. Our first approach would be a basic classification, in which all the recovered sherds belong to vessels, except for a small piece that is hard to identify. This singular object could be classified as a spindle whorl, but it could also be a small handle.

Due to the particular features of the assemblage we were not able to identify the manufacturing techniques of the remains, which would probably be similar to the different moulding and modelling techniques present in other Neolithic assemblages. These techniques tend to produce globular vessels that would be swollen afterwards to obtain the characteristic pointed profile observed in the few vessel bases remaining (fig. 3. 2-3).

Despite the wide range of vessel shapes, the vast majority of this assemblage can only be assigned to an initial morphological category (open shapes)

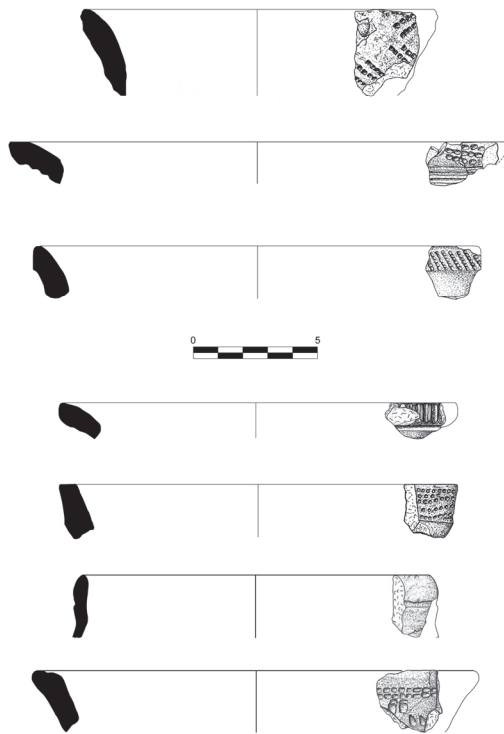


**Fig. 3.** 1. OK 12/1322/20. Impressed ware. 2-3. Pointed bases. Ok12/1325/7 and Ok10/1311/3 4-5. Body sherds with nipples OK10/1302/4 y OK10/1303/1.

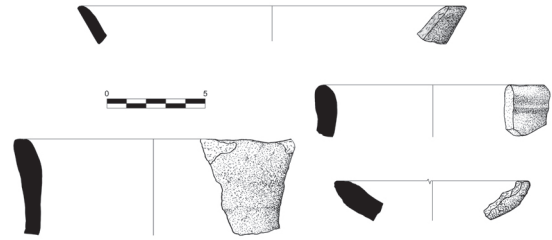
with little variation on the vessel profiles, in all probability.

Although the number of rim sherds might be considered appropriate (22 fragments), orientation was not possible for all of them. The orientation of half of the sherds might be doubtful, for they are far beyond the theoretical third of the original diameter of the vessel.

Information about the original diameters is also hard to determine. In the few conclusive cases, we



**Fig. 4.** Fragments of decorated, open vessels. OK10/1300/1, OK10/1301/1, OK10/1301/2, OK10/1301/3, OK10/1311/1, OK10/1322/9 and OK10/1324/4.



**Fig. 5.** Fragments of smooth, open vessels. OK10/1301/6, OK10/1302/2, OK10/1309/1 and OK10/1309/3.

observed small vessels: 16 out of the 17 diameter measurements obtained are smaller than 30 cm and only one of them reaches that size. Of the vessel diameters, 7 are smaller than 15 cm. Around 17 cm is the average measurement of diameter length. These sizes are compatible with the use of the vessel for cooking and eating purposes, but generally not for food storage, although a small-scale storage might have been possible. The presence of pointed bases could correspond to slightly bigger storage vessels. Although their thickness is compatible with the medium-sized and pointed vessel shapes observed in many other Moroccan sites presenting complete pottery, once again the high fragmentation of the sample makes its interpretation extremely complicated (figs 4 and 5).

The thickness of the walls varies from 5 mm to 13 mm, while the average measurement is 7.6 and the mode 7. Four of the fragments are thicker than 13 mm, as they belong to the base of the vessel, from which only small sherds remain, as occurs in the rest of the assemblage.

According to the measurements taken, we found 42 sherds from what we may consider fine pottery (under 7 mm thick) and 125 sherds of medium thickness. Thus, the sample studied presents a dominance of medium-fine thickness. The same has been observed in many other Moroccan assemblages. Data from other ceramic groups from High Atlas, as the *Toulkine* pottery (Bayle des Hermens *et al.* 1984) shows the same predominance of medium thickness vessels, the fine sherds from this site being rare. In another, more distant site, *El Kiffen* in Casablanca (Bailloud *et al.* 1964), the medium thickness sherds are around 6 mm thick. The same applies to other distant assemblages of the Moroccan Neolithic. In *Hassi Ouenzga* Level 3 (Linstädter 2003), the vessel walls present averages between 9 and 11 mm. In Levels 4 and 5, the average measurements vary between 9.5 and 12.5 mm.

Aside from the possible handles mentioned above, we recognised 4 possible nipples and a possible foot. The nipples are rounded, and resemble the ones doc-



umented in Levels 3 to 5 of *Hassi Ouenzga* (Linstädter, 2003: 98-102). In the particular case of Oukaïmeden pottery, these nipples form a slight relief, wide enough to improve the vessels' fastening (fig 3. 4-5).

**Firing**

Neolithic pottery usually presents a firing process between 550°C and 750°C, as these are the temperatures needed for ceramic transformation, while exceeding 750°C in an open firing is difficult. The absence of calcite and the presence of anorthite and muscovite could indicate slightly higher temperatures, between 800°C and 900°C. Also, once this temperature is reached it can cause chemical reactions creating hematite. Meanwhile, the presence of kaolinite in some fragments suggests lower temperatures. Lower temperatures have been described in other sites, such as *El Kiffen*, with firings around 600°C (Bailloud *et al.* 1964).

In any case, this would indicate open-air or pit firing, where temperature is difficult to control. This kind of firing is often present in these contexts, as well as over a wide chronological and spatial range, given its simplicity and profitability. The colour differences that we can observe in a single sherd are just another simple proof of this rudimentary mixed firing affected by the simultaneous burning of pots and fuel, due to a first phase of reduction and possible oxidation during cooling.

