AMPHORA PRODUCTION ON CYPRUS DURING THE LATE ROMAN PERIOD

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ΠΕΡΙΛΗΨΗ: Μέχρι σήμερα στην Κύπρο έχουν εντοπιστεί τρία εργαστήρια κατασκευής αμφορέων – στην Πάφο (Π), στην Αμαθούντα (ΑΜ) και στο Ζύγι (Ζ). Πιθανολογείται, επίσης, με βάση τη μακροσκοπική και την εργαστηριακή εξέταση του πηλού, η ύπαρξη άλλων δύο («εργαστήρια» Χ και ΖΑ). Στα εργαστήρια αυτά κατασκευάζονταν αμφορείς του τύπου LR1 ως κύριο προϊόν και σε τρία από αυτά επισημάνθηκε η κατασκευή αμφορέων τύπου LR13 ως δευτερεύουσα (μικρής κλίμακας) παραγωγή.

Οι αμφορείς LR1 χωρίστηκαν σε τέσσερις βασικούς τύπους, Τ.1, Τ.2, Τ.3, Τ.4(i), (ii), (iii), (iv). Ο περιορισμένος αριθμός των αμφορέων LR13 δεν επέτρεψε την κατάταξή τους σε τύπους με ασφαλή κριτήρια.

Από τα πέντε συνολικά εργαστήρια που παρουσιάζονται στο άρθρο, το πρωιμότερο είναι το «εργαστήριο» Χ, το οποίο άρχισε να λειτουργεί πιθανότατα στις αρχές του 6ου αιώνα μ.Χ. Τα υπόλοιπα τέσσερα εργαστήρια (Π, ΑΜ, Ζ, ΖΑ) χρονολογούνται από τα τέλη του 6ου και κυρίως στο α' μισό του 7ου αιώνα.

Τα κύρια ζητήματα που προκύπτουν από την έρευνα του θέματος, και τα οποία παραμένουν ανοικτά είναι:

1) Το περιεχόμενο των αμφορέων.

2) Η διασπορά τους.

3) Η αιτία της ταυτόχρονης κατασκευής τους στα κυπριακά εργαστήρια, με δεδομένη την αιγαιακή προέλευση των σφαιρικού σχήματος LR13.

The first time that the amphora production on Cyprus, during the Late Roman period, was suspected, was in 1976, when Mabel Lang identified the Cypriot modius written on the shoulder of LR1 amphorae[1], found in the Athenian Agora (Lang 1976: 58). In 1980, David Williams gave another indication towards the Cypriot origin of the LR1s; according to the petrographic analysis that he conducted on amphorae found in Carthage (Berenice) and Wales (Williams 1982: 102-103), their possible production centers should be sought along the south-west coast of Asia Minor, in Northern Syria, Euboea, Lesvos or Cyprus. The survey, that Empereur and Picon made along the south-west coast of Asia Minor, Northern Syria and Cyprus in 1989 (Empereur, Picon 1989: 236-243) confirmed the above textual and scientific propositions; they located sixteen LR1 kiln sites, three of which on Cyprus. In one of these workshops, LR13 were also made.

Although the amphora types mentioned above are well known, it would be useful to remind the main aspects of the relevant research before the presentation of the Cypriot products in detail. The LR1 group consists of amphorae with the same basic features: cylindrical or slightly conical neck, a horizontal ridge above the simple rim, ovoid body with a spiral-like ridge or groove around, which begins at the middle of the shoulder and ends at the base. The amphorae that bear these features and have been classified under LR1 (or the equivalent typological characterization[2]) had a life of about three centuries (from the 4th to the 7th century AD) and were found almost all over the Mediterranean[3]. Some scholars have attempted to divide them into sub-groups[4], as they have noticed differences in the formation of essential parts (such as the neck, the handles, the rim or the body). In addition, it is obvious that an amphora type cannot be reproduced without changes almost for three centuries, in (at least) sixteen workshops diffused in three different areas (North Syria, Cilicia, Cyprus).

