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NOUVELLES DONNÉES SUR LES DÉBUTS DU NÉOLITHIQUE À CHYPRE

ACTES DE LA SÉANCE DE LA SOCIÉTÉ PRÉHISTORIQUE FRANÇAISE PARIS, 18-19 MARS 2015

Textes publiés sous la direction de
Jean-Denis Vigne, François Briois et Margareta Tengberg

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SÉANCES DE LA SOCIÉTÉ PRÉHISTORIQUE FRANÇAISE
9

NOUVELLES DONNÉES SUR LES DÉBUTS DU NÉOLITHIQUE À CHYPRE

NEW DATA ON THE BEGINNINGS OF THE NEOLITHIC IN CYPRUS

ACTES DE LA SÉANCE
DE LA SOCIÉTÉ PRÉHISTORIQUE FRANÇAISE
PARIS
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Textes publiés sous la direction de

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Société préhistorique française
Paris
2017

À la mémoire d'Edgar Peltenburg

To the memory of Edgar Peltenburg

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Illustration de couverture : Klimonas: sub-zenithal photo of the communal building (St 10) and its entrance device (upper left), taken at the end of the 2012 excavation season. *Klimonas : vue sub-zénithale du bâtiment communautaire (St 10) et de son dispositif d'entrée (en haut, à gauche), prise à la fin de la campagne de fouille 2012. La mire mesure 1 m. Le nord est situé vers la gauche* (© M. Azéma, Passé simple).

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SOMMAIRE / CONTENTS

Nouvelles données sur les débuts du Néolithique à Chypre
New data on the beginnings of the Neolithic in Cyprus
Actes de la séance de la Société préhistorique française
Paris, 18-19 mars 2015
Textes publiés sous la direction de Jean-Denis Vigne,
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Paris, Société préhistorique française, 2017
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Manufacturing and use of the stone vessels from PPN Shillourokambos in the context of Cypriot and Near Eastern PPN stone vessel production

Claire Manen

Abstract: This article provides a description of the stone vessels recovered from the Shillourokambos site. Excavated under the direction of J. Guilaine between 1992 and 2004, this site provides us with an extensive archaeological sequence and a diversity of settlement types. Stone vessels result from the exploitation of stone sources, and were used for food preparation and consumption, as well as for the processing of non-food matter. In Cyprus, this craft remained important for centuries, as pottery technology was adopted relatively late by the inhabitants of the island: during the 5th millennium, although it was developed in the Near East as early as the 7th millennium BC. By using Shillourokambos' comprehensive stone vessel data assemblage, this article is able to shed new light on these artefacts: providing a description based on their context, their stages of operational sequence related to shaping, and their morphological and functional range. It has also established a diachronic analysis of their production with the aim of identifying the main evolutionary dynamics recognised at Shillourokambos between the end of the 9th and 8th millennium. Lastly, it puts these observations into perspective by providing a comprehensive overview of Cypriot and Near Eastern PPN stone vessel production.

Keywords: Cyprus, Pre-Pottery Neolithic, stone vessels.

La fabrication et l'utilisation de la vaisselle de pierre du PPN à Shillourokambos, dans le contexte de production de la vaisselle de pierre à Chypre et au Proche-Orient

Résumé : Cet article présente une description de la vaisselle de pierre issue des fouilles du site de Shillourokambos, menées entre 1992 et 2004 sous la direction de J. Guilaine. Avec sa longue séquence archéologique et la diversité de ses modalités d'occupation, le site de Shillourokambos permet l'étude de ces productions matérielles sous un angle nouveau, grâce à un corpus de données renouvelé. La vaisselle de pierre s'intègre dans la sphère d'exploitation des ressources minérales et participe à la préparation et la consommation des aliments, mais également à la transformation de matières non alimentaires. Cet artisanat a tenu une place toute particulière à Chypre durant de nombreux siècles puisque les habitants de l'île n'adopteront que très tardivement, c'est-à-dire au cours du V^{e} millénaire, la technologie céramique, pourtant développée au Proche-Orient dès le VII^{e} millénaire BC. Cet article présente une description de la vaisselle de pierre du site à travers les contextes de découverte, les segments de la chaîne opératoire de façonnage et les gammes morpho-fonctionnelles de ces contenants. Puis il propose une analyse des dynamiques évolutives de ces productions à Shillourokambos entre la fin du IX^{e} millénaire et la fin du VIII^{e} millénaire. Ces observations sont, enfin, mises en perspective dans le panorama du PPN chypriote et proche-oriental.

Mots-clés : Chypre, Néolihique précéramique, vaisselle de pierre.

At the Shillourokambos site, and Cypriot PPN sites in general, stone vessels are found in abundance. Related to the exploitation of stone sources they were used for food preparation and consumption, as well as for the processing of non-food matter. The Shillourokambos site, excavated under the direction of J. Guilaine between 1992 and 2004 (Guilaine et al., 2011a and in press), presents a long archaeological sequence and a diversity of settlement types. Due to its up-to date stone vessel data assemblage, this article aims to shed new light on these artefacts: providing a description of their context, their stages of operational sequence related

to shaping, and their morphological and functional range. It also sets out a diachronic analysis of their production with the aim of identifying the main evolutionary dynamics recognised at Shillourokambos between the end of the 9th and of the 8th millennia cal. BC. Lastly, it puts these observations into perspective by providing a comprehensive overview of Cypriot and Near Eastern PPN stone vessel production.

DATA AND CONTEXT OF DISCOVERY

Shillourokambos is a large open-air Neolithic site (5,000 m²) located near Limassol. To date, three main phases of occupation have been identified (Early, Middle and Late, with some subdivision), spanning the period from approximately 8350 to 7000 cal. BC. The entire excavation has yielded almost 2,700 remains of stone vessels, distributed as presented in table 1. The remains were unequally distributed across sector 1 and sector 3. The various stratigraphic units and features of sector 1, mainly enclosures and dump concentrations (ca. 3,000 m²), contained only a third of the remains for a comparatively long period of settlement; in contrast, sector 3, domestic building remains (ca. 2,500 m²), provided more abundant finds. However, further study of these contexts showed that the stone vessels were primarily from stratified dump deposits that were not strictly connected to the buildings, or came from pit features such as wells and cisterns (fig. 1).

In sector 1, half of the vessels were recovered from structure 23, which exhibited a complex fill composed of stratified dump deposits and burials (Vigne et al., 2011a). In sector 3, in which actual buildings and sections of floors were identified, only a few pieces were discovered. However, as the stone vessel remains generally stemmed from features and deposits with a complex fill and/or accumulation process, within a secondary context (i.e. refuse), it was impossible to determine their primary context or how they were integrated into the domestic space. Finally, not a single feature directly related to the

	Early phase	Middle phase	Middle-Late phase	Late Phase	undet. Preceramic	Sotira	Historic	Total
Sector 1	354	185	0	69	17	12	1	638
Sector 3	54	535	169	1,157	92		2	2,009
Total	**408**	**720**	**169**	**1,226**	**109**	**12**	**3**	**2,647**

Table 1 – Frequency distribution of the number of remains (from the unshaped fragment to the complete vessel) of the stone vessel recovered from the Shillourokambos site according to the discovery sectors and the main settlement phases of the site. The fragments recovered from Sotira and historical contexts were obviously found in a disturbed position.
Tabl. 1 – Distribution en fréquence du nombre de restes (du fragment informe au vase complet) de la vaisselle de pierre du site de Shillourokambos selon les secteurs de découverte et les principales phases d'occupation du site. Les restes issus des contextes Sotira et historique sont, évidemment, en position remaniée.

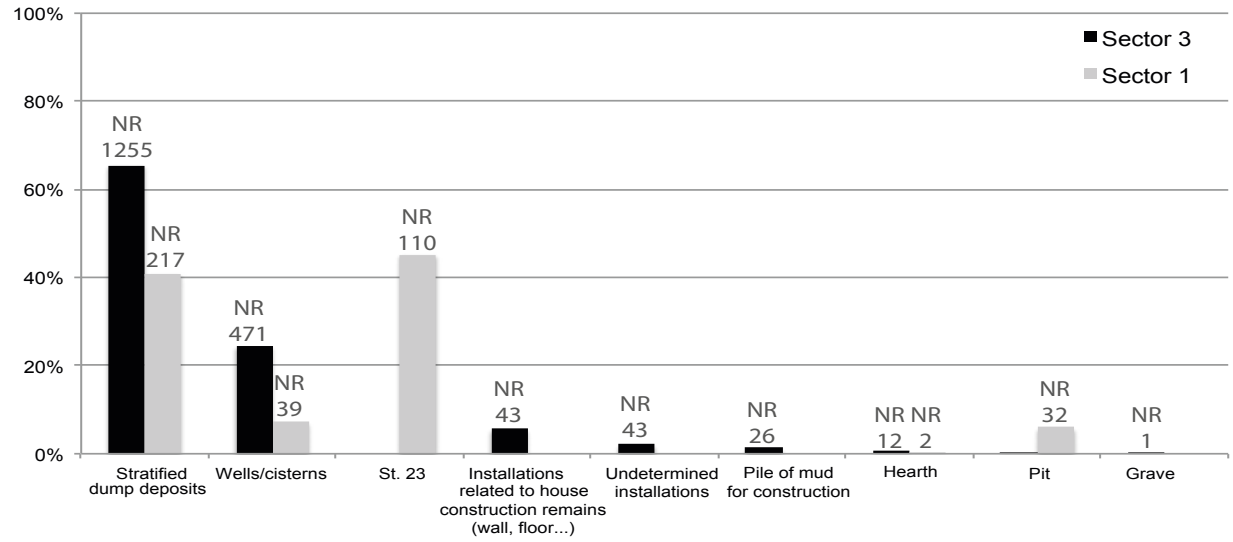

Fig. 1 – Frequency distribution of the number of stone vessel remains recovered from the Shillourokambos site according to the contexts of discovery, all phases combined.
Fig. 1 – Distribution en fréquence du nombre de restes de vaisselle de pierre du site de Shillourokambos selon les contextes de découverte, toutes phases confondues.