In the Oukaïmeden assemblage reduction firing (67%) is dominant, while oxidation firing is less fre-

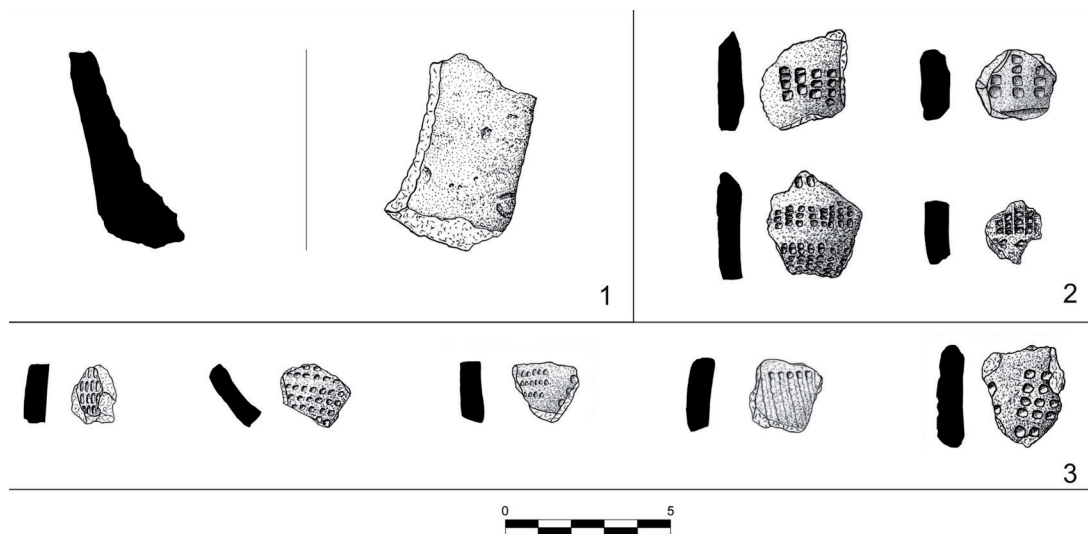
quent (33%). However, they both are highly irregular processes. Although the use of this simple firing technology makes it difficult to control the results, these technical limitations do not diminish the functionality of the resulting ceramics. They can be used as cooking pots, as this process requires no direct exposure to the fire. The use of the remaining embers and the thermal inertia of the vessel once the fire was extinguished are sufficient. Nevertheless, many sherds from Oukaïmeden seem charred. Thus, it is quite probable that they were used by being repeatedly placed directly on the fire. The presence of muscovite would be an important since it increases plasticity and its use is highly advisable in the event of strong temperature changes, such as those produced by open firing.

The appearance of calcium-rich plagioclases, like anorthite, can be considered appropriate to elaborate cooking pots. On the contrary, high proportions of quartz (which has a high coefficient of thermal expansion) would be a better fit in other uses.

The differences in composition could be related to a differential use of the ceramics, according to the two great families of ceramics functionality: cooking and water storage vessels.

**Decoration and Finishing**

Delicate smoothing is the most common technique, while the presence of polished wares is scarce. The same proportion appears in other Moroccan sites (Linstädter, 2003: 101). We also observed the same



**Fig. 6.** 1. Body and base of smoothed sherd. OK 10/1305/2. 2. Body sherds with impressed decorations. OK10/1303/6, OK10/1303/7, OK10/1311/4 and OK10/1311/9. 3. Body sherds with impressed decoration. Ok10/1301/9, Ok10/1301/14, Ok10/1305/4, Ok12/1322/12 and Ok12/1322/14.

surface treatment, applied more carefully on the outer surface rather than on the inner surface (fig. 6.1)

The existence of intense slips, such as those described in other Moroccan assemblages could not be documented. However, as we said above, it is quite possible for some sherds to have had a thin red slip layer.

There are a high proportion of decorated sherds, which is not rare in Neolithic ceramic assemblages. In some emblematic sites such as *Cova de l'Or*, a total of 1456 out of 5523 sherds are decorated (26%) (García *et al.* 2011: 71-136). Regarding Moroccan sites, we observe a certain degree of variability. In the North African site of *Caf Taht el Ghar* the percentages of decorated sherds during its cardium phase is between 45% and 50% (Daugas and El Idrissi 2008a: 67). In *Hassi Ouenzga*, the decorated sherds (Linstädter 2003: 110) represent 20% of the total (Mikdad and Eiwanger 2000: 143) and in *Zafrin* they represent 13% (Rojo *et al.* 2010).

Decorated sherds in Oukaïmeden represent 53% of the total from the ceramic assemblage. This represents a significant proportion, especially when we bear in mind that a smooth sherd could also be nothing more than a smooth part of a decorated vessel, as we rarely find a cover decoration, although in some cases it might be considered as such. This could be the case of one of the largest (OK12/1325/15) recovered in the assemblage. Nevertheless, we consider its relation with the decorations of Casablanca more likely (Bailloud *et al.* 1964). In Casablanca the vessels are not completely covered by decorations.

Impression is the most common technique, always on greenware and using a tool (fig. 6.2). A possible fingernail pattern on a rim sherd was considered in OK12/1322/9, but confirmation of this technique is not possible due to the extreme deterioration of the sherd.

Overall, Oukaïmeden presents impressed, incised and grooved sherds. The sherds are distributed into the following categories (fig. 7):

Traditionally, cardial wares have received more attention than any other impressed ware technique, due to the cultural assumptions derived from its presence. The existence of cardial wares in Oukaïmeden is possible, but we cannot be certain due to the presence of many impressed cardium-like sherds. Despite the multiple efforts carried out by many scientists to classify these sherds, we consider that the determination of the element used to decorate them is quite difficult due to the deteriorated surfaces, small sizes and soft impressions. Thus, we cannot classify these sherds as cardial ware *sensu stricto*. The cases in which the *natis* of the shell is

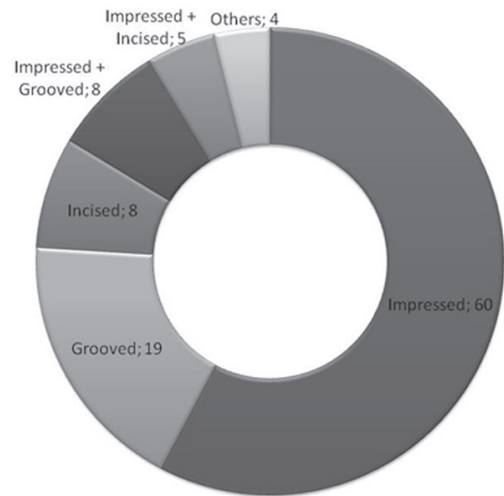


Fig. 7. Distribution of decorative techniques.

used are usually undeniable, but not when the external edge is used, especially if the inclination of the shell is not near 90°. The morphology of this kind of shell (*Cerastoderma* or *Acanthocardia*) prints a circular trend if the decoration is made with a fragment of the shell that is wide enough (the wider the original shell, the larger the motif). This circular impression can easily pass unnoticed, either because of the vertical angle of the shell when it was made or the use of a fragment of the same shell. There are many other aspects that can be studied, such as the curve of each print, the specific morphology of each tooth, the homogeneity of the teeth, the inward convergence of the decorative arch, etc. But there always remain sherds that are hard to classify. Thus, some specialists choose to classify them as *cardium*

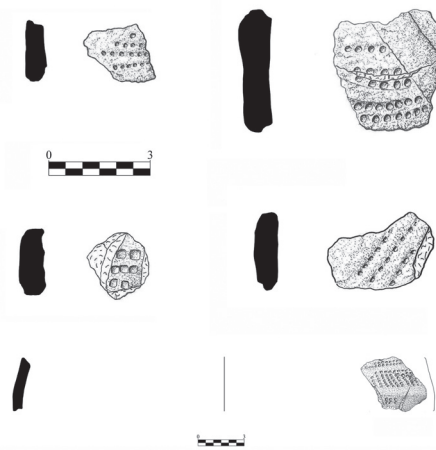


Fig. 8. Body sherds with impressed decoration. Ok10/1322/17, Ok10/1322/23, Ok10/1322/26, Ok12/1324/7 and Ok12/1325/12.

ware even if they cannot assure the use of shells in the manufacturing process (figs 6.3 and fig.8).