Contrary to the LR1s, the LR13 amphorae have not attracted the interest of the scholars very much so far. They belong to the family of the globular amphorae with incise or combed decoration. These amphorae are generally believed to be Aegean (Thomas 1959: 91; Radulescu 1973: 205-207; Hayes 1976: 117, 120; Riley 1979: 231; Opait 1980: 298, 320) because they are found in large quantities

1. The nomenclature adopted here is that of Riley (Riley 1979: 115-232).
2. The most widely used typological characterizations are: Bii (Thomas 1959: 92), Egloff 164-169 (Egloff 1977: 112-113), Keay LIII (Keay 1984: 268-269).
3. For distribution maps, see Riley 1979: 214; Pacetti 1995: 275.
4. Egloff 1979: 112-113 (nos. 165-169); Riley 1979: 212-216 (LR1 and LRA1a); van Alfen 1996: 192-201 (YA types 1-10).

in that area and, moreover, because kiln sites have been located in Argolid (Rudolf 1979: 301-302) and in Kos (Didioumi 1995). The earlier amphorae of that kind, known as LR2, are dated from the 4th century AD onwards (Opait 1984: 312-313) whereas in the 7th century the LR13 types dominate. Large concentrations of the latter have been found in the Yassi Ada wreck (Bass, van Doorninck 1982: 157-161; van Doorninck 1989: 247-251) and in the Eupalinos Tunnel in Samos (Hautumm 1981: 21-51).

All the above facts considered, my study was in the first stage concentrated to the Cypriot production, in order to make possible, in a second stage, the definition of the place that Cyprus possessed in the frame of the "international" trade relations of Late Roman period. In other words, the aim of this amphora study was to determine which was the size of the Cypriot export trade, what products it involved and which were its destination markets.

In order to clarify the picture of the local production, four main questions should be answered:

a) Which were the production sites (located or possible)?

b) Which were the special features of the Cypriot amphorae?

c) When do they date?

d) How can they be connected with the trade patterns of the area?

The production sites (Fig. 1)

Apart from the indications derived from epigraphy or scientific analysis, the amphora production on Cyprus was certified by excavations, too. In a well, by the ancient port of Amathus, the French mission found kiln wasters from a workshop where LR1 and LR13 amphorae were made (Empereur, Picon 1989: 242). In Paphos, the kiln complex and the wasters of a workshop, where the same amphora types were made, was excavated by the Cypriot Department of Antiquities (Karageorghis 1989: 848; Papageorghiou 1990: 95; Demesticha, Michaelides 2001). In 1996, a third kiln site was located during survey by Sturt Manning and the Maroni Valley Archaeological Survey Project, in Zygi; unfortunately, it has not been excavated yet (Manning *et al.* 2000).

During my research, I had the opportunity to study the

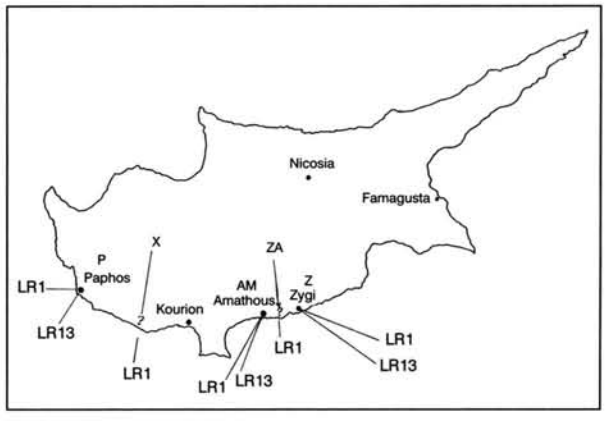

Fig. 1. Map of Cyprus with the amphora workshops and their products.

amphorae found during the systematic excavation of the kiln site in Paphos[5] as well as those, which were collected during the survey in the area of the Zygi kiln. Moreover, amphorae from the Late Roman Agoras in Amathus and Kourion, the basilica complex in Aghios Georghios (Peyia, Paphos) and the south-east Basilica in Amathus[6] were at my disposal.