disposal of vessel debris, during shaping or after breakage, was identified. Stone vessel remains were, however, associated with waste stemming from other craft or economic activities (e.g. knapped flint industry, faunal remains, and macrolithic tools).

The stone vessels occur as complete pots (fig. 2) or, on the contrary, as simple undetermined/determined fragments, independent of the period and/or context (e.g. stratified dump deposits, discard in wells).

Almost 55% of the remains were simple typological elements: rims, wall fragments, base fragments, handles or spouts. Less than 40% of the remains were undetermined fragments, which in some cases bore shaping or finishing marks. The complete profiles, or those obtained by graphic reconstruction, represented 6% of the remains. Finally, less than 1% of the items were roughouts discarded during the shaping process, or pieces that were recycled after breakage. Almost all the studied fragments were finished products that were either discarded after use and breakage, or recycled (e.g. anvil, net weights or possible loom weights).

OPERATIONAL SEQUENCE

As previously mentioned, there were few elements which enabled reconstruction of the initial stages of stone vessel shaping (fig. 3).

The raw materials used by the communities of Shillourokambos can be subdivided into two groups, their nature and physical properties determining the operational sequence. The first group is formed of soft rock, in this case calcareous rock (i.e. limestone) of varying density that was generally grained. The second group is formed of hard rock, mainly igneous such as serpentine, gabbro, and diabase. Basalt and picrolite, which exhibit slightly different physical properties, were also used though less frequently. All these raw materials occur in large diversities at/or close to the site, in either a primary or secondary position (Devillers and Morhange, 2011):

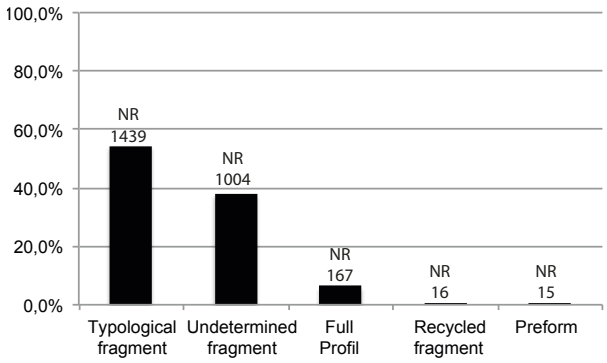

Fig. 2 – Frequency distribution of the various types of stone vessel remains of the Shillourokambos site.
Fig. 2 – Distribution en fréquence des différents types de restes de vaisselle de pierre du site de Shillourokambos.

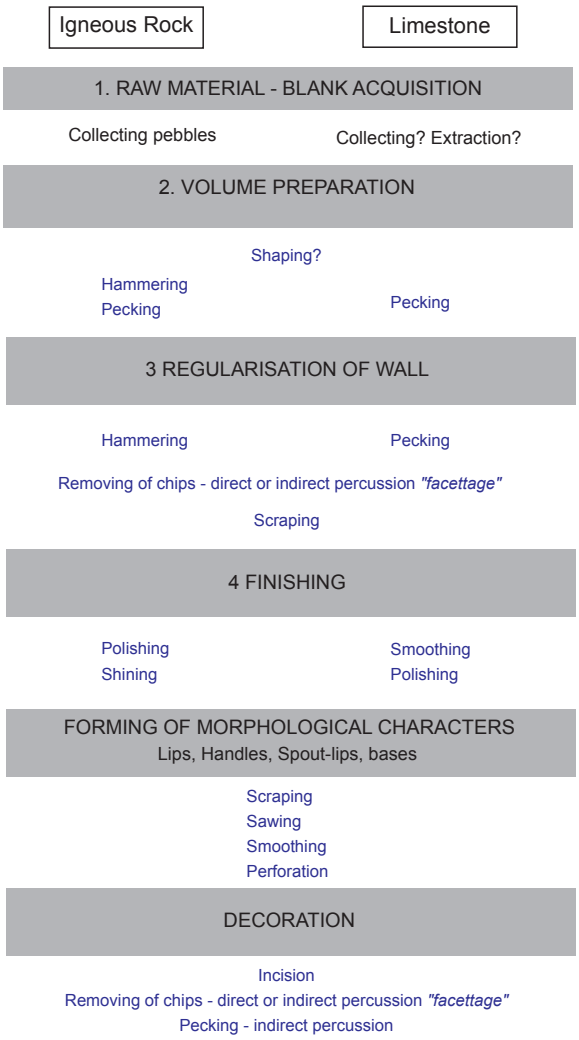

Fig. 3 – Simplified scheme summarising the stages and processes related to the stone vessels of Shillourokambos.
Fig. 3 – Schéma simplifié résumant les étapes et les procédés de fabrication de la vaisselle de pierre de Shillourokambos.

limestone is present in the immediate environment of the site, igneous rocks occur nearby (< 5 km), and picrolite can be located 20 km west of the site (Kouris riverbed). With regard to raw material procurement, igneous rocks, occurring in secondary position, were probably collected in the form of pebbles; whereas limestone may have been both collected and quarried, though no indication of quarrying was identified at the site. The volumetric distribution range and the diversity of these blanks is similar for both types of raw material: from small pebbles (less than 10 cm), to massive supports measuring around 60 cm, and in some cases exceptional pieces measuring 1 m in length. It is not possible to expand further on these observations, however, the sourcing of the rocks and their distance of origin are still a valid point of discussion. Unfortunately, the tools and techniques used for extraction are completely unknown.

Stone vessel production involves several stages (fig. 3) that constitute various degrees of shaping. During

the final stage all the stigmata stemming from shaping and regularisation are erased (Manen, 2011 and in press), which further complicates the understanding of volume shaping techniques. The question of the production sites at Shillourokambos are also difficult to address: during excavation not a single concentration of unworked raw materials or tools was identified, nor was it possible to recognise concentrations of roughouts or waste stemming from preliminary flaking of the blocks. This same problem was discussed for the Khirokitia site, in the context of a large village agglomeration; however, evidence of a stone vessel workshop has recently been discovered here (e.g. fine greenstone powder, preforms, numerous pick-hammers, and flakes; Astruc et al., 2008), indicating that the production of stone artefacts was part of domestic activities in multifunctional areas. At the Mylouthkia site, well 123 yielded an assemblage of stone vessel fragments and percussion tools that were thought to stem from a nearby workshop (Peltenburg et al., 2001). On the continent, apart from the Basta workshop in Jordan (Aurenche and Kozłowski, 1999), manufacturing workshops have rarely been identified.

With regard to the modalities of shaping, several roughouts, probably failed pieces that were discarded during the shaping process, enabled us to propose some hypotheses (fig. 4). Hard rock (i.e. pebbles) appears to

