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Stissi, V.

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From Counting Pots to Counting People: Assessing the Scale of Athenian Pottery Production and Its Impact on Workshop Staff

Vladimir Stissi

Introduction

Production of Greek table wares, particularly Athenian painted pottery, is usually considered refined craft, requiring highly skilled artisans, almost artists, carefully producing their masterpieces.[1] There are some reasons to question this image, however: the amount of preserved pots is staggering, and what we can see of ancient workshops, shows more than just masters. In this paper I want to explore the scale of Athenian figured pottery production, and the way this question is connected with the scale, organization and modus operandi of workshops.

Numbers: Production and Producers

Let me begin with scale: the digital Beazley archive now contains more than 86.000 Athenian figured pots.[2] Depending on one's estimate of the survival rate,[3] these represent between 8.600.000 (at 1%) and 34.400.000 (at 0,25%) pots originally made. However, the Beazley archive is far from complete. No good estimates are available, but (starting from some exemplary cases I checked) it seems to cover about 5–15% of the known material, at least that in major collections and publications – with both the corpus and the archive growing. That would imply an original production between ca. 57.300.000 and 688.000.000, mostly produced during a period of around 250 years (discounting the earliest and latest production, which was relatively marginal). This amounts to an average yearly output of between ca. 230.000 and over 2.750.000 – surely less during the first half of the 6th century and the 4th century BC, and more during the heyday of Athenian export in the decades around 500 BC. If we discount the extremes, a yearly output of 1.000.000–2.000.000 seems a fair guesstimate, certainly for the period between 550 and 400 BC.

If we then turn to the human side: the Beazleyan corpus contains about 1.300 possible individuals or groups of individuals (e.g., hands, groups, classes and related entities).[4] Dividing 250 years in ten generations of 25 years, this would imply an average of 130 active hands or groups at any given time – again, probably fewer in the early and late years of production, and more during the heyday. However, 25-year generations may be quite long in view of life expectancy, interruptions by war service, illness and famine, and considering the rather low amount of surviving items for most hands, though perhaps not for collective categories. On the other hand, at 130 hands or groups (etc.) even the

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lowest average total output I just provided would imply an average output of about 1.770 items a year, which seems on the high side as a lower margin for painted vessels,[5] at least for individuals; the highest would lead to a surely impossible yearly production of more than 21.150 items. Also taking into consideration the conclusions of Sapirstein, who noted that the Beazleyan corpus is based on a (smaller) core of potter/painters who left us about 5 pots for each active year (so an actual production of 500–2.000), and specialized painters usually producing around 8 surviving pots (so an actual output of 800–3.200, which has, however, to be shared with potters), the inevitable conclusion must be that we are wholly or partly missing many of the makers – not even counting assisting staff, preparing clay, loading, firing and unloading kilns.

If we (arbitrarily, just for the sake of argument) assume a normal yearly output of 2.000 for each maker, 1–2 million pots would require a group of 500–1.000 makers – or rather more as potter-painters were slower and specialized painters decorated work of often 'invisible' potters. We would thus only recognize ca. 10–20% of the hands, at the very best, since the many hands that are known from just a handful of pots, or even less, must have had more lost counterparts than the relatively productive ones, which dominate the oeuvre lists. It is moreover likely that most groups and classes and other collective units comprise several individuals. Taking a different approach, if we assume (theoretically, of course) every fully productive hand would on average last 10 years, which is probably on the optimistic side, and produce 2.000 pots a year, there would be 50–100 new hands needed every year, leading to a total number of 12.500–25.000 hands employed over 250 years, 5–10% of which made it into Beazley's lists. Since, as we have mentioned, productive painters with long careers are much less likely to have escaped Beazley, we can assume that proportionally many more 'major' painters are represented in our lists, but very few of the minor hands – as we indeed seem to see in practice.