Apart from the homogenous and large Paphos kiln group, the majority of the amphorae I had at my disposal derived from the Agoras of Amathous and Kourion. The identification of their provenance was made by comparing the fabric of each amphora with the samples that were collected from the production sites[7]. The fabric groups were macroscopically separated into three categories:

a) these that matched the three known Cypriot fabrics (Paphian, Amathousian and Zygian);

b) these that did not exactly match the known fabrics but were similar to them (they were considered as possible Cypriot fabrics);

c) these that were of completely different composition (they were considered as imports).

The above macroscopic separation of the groups needed the confirmation of the scientific analysis, in order to be valuable for further study. The method selected was the petrographic analysis which was conducted by Dr C. Xenophontos (Senior Geologist of the Cyprus Geological Survey). The lack of comparative material from production sites outside Cyprus[8] prevent any further use of these re-

5. I thank my Professor Dimitris Michaelides for letting me study the amphorae of the kiln and for supporting me during my research.

6. I thank Dr Dimos Christou, Dr Michalis Louloupis, Professor Charalambos Bakirtzis and Miss Eleni Prokopiou for giving me the permission to study the Late Roman amphorae found in their excavations.

7. The Paphos samples derived from the excavation, whereas the samples from Zygi were collected during the survey. The Amathousian fabric was shown to me by Dr May Touma (Member of the French Mission at Amathus). I have to thank also Dr J.Y. Empereur, who has given me the permission to see the amphorae from the well found at the port of the ancient city.

8. The results of Empereur and Picon's research have not been published yet in detail.

sults. So, it was judged that the concentration on the Cypriot material (categories a and b above) would be of more value. The samples from the three kiln sites were analysed first, whereas the samples of the possible Cypriot fabrics were checked afterwards. For the two out of the five groups that were examined in this category, the Cypriot provenance was certified[9]. The position of these potential "kilns" is still unknown. The first group presents close analogies to the Amathus and Zygi fabrics, petrographically and macroscopically. For that reason, it is placed conventionally to some place between the two sites and is given the code ZA, which means Zygi-Amathus. To the second group, the code X was given, because it was more difficult to precise its provenance. Most probably, on petrographical/geological grounds, the group X amphorae were produced to some kiln between Akrotiri peninsula and Palaipaphos. For the ZA and X groups I will use the term "workshop" to separate them from the three located kiln sites.

The amphorae

LR1 amphorae

As it has already been mentioned, the LR1s were produced in all three located production sites but they were also abundantly found in the fabric groups X and ZA. They present similar features in all but one group, which is the "workshop" X. More specifically, the amphorae of "workshop" X can be divided into three types (Fig. 2):

Type 1: The below average quality of manufacture is the general characteristic of this type. The shape of the neck often presents defects or disfigurements, whereas the rim is carelessly shaped, with tool traces that were never smoothened. The proportions of the neck are also interesting: the rim diameter is equal or bigger than the height of the neck, so the section of the neck is almost square. The handles bear a very distinctive finger-made double grooving. They have almost the shape of a right angle and very often the horizontal and the vertical parts are equal.

Type 2: The type 2 amphorae have basically the same features with Type 1 (handle section, rim formation) but the necks are more elongated and the quality of manufacture is better.

Type 3: The necks of type 3 amphorae are slightly conical with thick walls. Also, the horizontal ridge above the rim is not so protruding as at the previous two types.

The fabric groups P (Paphos), AM (Amathus), Z (Zygi) and ZA (Zygi-Amathus) do not include amphorae of the Types 1, 2 and 3. On the contrary, they comprise amphorae that present great similarity among each other. They all belong to one type, namely type 4 (Fig. 3).

