VITICULTURE AND WINE CONSUMPTION IN THE ARSINOITE NOME (*P. KÖLN* V 221)

A. NEW READINGS FOR *P. KÖLN* V 221

P. Köln V 221 is an apomoira account from the Arsinoite nome, dating to ca. 190 BC. This interesting document provides exact amounts of the total produce of vineyards and of their apomoira for a six-month period. The large amounts show that it deals with the produce and the apomoira of a large part, or even the whole, of the Arsinoite nome (see section C below). The account records more specifically:

I. The produce of vineyards, specified in metretai.
II. The apomoira of that produce, specified in metretai.
III. The same apomoira, converted into copper drachmai.
IV. The apomoira on the produce of orchards, specified in copper drachmai.

Most of the text is too fragmentary to allow for a reconstruction of the calculations. We have concentrated on ll. 6-20, which are rather well-preserved and deal with the total for the whole area. By proposing a few textual corrections (which are printed in bold in the table on the next page and which were kindly checked on the original by K. Maresh), we can make sense of the figures.

B. THE RATE OF THE APOMOIRA ACCORDING TO *P. KÖLN* V 221 AND THE CONSEQUENCES FOR OUR KNOWLEDGE OF CLERUCHIC LAND IN THE ARSINOITES

The normal rate of vineyard-apomoira in the Arsinoite nome was 1/6 of the total yield. The lower rate of 1/10 was reserved for cleruchs[1]. The rate of 1/6 is found in *P. Köln* V 221, l. 14 in relation to a small amount:

[1] See *P. Rev. Laws*, col. 24, l. 4-13; W. CLARYSSE – K. VANDORPE, *The Ptolemaic Apomoira*, in H. MELAERTS (ed.), *Le culte du souverain dans l'Égypte ptolémaïque au IIIe siècle avant notre ère* (*Studia Hellenistica*, 34), Leuven 1998, pp. 5-42.

the total produce of some newly planted vineyards is 231 1/2 metretai, the apomoira is 1/6 or 38 1/2 1/12 metretai. The totals in ll. 6-7 and 17-18 give another rate:

– ll. 6-7: an apomoira of 37[,926 11/12] on a total of 296,969 1/2 1/12 = *12.77% or ca. 1/8.*
– ll. 17-18: an apomoira of 37,965 1/2 on a total of 297,200 1/2 1/12 = *12.78% or ca. 1/8.*

New readings of the amounts in *P. Köln* V 221 (The new readings are marked in bold.)

line	*I. Total of the produce of the vineyards, specified in metretai*	*II. The apomoira on that produce, specified in metretai*	*III. The apomoira on that produce, converted into money: 1 metretes = 400 dr.*	*IV. The apomoira on orchards, specified in money*
6-7	**[2]96,969 1/2 1/12** metr.[a]	**37,[926 5/6 1/12]** metr.[b]	x 400: 2528 tal. **2766 dr.** 4 ob.[c]	→ 2528 tal. 2766 dr. 4 ob.
9-10				(+) 64 tal. 3626 dr. [**4 ob.**] (=) 2593 tal. 393 dr. 2 ob.
14	(+) 231 1/2 metr.	(+) 38 1/2 1/12 metr.	x 400: (+) 2 tal. 3433 dr. 2 ob.	
17-18	(=) 297,200 1/2 1/12 metr. (deficit: 1/2)	(=) 37,965 1/2 metr.	x 400: (=) 2531 tal. 200 dr.	
19-20			2531 tal. 200 dr. (+) 64 tal. 3626 dr. 4 ob. (=) 2595 tal. 3826 dr. 4 ob.	

[a] We read $\overset{\kappa\theta}{\mathrm{M}}$ϛ̓ϡξθ ∠ ιβ´ (296,969 1/2 1/12) instead of $\overset{\kappa\beta}{\mathrm{M}}$ϛ̓πξε ∠ ιβ´ (226,865 1/2 1/12). The editor interpreted his reading πξε as 865, being well aware of the problem that π is 80, not 800. The sign, however, is ϡ (900) not π (80). It is true that in ll. 17 and 33 the scribe uses a different form for 900.

[b] The editor supplements 37,[810 5/6 1/12 1/72] in order to arrive at one sixth of the total 226,865 1/2 1/12 as read by him. It is clear, however, that the apomoira in this text is not always one sixth, but a figure between one sixth and one tenth (see below: B). We restore 37,[926 5/6 1/12] by dividing the money figure 2528 tal. 2766 dr. 4 ob. by 400 (see table, col. II-III).