All this is not exactly a surprise if, as we can safely assume, the Beazleyan corpus only represents between 0.0125% (a 0,25% survival rate, with 5 % of existing material in the Beazley corpus) and 0.066% (1% survival with 15% in the corpus) of the original output, or something in that order of magnitude. This brings us to some core problems. In order to convert quantitative data based on attributions to a social reality, it is important to evaluate whether such a miniscule proportion is still somehow representative. We also need to contextualize our data in two ways: first, the numbers have to be meaningful and the workshop setting has to be realistic. In other words, we need to place hands, groups and other related entities in a credible working environment: a workshop organization with a certain division of labor, producing at a certain scale, in the spatial and technological context known to us from other types of evidence.

In order to do so, we have three or perhaps four main sources of information: excavations, depictions, and the workshop output – these vases we have counted, catalogued and classified in large numbers and great detail. In addition, ethnographic research can help us understand the archaeological record. For the Athenian vase industry, however, where the high quality in shaping and painting was crucial, very few ethnographic parallels are available.

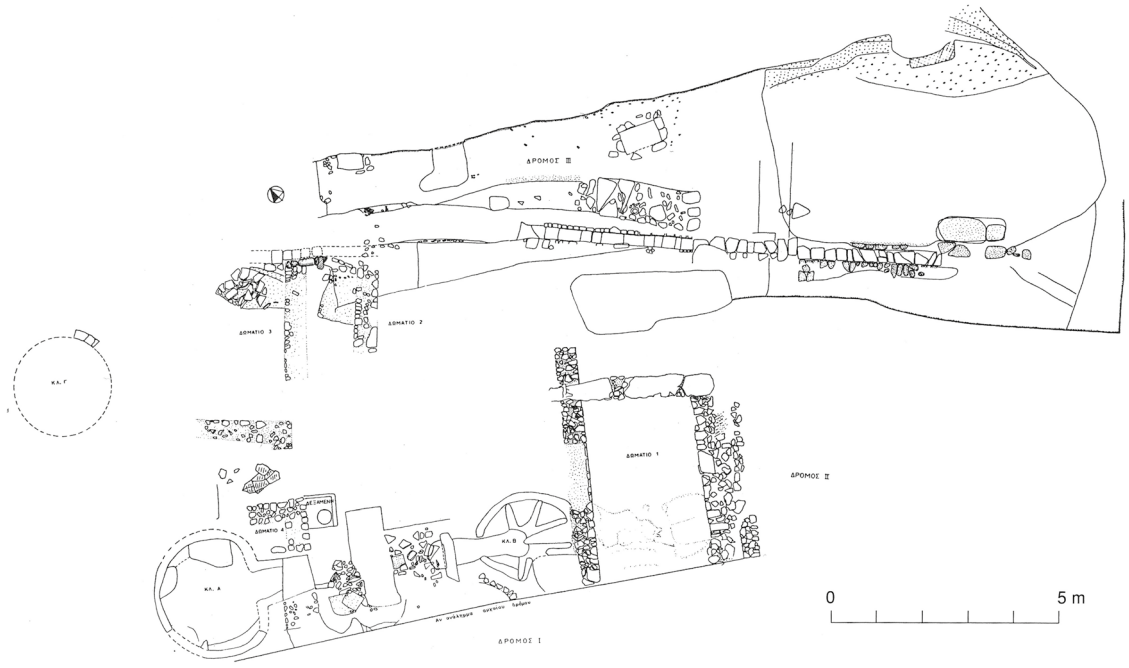

Fig. 1: The Classical pottery workshop excavated at Lenormant/Konstantinoupoleos Street, Athens: site plan.

From Numbers to the Social Reality of Workshops: Excavated Remains

Excavated pottery workshops offer the most direct way to study potters' workplaces. Remains of at least seven Athenian workshops producing black- and red figure pottery have been unearthed, plus a few sites with workshop wasters. In addition, architectural remains and dumps point to ten more Athenian workshops from the Archaic and Classical periods, which were producing other types of ceramics. The total number of Archaic and Classical workshops known from the entire Greek world is over 250.[6] Even though most workshop sites in Athens and elsewhere are poorly preserved and the state of publication also leaves much to desire, the available data offer a good impression of the scale and organization of work in workshops all over the Greek world.