Type 4: Type 4 amphorae, unlike the previous three types, are characterized by their careful construction. The neck is cylindrical or very slightly conical. The rim is rounded and the horizontal ridge above it is not sharp but well formatted, rather protruding. The angle-shape handles have always their horizontal part smaller than the vertical, apparently due to the relatively small shoulder diameter. In the case of Type 4 amphorae, intact examples were found, too, so we know their body shape. At least for the two smaller sizes, the body is pear-shaped with an important deduction of the lower body diameter. Moreover, it seems that the spiral ridge all over the main body begins from the point of the handle attachment on the shoulder and ends where the diameter is reduced, leaving an undecorated zone above the base, which is also covered with grooves.

The standard measurements for each amphora were the rim diameter (Rd), the height of the neck (Nh), the shoulder diameter and the total height (H). Out of these measurements it turned up that ancient potters paid much attention in order to keep the standard dimensions of the amphorae[10]. Due to the small number of the intact examples, the measurements were limited to the neck-shoulder area; even those were proved to follow standard sizes.

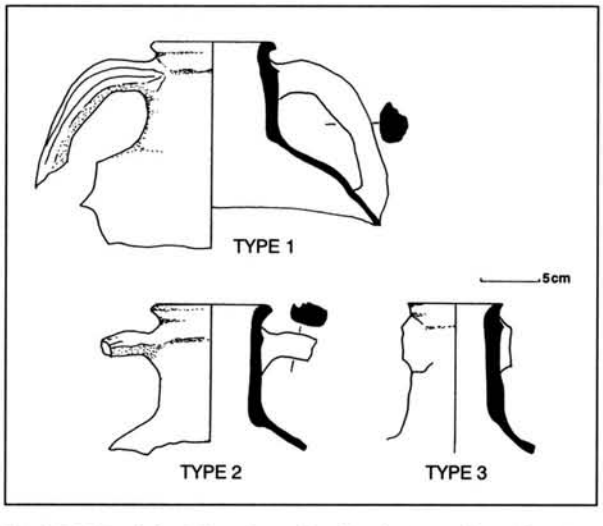

Fig. 2. LR1 "workshop" X amphorae found in the Agora of Amathus: Type 1 (AM1988/ΦΦ4/XCI), Type 2 (AM1985/PP4/B:1,5-2,5/II) and Type 3 (AM1985/PP4/B:1,5-2,5).

9. A detailed account of the petrographic description of the thin sections is included in my thesis, which will be published in the future.
10. See also van Alfen's comments on the subject (van Alfen 1996).