The presence of the aforementioned species of bivalves on the Moroccan coasts would provide the required elements to make the impressed decorations. Nevertheless, the absence of the valves at the site, but most importantly its characteristics, make it more likely that the recovered sherds were manufactured elsewhere.

The common cockle shell has many uses as is common in ceramics from sites in the *Valencia* area: for printing the *natis*, dragging, double-edge decorations, flame decorations, etc. Impressed elements are widely used: this provides a great richness in cardium decorations and makes it easier to identify the style accurately. However, it is less frequent in other Neolithic ceramic groups such as the Portuguese or the Moroccan, which is the object of our study. The majority of Oukaïmeden decorations are combed: in some cases the teeth are very clear and a square section can be seen. Only a small group could be classified as cardium pottery *sensu stricto*. Within this group, the impressed decorations are univalve, short, imprecise and the angle always seems to be around 45%, probably due to the use of valve fragments rather than complete shells. Nevertheless, there is one case (OK10/1302/6) in which the decorative motive could have been performed by using both valves.

Accurate identification is very difficult in other cases. Nevertheless, this aspect is not essential: regardless of whether the decorations belong to real cardium wares or not, their goal is to create a similar effect, regardless of the tool used for its manufacture.

The motifs used to decorate the damp clay indicate the use of different combs, mainly more or less regular squared teeth.

The description of *Toulkine* pottery states the presence of impressed ware decorated with flexible and rigid combs (Bayle des Hermens *et al.* 1984: 437). Incised decorations predominate in other Moroccan assemblages. However, impressed and plastic decorations are very common as well. From all the impressed decorations manufactured with many kinds of combs, the use of *cardium* is uncommon and it is rarely found on vessel lips.

Besides the cardial-like assemblages, Oukaïmeden also provides many other impressed decorations, such as OK10/1309/6, decorated with small, perfectly rounded circles and spaces between them. Other impressed motifs that could have been manufactured by using a flexible comb are those from OK10/1311/2. In this case we find dotted decorations around the perimeter of a nipple. In *Toulkine* there is a similar motif (Bayle des Hermens *et al.*



**Fig. 9.** 1. OK10 /1311/2 body sherd with nipple and combed decoration. 2. OK10/1311/5 body sherd with impressed decoration. 3. Ok10/1311/7 body sherd with impressed and grooved decoration.

1984: fig. 13) although in this case the decorations are more complex (and the sherd is bigger) (fig 9.1).

Also within the group of impressed wares, but far from the groups specified above, we found a sherd decorated with larger motifs, closer to a stamped decoration (OK 10/1311/5). It presents concentric circles in disorder, manufactured using some kind of hollow tool, possibly a cane. These decorations are less frequent in Neolithic assemblages. However, given its simplicity, it can appear over a wide spectrum of time and space (fig. 9.2).

Another decorative technique that appears in the assemblage is grooved sherds. These present wide, parallel and horizontal grooves, typical from an evolved Neolithic in northern Morocco (Bensimon and Martineau 1987: 626). Similar decorations also appear in the *Ghar Cahal* caves (Ceuta, Spain), *Caf Taht el Ghar* in Tétouan (El Idrissi 2012), the *Has-si Ouenzga* Shelter in the Eastern Rift Valley (Linstädter 2003) and the Neolithic sites on the Atlantic coast, such as *El Khil* (Jodin 1958-59). There are 11 sherds presenting only this decorative technique. Another interesting feature of the assemblage is the combination of impressed and grooved elements. In this regard, the small size of the sherds should be highlighted again, for it could distort the interpretation of these parameters.

A total of 16 sherds were decorated by scraping leather-hard clay with a blunt punch and 4 of them combine this type of decoration with cardial motifs, while another sherd presents a combination of incisions and grooves. The joint use of impressed and grooved decorations (fig. 9.3) is present as well in sites such as *El Khil* (Bensimon and Martineau 1986: fig. 3; Daugas and El Idrissi 2008a: fig.5) and it is frequent in Moroccan ceramics throughout the Neolithic period (*Ibidem*).

It is difficult to establish the exact moment when grooved ware appeared in Moroccan pottery. Tarradell and Camps-Fabrer placed it in the Late Neolithic, considering it as a phase previous to the Bell Beaker culture and related to the Tagus and *Los Millares* cultures (Tarradell 1958; Camps-Fabrer 1966). Gilman reached the same conclusion dur-



ing his research on the recent prehistory of Tangier (Gilman 1975). Recently, the study of *Tahaddart*, in the Tangier-Asilah region, led Otte to maintain this chronological hypothesis (Otte *et al.* 2004).

It may be arbitrary to establish a strict difference between grooved and incised wares in this assemblage. At any rate, we can point to minor differences in the groove widths and a radial disposition around a nipple in the OK10/1302/3 sherd.

OK10/1300/1 is a rim sherd decorated with zigzags (See fig.4 above). This decoration is similar to the one found among the *Akka* or *El Kiffen* impressed assemblages and is arranged in a similar way to the *Oued Fatma* and *El Ouar* Saharan assemblages, presenting decorative schemes around the rim of the vessel. However, the technique used in the latter two sites is the incision. Despite the similarities found between the decorative motifs, the vessel presents a closed shape in all the cases (Bensimon and Martineau 1987: fig. 6, 13, 21 and 22).

Pivoting or “flames-like” decorations have been documented, although not as clearly as in other assemblages. This is the case of OK12/1324/4 and OK 10/1322/20, which present “flames-like” decorations ( See fig. 3.1). This decoration is frequently found in caves from the Middle and Late Neolithic on the Atlantic coast from Casablanca to Tangier, as well as in caves along the Mediterranean coast. The presence of this type of decoration in *Toulkine* was documented in the excavations in 1951 by Glory (Bayle des Hermens *et al.* 1984) and the collection from the Institut de Paléontologie Humaine de Paris, four fragments of which remain unpublished. They consist of a straight rim with shell impressions and three body sherds with grooves or rounded impressions and vertical incisions. This assemblage is reminiscent of Cardial ware. There are, anyway thermoluminescent dates, which place them in the early Neolithic similar to the *Skhirat* site (Cle TL 142: 4000 +/- 500 BP and Cle TL 143: 4300 +/- 400 BP. (Ousmoi 1989). Although the probability range is very wide and makes dates unreliable.