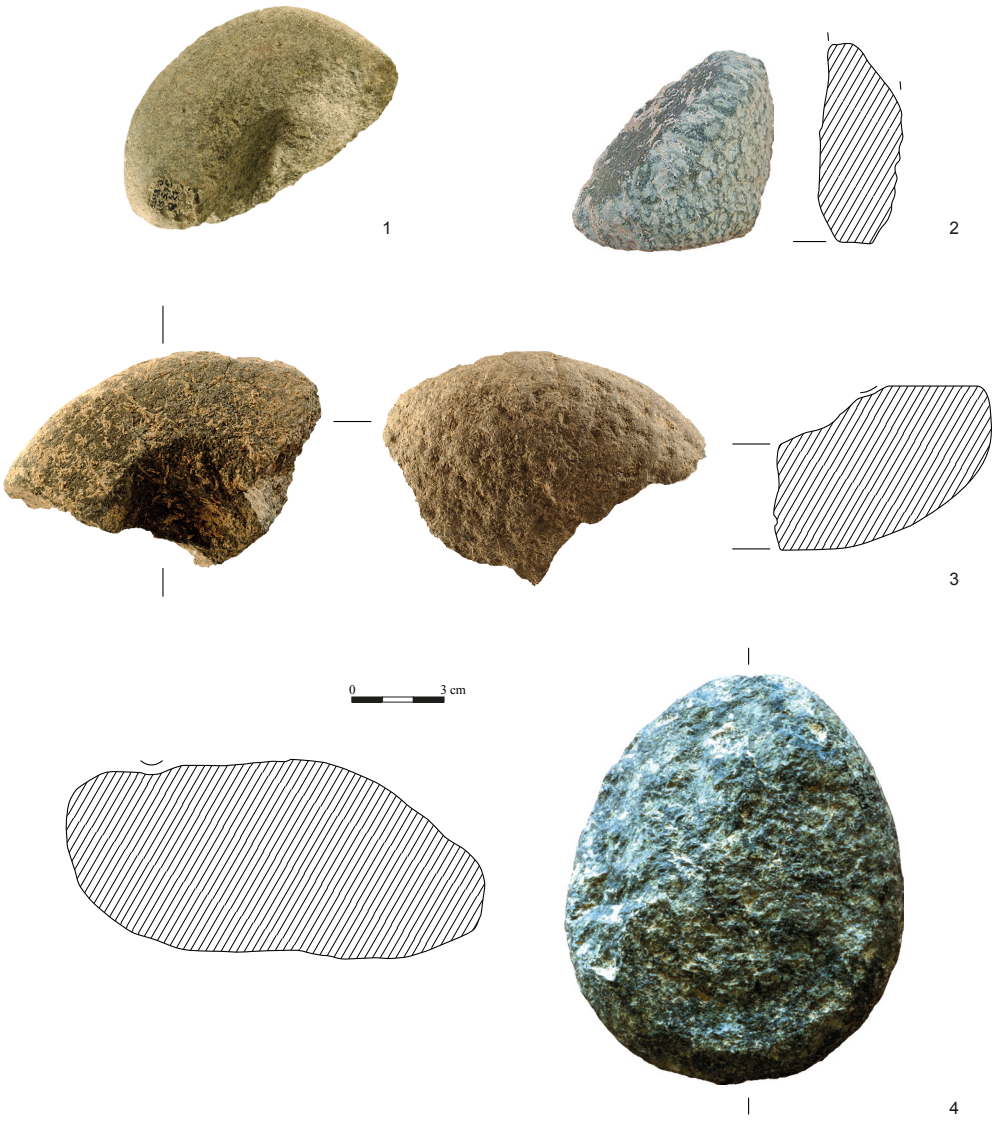

Fig. 4 – Some examples of roughouts stemming from sectors 1 and 3 of Shillourokambos. 1 and 3: a cavity is in the process of being hollowed out whilst the general shape of the cobble has already been achieved; 2: probable roughout of the lower part of a container made from gabbro rock. The exterior is entirely pecked ; 4: Roughout made from a cobble of igneous rock. The upper side was subject to regular annular pecking with the aim of shaping a central core located at the level of the planned hollow.

Fig. 4 – Quelques exemples d'ébauches provenant des secteurs 1 et 3 de Shillourokambos. 1 et 3 : une cavité est en cours d'aménagement tandis que la mise en forme générale du galet a déjà été réalisée ; 2 : ébauche probable de la parte inférieure d'un contenant en roche gabroïque ; la surface externe est entièrement piquetée ; 4 : Ébauche sur galet de roche ignée. La face supérieure a fait l'objet d'un piquetage régulier annulaire permettant de dégager un rognon central placé au niveau du futur creusement.

have been worked by hammering, battering or pecking with the aim of regularising the shape and isolating a central core by cutting a peripheral grove. Some pieces recovered from the Shillourokambos site exhibited these characteristics, as did several artefacts discovered in the Khirokitia workshop (Astruc *et al.*, 2008). This process of manufacturing was first identified for Khirokitia by M. Mouton (1984). With regard to limestone, several pieces, with irregular surfaces, exhibited marks stemming from rough pecking. The hollowing of a cavity in a limestone cobble can be achieved quite rapidly using simple pecking, even if limestone is quite dense. The techniques used for the regularisation stage were revealed by surface aspects (fig. 5). Distinct marks enabled us to identify several techniques: percussion made by mostly rough pecking, flake removal by direct or indirect percussion, and grooving/scraping on calcareous rocks; and percussion by hammering, and flake removal by direct/indirect percussion for igneous rocks. Some surfaces were even soft and smooth, and showed that a substantial effort was invested in their finishing, resulting in the erasure of all the marks mentioned above. Finally, with regard to shaping, it should be noted that some vases were equipped with handles or spouts, or were decorated (see below).

Two main tool types were probably used for the shaping of stone vessels. The first group refers to tools attributed to the macrolithic toolkit[(1)] (Perrin, 2011 and in press), particularly hammerstones, used for pecking/battering; and pebbles with an active ridge shaped from igneous rocks used in direct percussion (crushing marks and impacts on the active ridge); the second group are knapped flint tools. Use wear analysis carried out on a sample recovered from sector 1 demonstrated that "the examined pieces were used for a large range of

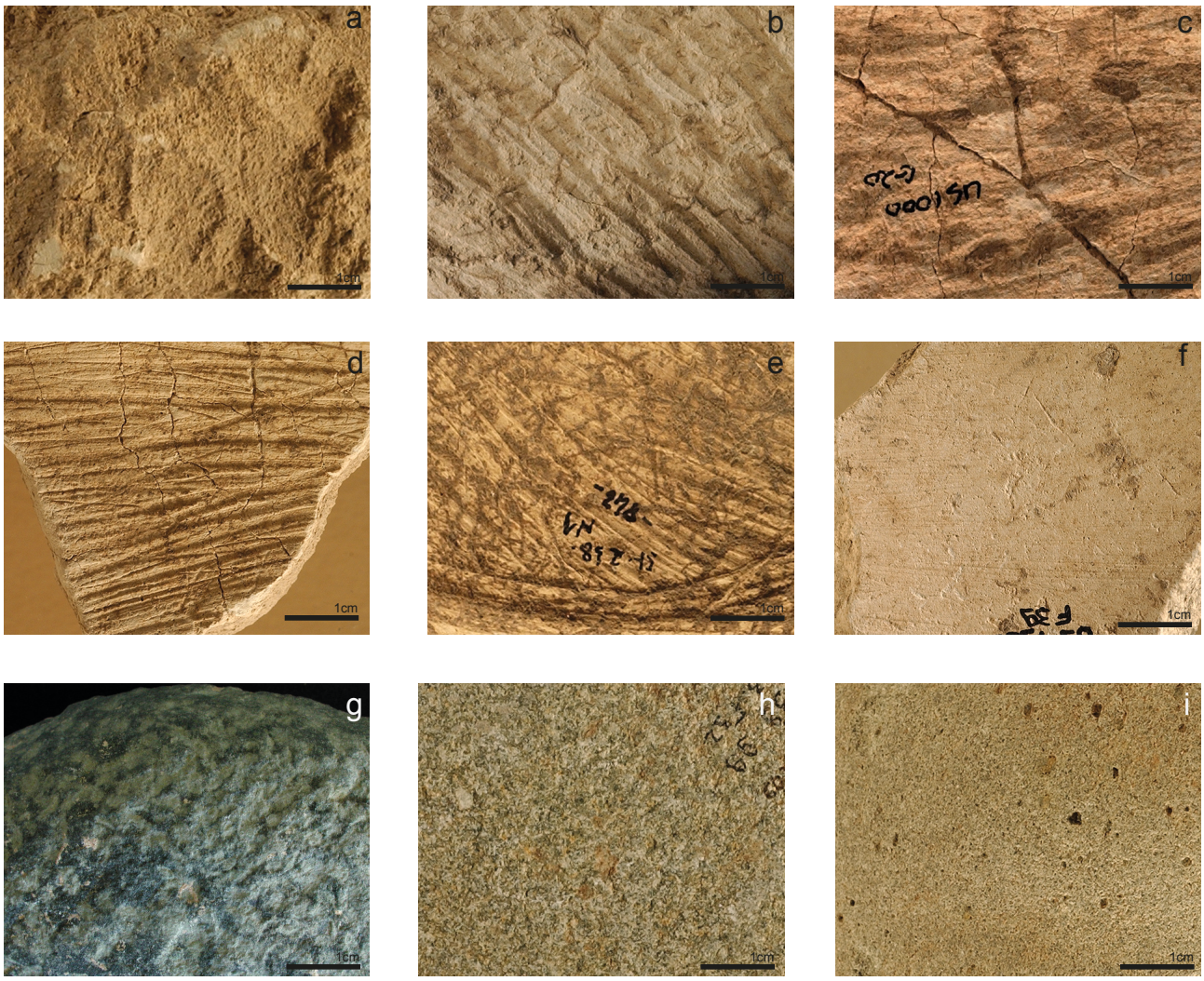

Fig. 5 – Examples of marks linked to the regularisation stage of the walls on limestone (a: battering or pecking scars; b and c: facets left by the removal of flakes by direct or indirect percussion; d and e: scraping/grooving striae; f: smoothing) and on igneous rocks (g: hammering scars; h: fine pecking scars; i: smoothing).

