TWO NUMERICAL NOTES

1. Boeotian capacity

In GRBS 22 (1981) 113-118 Karl Kilinski II and Clifford Dull publish an inscribed sherd from Haliartos in the collection of the American School of Classical Studies in Athens and request further contributions to the discussion. I find some difficulties with their interpretation which lead me to question its overall validity.

The sherd is part of the handle of a Boeotian kantharos, probably black-figured in view of the fact that the inside of the handle is reserved; it may ba added that a wholly glazed piece would probably not have been inscribed down the handle.[1] The main part of the text, ϝεκταϝακρατια[, is interpreted as Fέκτα F άκρατία['six sixths of unmixed (wine)'. The date is in the second half of the sixth century.

We may certainly grant that the first five letters form a separate word, a form of ἕκτος. The proposed interpretation of the following digamma as an isolated 'Milesian' numeral is far less probable. This numeral system is not yet attested in the archaic period in mainland Greece and indeed may not have been used there at all, by local inhabitants, before the Hellenistic period;[2] the numeral system must be distinguished from the sequential use of letters of the alphabet in lists, as for example in Lokris in the early fifth century.[3] We are admitted ill-informed as regards the numeral systems of Boeotia in the classical period and earlier; the earliest attested material comes from an inscription from Thespiai, not too far from Haliartos, where we find in the early fourth centiry the acrophonic system, with the archaic 'lunate' delta retained to signify 'ten'.[4] One would expect this system to have been used by those sufficiently literate at Haliartos whenever a numeral system was first introduced.[5]

Kilinski and Dull were led to their conclusion by the difficulty which they found in interpreting ϝακρατια[. Certainly, more than one element must

1) Graffiti on glazed kantharoi from Rhitsona are on the wall or under the foot. A black-figured kantharos from Gravisca has the dedicatory inscription of its owner, Euarchos, cut down the handle.

2) For the Ionic or 'Milesian' system see BSA 68 (1973) 186-7, PdP 30 (1975) 362 and Trademarks on Greek Vases 27. Virtually all examples of the sixth century are found on Corinthian or Attic pots but there is every reason to think that they were inscribed by Ionian traders.

3) Tod, BSA 49 (1954) 1 and specifically IG IX² 718 (Meiggs and Lewis, GHI no.20).

4) SEG XXIV 361 (Rev.Phil. 1966 70-87). For further material from Boeotia see in the latest instance Tod, BSA 37 (1936-7) 244-5.

5) To support the interpretation of digamma as an Ionic numeral here one would have to argue that it was a seemingly short-lived experiment on the part of a particularly far-travelled Haliartan.

be distinguished here, but to separate merely the digamma not only introduces the numerical problem but also the phrase 'six sixths', which I find most odd, despite their protestations that there would be little point to saying that the jar contained a whole of something. One factor that they have not considered is that if the writer was happy to use a digamma instead of heta in Fέκτα, why should he not have done the same in the article Fα? The two aspirates may have philologically different origins, but should that weigh heavy in our considerations of idiosyncratic Boeotian spelling?[6] The interpretation 'a sixth belonging to Kratia[---]' seems preferable, despite the slight awkwardness of the omission of the article with Fέκτα.[7]

Further consideration should also be given to the probable size and therefore capacity of the kantharos. It may be hazardous to assess this from the preserved measurements, breadth and part of height of handle, but some comparative figures do suggest an original capacity of between a half and one litre, the range in which fall both the Attic and the more theoretical Aeginetan sixth of a chous.[8]

The comparandum illustrated in GRBS l.c. pl.2 suggests that the Haliartos kantharos had an internal bowl depth in the region of nine to ten and a lip diameter of twelve to fourteen centimetres. I have measured (to the rim) a restricted, but representative range of Boeotian kantharoi with the following results:[9]

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6) I assume that the digamma reflects some actual pronounciation rather than that the writer has confused signs for heta and digamma; tha latter is possible but begs the question of how he would have rendered a 'normal' digamma had the need arisen.

7) The owner's name is generally placed first in such inscriptions; see the survey by M.L.Lazzarini, Arch.Class. 25-26 (1973-4) 341ff. However, I find nothing improper in the sequence here - 'flagon, the one belonging to Kratia[---].'

8) Attic chous, M.Lang, Agora x 44ff. The Aeginetan capacity measure is a much less tangible thing; for a resumé see P.J.Rhodes, Num.Chron. 1975 7-8; ideally it would stand in the same ratio to Attic as does Aeginetan coinage, i.e. about 100: 70. I add some further considerations below. Note also M.F.Vos, Oudh.Med. 62 (1981) 37-8, who suggests that this was the standard used in filling some prize Panathenaic amphorae with capacity inscriptions, c. 500 B.C.; this is not the place to assess the merits of her argument, but suffice to say that it requires the use of Aeginetan measures by an Ionian writer, which is plausible in view of the widespread usage of the Aeginetan monetary unit is SW Asia Minor (our meagre information on classical Ionian measures is largely confined to Chios), and it demands the disassociation of one vase, stylistically very close to the rest, from this very unusual group of inscribed vases.