The arrangement of the zigzags and grooves in this sherd decoration (OK10/1302/5) vaguely reminds us of certain cardial schemes, such as the aforesaid flame decoration motifs and wares whose decoration combines the edge and *natis* of a shell. This last case has similarities with many other sites of the north-western Mediterranean region. (García 2010: 49). This sherd was decorated using a blunt punch to draw straight grooves ending with a large dot, similar to those observed in *Toulkine's* pottery (Bayle des Hermens *et al.* 1984: fig.13).

The size of the sherds does not allow for an accurate description of the features that make up the

assemblage. Nevertheless, larger sherds and some complete vessels from *Toulkine* have made it possible to describe a decoration restricted to the neck and the area around the handle attachments' (Bayle des Hermens *et al.* 1984: 437).

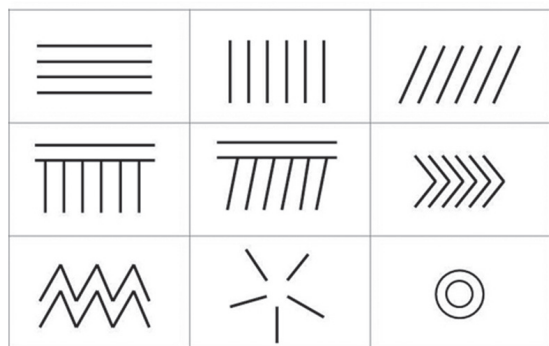
Decorations are usually arranged on the outside surface of the vessels, while interior decorations are rare. Although we have some examples of internal decorations of vessels, this is also the case in Morocco (Linstädter 2003: 98-102). Only one of Oukaïmeden's sherds could be included within this group, for its decorations are located both on the inside and outside of the rim.

In those cases in which the exact location of the decorations could be identified, 13 were decorated on the outside surface of the rim, while only one of them has an internal decoration. In two of those sherds the decoration is associated with a handle attachment (nipple), highlighted by the surrounding arrangement of the incised or impressed motifs. Both cases are also present in the *Toulkine* assemblage (Bayle des Hermens *et al.* 1984: 431-432). Decorations around the vessel's nipples are frequent among other Moroccan assemblages such as *Caf Taht el Ghar* (Ramos *et al.* 2008: 247).

As is well known, pottery studies include a great diversity of approaches, which sometimes can vary according to the researcher's best interest. In the last few years there has been a renewed interest in the “style”, that is, the combination of regularities in a “*chaîne opératoire*” or operational sequence, grouped by shape, decoration and technology. African assemblages do not escape these scientific trends (Gallin 2001-2002). The decorations were analysed by identifying the most basic elements (straight line, dot, arch, angle, etc.). Once oriented and repeated, these elements make up the motifs (parallel lines, suns, concentric circles, etc.), which in turn are arranged in groups (horizontal, vertical, oblique, convergent, divergent and homothetic seriations). The location of these groups on the vessel determines its theme: bands, lines, mosaics, friezes, figurative, cords and added decorations (Bernabeu *et al.* 2011).

The main interest in finding the decorative parameters of these vessels lies in the access to the numerous testimonies of the identity of the many human groups that created them by associating decorative motifs. Oukaïmeden's characteristics may not include a wide diversity of vessels, but we considered the analysis of this aspect on detail an interesting factor to continue these studies.

The motifs of the impressed decorations make up 9 decorative schemes, (fig. 10) 15 if we count the sherds in which many different techniques are used (incised, grooved and impressed). It is well known



**Fig. 10.** Decorative schemes from Oukaïmeden decorated sherds.

that the basic elements are spatially and chronologically universal. Thus, to define a particular culture we must pay attention to the combination of those elements. However, in this case a wider assemblage will be needed to dwell on this issue in depth.

The simplest decorations are those consisting exclusively of grooved and incised motifs. They are decorated with horizontal bands and, in some cases, the alternate use of diagonal and zigzag incision lines.

Decorations covering the vessel entirely with zigzags, grooves and impressed combed lines, are characteristic of Saharan pottery (Bensimon & Martineau, 1987: 647). It is impossible to ensure the extent of decorations on the original surface due to the small size of the remaining sherds, but a complete cover does not seem to be the case in Oukaïmeden. The OK12/1325/15 sherd could be an exception. It is one of the largest sherds recovered from the site, but still insufficient to determine the decoration of the whole vessel. However, the motif was used repeatedly to decorate the sherd, which indicates a relation with certain vessels from the *El Kiffen* necropolis (Casablanca), where zigzag decorations cover more than three quarters of the vessel's surface (Bailloud *et al.* 1964: plate V.1) or at least half of it (Ibidem: fig. 4 and 5).

### Global Analysis

Despite our analysis, there are many unanswered questions about the pottery sherds recovered from Oukaïmeden. Thus, a more detailed comparison between the features observed in these sherds and those from bigger assemblages will be enriching.

The most famous site in the Oukaïmeden area is the *Amzri Cave (Toulkine)*, excavated during the 1950s and studied again in the 1980s. Unfortunately, a great part of information about this site is not available, due to its tortuous recent history.

However, *Toulkine's* pottery presents a greater variation in decorations, made up of incisions and grooves; dotted lines, arcs or circles; basket impressions and flame decorations forming open arches and made with a spatula. The longer size of the recovered sherds and the complete vessels allow for a detailed approach to the pottery from this area and its relation with the Neolithic of the northern Morocco and the Saharian assemblages (Bayle des Hermens *et al.* 1984: 437).

Because of its shape and decorations, *Toulkine* pottery is included among the characteristic pottery of the Maghreb, and particularly among Moroccan wares. However, it presents clear affinities with Saharan pottery (Camps-Fabrer 1966). The hemispheric vase is reminiscent from the Saharan-Sudanese Neolithic (Camps 1974).

Many sites in the Casablanca-Rabat region provide archaeological material analogous to material found in *Aougnin n'ait Ourigh*. The *Oued Mellah* site, located in the surroundings of Casablanca, provided interesting sherds, but also a complete vase. The clay is smooth and easily crumbled, product of low temperature firing (Antoine 1952; Souville 1973). The body is decorated with double chevron lines, and the rim shows three horizontal lines made with a square-toothed comb. As in *Aougnin n'ait Ourigh*, the *Oued Mellah* pottery assemblage was found along with microlithic industry. These lithic remains have been classified as Epipalaeolithic or, after Armand Ruhlmann, belonging to an Iberian-Mauritanian tradition.

The decorations of impressed horizontal, vertical or oblique bands and repeated chevron lines from *Aougnin n'ait Ourigh* are very similar to those from the *El Kiffen* necropolis (Bailloud *et al.* 1964) and *Rouazi-Skhirat* (Daugas *et al.* 1989).

The presence of wares decorated only by the use of a comb or some other type of toothed instrument is characteristic of this Neolithic facies. This decoration shows clear Saharan influence, as it is restricted to the upper part of the vase and usually organized in horizontal bands around the rim or vertical bands extending downwards on the body. Sometimes, chevron or zigzag lines are also part of the decoration. Although the pottery varies, the shapes present a certain degree of homogeneity. It consists of shoulder bowls and vases that sometimes present a cylindrical neck and a conic or rounded base in most cases. Bowls and spherical urns seldom present an omphalos. These items sometimes present grasp elements, such as horizontally or vertically perforated nipples or tubular handles, which are mostly large.