One insight which may come unexpected is that all known Athenian workshops are quite a bit smaller than some very large workshops mostly producing undecorated ceramics in places like Selinous (see Bentz in this volume) and Corfu, which are not known as major pottery producers.[7] This may perhaps imply that on the level of the single workshop, the scale of production of plain pottery was higher than that of the labor intensive and more exclusive production of decorated fine wares. On the other hand, the single excavated Athenian workshop of black and red figure where kilns remained shows two rather large kilns, with a diameter of over 2 meters, operating at the same time (fig. 1).[8]

Fig. 2: Depiction of a potter's workshop. Hydria, Munich, Staatliche Antikensammlungen and Glyptothek 1717. Ca. 520–510 BC; Leagros Group.

Finally, the extensive series of production sites uncovered during rescue excavations in the Kerameikos cemetery near the Dipylon Gate and as far as the 'Plato's Academy', about 2 kilometers from the city walls, is indeed impressive, but perhaps not surprising when compared to similar extension of the relatively minor kerameikoi at Selinous or Lokroi Epizephyrii. Despite their large numbers, the excavated remains reveal little information regarding the organization of work and the scale of the output of individual Athenian workshops producing figured pottery. Moreover, the scale and organization of production as a whole, though probably quite large, remains hard to assess.[9]

From Numbers to the Social Reality of Workshops: Ancient Depictions

Even though Corinthian and Athenian painters (and a single Boeotian one) have left us images of potters in their working spaces, these depictions offer surprisingly limited useful information regarding scale of production of decorated pottery. Obviously, these depictions do not offer information beyond single workshops. Yet, more than a hundred scenes on votive plaques found at Penteskouphia near Corinth and ca. 16 scenes on Athenian plaques and pots represent a wide spectrum of the production cycle in detail, from digging out clay to firing and possibly selling pots.[10] Such evidence provides valuable insight into the technologies and the scale and organization of the production within workshops. Representativity is an issue however, since the votive purpose of the plaques and many of the pots involved is likely to have affected what these images show or leave out, and the generally small scale of visible operations may be partly related to the limitations posed by the medium used and the available drawing space. Much of what is shown regarding the organization of

work and the hierarchies within workshops is therefore either ambiguous or rather self-evident. It is no surprise that one sees older supervisors and boys working as wheel-turners (fig. 2). In the scenes of painters at work, one can detect a possibility of labor division by seniority, but nothing more. And processes like serial work on parts of the decoration can hardly be visualized – and were not. At most, one could suppose that workshops which had hierarchical teams of two or three people firing kilns and turning the wheel, might also have had similar (or the same) combinations of experienced artisans and apprentices during the painting process.

From Numbers to the Social Reality of Workshops: Starting from Style and Attributions

This then brings me back to Beazley. As illustrated elsewhere in this volume, but also in several books and articles published over the last decades, there are various ways of using framework of stylistic attributions to reconstruct workshop organization. My own aproach is based on a series of monographs on 6th century BC mainly pre-525 BC Attic Black Figure makers, produced in Amsterdam, which offer the following list of hands and their outputs:

Tyrrhenian Group (Kluiver 1997)	8 hands	260 items
Komast cups (Brijder 1983; see also 1991; 2000)	10 hands	ca. 250 items
Siana cups (Brijder 1983; 1991; 2000; Stissi 2009)	ca. 40 hands	1.077 items
Little Master cups (Heesen 2009)	ca. 35 hands	ca. 5.400 items
Nikosthenes (Tosto 1999)	37 hands	ca. 200 items

Even excluding very minor hands, in all these studies many more stylistical units appear than in the Beazleyan corpus they started from, but a large number of them is represented by small numbers of pots. Nevertheless, if one spreads the 130 hands over 5 year blocks starting from dated vessels, there are over 25 hands per year for 565–540 BC, with a peak of 48. As these 48 hands produced a small proportion of the total Athenian output at the time, this again indicates the Beazleyan corpus is missing many artisans.