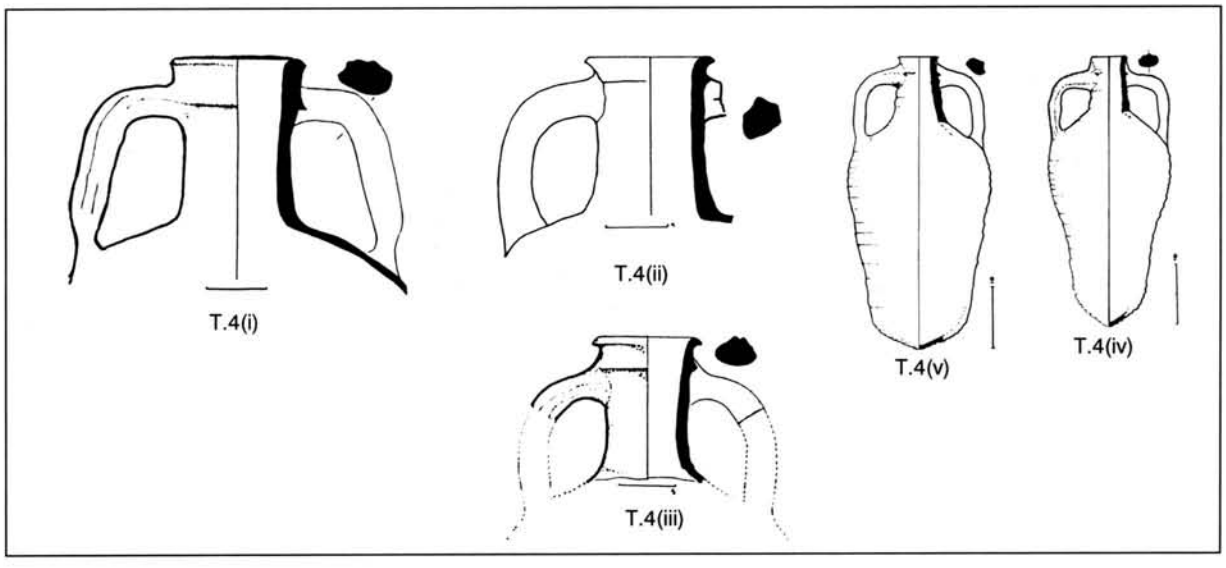

Fig. 3. LR1/ Type 4 amphorae. T.4(i): AM1985/ΣΣ3/B.2-3, T.4(ii): KA1981 (-E)(-F)(-3)-(-4) LII, T.4(iii): AM1985/PP1/B.2,5-3,5 I, T.4(iv): LM1688(ii), T.4(v): (LM1688(i).

More specifically, the type 4 amphorae are divided into 5 different sizes:

Type 4(i). In this group were classified all the type 4 amphorae with the biggest neck proportions (the Nh is 14-15.5 cm and the Rd varies between 10 and 12 cm). Unfortunately, no intact amphora with a neck of those dimensions has come to my knowledge yet.

Type 4(ii). The neck height of those amphorae is smaller than that of the previous group (Nh=10.5-12.2 cm) but the rim diameter is almost the same. I have found only one published intact amphora of this type, the total height of which was 55-60 cm (Flourentzos 1996: 24, no. 43).

Type 4(iii). Type 4 amphorae have smaller proportions than the previous groups (Rd=8.5-9.5 cm, Nh= 10.5-11.5 cm) as regards both their neck and body. Their total height is approximately 46-48 cm. This is one of the most commonly found group, especially in Paphos kiln, where from the 290 catalogued amphora necks, the 190 belong to this type.

Type 4(iv) / Type 4(v). In Type 4(iv) and (v) groups, the proportions are prominently more elongated and smaller. The dimensions of the necks differ only 1 or (maximum) 1.5 cm between the two types. Thanks to a rescue excavation in Limassol, their body size is known too: in the smaller variant [T4 (iv)], which is probably what Riley called LR1a (Riley 1979: 216), the body is pear-shaped and the diameter of the lower part is much narrower than that of the body.

Distinguishing between the Type 4 amphorae from Zygi, Amathus and ZA "workshop" is often difficult, as they belong to the same groups and their fabric, especially that from Zygi and ZA workshops, is macroscopically very similar. The Paphos kiln, however, is easier to identify. Apart from the fabric, which is very distinctive[11], it presents more, although slight, differences from the other three:

a) the first two, i.e. the biggest, varieties of type 4 – T.4(i), (ii) – were not found in the wasters of this kiln (so, apparently they were not manufactured there),

b) the handles of T.4(iii) amphorae, which were the most common in the site, have a particular feature: they bear one or, rarely, two tool made grooves off center. The handles of the rest of type 4 groups, even those from Paphos kiln, are either undecorated or bear very shallow finger made ridges, symmetrically placed on the outface.

LR13

The LR13 amphorae were made only in the three of the five sites examined here: in Paphos, Zygi and Amathus. Naturally, as the ZA "workshop" has not been located yet, the production of the type there cannot be excluded. The LR13 amphorae are not very common finds in the Cypriot Late Roman sites. Even in the Paphos waster, their numbers were extremely low in relation with those of

11. Their fabric is coarse, with large inclusions. The Amathus fabric is yellowish to greenish whereas the Zygi fabric is reddish with more and larger black inclusions. The Paphos fabric has a more fine grain, with less and smaller inclusions, and its colour is light to reddish brown.