Half of the wares present impressed decoration. They present only a few motifs, always performed

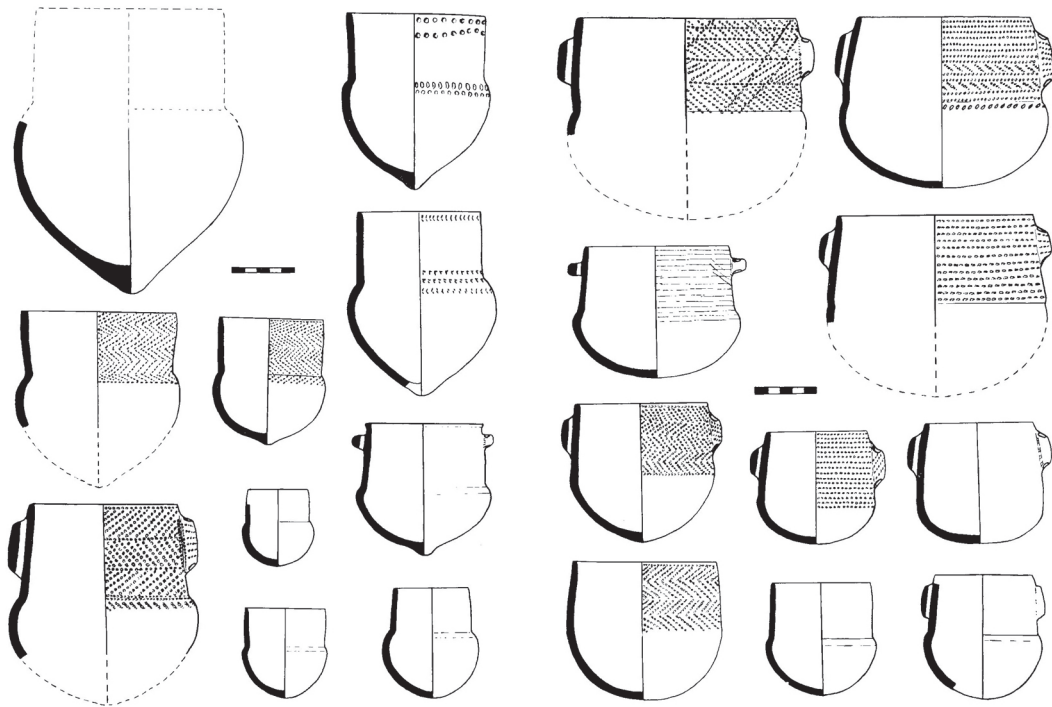


Fig. 11. *El Kiffen*: vessels with impressed decoration (after Bailloud et al., 1964).

by using the comb and applying the same technique. These impressed motifs are usually arranged in lines. The most frequent motif consists of one or several horizontal chevron lines that completely cover the upper part of the shoulder vases or the bodies of the spherical vases having a neck.

The *El Kiffen* necropolis (Casablanca), holds a particularly interesting assemblage of complete or partially complete vessels that allows us to deduce their shapes. Pottery from the *El Kiffen* site includes a set of vessels that could be classified as hemispheric bowls, which means they can belong to a wide chronological and geographical range. *El Kiffen* also provided a set of pointed-base vases, whose maximum average diameter is 15 to 20 cm. Similarities with Oukaïmeden pottery can be found in the repetition of decorative motifs, the orientation of the edges and the presence of thick pointed bases (fig. 11).

Pottery from the *Rouazi-Skhirat* necropolis shows clear affinities with the *El Kiffen* assemblage. The decoration is performed mainly with square-toothed combs. The motifs are arranged in horizontal or vertical bands separated by oblique or chevron lines as well as by cross-hatching lines. One of the hemispheric bowls presents impressed cord lines. Except for the latter, the techniques used in both sites were very similar.

TL and 14C dates suggest that *Skhirat* necropolis was contemporary to the *Aougnin n'ait Ourigh* Shelter. One series of datings are synchronic to the shell midden of the necropolis. The thermoluminescent datings -performed over three sherds (Ousmoi 1989) and the radiocarbon datings -performed over charcoal (Daugas *et al.* 1989). Anyway it should be noted, that TL dates as much as Ly 4096 date by 14C, offer a very wide chronological range and are, therefore, scarcely reliable, due to the associated error of  $\pm 250$  years,  $\pm 1500$  years and  $\pm 650$  years respectively in the case of the ceramics and of  $\pm 150$  years in the charcoal sample. Another dating series directly related to the funerary structure apparently confirm this chronology (Daugas 2002). Anyway these dates are as unreliable as the previous ones.

Information about the Neolithic populations of the southern Mediterranean lands is scarce. Thus, more distant references should be noted, such as *Ma Izza*, a small cave close to the Atlantic coast. This cave was also excavated in the mid-1950s and 132 sherds were recovered, 16 of which were decorated. Among the different shapes we can identify concave bases, quartz temper and smooth and thick walls of brownish and greyish colours, where the irregular open firings have left some back stains. We can also find cylindrical necks, vases and bowls mainly with straight edges, between 16 mm and

23 mm thick. Notable among the decorations are grooved, incised and fingernail patterns, and closed flame decorations.

The mixture of decorative techniques observed in *Ma Izza* and Oukaïmeden can also be found in cardinal contexts as distant as Languedoc or Corsica, or in North African assemblages such as *El Khil* (Berthélémy and Accart 1987: 78). The presence of combs would not be necessary among these sites, located near the coast, due to the abundance of molluscs available. However, some of the decorations were made using a comb, and even forming cover decorations.

Mention could be made of more distant sites, such as *Zafrin* or *Hassi Ouenzga*. The first one, located in the *Islas Chafarinas* (opposite the Moroccan coast and the border with Algeria) was recently excavated and classified as Early advanced Neolithic (Mid Fifth millennium calBC.) The more than 3000 sherds recovered in *Zafrin* probably belong to rough vessels used for cooking and storing products. A small percentage of vessels are decorated and were standardized. However, high quality pottery is very scarce (Rojo *et al.* 2010).

As for *Hassi Ouenzga*, there are 5 different stratigraphic levels. Two of them have mixed materials, and the three inferior levels can be dated as Early Neolithic, although they could reach the early Fourth Millennium BC (Linstädter 2003: 85-119). These have impressed combed decorations, typically belonging to the Late Neolithic in this area and areas near the coast (Linstädter 2010: 232). Similar cases have been found in the Iberian Peninsula and the Oran region, but were developed locally (Linstädter 2010: 229).

Recent excavations in *Hassi Ouzenga* unearthed a middle and late Neolithic layer, dating between 3900 and 2250 BC. This layer provided about forty ceramic sherds that were mainly comb-decorated. Flame decorations are the least common in the assemblage. We also find an impressed triangle band (fishbone) type of decoration, similar to the one found on Bell Beakers. These ceramic decorations and shapes are related to a Saharan facies extending as far as the Mediterranean Sea. This group of Saharan pottery presents a thinner wall than the ancient Neolithic pottery from the same site. The surface finishing is also of higher quality. The polished surfaces appear for the first time in this layer. Similar cases are found throughout the Moroccan Atlantic coast, but also in the High Atlas and the Argelian Saharan Atlas (Linstädter 2003).