9) I am grateful to Jane Gardner and Michael Vickers for assisting me in obtaining these measures. The capacity of the University College London kantharos was ascertained by weighing on a chemical balance and is therefore very accurate; that of the rest was obtained by use of a litre measuring cylinder and so should be regarded as approximate to ± 10 cc. There should be no need to stress that these measurements do not amount to any statistically significant sample; the shape of the bowl of the Boeotian kantharos developed substantially over the period embraced by the examples. The width of the handle of the Haliartos kantharos is 2.5 cm.

	method	ht.	internal height of bowl	rim diam.	handle width	capacity	
Reading 49.xii.1	water	24.8	17.0	17.5	2.5	1282 cc	Hellenistic
Univ.Coll.London 594	water	15.6	9.2	12.8	2.3	738.5	c.500
Oxford 1936.613	rice	21.0	9.4	11.9	2.0	565	RF, later V.century
Reading 38.iv.9	water	14.5	8.0	11.5	2.1	442	c.450,CVA pl.33,7
Oxford 1967.1510	rice	13.3	8.2	10.5	1.4	395	early V.century
Reading 26.vii.15	water	13.5	7.5	10.8	1.8	340	c.450,CVA pl.33,6
Reading 22.ix.3	rice	9.0	7.3	9.5	1.9	c.280	450-25,CVA pl.33,9
Reading 38.iv.1	water	8.0	5.3	8.5	1.5	165	BF,c.500,CVA pl.33,5

Such comparanda would lead to the conclusion that the Haliartos piece had a capacity similar to that of the UCL kantharos, which is a little later than the vase illustrated in GRBS, but of no significantly different shape (the contours are less rounded and the offset between lip and bowl far more pronounced). We may with some confidence place the capacity of the Haliartos vase between 500 and 900 cc., if not between 600 and 800. It could therefore have contained the equivalent of a sixth of an Attic chous (approx. 540 cc.), but it is more likely that a larger unit was used, and the sixth of a presumed Aeginetan chous would be in the order of 760 cc. - remarkably, but probably accidentally close to the capacity of the UCL kantharos.[10] We should note that the capacity of a Euboean (or Boeotian?) glazed oenochoe in Bonn is 700 cc. and it is marked as a sixth (or to be precise, hemitriton).[11]

On the other hand, there is no known or predicted measure such that six would amount to a total within this range; six oxybapha would be markedly less. To account for 'six sixths' one would have to posit a sixth which would be the sixth part of the sixth (or perhaps fifth or quarter) of a chous, possibilities are at best special pleading, at worst totally confusing. To argue that 'the sixth was a common way of designating and reckoning this kind of commodity' is to overlook how small such a measure would be, had it existed; would any self-respecting Boeotian have used it to measure out his potations?

An additional point is that we would except such an inscription as this to be some form of indication of ownership, rather than a bald statement of capacity of a specific liquid, unmixed wine.

In sum therefore, I see no reason why Fα cannot be taken as the article in view of the comparable use of digamma in the previous word; such an interpretation overcomes the difficulties raised by the suggested Ionic numeral and by the likely capacity of the kantharos.

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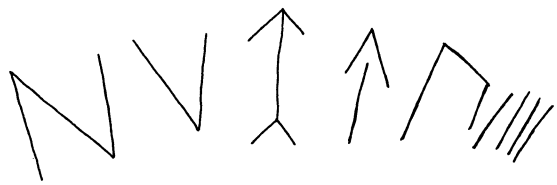
10) This piece is rather larger than the 'average' glazed short-stemmed kantharos from Rhitsona, which is 14 cm. high or less.

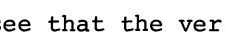
11) CVA Bonn 1 47, Kilinski and Dull n.7. To round off the picture one should add the inscribed black-glazed mug from Kythera in the British Museum, J.N.Coldstream and G.L.Huxley, Kythera 271, 5; it is marked hemikotylion and has a capacity to the neck of 245 cc., far in excess of any theoretical Aeginetan half-kotyle (200 cc. at the outside).

2. A new sign for one hundred

I have isolated a 'primitive' numeral system in Trademarks on Greek Vases 29-30. The signs used in it are built up from a simple stroke for one; an oblique line is added at the top for five, two such lines for ten and oblique lines at top and bottom for fifty, to form a bracket-like sign. The sequence can now be further expanded through the graffito under the foot of an Attic red-figured column-krater by the Orchard painter, New York 25.78.45 (ARV² 523,6), mentioned by D. von Bothmer in AJA 85 (1981) 354 and illustrated here by a drawing kindly supplied by him.



The graffito is of a type found on one other piece by the Orchard painter and not infrequent around the middle of the fifth century:[12] NV is followed by a numeral and an explanatory note, KVLIKIA; the latter must indicate that a batch of 119 kylikia accompany the krater as their master-vase (a large batch comparable in size to the quantities of lekythides noted in Trademarks type 1F, 2 and 3). We should first note the 'Attic' lambda in kylikia, since this is the first inequivocal non-Ionian letter to accompany the enigmatic NV abbreviation, to be compared with similar non-Ionian letters with the 'sister' abbreviation ON. Secondly, the sign for one hundred,  , can be seen to be a logical progression from that for fifty,  .[13]

Now that an almost complete sequence of signs for this system is attested,  , we can see that the version of the symbol for ten which we normally find is slightly anomalous; while  is to be expected, we regularly find  – examples with the vertical joining the oblique lines are rare indeed. It would seem that the sign may have fallen under the influence of a form of delta then current, and presumably current as an acrophonic numeral, d(eka),

12) Trademarks type 9F; add this piece as 9F,3a and 4F,4a.

13) On non-Ionian letters with these graffiti see Trademarks 226. The 'doubling' of the sign for fifty (or ten) to be used as one hundred may be echoed in another numeral system where o = ten and 8 = hundred (ibid. 31 with n.18).

as well as letter.[14] In the current state of our evidence I find it difficult to assess these influences and their geographical location; we may hope for more material from which to draw more specific conclusions.

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14) For the forms of delta see Trademarks 29-30 with n.11. It will be noted that the normal acrophonic pi = five appears in the New York graffito; this is the earliest certain use yet attested of this mixture of systems (Trademarks 29, bottom), still substantially later than uncontaminated examples.