Fig. 5 – Exemples de stigmates relatifs à l'étape de régularisation des parois sur calcaires (a : alvéoles de bouchardage ou de piquetage ; b et c : facettes liées à l'enlèvement d'éclats par percussion lancée directe ou indirecte ; d et e : stries de raclage et de rainurage ; f : lissage) et sur roches ignées (g : alvéoles de bouchardage ; h : alvéoles de piquetage fin ; i : lissage).

activities including a great variety of technical actions (cutting, planning, scraping, drilling, sawing, etc.) and various working materials" (Philibert, 2011, p. 703). Amongst the flint tools (Briois, 2011), retouched scrapers would have been used for sawing and scraping actions, end-scrapers testify to the scraping of moderately hard or hard matter, and finally bruised and splintered pieces show stigmata stemming from direct percussion. A specific use wear protocol will be required in order to further investigate the tools used during the different stages of operational sequence.

THE MORPHO-FUNCTIONAL CLASSES

In order to describe the morpho-functional aspects, 167 complete and incomplete (where profiles could be restored) pieces were analysed, making it possible to calculate typometric variables. In addition, a further sixty-six incomplete vessels were attributed to a precise shape category, and/or were able to provide some metric variables (notably aperture diameter). With regard the complete pieces, the metric data were used to estimate both the aperture index and the depth index of the vessel. For the latter, we differentiated between the 'external' depth (estimated based on the height of the vessel, which provides information on its size), and the 'internal' depth (based on the height of the hollowed-out cavity). The two height values often vary considerably depending on the thickness of the vessel walls. For distinct types of containers, this thickness value may be very high, thus determining a particular function.

The scatter plot (fig. 6) of the average of the interior height values (H), of the aperture diameter (A), and of the maximum diameter (M) for each category figures the classification of the Shillourokambos stone vessels, across all phases and sectors. Based on the depth index and the aperture index, it provided an immediate impression of the main classes of identified containers: from the widest to the narrowest, and from the shallowest to the deepest. It was noted that most of the containers had a large aperture index (between 0.8 and 1), and a low depth index when compared to a Neolithic pottery range, both indicative of important technical constraints. Although there is no clear rupture with regard to their size, by adding to these trends the geometric characteristics of the profiles (e.g. hemispherical, cylindrical) and the size criteria (mainly estimated from the values of the aperture diameter and the flat bases), three major common morpho-functional classes were identified (fig. 7 and 8). The terminology used here follows the studies of C. Saliou (1989), K. Wright (1992) and C. Manen (2011 and in press).

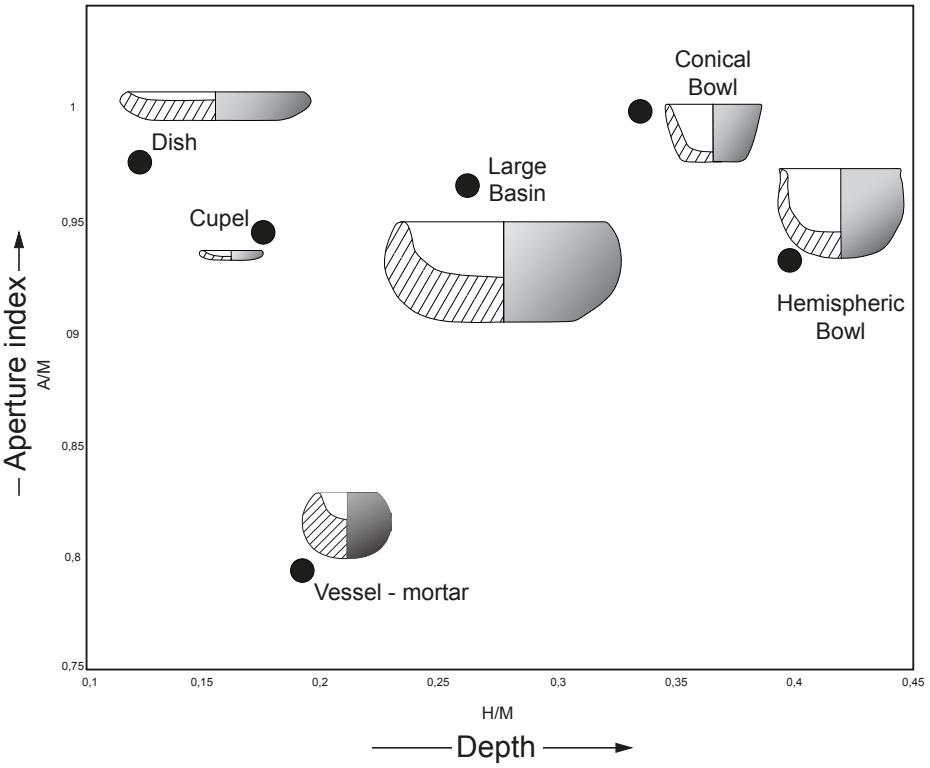

Fig. 6 – Scatter plot of the mean values of the height (H), the maximum diameter (M) and the aperture diameter (A) according to various morpho-functional categories. In the absence of complete profiles, this plot cannot show the entire morphological variability of the stone vessels of Shillourokambos.

Fig. 6 – Diagramme de dispersion des moyennes des valeurs de la hauteur (H), du diamètre maximum (M) et du diamètre à l'ouverture (A) selon différentes catégories morpho-fonctionnelles. Faute d'un nombre suffisant de profils complets, ce diagramme ne peut faire apparaître toute la variabilité morphologique de la vaisselle de pierre de Shillourokambos.

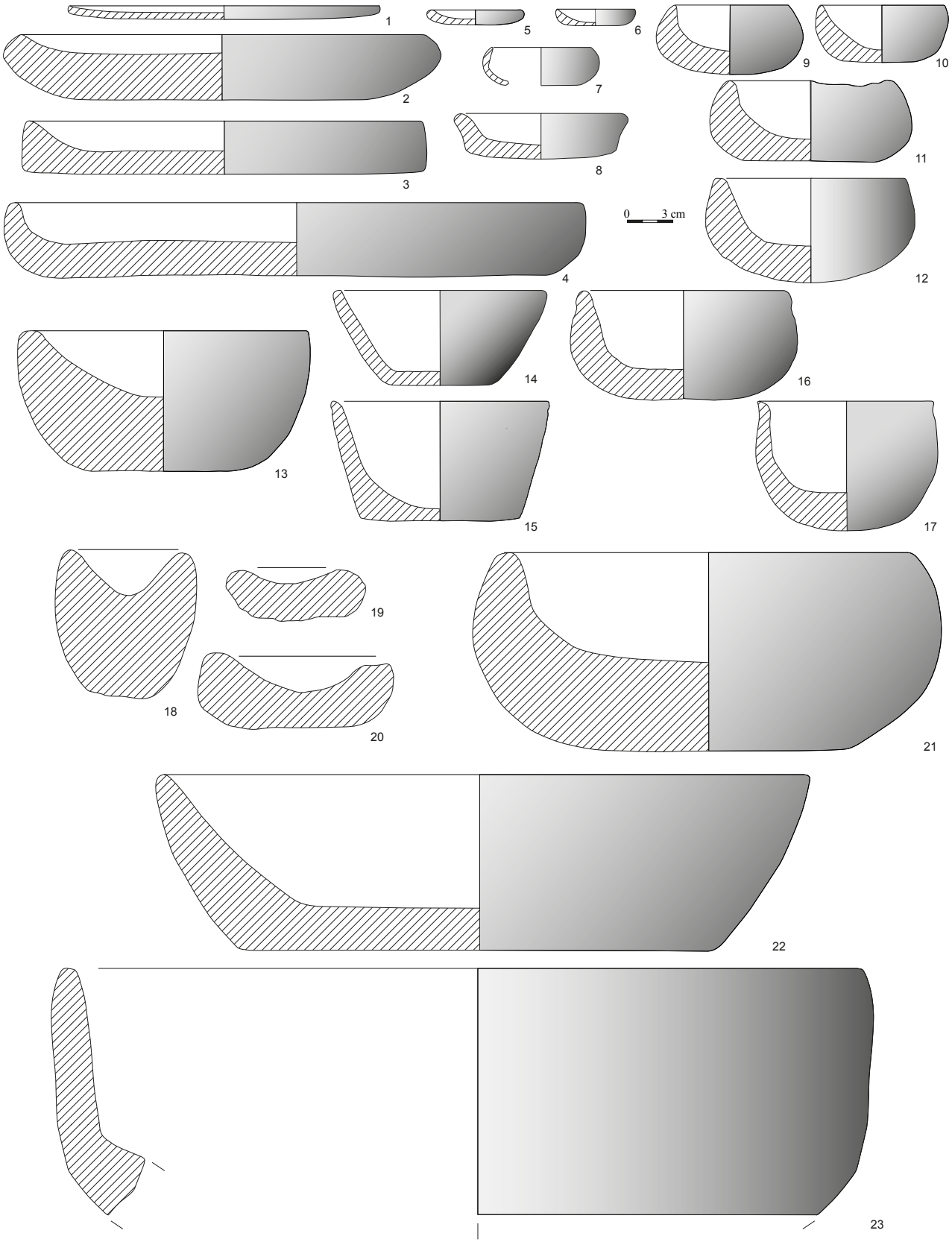

Fig. 7 – Synthetic summary illustrating the morpho-functional diversity of the stone vessels of Shillourokambos, all phases and sectors combined.