This kind of pottery has been found in *Hassi Ouenzga*, in a ploughed stratigraphic context. Here, we find impressed comb decoration usually arranged in chevron and triangle bands framed

by horizontal lines. These bands are separated by reserved spaces. This decoration, dating from the early Neolithic, is present in many Moroccan sites. Thus, many authors classified it as a pre-Beaker manifestation (Daugas 1985, 1986; Bokbot 1991, 2005).

This facies is also present in the archaeological assemblage found in layer B or *Dar-es-Soltan 1* Cave (Ruhlman 1951; Bokbot 1991). Among the pottery of this site there are 47 small sherds decorated with a comb (Souville 1977). The decoration consists of oblique vertical lines and chevron lines. These fragments have been studied by Jodin, who confirmed the use of a square or blunt-toothed comb to decorate the pottery of *Dar-es-Soltan* (Jodin 1957).

Other authors, such as Marchand and Manen (2010: 176), consider that the diversity of impressed and incised decorative techniques and its structural simplicity draw a relation between Moroccan pottery and western Portuguese and Andalusian pottery.

Determination of the most abundant types in the *Aougnin n'ait Ourigh* site would be interesting; this relation would give us a more detailed understanding of the activities developed in the site. However, as mentioned above, this information is unattainable due to the high fragmentation of the assemblage. The efforts to connect shape and function have been highly criticized, and the ethnographic information gives multiple uses to the existing vessels in a domestic context, especially when it is as restricted as this one. Nevertheless, we think that it is not risky to point out at least the "impossible" uses determined by some of the morphologies. Thus, no vessels devoted to water storage were found, or at least no vessels with an adequate shape to the task. This means that they must have been manufactured with another material, probably a perishable one.

The pottery assemblage recovered in this rockshelter is made up of small and medium-sized vessels, a basic kit used daily to transform, consume and store foodstuffs. The assemblage presents a decorative element that would be compatible with this purpose. The rockshelter's size would also fit this reason as a possible refuge. The presence of these refuge shelters is characteristic of the Moroccan Neolithic settlements, and suits the hypothesis we propose for the studied assemblages.

*Aougnin n'ait Ourigh* pottery constitutes a homogeneous assemblage according to its chemical composition and its manufacturing and decorative techniques. Unfortunately, the lack of bone remains and bone industry at the site makes it impossible any conclusion about its intensive or occasional use.



On the other hand, the fact that a vessel was represented by a small amount of tiny sherds -or even a single one, in most cases- as is the case in *Aougnin n'ait Ourigh*, has been interpreted in other rock shelters as a consequence of an intensive use of the settlement. If this were the case, repeated cleaning of the domestic area would be necessary (Mikdad and Eiwanger 2000: 143).

Ceramics from *Aougnin n'ait Ourigh* display many similarities with those from certain Neolithic sites along the Atlantic and Mediterranean Moroccan coast, particularly regarding the decorations. However, they show greater stylistic and cultural affinity with the sub-Saharan area, where the Mediterranean use of shells to decorate pottery is replaced by the use of combs. Also, the flames decoration motif performed with a comb is the most frequently used.

Oukaïmeden, and many other sites in the Marakech area, should provide information about the existing relationship between Saharan and Mediterranean Neolithic pottery.

#### **Appendix. Other ceramic materials from archaeological fieldwork in the Oukaïmeden Valley**

None of the archaeological interventions throughout this project or in previous research activities has collected nearly as many pottery remains as the Neolithic settlement of *Aougnin n'ait Ourigh*. This is why a study on the rest of unearthed materials cannot be made using the same approach.

In this appendix we collect the few materials unearthed during the excavation of several areas and contexts in the valley, as well as materials from the studies and surveys previous to our intervention in the area. To do this, we will follow the chronological order provided by the findings and the <sup>14</sup>C dating associated to some of them, adjusting the internal order of this assemblage. The materials without an accurate chronology will be analysed as well. Lastly, the recovery of some wheel-made sherds in several test pits on the valley must be noted. These sherds provided no information about the shape or the chronological period they belong to, or are clearly modern sherds, and thus have been excluded from this study.

The oldest materials found in the Oukaïmeden Valley seem to belong to the same chronology as *Aougnin n'ait Ourigh*; that is, the sherds belong to small and medium-sized vases, mainly characterized by an impressed decoration, although grooved decorations are also represented. In general, the sherds are very small, are highly fragmented and

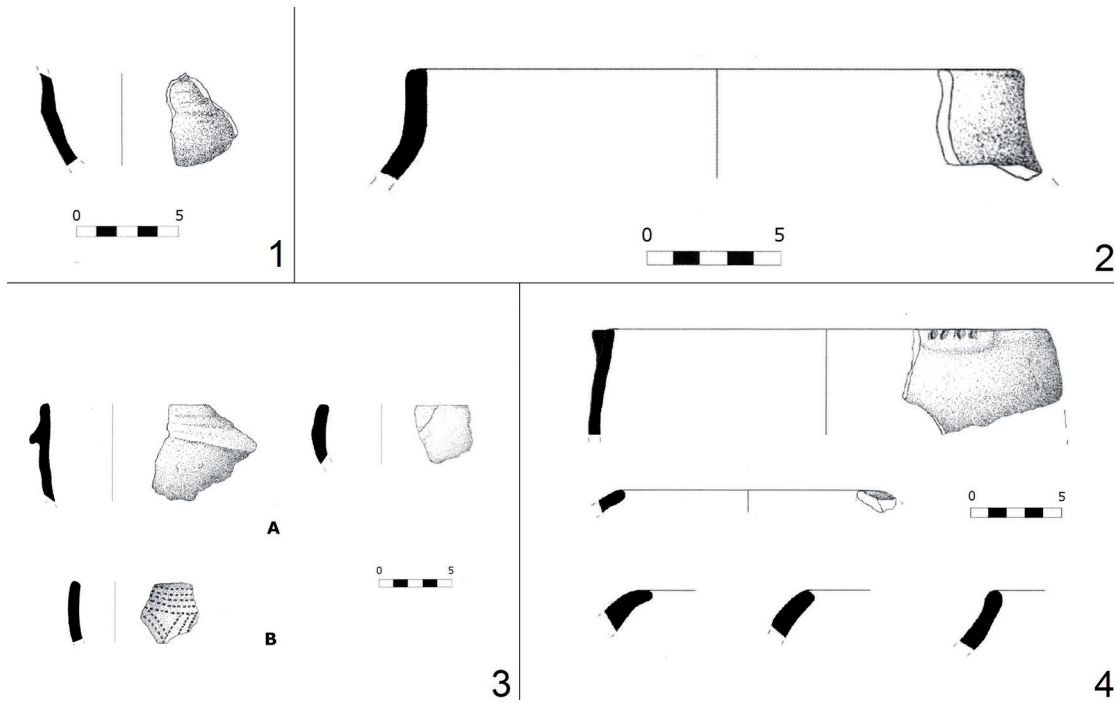
have similar characteristics to those described above.