Zooming in, shapes like Siana cups and Little Master cups appear to have been made by groups of painters spread over (and possibly sometimes moving between) several workshops[11], but the Nikosthenic output seems to be connected to a single workshop, employing between 5 and 8 recognizable hands. The Tyrrhenian Group also looks like a closely connected unit of 4–7 painters, who were probably also doing some of the potting. These results can be repeated by considering other monographs on black or red figure painters. One example is the Shuvalov Painter's workshop which employed some 35 hands between ca. 460 BC and the early 4th century BC, of whom at least 4 were active in any 5-year period, with peaks of over 10 hands around 440–430 BC.[12]

Interestingly, most of these 'hands' come and go fairly quickly while long lasting, truly productive artisans, who constitute the core of the traditional Beazleyan framework, are

remarkably rare. Of the 130 Black Figure hands mentioned above, 21 have left us more than 30 surviving pots, and 6[13] of those more than 100. The Shuvalov Painter arrives at about 150 items, but nobody else in the workshop surpasses 20, although a few of the employees have a substantial output elsewhere. In Beazley's original corpus, the proportions of more productive painters are somewhat higher (for about 10% of hands there are over 100 attributed pots, for about 20% more than 30, but for around 60% less than 10). It is therefore clear more intensive recent study has added relatively many 'minor hands'.

While we should probably assume that many small stylistic groups can be merged with others, and some are phantoms, there must be more to this phenomenon. There are certainly some painters moving between workshops, or starting their own workshop after working elsewhere – the Shuvalov workshop offers several cases. These, however, are a minority. Apparently, only a small proportion of potters and painters were regularly active for a long period, while most others either did not work long enough to be recognized by us, or perhaps combined potting and/or painting with other activities. Precisely these minor hands, which appear to form more than 80% of the stylistic units visible to us now, deserve some focused scholarly attention.

The fact that many can be connected to just a few items, often a single vessel, and that even the more visible minor hands usually seem to have been active for a short period only, needs explanation. Low survival rates play a role, in two significant ways: at 0.25%, every surviving vessel of an assistant (also doing other tasks) painting 50 vessels a year would represent 8 years of work. The mortality rate in the pre-modern world must also have affected the average total output of artisans: careers of twenty or thirty years as master, leading to a now well visible output, can perhaps be expected to have been exceptional.

Even those masters who died early in their careers should be visible to some extent during their training and formative years, and not appear suddenly as well-defined hands. The same could apply to many minor hands in the workshop staff who were not regularly engaged in painting. These craftsmen would have required an apprenticeship in painting.[14] Furthermore, one would expect some of them popping up at several moments over longer periods, which is not what we see – or perhaps goes unnoticed due to our way of seeing. Similar issues would arrise if one assumes that workshop staff moved around quickly, perhaps due to other occupations: this again would fit minor hands appearing several times during their working years, and not through single concentrated groups of vessels – unless the general staff turnover rate was high, but in that case training and formation are once more problematic. A final explanation may be found in migration, which could mean that a portion of the minor hands represent staff coming in from elsewhere and/or leaving to workshops in new areas. At least some of these, however, should be visible in their other workplaces as well as the migrant vase-painters we are occasionally able to trace.

Conclusions: Sketching 'Real' Workshops

Perhaps the high output combined with our small corpus are indeed so problematic that we have to stick to broad outlines: a major issue regarding all the hypothetical possibilities mentioned above is that they do not seem to fit any realistic model of workshop organization and operation – a model which should not only include a technical and practical labor division, but also take into account the social organization of work and workshop hierarchies. While it seems clear that the backbone of Athenian decorated pottery production, and the cores of actual workshops, were formed by a relatively small number of very active 'masters' (painters, potter-painters or potters), it is still difficult to envisage how the complete workforce was organized and placed in and around their workshops. While there must have been a flexible, dynamic and to us poorly visible group of minor hands around the core of masters, it is not easy to estimate how many minor hands existed, what their tasks were, and how they were connected to and moved through workshops.[15] A few well-studied workshops or groups of workshops, like those of the Shuvalov Painter, the Penthesileia Group or the painters of Siana cups, moreover, show a level of complexity and interaction between artisans that does not seem to fit a traditional master-centered model very well. Indeed, even some simpler looking groups, like the Tyrrhenian workshop with its handful of apparent 'masters' who seem to operate closely together but with no clear hierarchy, deviate from such a traditional organisational perspective.