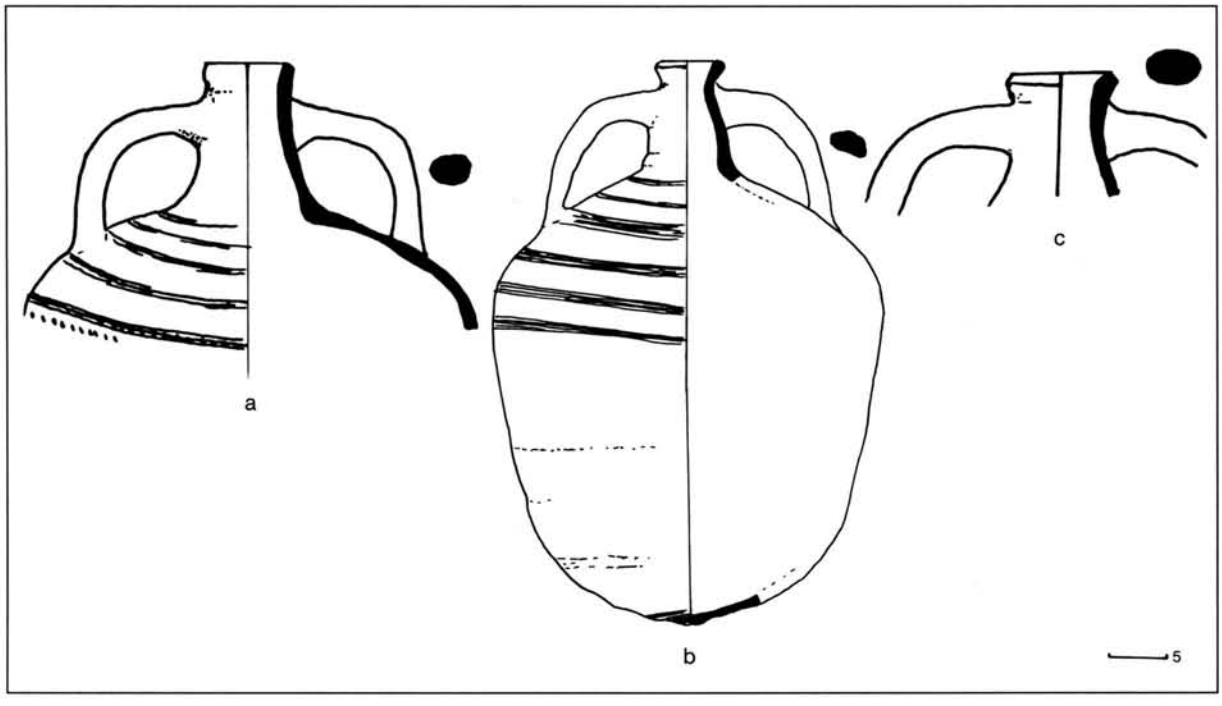

Fig. 4. Cypriot LR13 amphorae: a. Reconstruction of a Paphian LRA13; b. LRA13 from the Amathus workshop [LM1688 (iii)]; c. Part of a LRA13 from the Zygi workshop.

the LR1s (out of the 290 catalogued necks only 10 belonged to this type). For that reason it is rather premature to divide them into types, as it was done above with the LR1s; in the present stage it is better to present the products of each kiln and then attempt some comparisons.

Paphos kiln (Fig. 4a): The neck is conical and the rim slightly everted (Nh= *c.* 12 cm, Rd= *c.* 8 cm). The handles have an oval section and join the neck with the shoulder. Strips of combed decoration, which form a spiral, cover the shoulder. The only feature, that could be pointed out as characteristic of this product, is the presence of one or two bands of small oblique notches, at the lower part of the combed decoration zone, placed sometimes between the combed strips, sometimes on them and sometimes around the upper part of the main body. The total height of the amphora can be calculated at 50-55 cm, if we accept that, in this amphora type, the neck is approximately 1/4 or 1/5 of the total height.

Zygi kiln (Fig. 4c): Seven fragments and only one neck that preserved its dimensions, is what I have catalogued as LR13 amphorae from Zygi kiln. The general appearance does not seem to present any special feature: the neck is conical and the rim everted, with slightly smaller diameter than this of the Paphian examples (Nh=9.5 cm, Rd=6.4-7.5 cm). Continuous, very shallow combing covers one shoulder fragment, but maybe this is an exception but not the rule.