[c] The editor reads the money price as 2528 tal. 4362 dr. 4 ob. According to K. Maresch, the faint remaining traces of this figure may well fit our proposal [Β̓]φ̣ξ̣ϛ̣ or 2766 dr. (see table, col. III). We arrive at this figure by subtracting the apomoira of the orchards 64 tal. 3626 dr. [4 ob.] — this figure is damaged in ll. 8-9, but well preserved in l. 19 — from the total 2593 tal. 393 dr. 2 ob. in l. 10 (see table, col. IV).

– see also *P. Köln* V 221 fragm. C, ll. 6-7: an apomoira of 2,563 on a total of 19,636 = *13.05% or ca. 1/8*.

About the second example the editor remarked that «der sechste Teil von 297,200 1/2 1/12 ist 49,533 1/3 1/12 1/72, (…) Wie diese Differenzen zu erklären sind, ist mir (…) unverständlich».

The solution lies in the high amounts. As said before, the apomoira account must concern a large part of the Arsinoites. It is known that there was a lot of cleruchic land in the Arsinoites and the cleruchs paid an apomoira of 1/10 instead of the normal rate of 1/6. The apomoira amounts in the Köln account are a mixture of apomoira of 1/6 and 1/10. Apparently, the average is ca. 1/8. Therefore, the total produce in *P. Köln* V 221 being 297,200 1/2 1/12, the apomoira is 37,965 1/2 or 12.78%. Consequently ca. 173,520 metretai of wine or 58.5% come from land on which the owners paid an apomoira tax of 1/10, no doubt mostly cleruchic land.

C. PLAYING WITH FIGURES

P. Köln V 221 allows us to assess for the first time the importance of wine production and consumption in the Arsinoites in the Ptolemaic period. Our starting point is l.17, where the total of the wine produce for a non-specified area is given as 297,200 1/2 1/12 metretai. For our further calculations we have rounded off this figure to 300,000 metretai. When the metretes is equated with 37 lt[2], this corresponds to a production of 111,000 hl of wine:

297,200 1/2 1/12 metretai or 111,000 hl of wine

From l.21-22 this looks like a half-year figure[3], in which case it should be multiplied by two in order to obtain the full yearly rate for the whole area:

600,000 metretai or 222,000 hl of wine

[2] 37 lt is the average of the Attic metretes of 39 lt and the Alexandrian metretes of 34.5 lt.

[3] Line 21: read εἰς (ἑξάμηνον) instead of εἰς ϛ (μῆνας).
The passage (to l. 27) deals with the expected revenues of the months Thoth to Mecheir. Line 28 continues εἰς δὲ ταῦτα ἀναφέρεται διαγεγράφθαι, «for these (taxes) it is recorded that is paid», (the editor reads: εἰς δὲ τὰ κα θ' ἕνα φέρεται διαγεγράφθαι); our reading is paralleled by *P. Tebt.* I 99, l. 26: εἰς ταύτας ἀναφέρει NN μεμ[ετρῆ(σθαι)]. Lines 29-40 contain the sums paid for the months Pachon to Thoth. These are very low and are undoubtedly overdue or provisional payments; these sums are most probably used to pay off soldiers in the Fayum, as recorded in l. 41-49.

Starting from this amount the following arguments show that *P. Köln* V 221 deals with the whole Arsinoite nome.

(1) A. French estimates the normal yield for an ancient vineyard at 100 to 150 gallons an acre[4], i.e. just over 10 hl/ha. D.W. Rathbone, however, prefers a much higher yield of 25 hl/ha for the third century AD Appianus Estate; for this «average yield appropriate to intensive, specialised vineyards» he refers to *P. Cairo Masp.* I 67104, a contract of 530 AD: the yield implied by this text is 26.75 hl/ha[5]. We have found a similar yield in *P. Tebt.* III 1062 of 207 BC[6]; this text provides the area of a vineyard (1 1/6 aroura or 3215 m^2) and the amount of the apomoira (3 7/8 metretai): this gives a yield of 26.75 hl/ ha[7].

If we start from a yield of ca. 25 hl/ha, 222,000 hl correspond to an area of 8,880 ha or 88,8 km^2. If then we estimate with Rathbone[8] the cultivated area of the Fayum in Greco-Roman times at about 1200 km^2, this is 1/14 of the Arsinoite nome, which is reasonable[9]. If our text deals with the meris of Polemon only, the total area of vineyards for the whole nome should be (at least) tripled to 266 km^2 or almost 1/4 of the cultivated area of the Fayum. This is clearly too much and therefore the figures must be for the whole nome. Conclusion: *P. Köln* V 221 deals with the Fayum as a whole.