Fig. 7 – Planche synthétique illustrant la diversité morpho-fonctionnelle des vases de pierre de Shillourokambos, toutes phases et secteurs confondus.

Fig. 8 – Some photographs of the main morpho-functional types of Shillourokambos. 1-2: picrolite; 3-4-7-9-10-11-12: limestone; 5-6-8: igneous rock.

Fig. 8 – Quelques photographies des principaux types morphofonctionnels de Shillourokambos. 1-2 : picrolite ; 3-4-7-9-10-11-12 : calcaire ; 5-6-8 : roches ignées.

The first class groups together shallow and wide vessels, such as dishes and cupels, which were differentiated based on size criteria and usefulness (fig. 7, nos. 1 to 8, and fig. 8, nos. 1 to 6, 8 and 12); and were probably used for processing/presenting food, or non-food matter like colorants and ointments (NB these non-food matters have not been identified at Shillourokambos but are assumptions based on discoveries at Asprokremnos and Ais Giorkis). The second class is formed by wide and deep vessels, the size of which allowed for everyday handling: utensils, bowls with a hemispherical profile, and bowls with a conical profile (fig. 7, nos. 9 to 17, and fig. 8, nos. 7, 9 and 11). Lastly, the third class is composed of deep wide vessels and large containers with an aperture diameter between 30 and 60 cm, such as basins, the handling of which was more difficult and probably less regular (fig. 7, nos. 21-22, and fig. 8, no. 10). All these vessels exhibit a simple, non-segmented profile. Table 2 and figure 9 show their distribution, across all phases. Of course, it should be stressed that our perception of these various morpho-functional categories is biased, notably because of their fragmentation. The portion of huge containers, rarely completely preserved, is therefore minimised based on these metric analyses.

For all these classes, distinct variability of size (fig. 10) and wall thicknesses can be observed. Igneous rock, which was used only occasionally (see below), were not restricted to a particular shape type; however, they exhibit more regular finishing. Picrolite was exclusively used for the shaping of small cupels.

It was observed generally that the range of activities linked to food consumption and presentation[(2)] (dishes and bowls) and to the probable processing of non-food matters (e.g. oils?, perfume?, ointments?, colorants?) was well represented. However, stone vessels do not seem to have been involved in the long-term storage of foodstuffs, as large storage vessels of a substantial height and volume, commonly seen in the case of pottery vessels, were rare. Obviously, the constraints linked to stone as a raw material may be invoked in order to explain this absence; however, it is acknowledged that these communities had the technical know-how to manufacture these types of large containers. It should also be stressed that storage pits were rare at the site, and that food storage and conservation maybe have taken place in raised granaries. There were also relatively few indications regarding the cooking of foods. Traces stemming from fire contact were not frequent on the stone vessels (i.e. 2.5% of all the fragments or vases), and in many cases contact with fire occurred after breakage, probably accidentally. Nonetheless, the absence of referential has to be mentioned with regard to marks left by heating on limestone (depending on the temperatures), which would have enabled us to identify more precisely their contact with fire. The absence of carbonised residues on the walls of the containers should also be highlighted. As the issue of cooking foodstuffs using stone vessels remains undetermined, cooking traditions involving indirect cooking should be considered.

The following section describes some characteristic elements of these stone vessels (fig. 11). The rims of the containers were of various types: mainly rounded (fig. 11, no. 3) and outsplayed (fig. 11, nos. 1 and 2), but also thinned and flattened. Handles were also shaped (fig. 11, nos. 4, 5, 6 and 7) and displayed a wide variety of types and sizes: lug handles with a quadrangular, circular, oval, and triangular section. True handles were also shaped. Handle elements, which were rare (i.e. on scarcely 2% of the fragments or vessels), were associated with all size classes of containers. Lastly, particular systems linked with the pouring of liquids (fig. 11, nos. 8 and 9),

	Limestone		Igneous Rock		Picrolite	
	NR	%	NR	%	NR	%
Bowl	90	92%	8	8%	0	0%
Dish	67	68%	31	32%	0	0%
Basin	40	91%	4	9%	0	0%
Cupel	15	45%	14	42%	4	12%
Cup	30	100%	0	0%	0	0%
Vessel-Mortar	7	50%	7	50%	0	0%
Utensil	12	80%	3	20%	0	0%
Total	**261**	**79%**	**67**	**20%**	**4**	**1%**

Table 2 – Frequency distribution of the number of remains and percentage distribution of the various morpho-functional categories of Shillourokambos according to the raw materials, all phases combined.
Tabl. 2 – Distribution en fréquence du nombre de restes et en pourcentage des différentes catégories morpho-fonctionnelles de Shillourokambos en fonction des matières premières utilisées, toutes phases confondues.

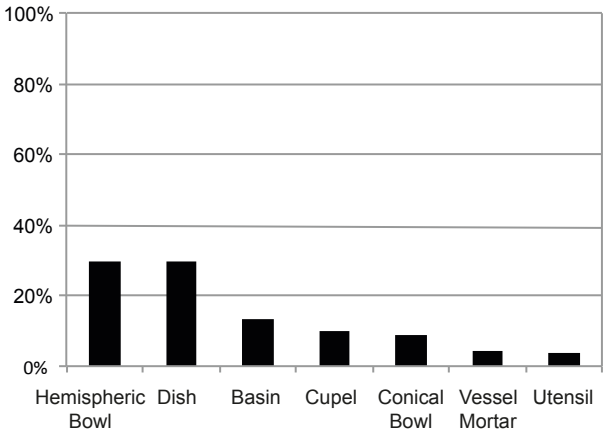

Fig. 9 –Graph showing the percentage distribution of the various morpho-functional classes of Shillourokambos. For the frequency data of the number of remains please refer to table 2.
Fig. 9 – Graphique de distribution en pourcentage des différentes catégories morpho-fonctionnelles de Shillourokambos. Pour les données en fréquence de nombre de restes se référer au tableau 2.