In view of these, but also of the scale of production as estimated above, I would suggest that there was more labor division and specialization and a larger floating body of short term and/or part time staff than scholars often have thought. At the same time, since many 'minor hands' exhibit high levels of quality in painting and potting, barely distinguishable from what 'masters' achieved, we may need to consider that the basic skills required to be a fully qualified potter or painter were easier to develop than we have assumed.

It may be noted here that some of the criticism offered to my earlier workforce estimates by Sapirstein seems to conflate my lines of argumentation: first, the use of biographic studies: as it is evident also in this paper, I have used recent monographs to show that there are many more 'hands' than Beazley once recognized. However, I never stated that *all* these 'hands' correspond to *full-time* craftspeople – rather the opposite, as my point is that we should envisage a flexible workforce, and various kinds of employment; second, my estimation of the pottery workforce: as should be clear from my previous calculations[16] and the argumentation in this paper I do not think that the increased number of 'hands' (or known 'hands' with an increased recorded output) can all simply be added up to estimate the total size of the pottery workforce. Some hands should definitely be included and it is odd that many hands, such as the KX Painter or the Castellani Painter, which fulfill the quantitative criteria for inclusion in Sapirstein's model, are excluded. For others, however, we have to

look for alternative approaches, as I think we do need to account for the output of these 'minor' artisans and cannot simply remove them either from an economic model or from historical reality; it is untenable that all these minor hands *together* were marginal, as Sapirstein argues.

To support this, I argue that not only the total group of producers but also our corpus of existing decorated pottery is considerably larger than that estimated by Sapirstein. The numbers I offer for the corpus are extrapolations from the total of items listed by the Beazley Archive Pottery Database (BAPD) which I based on a series of case studies of groups of material, including a corpus of about 30.000 published Athenian figured pots and fragments from regular excavations, few of which are included in the BAPD, that I have used in my dissertation.[17] If one finds extrapolations too risky, an alternative would be to start from a minimum number of published material, which I estimate at (far) above 200.000 items. Overall estimates can always be a matter of debate, but Sapirstein's model, based on 38.830 items, fails to address even this lowest possible estimate, which seems a clear bottom figure.

What we need is an integrated approach, combining data and avoiding uncertain individual detail. I provide two examples: the 5.400 Little Master cups listed above (based on Heesen 2009, a mere selection of the corpus) were produced in about 40 years (ca. 565–525 BC), so at a rate of 135 surviving vessels a year. Using Sapirstein's regular output figure for potter-painters, 27 full-time artisans would be needed to produce these pots. Of course, many (but not all!) Little Master cups are relatively small and simply decorated, so possibly a much higher output rate should be used in a workforce size reconstruction. Even so, it is difficult to reduce the total number of the makers of Little Master cups to a number (2, 3, even 5?) which, given the relative role of these cups in the total Athenian production of the period, would fit the 18–34 that form Sapirstein's total estimates for the size of the Athenian pottery workforce between 575 and 525 BC. In addition, the existing 2.700 Siana cups (pers. comm. H. Brijder, soon to be published) produced in an overlapping 50-year span (ca. 580–530 BC), would add 54 elaborate vessels to the yearly output of 135 Little Master cups just mentioned. The Siana cups alone then would have required 5–10 artisans, according to Sapirstein's model. Additional cases are easy to find, but I think the basic point is clear: the numbers of artisans suggested by Sapirstein are far too low to have produced the output as documented by published items.