These materials come from two accurately defined sectors of the valley. The first is the same platform of the OK1 sector where the Neolithic shelter was found. Three sherds were located in a 2010 test pit at barely 30 m from the shelter, but in a higher level, so they cannot possibly belong to it. A settlement level could not be documented in this test pit, but the pottery and the poorly represented lithic materials associated with it indicate the possibility of other Neolithic settlements on the same platform that were possibly seasonal and maybe repeated over time.

The same pattern of decorations and shapes is present in the assemblage from the test pits around the *Gar Issafen* Rock Shelter, decorated with engravings and located in the OK3 sector. As in the case mentioned above, the archaeological materials appeared scattered throughout the stratigraphic section, and a settlement level could not be documented in this area. Three test pits were excavated in succession around the rock shelter mentioned above. The first one was excavated by Rodrigue at an unknown date, according to the information provided by the CNPR researchers. The second one was performed by the CNPR team, as a part of a systematic plan to excavate test pits in the whole valley (Graoui *et al.* 2008). Eventually, the third one was performed in the framework of our project in 2010. The abundance of studies in this area is not surprising, given that the decorated wall of *Gar Issafen* has unique characteristics among the rock art assemblage of Oukaïmeden and even among the different areas of the High Atlas.

The findings again highlight impressed and grooved decorations, combined the same way as in the *Aougnin* Shelter in one case. Five sherds were collected in the 2010 test pit, and four of them were decorated. Another one was found in the test pit performed by Rodrigue. Two sherds come from the nearby test pit performed by M. El Graoui: one of these is smooth and the other one has a horizontal long nipple under the rim, associated with the aforementioned sherds because both test pits are practically overlapping, although an accurate archaeological context was not found (fig. 12.3).

Findings from *Aougnin n'ait Ourigh* and *Gar Issafen* not only prove the existence of new Neolithic materials in a different area of the valley, but also share a remarkable feature. They are located in two of the main accesses to the valley from the lower lands, a fact that is confirmed by the geographical characteristics and the historical use of these paths. Radiocarbon dating for the Neolithic shelter indicates that this is the beginning of the human pres-



**Fig. 12.** 1. Body sherd from the Igountar burial mound (number 300). 2. Pottery sherd found in *Abadsan* Rockshelter. 3. Ceramic materials from *Gar Issafen*. A. El Graoui test pit (CNPR collection). B. A. Rodrigue test pit (CNPR collection). 4. Pottery sherds from the Context 700.

ence in the Oukaïmeden Valley. The location of the Neolithic findings could confirm that this is the starting point of human colonization in this territory.

The *Abadsan* Rockshelter, located in the OK7 sector, could represent the next settlement phase. The 14C-dates for the first archaeological levels are 2840-2340 cal BC. A compact level was found in this site. Although in a secondary context, this level provided a remarkable lithic assemblage and at least six modelled sherds, all of them described as roughly manufactured, having middle-sized tempers (over 1 mm thick) and rough surfaces. Five of them were smooth body sherds, and the last one corresponds to the rim of a small pot with a globular-shaped belly and a straight neck. The diameter of the rim is 18 cm (fig. 12.2). Similar shapes are found in assemblages of the Moroccan late Neolithic, such as *El Kiffen* necropolis (Bailoud *et al.* 1964: fig.8).

The largest assemblage of pottery materials documented in Oukaïmeden belongs to a third settlement phase in the valley, the chronology of which would be similar to the Bronze Age in Europe. The archaeological materials come from the context C-700, a test pit performed in the upper platform of the OK1' sector. In this test pit, 32 modelled sherds were unearthed, mainly belong-

ing to the bottom layer, dated between 1610-1400 cal BC. Proper documentation of the settlement level was not possible in this case either, although the accumulation of findings allows us to think that the aforesaid settlement was located somewhere near the test pit (fig. 12.4).

The pottery sherds are roughly modelled and have no decorations. The tempers are medium/large-sized and the surfaces, when preserved, have been smoothed. Only five sherds in all the assemblage shed some light on the possible shape of the original vessel they belonged to. The sherds are part of a smooth rim and small, except for one, slightly bigger, that presents an elongated nipple and decorated with a pattern of four fingernail marks.

Despite the small amount of findings and the inaccuracy of their context, these materials belong to an important chronological phase in the development of rock art in the Oukaïmeden Valley. Some of the most representative weapon figures, such as halberds, seem to belong to this phase. Little can be said of these sherds, except that they do not deny this chronological association if we accept the similar examples our environment provides, since this period is not well documented in Maghreb, at least for ceramic materials.

The study of the pottery from the post-Neolithic

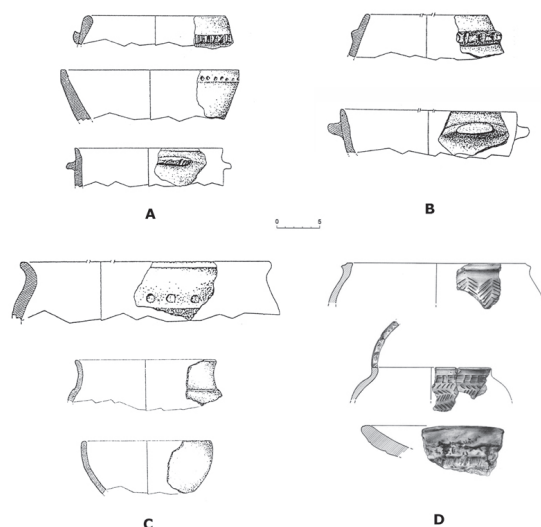
layers of the northeastern Moroccan caves revealed for the first time the presence of this kind of pottery, which was traditionally considered exclusive of the region neighboring the Strait of Gibraltar. This type was initially identified in the *Ghar Cahal* and *Caf Taht el Ghar* caves (Tarradell 1953, 1955). The great majority of this pottery presents an even black colour, due to complete reduction firing. This pottery also presents a smooth and meticulously performed finish.

This kind of pottery is rarely decorated. On the contrary, much attention is given to the surface treatment of the vases. These generally present a smooth surface, and in some cases we could even classify it as a polished surface. The most frequent shape is a large conical frustum vase with a flat base. The second most frequent shape present in all the caves of the Tangier Peninsula is the spherical vase. These vases do not usually present decorations of any kind, but they do present relief elements. Generally, these elements consist of an impressed cord on the upper part of the body, decorated with dactilar impressed motifs -performed by pinching the clay between the index finger and the thumb- or fingernail patterns (Bokbot 1991). Sometimes, they also present very characteristic crescent-shaped suspension elements, orientated towards the base of the vessel. The third characteristic ceramic shape of the Bronze Age layers are hemispheric bowls of various sizes. These present no decoration or relief elements.