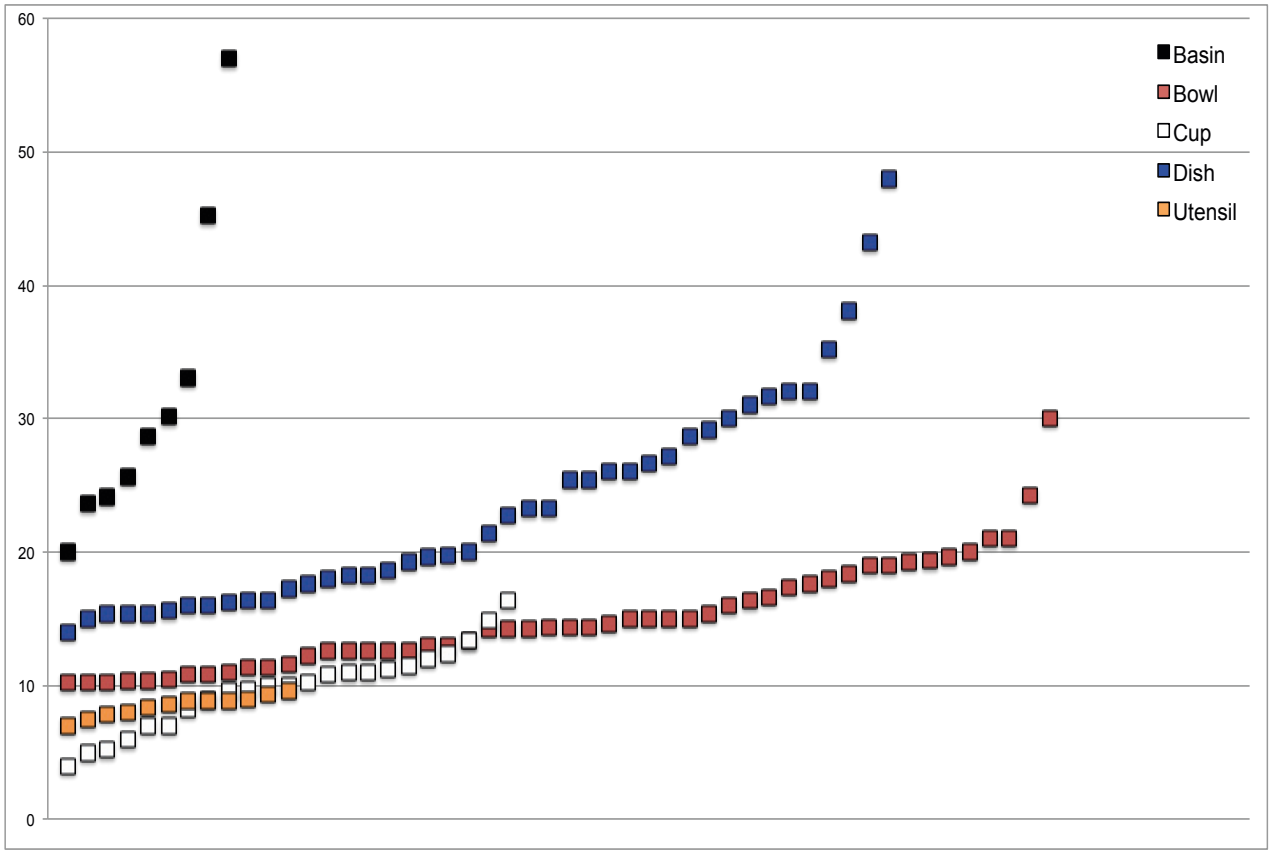

Fig. 10 – Dispersion of the aperture diameters (in cm) of the various morpho-functional classes.
Fig. 10 – Dispersion des diamètres à l'ouverture (en cm) des différentes catégories morpho-fonctionnelles.

represented by the shaping of a groove on top of the vessel (slightly more than 1% of the remains), were noted. The grooves were primarily sophisticated with real protruding and decorated spouts, with a decorative rostrum below the spout or the brim of the groove, though some were much simpler. Few of the external surfaces of the stone vessels recovered from Shillourokambos were decorated (i.e. only 2.5% out of the fragments or vessels) by the removal of flakes by percussion; regular faceting (exclusively on the exterior of the vessel), fine and regularly spaced pecking, and incision (fig. 12) were the preferred methods used.

Some vases were distinguished from the common shapes described above because of their particular shape, and were grouped together under the label 'mortars[(3)]': small vases with a spherical or hemispherical profile; the cavity of which was shallow in comparison to the general height of the vessel (fig. 7, nos. 18, 19 and 20), probably used for processing or grinding with a small pestle, or beaker. Some fragments testified to the presence of huge containers, probably used for collective events (Manen, 2011 and in press). Amongst these was a large basin (well 114, Early phase) measuring 0.70 to 0.80 m in diameter, shaped from a large block of igneous rock. It had a finely worked 'rim' and a flat 'lip'. It was interrupted at one point by a polished vertical slot/groove which may have been used for pouring, unless it was purely a decorative element. This piece is exceptional with regard to its volume, size, and the quality of its finishing (thorough polishing) and throws up numerous questions: What support was selected? What shaping technique was used? Was it the raw material or the finished product that was transported? The second vessel was a large platter 52 cm wide with a preserved length of 57 cm (feature 396, Middle-Late phase). It was assumed that its total length was initially 70 cm. Its shape is sub-rectangular, but the edges are rounded. The particularity of this platter is the presence of several massive, cylindrical feet. These two pieces are indeed unique and may indicate that stone vessel shaping was used to produce containers for purposes other than just everyday use.

DIACHRONIC ANALYSES OF THE STONE VESSELS FROM SHILLOUROKAMBOS

The characteristics of the stone vessels from Shillourokambos were grouped together according to the site's three settlement phases, defined on the basis of the lithic industries, the faunal remains, the macrolithic tools, and the radiocarbon dates (Guilaine et al., 2011a and in press). The assemblage was unequally distributed, with the Early and Middle phases underrepresented (table 1).

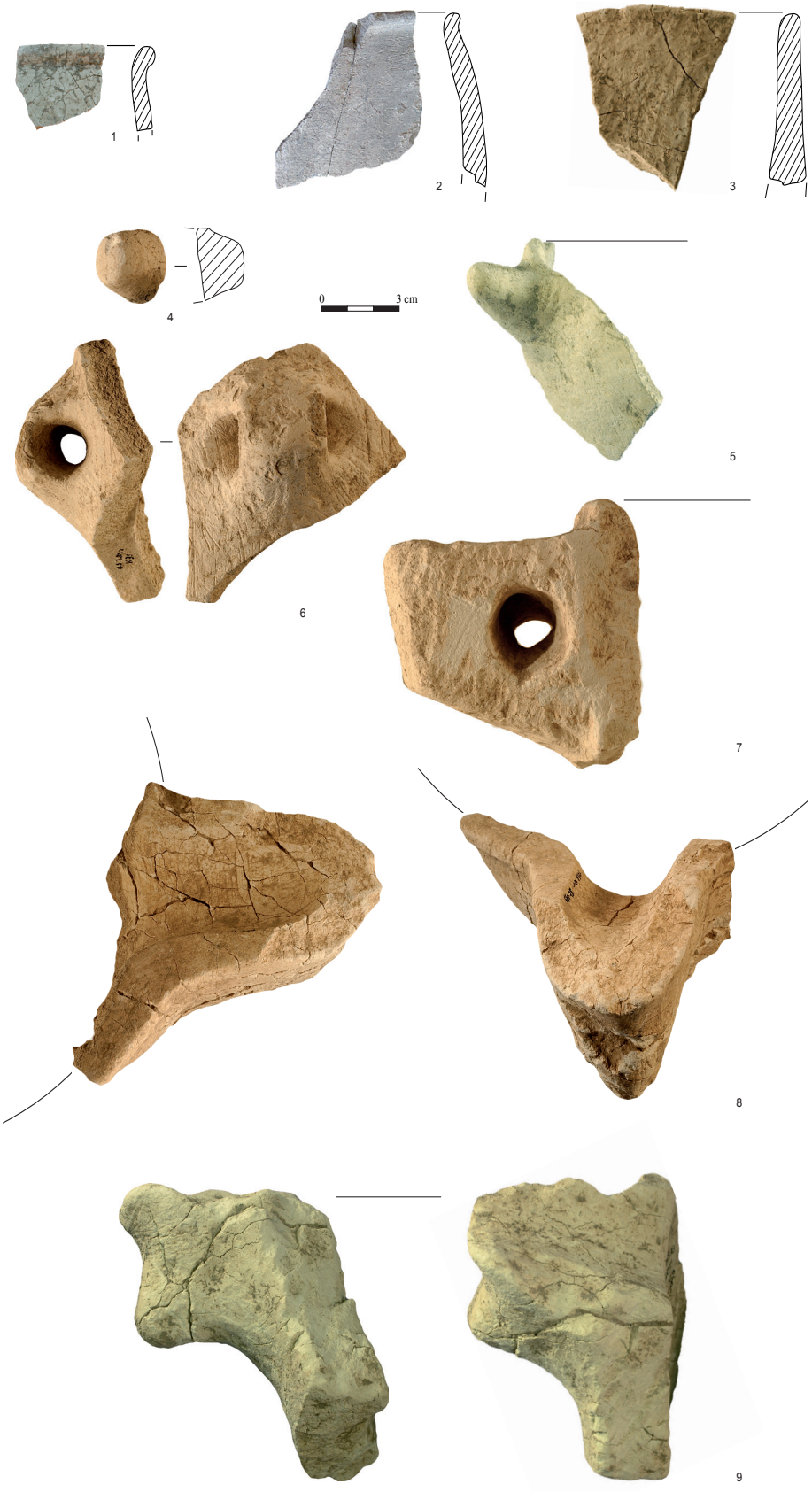

Fig. 11 – Photographs of elements composing the stone vessels (limestone) of Shillourokambos. 1 and 2: rim fragment with an outsplayed lip; 3: rim fragment with a rounded lip; 4 and 5: small handle lug; 6: handle; 7: perforated quadrangular lug; 8 and 9: spouts.

Fig. 11 – Photographies d'éléments de vaisselle de pierre de Shillourokambos. 1 et 2 : bord à lèvre ourlée ; 3 : bord à lèvre arrondie ; 4 et 5 : petit tenon de préhension ; 6 : anse ; 7 : tenon quadrangulaire perforé ; 8 et 9 : becs verseurs.