Amathus kiln (Fig. 4b): In the case of the Amathus kiln, apart from fragments and necks, intact examples were also at my disposal. The neck is again conical (Nh=9-12 cm) but the rim is distinctively everted, strongly separated from the neck, with an oblique outface. The rim diameter is smaller than the previous groups (7-8 cm). The handles have the typical angle shape and oval section for the type. The body shape is ovoid, having an enlargement at the upper part. The total height, of all the three intact amphorae of my catalogue, is 49 cm.

Dating

As it was already mentioned, the only properly excavated kiln is, for the moment, that of Paphos. So this is our only source of secure dating evidence, at least for the LR1/ Type 4 and the LR13 amphorae, that were made there. Unfortunately, only two datable coins were found[12]:

12. The coins were dated by Dr Vasso Penna, to whom I am always grateful.

the first was dated in the second half of the 6th century (most probably of Maurice (582-602). The second was worn out and we can only suggest a date of the period between Justinian I (527-565) and Tiberius (578-582). All the Cypriot Red Slip Ware fragments belong to the type Hayes 9b and c (Hayes 1972: 379-382), which are also dated to the end of the 6th and to the 7th century. So, the Paphos kiln cannot have started functioning before the third quarter of the 6th century AD. For the end of its function there is not any secure evidence. Conventionally we assume that the production continued until the Arab invasions of the middle of the 7th century, keeping in mind that after that date, at least the LR1 amphorae began to disappear in all Eastern Mediterranean Late Roman sites. Still, we cannot exclude the possibility that the kiln stopped functioning before or after that date, for reasons not related to the invasions.

The dating of the rest of the production sites was based on the identified amphorae found in stratified levels of various sites, except from the diagnostic surface sherds which are collected from the Zygi kiln area, during the first survey. The exact chronological limits of the kiln function of these three production centers cannot be precised for the moment.

Nevertheless, it came out that the Amathus, the Zygi and the ZA amphorae, namely the amphorae of the three sites of the south slopes of Troodos mountain, were uniform, not only as regards to their type but also to their date: they were all found in 7th century layers of Cypriot sites – e.g. in the two basilicas in Amathus (the Metropolitan, excavated by the Department of Antiquities of Cyprus, and the one in Acropolis, excavated by the French Mission), the Basilica in Maroni-Petrera[13], in Alassa-Aghia Mavri (Flourentzos 1996: 24) and in Kalavassos-Kopetra (Rautman 1995: 336). Published examples of similar amphorae outside Cyprus are also dated in the same period (Cancova 1959: fig. 1.8; Bottger 1992: 373; Papadopoulos 1989: 100; Fulford, Peacock 1984: 119; Tubb 1986: 63).

The "workshop" X presented the greatest difficulty in dating. The largest number of its amphorae was found at the ancient Agora of Amathus, where, unfortunately, the stratigraphy was highly disturbed. However, I suppose that this workshop began functioning earlier than the rest. This cannot be proved, because the kiln itself has not been located yet, but there are some indications, which drive to this conclusion:

1. The "workshop" X/ Type 1 LR1 amphorae were absent from the 7th-century layers of the Cypriot sites that I mentioned earlier. Of the same fabric group, only Type 2 and mainly Type 3 amphorae were found, but in small numbers.

2. No LR13 was located among the catalogued amphorae of fabric group X.

3. Similar to the Type 1 published examples from sites outside Cyprus, like Carthage and Negev in Israel (see previous note).

Before going on, I will summarize the above:

On Cyprus there were five amphora production sites, the main function period of which is dated from the 6th century AD onwards. More specifically, in "workshop" X the production seems to have begun at the beginning of the 6th century with LR1/Type1 and continued with Types 2 and 3, in the 7th century. In the meantime, at the end of the 6th century in Paphos, and slightly later in three sites between Amathus and Zygi, the production of LR1-Type 4 amphorae began. This production continued well into the 7th century, alongside with a secondary amphora production, namely that of LR13.