This ceramic shape, discovered –as mentioned above- in the Bronze Age layers of *Ghar Cahal* and *Caf Taht el Ghar*, was later identified in the pre-Phoenician layers of *Lixus* and *Mogador* (fig. 13)

The test pits excavated by Tarradell in the ancient city of *Lixus*, provided an occupation layer at the base of the stratigraphy. This layer was characterized by a great abundance of handmade pottery, described by the author as belonging to a “Neolithic tradition” (Tarradell 1954). Excavations by Michel Ponsich in the same site confirmed the existence of this archaeological layer (Ponsich 1981: 131). The pottery found at this site is handmade and the surface is generally smoothed, also presenting some polished sherds (fig 13c). The surface is rarely decorated, although it sometimes presents a horizontal band on the upper part of the vase. Sometimes, this band presents a relief and dactilar impressions, while in other cases it is constituted by an alignment of impressed motifs.

In *Mogador* Island, Cintas recovered handmade pottery at the bottom of the site that he concluded was an autochthonous type, previous to Punic production (Cintas, 1954). This pottery is generally smoothed or polished, with little variation in shapes.



**Fig. 13.** Bronze Age pottery from: A. cave of *Gar Cahal*. B. cave of *Caf Taht el Gar*. C. *Lixus* and D. *Mogador*. (A, B, C: after Bokbot, 1991. D: after Marzoli & El Khayari, 2010).

It usually consists of large vases with a flat base and cord motifs decorated with dactilar impressions or fingernail patterns. These cords are located horizontally around the neck, and they adopt winding shapes over the body of the vessel.

Recent excavations in the *Mogador* site, during a joint project by the INSAP and the German Archaeological Institute in Madrid, confirmed the presence of this ceramic type (Marzoli and El Khayari, 2010). The stratigraphic position of the layers where this pottery is found is not clear, although it seems to be located mainly in the deepest layers (fig. 13d).

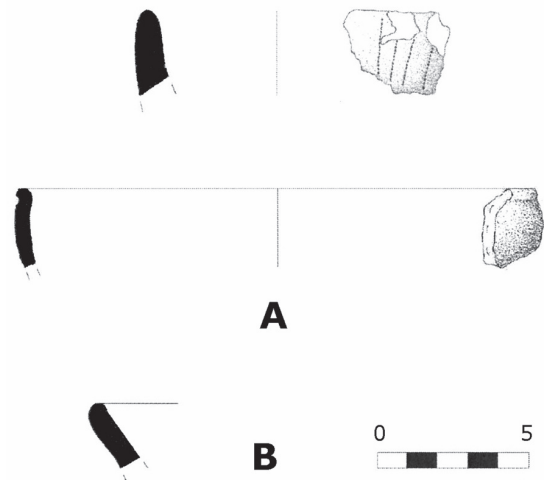
The materials from *Lixus* and *Mogador* present the same features as the vases from the Bronze Age layers of the aforementioned caves of *Ghar Cahal* and *Caf Taht el Ghar* (fig. 13 a, b), as well as the *El Khil* and *Dar es Soltane* caves (Jodin, 1966a; Bokbot 1991; Bokbot and Onrubia 1992). André Jodin pointed out the similarities of this pottery with the wares of the European Bronze Age (Jodin 1957).

Similar pottery has been found in megalithic funerary structures in the Tangier region. This pottery probably dates from the Bronze Age, because a copper or bronze halberd blade was found in the same archaeological context. It was discovered by Ponsich (1970: 55-58) in the megalithic necropolis of *El Mers*, inside a cist tomb next to the deceased's head and two copper or bronze awls. The small size of the halberd suggests that it is a funerary votive object. The shape, central nerve, grooves and the presence of three rivets to fix it to the handle, relate it to the *Carrapatas* or other Atlantic type.

A final notable observation related to this period in Oukaïmeden is the presence of a small modeled sherd. It is a carinated body sherd that belongs to an open vessel and still shows the indicators of quality smoothing on some parts of its surface. It was found during the excavation of OK5.2 tumulus in *Igountar*, along with another small shapeless sherd (fig. 12.1). This was the only finding in the excavation of the mound, which had been sacked long ago. The sherd comes from the contact surface between the geological level at the bottom and the modified filling of the mound. Thus, it could be associated to the original grave goods, although this association is no more than a hypothesis. As in the previous case, the little data existing on this period in North Africa only allow us to establish similarities with these kinds of materials within our own experience. Being cautious, this could indicate a possible Bronze Age -or even later- chronology.

Lastly, other modelled sherds unearthed during the excavation or survey complete this partial picture of the evolution of prehistoric pottery in Oukaïmeden. Firstly, a modelled body sherd from the 2009 excavation collected in front of the Elephants' Frieze and OK4 area. This body sherd is not decorated, it was roughly manufactured, contains large temper particles and was fired irregularly. It belongs to SU 807, associated with a fireplace (SU 806): 14C dating of the burnt material shows dates between 380-540 and 420-570 cal AD. The hearth offers very little information about the endurance of modelled pottery in late pre-Islamic times. Nevertheless, the size of the sample is small and it was found in an open air location, which encourages us to take this particular data as a reference that further studies should confirm.

Lastly, we should highlight the presence of some modeled sherds found in the valley during the field works of the CNPR, before our project had begun. These are three small rim sherds (fig. 14). The first one was found in a test pit in the OK1 sector by the El Graoui team, and the other two were found in OK2, near the reservoir. These last rim sherds are the most interesting. The first one could have originally been part of a bowl, because it is decorated with irregularly vertical lines. The second one belongs to a similar shaped vessel, because it has a small moulding under the rim. Since it is impossible to connect these sherds to any context or archaeological material, we can only name them to offer a complete vision of the inventory of known prehistoric pottery in the Oukaïmeden Valley.



**Fig. 14.** Sherds with no cultural affiliation. A. Materials found during the K2 section survey, near the reservoir (CNPR collection); B. Pottery sherd from a test pit in K1 (CNPR collection).

The small size of the sample leaves us little room to establish a hypothesis, but we can draw some thoughts that might shed some light in future studies of this region. Firstly, the Neolithic pottery from *Aougnin n'ait Ourigh* and *Gar Issafen* clearly belong to the first human settlement in these mountain habitats of the High Atlas, which probably began in the second half-late of the Fourth millennium BC. The location of the sites in the accesses to the valley from both ends seems to confirm this hypothesis. Pottery during this period is profusely decorated, mainly with impressions and grooves, and consists of small/medium sized vessels used in everyday activities.

The next period is much more uncertain, due to the small size of the available sample. However, we propose that non-decorated pottery was predominant -sometimes with a grasp element- developed throughout the Third and the Second millennia BC. On the other hand, the size of the vessels is also small/medium, and they are roughly manufactured. Judging by the assemblages from other sites whose chronology is known, such as *Hassi Ouenzga* (Levels 1 and 2), this kind of non-decorated pottery could have endured at least until nearly the end of the first millennia BC (Linstädter 2003).

Finally, we found no clear evidences of a relation with later moments, particularly with the wide Lybian-Berber period.