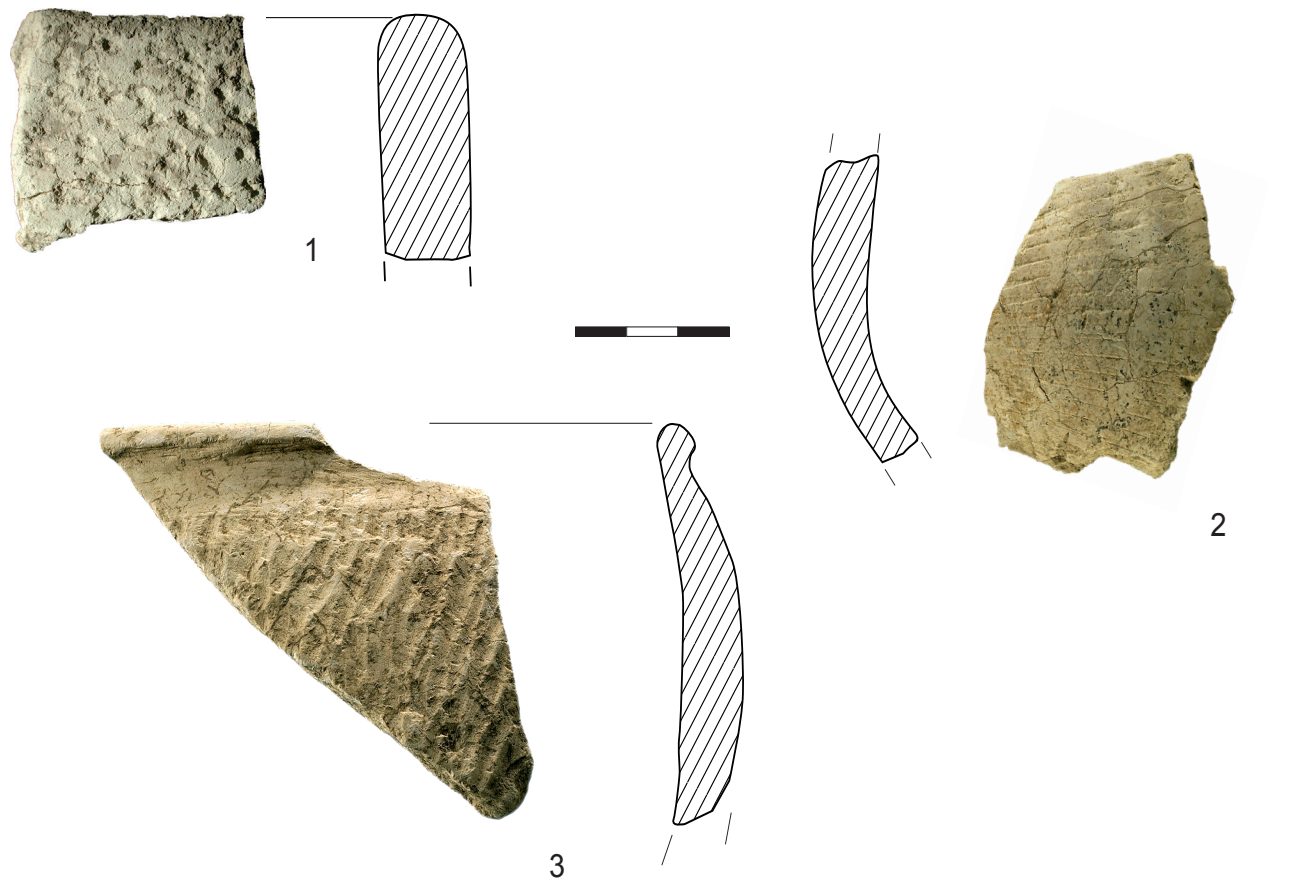

Fig. 12 – Some examples of stone vessels recovered from Shillourokambos exhibiting decoration on the exterior (limestone). 1: fine pecking; 2: incision and 3: facetting.
Fig. 12 – Photographies d'éléments de vaisselle de pierre de Shillourokambos. 1 et 2 : bord à lèvre ourlée ; 3 : bord à lèvre arrondie ; 4 et 5 : petit tenon de préhension ; 6 : anse ; 7 : tenon quadrangulaire perforé ; 8 et 9 : becs verseurs.

As previously mentioned, the fact that numerous stone vessel remains were found in sector 3 (Middle and Late phase) may be linked with the abundance of house construction remains in this sector. Is it possible to assume, therefore, that a change to a more sedentary village life, associated with increasing agricultural activities, might explain the increase in the production of these stone vessels used for food processing and consumption. Comparisons using descriptive statistics analysis carried out on the data across the three main phases highlight three main criteria that display substantial variations: the raw materials, the shape of distinct parts of the vessel, the finishing of the rims; and to a lesser extent, distinct morpho-functional classes. The handle and pouring systems should also be mentioned though these occur in relatively small numbers, which makes it difficult to guarantee the validity of the observations. These results and the general data structure were summarised using factorial correspondence analysis which was carried out by combining the different variables and the three major chronological phases (fig. 13). The chi-square test enabled us to rule out the hypothesis of independence between the rows and the columns of the table at the 0.05 threshold ($\chi 2 = 213.860$, df = 24; p-value < 0.0001).

The correspondence analysis indicated 100% inertia on the first two axes (i.e. 95.24% for axis 1, and 4.76% for axis 2). The best absolute contributions on axis 1 concerned the 'outsplayed rim' (on the left), 'late phase' (on the right), 'igneous rock' plus 'bowl' plus 'thinned rim', and 'Early phase'. Axis 1 enabled us to define a significant rupture between the stone vessels of the Early phase (largely made from limestone but also from igneous rocks: 12% of the raw material in the Late phase and 2% for the Early phase), and those of the Late phase that exhibited an increase in finished rims (i.e. the shaping of small, regularised cordons that form an outsplayed rim; fig. 11, nos. 1 and 2). A study carried out on the values of the vessels wall thickness evidenced a trend towards thinner walls from the Late to the Early phase (fig. 13). As to the morpho-functional classes, it was not possible to determine any evolutionary trend. The chi-square test carried out on the data combining the major morpho-functional classes and the three phases was not significant, and indicates the absence of structuring in the morpho-functional classes according to the chronology. These results seem to indicate continuity with the practices and uses linked with the stone vessels. It should be noted, however, that these types of objects were shaped

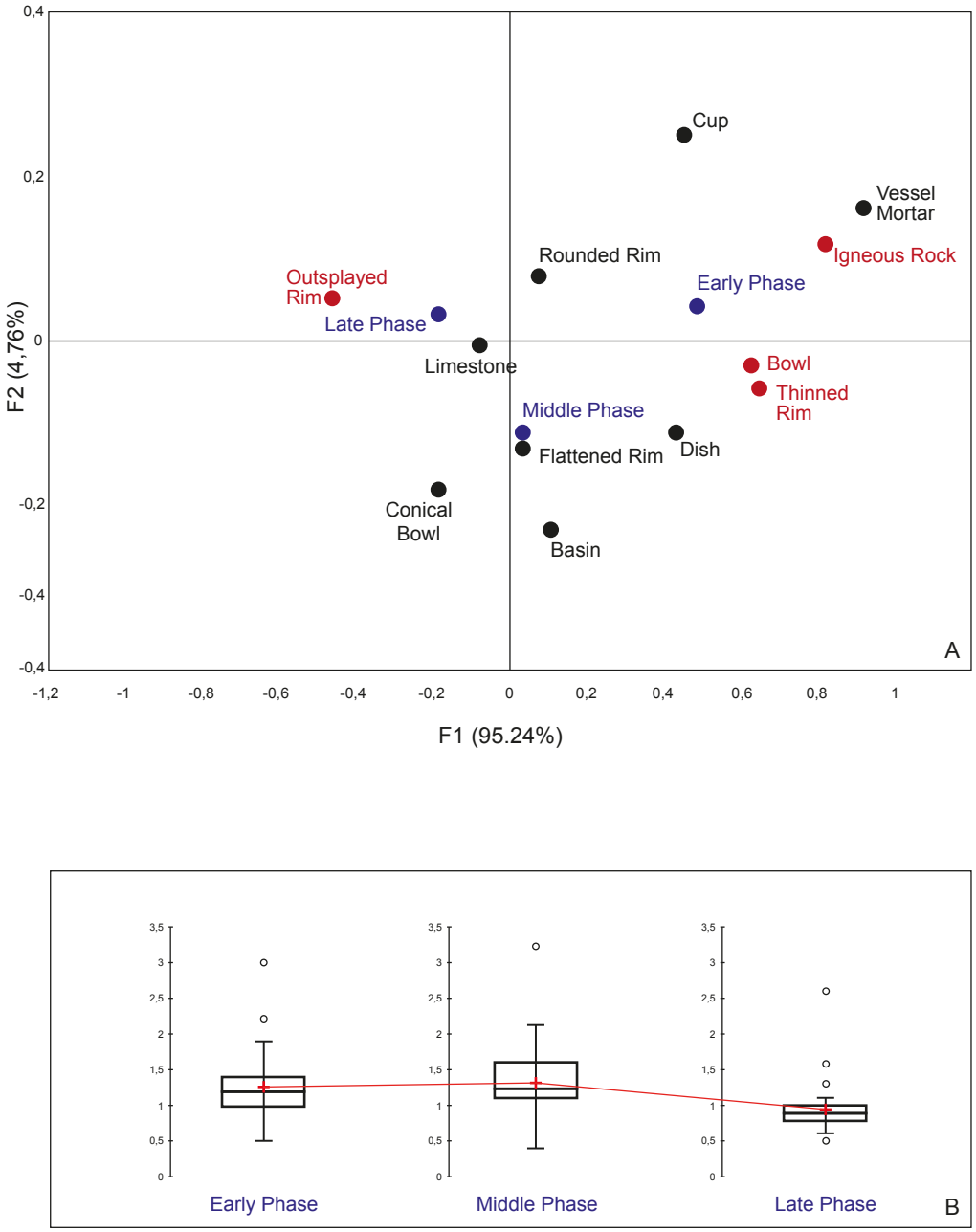

Fig. 13 – A: factorial correspondence analysis of the characteristics of the stone vessels of Shillourokambos combined with the main chronological phases that were identified; B: box plot of the thickness values according to the three chronological periods. ***Fig. 13 – A : analyse factorielle de correspondances des caractères de la vaisselle de pierre de Shillourokambos croisés aux principales phases chronologiques identifiées ; B :*** **box-plot** ***des valeurs des épaisseurs selon les trois phases chronologiques.***

prior to technical advances, such as drilling systems, which were developed much later.