If the number of skilled potters and painters potentially available was much higher than the masters we readily recognize, there must have been a large number of minor hands backstage, either doing generic work in the pottery or (un)employed outside, and only occasionally coming into the light – as we perceive the ancient reality. Some of these hands may have been young apprentices who never advanced further, dying early or moving to other occupations, others skilled hands on the background, others again potential masters who never managed to establish

themselves properly or had to give up soon. Undeniably, it is difficult to know what exactly happened in each case. I would argue, however, that the availability of a large group of skilled craftspeople outside a core group of workshops and artisans would have kept the social and economic balance tense and could have been a major factor in the functioning of workshops, possibly stimulating high production figures and perhaps even keeping costs low.

This brings me to a final point. Our ideas or hypotheses about the organization of workshops are at least partly grounded in assumptions, which are also a foundation of our approach to attribution. Starting from the preserved images and ethnographic examples, it is generally assumed that workshops had a core of few potters and/or painters, usually even just one of each or a single potter-painter, surrounded by some assistants, who could well be family members (as also suggested by signatures). A similar image, partly based on a somewhat romantic view on early modern artists' workshops, is also the starting point of the attribution framework, centering on masters who have groups around them and train pupils. I am not quite sure this cosy image fits what I have sketched above: both the very large output and the dynamic body of invisible or partly visible minor hands suggest a much less romantic Kerameikos than we may like to recognize, with a large body of 'flex workers', and rather unstable workshop teams, producing large numbers of vessels.

Notes

[1] I want to thank E. Hasaki and M. Bentz for inviting me at this session, and particularly D. Cline for reading my paper when I could not attend, at the last minute. I should also note here that parts of this paper are based on Stissi 2016, which explores related issues, with a stronger focus on artisanal organization and less attention to quantities of production.

[2] <www.beazley.ox.ac.uk/xdb/ASP/default.asp> (09.4.2020). As Philip Sapirstein (this volume) rightly remarks, in earlier work I have been wrong to assume that non-"Athenian figured" material in the Beazley archive is negligible – it forms more than quarter of the entries. This difference does not significantly affect my argumentation. The number I now give is that of the entries for Athenian black and red figure in the database; this includes items which may not be considered as "figured" by some, but also excludes some potentially relevant material entered under different headings.

[3] See Bentz 1998, 17 f. n. 62; Stissi 2002, 24–31; Sapirstein 2013b, 9, all with references to earlier literature.

[4] According to Sapirstein 2013a, 506 f.; Table 1.

[5] See Sapirstein 2013a, 507; 2013b, 9.

[6] For overviews and lists of finds see Hasaki 2002, Stissi 2002, 35–73 and Appendix I; 2012; see also, for Athens, Baziotopoulou-Valavani 1994; Monaco 2000.

[7] For the workshop in Corfu (city) see Preka-Alexandri 1992; Kourkoumélis – Démesticha 1997; for the recent finds at Selinous Bentz et al. 2013, and this volume.

[8] Zachariadou et al. 1985.
[9] Stissi 2012 is an attempt. Hasaki 2011 offers an interesting different approach, bringing together ethnographic and archaeological data.
[10] A good recent overview with references can be found in Williams 2009; see also Stissi 2002, 75–95.
[11] This phenomenon is very nicely explored in the article by Hasaki and Cline in this volume.
[12] Lezzi-Hafter 1976.
[13] The C Painter, the Heidelberg Painter, the Taras Painter, Tleson/the Tleson Painter, the Centaur Painter and Nikosthenes.
[14] For an excellent overview of apprenticeship in ancient crafts, offering many insights relevant to the discussion here, see Hasaki 2013.
[15] The project started by Hasaki and Cline to map connections between makers in a network is a promising start, but is limited by its (understandable) rooting in Beazley's work, which misses many more recently defined makers.
[16] Stissi 2016, 50–51.
[17] See Stissi 2002, 24–27, Tables III.3.a-b-c.

Image Credits

Fig. 1: Based on Baziotopoulou-Valavani 1994, 48, fig. 2, with some modifications. – Fig. 2: from I.S. Mark, The Lure of Philosophy: Craft and Higher Learning in Ancient Greece, in: W.G. Moon (ed.), Polykleitos, the Doryphoros and Tradition (London 1995) 25–51. 26 fig. 3.1.

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