The globular amphorae of the Cypriot production centers have similar appearance with minimal differences in proportions. The only morphological criteria for their attribution to the different groups is the zone of the oblique notches on the shoulder of the Paphian ones and the everted, well formatted rim of the Amathusian group. Morphologically, among the LR1s, only "workshop" X can be easily identified from the rest into critical parts as the neck-shoulder joint in the inner side and the handle section of the proportions. The rest groups are homogenous, with the exception of the Paphian LR1/Type 4(iii), the handles of which have a distinctive section.

Trade patterns

In order to find the answer to the fourth question that was put in the beginning, it is important to clarify the relation between the two types that were made on the island.

The LR1 amphorae were correlated, apart from Cyprus, with the area of Northern Syria and Cilicia. Cyprus had very strong economic, administrative and geographic connections with this area. So, the Cypriot LR1s can be considered as part of the tradition in this area and their special features as a natural form evolution in the hands of each potter group. However, how can this sort of sudden appearance of LR13s be explained? They differ in size, decoration, morphology and, above all, they have different background from the LR1s.

13. I thank Miss Eleni Procopiou, Dr May Touma and Dr Sturt Manning for giving me the permission to see the amphorae from the Metropolitan Basilica, the Basilica of the Acropolis at Amathus and the Basilica at Maroni-Petrera, respectively.

Given the conservatism of pottery, we can imagine that there have to be serious reasons for the introduction of a new type of vessel among the range of products of a workshop specialized in mass production (as opposed to artistic production). In the case of Cyprus, in order to find the reasons, which led the 7th-century workshops to introduce an Aegean type of transport vessel, we must keep in mind the changes in administrative history of the island during that period. Already in the mid-6th century Cyprus lost its administrative links to Antioch and got linked to the Aegean islands, with Caria and the Danube provinces (Scythia Minor, Moesia Secunda) through the Questura Exercitus. So far, many attempts have been made to explain this reform of Justinian, but this is not the place to go through them (Stein 1949: 474-475; Mitford 1980: 137; Hill 1940: 258; Lokin 1986: 7). Besides, the introduction of globular amphorae by Cypriot workshops does not seem to be directly linked to the institutionalization of the Questura, since there was a lapse of about 40 years between each other. However, it seems that this institution gave Cyprus a new financial orientation, namely towards the Aegean Sea. Moreover, the Persian wars harmed financially the areas of Antioch and Egypt but they probably favored Cyprus. The latter, taking advantage of its position away from the main battlefields, might have attempted a dynamic penetration in the free or the state controlled trade. This is however a mere conjecture and I will not argue further on it, as long as two main questions remain still open: a) the content and b) the distribution of both types of Cypriot amphorae.

a) As far as the content is concerned, I can only make assumptions, as no scientific analysis on Cypriot material has yet been made. Scientific analysis on LR1 and LR13 amphorae from the Yassi Ada wreck has proved that they contained wine (Bass, van Doorninck 1982: 252, 327-331; van Alfen 1996: 203, 209).

b) The specification of the Cypriot LR1s among the hundreds of LR1 amphorae that have been found all over the Mediterranean will help us not only to understand the trade network of the island but also the reason of the simultaneous manufacture of the two types in the same workshops. To this point, it is important to stress the fact that only one researcher cannot resolve this problem. The detailed – and sometimes tiring – description of the amphorae, which are being catalogued in every site, is the only tool we have in order to trace the lines of their trade. Scientific analysis is very important but not as fast and low cost as a good cataloguing can be. As I have tried to show, apart from the differences in fabric, there are also morphological differences even among workshops of the same island. We can imagine that amphorae of the same type but of different provenance can bear more distinctive features. If these features are specified, it will be easier to handle the massive volume of coarse pottery in order to transform it from a trouble into an alphabet, as Petrie used to say (Petrie 1904: 16).

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