In addition to these two main evolutionary trends, concerning the procurement of raw materials and a preference for the creation of outsplayed rims, it should be noted that handle elements and pouring systems were further developed during the Late phase, though this is difficult to demonstrate quantitatively. This may be linked to new uses, notably the pouring of liquids, as well as to an increasing skill level of the craftsmen. The modalities of the emergence of these new techniques are still to be determined (innovation, imitation).

THE STONE VESSELS OF SHILLOUROKAMBOS AND PRE-POTTERY NEOLITHIC STONE VESSEL PRODUCTION IN CYPRUS AND THE NEAR EAST

To conclude, we examined the characteristics of the Shillourokambos stone vessels within the PPN context of Cyprus and, as far as possible, with that of the Near East; with the aim of outlining the main stages of stone vessel craft development, preserved on the island up to the

5th millennium cal. BC. The issue of the emergence and development of this craft accords with the gradual but crucial social and economic changes that took place during the PPNA in the Near East. The stone vessels, although only known in small numbers from the end of the Upper Palaeolithic (Wright, 1992; Rosenberg, 2008; Valla, 2009), did indeed develop and diversify during the PPNA.(4) "This phenomenon of producing dishes (…) appears at the same time as the establishment of permanently settled villages characterised by architecture, public structures and generally, a greater degree of sedentary life with growing dependence on cultivated plants" (Rosenberg, 2008, p. 27). The main shapes of the PPNA vessels were not deep (i.e. hemispherical bowls and platters); however, according to D. Rosenberg (2008), it was the low capacity of these vessels which related to a new way of serving, presenting and consuming foodstuffs, "accompanied by the formation of the family's 'private' domain" (Rosenberg, 2008, p. 28). D. Rosenberg also noted that the permanent or semi-permanent PPNA settlements on the continent (e.g. Ain Darat, Jericho, Netiv Hagdud, Gilgal I) yielded few vessels "between one and several (usually not more than ten)" (Rosenberg, 2008, p. 27). The PPNA settlements in Cyprus (i.e. Late PPNA, Klimonas and Asprokremmos) also yielded some stone vessel remains. At the Asprokremmos site (McCartney, this volume), three complete vases made from chalky limestone were discovered. They were discarded in situ and their shape was unsophisticated: hemispherical profile, circular or quadrangular aperture; on one of these vases two simple notches were made for the pouring of liquids. The discovery in one of these vases of ochre remains is more noteworthy, as it testifies to the use of these stone vessels for the processing of non-food items. The Klimonas 2015 excavation, although it identified approximately twenty buildings, did not yield more than a hundred stone vessel fragments: exclusively limestone and primarily hemispherical bowls (oral communication F. Briois and J.-D. Vigne).

During Cyprus' Early PPNB, from 8500 cal. BC, stone vessels became more abundant (i.e. almost 150 vases were recovered from Shillourokambos' Early phase, and at least seventy vases were discovered from wells 133 and 116 at the Mylouthkia site). The volume capacities of these containers slightly increased between the PPNA and the PPNB, suggesting the mastery of more sophisticated techniques and a change in requirements. From the Early phase of Shillourokambos, the morpho-functional ranges displayed huge variety although the profiles are simple (e.g. bowls with hemispherical profiles, large, flat bottomed bowls and flared walls, platters). In addition, the finishing of the interior and exterior is generally quite sophisticated, and reinforces the idea that these vessels were used for the presentation and consumption of foodstuffs rather than for food preparation. Lastly, it should be mentioned that stone vessels were probably used alongside other types of containers which are rarely preserved: baskets coated with bitumen, plaster, or lime; and wooden containers (Picon and Le Mière, 1998).

With regards the Near Eastern context, only rare assemblages have been published in their entirety and it is therefore difficult to determine whether we are dealing with the same type of practices. Although frequent and continuous exchange with the continent is attested to during the entire occupation of Shillourokambos, as shown by raw materials (e.g. obsidian) and faunal remains (Vigne and Cucchi, 2005; Briois, 2011; Gratuze and Boucetta, 2011; Vigne, 2014), this is not the case for stone vessels, which do not appear to be part of the interaction networks between the continent and the island (e.g. Anatolian ware is completely absent).

At the Shillourokambos site, it appears that the only small rupture took place between the Middle and Late Levantine PPNB (Middle-Late phase of Shillourokambos, around 7500 cal. BC), with a slight increase in production and more investment in the finishing of the vases (i.e. finely outsplayed rims, thinned walls and more standardised thicknesses, handle elements, and systems for the pouring of liquids). During this period, more substantial village settlements were created, accompanied by specialisation in ovicaprid breeding, and caprine dairy production (Guilaine et al., 2011b; Vigne et al., 2011b).

At the Bouqras site, dated to the end of the PPNB (Roodenberg, 1988), thin-walled vessels with a segmented profile, footed vases, and zoomorphic decoration were identified. These illustrate the high skill level of the craftsmen and perhaps the emergence of a drilling system.

In Cyprus, the Khirokitia culture succeeded the Late PPNB, and the stone vessels recovered from this eponymous site show increased sophistication in their shape and decoration. From the earliest excavations carried out by Diakaios, diabase vessels with relief or incised decoration were considered as being the marker of the 'Khirokitia culture'. However, L. Astruc et al. (2008) noted that these finely decorated stone vessels, which highlight renewed skill and expertise, represented only between 1.8% and 2% of the assemblage. These rocks exhibit particular mechanical properties and may have been sought out for their esthetical potential. Might this have conferred a renewed status for the stone vessels? It seems likely, as these forms are exclusively found in funerary contexts (Le Brun, 1994) or in relation to the rituals of abandoned buildings (Le Brun, 2004). It is interesting to note that the initial sequence at Khirokitia is marked by the predominance of limestone, but that this trend was reversed in favour of igneous rocks for the following occupation phases. This evolutionary trend differs from the one observed at Shillourokambos where igneous rocks predominated during the Early phases, although invariably in a minority compared to limestone.

At Cap Andreas-Kastros two vessel classes coexisted: fine stone vessels (mainly made of andesite) and coarse stone vessels. The fine andesite vessels were "particularly remarkable with regard to the mastery of the manufacturing and the polishing technique" (Le Brun, 1981, p. 75), and may have represented a highly valued craft which the island settlers desired to perpetuate during the entire

PPN sequence. As part of their everyday domestic life, these stone vessels may have become more valuable to the Late Neolithic Khirokitian culture, eventually becoming an identity marker for these islanders who refused to acquire pottery technology for a further two millennia. Could this have been because of the decreased contact between Cyprus and the continent? Or because the inhabitants of Cyprus did not realise the benefits and potential advantages of pottery?

Acknolegdments: In particular, I would like to thank J. Guilaine, F. Briois and J.-D. Vigne for discussing the Shillourokambos and Klimonas sites with me. I would also like to thank L. Astruc, I. Carrère, C. Hamon, C. McCartney, and T. Perrin for their input on stone vessel manufacturing. The archaeological work at Shillourokambos has been granted by the French ministère des Affaires étrangères et du Développement international (mission 'Neolithisation') and the French School at Athens, with the support of the Department of Antiquity of the Cyprus Republic.

NOTES

(1) In the Levant, several specific tools are thought to have been used for the manufacturing of stone vessels (Aurenche and Kozłowski, 1999): strangled blades, Çayönü tools; these are, however, unknown at the Shillourokambos site.

(2) At the Ais Giorkis site, dated to 7600-7500 cal. BC, analysis carried out on the residues from the stone vessels made it possible to identify "…pollen, starch, and phytoliths. These support the use of cereals and indicate that wild resources, including mustard, were also exploited. The latter could represent condiment or medicinal resources" (Simmons, 2012, p. 96).

(3) This class of mortars cannot be compared to the Natufian vases sometimes labelled 'mortars' or more frequently 'stone-pipes' (Valla, 2009).

(4) During the Natufian period, the so-called 'stone containers' corresponded to the arrangement of in situ limestone rocks, or to immovable dug 'stone-pipe' mortars (Valla, 2009).

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