[4] A. French, *The Growth of the Athenian Economy*, New York 1964, p. 21.

[5] D.W. Rathbone, *Economic Rationalism and Rural Society in Third-Century A.D. Egypt. The Heroninos Archive and the Appianus Estate*, Cambridge 1991, p. 247 and n. 51. Rathbone's figures are in agreement with Columella. For the uncertainty of Columella's estimate, see R. Duncan-Jones, *The Economy of the Roman Empire. Quantitative Studies*, Cambridge 1982², p. 44-48, who compares early 20th-century Italy, where the average yields are only 8 hl per ha. According to A. Tchernia, *Le vin de l'Italie romaine* (*Bibliothèque des Écoles françaises d'Athènes et de Rome*, I 261), Rome 1986, p. 359-360, a yield of 10 hl/ha is a poor to average yield, a yield of 20-30 hl/ha an average to good yield.

[6] The text dates to a year 15; as the price of the wine is 300 drachmai per metretes, year 15 must correspond to 207 BC, see W. Clarysse – E. Lanciers, in *AncSoc* 20 (1989), p. 117-132.

[7] We assume that the apomoira in this text from the Fayum is 1/6 of the yield, as the taxpayer is not a cleruch and thus not subject to the lower tax level of 1/10. Thus, to obtain the total produce of the vineyard, the apomoira of 3 7/8 metretai has to be multiplied by 6 = 23 1/4 metretes. If we calculate the metretes at 37 lt (see note 2), this gives a total produce of ca. 860 lt. Consequently the yield for 1 1/6 aroura (= 3215 m^2) is 860 lt or 26,75 hl/ ha.

[8] D.W. Rathbone, *Villages, Land and Population in Graeco-Roman Egypt*, *PCPhS* 36 (1990), p. 103-142, esp. 111.

[9] Compare the Antaeopolites in Roman times, where vineyards make up 1/20 of the total cultivated area, see J. Gascou – L. MacCoull, *Le cadastre d'Aphroditô*, *T&MByz* 10 (1987), p. 118.

(2) The above model can be checked from the consumer's point of view: 222,000 hl is enough wine to satisfy 222,000 persons each drinking an average of 100 lt of wine a year[10] (the natives probably drank more beer than wine). If this is a reasonable assumption, then this production sufficed for more than twice the population of the Arsinoite nome, which D.J. Thompson and W. Clarysse in *P. Count*[11] set at somewhat less than 100,000 people. We know the Arsinoites was an important producer of wine. *P. Köln* V 221 shows that it was an exporter.

(3) A third approach is based on *P. Petrie* III 57a (204-202 BC), where the tax farmer of the apomoira has to pay the following sums to the government:

for the topoi around Philadelpheia	9000 dr. a year
for Boubastos	3000 dr. a year

Though the text dates from the very end of the third century BC, the figures are given in silver, not copper drachmai[12]. Given a wine price of 5 dr. per metretes, 9000 dr. correspond to an apomoira of 1800 metretai, and if we count the apomoira at 1/8 (halfway between 1/6 and 1/10, see above: B), this implies a production of 14,400 metretai, i.e. 5,760 hl for the area of Philadelpheia.

If we suppose that the village covers one percent of the wine production of the Fayum[13], we come to a total production for the nome of

[10] Compare K.W. HARL, *Coinage in the Roman Economy*, Baltimore–London 1996, p. 279-280. This is modest in comparison to what Roman soldiers got: 0.5 litre a day, see C. ZUCKERMAN, *Legio V Macedonica in Egypt. CLP 199 Revisited*, *Tyche* 3 (1988), p. 280.

In estimating ancient wine consumption, we can also compare the better known figures for the Middle Ages and Modern Times given by N. PURCELL, *Wine and Wealth in Ancient Italy*, in *JRS* 75 (1985), p. 1-19, esp. 15 n. 71: Valladolid in the late 16th cent.: 100 lt per person a year; Paris ca. 1780: 120 lt per person a year; Rome in the 18th cent.: 200 lt per person a year. For ancient Rome, see A. TCHERNIA, *Le vin de l'Italie romaine*, p. 10, who estimates the daily consumption of a male adult at 0.8 à 1 lt a day, *i.e.* 300 lt a year. We would like to thank R.Van Uytven for these references.

[11] Forthcoming in *Collectanea Hellenistica*.

[12] This also results from the very detailed figures in *P. Petrie* III 57b, containing even fractions of obols. For the continued use of the silver standard in state bookkeeping, even after 211 BC, see T. REEKMANS, *Monetary History and the Dating of Ptolemaic Papyri*, in *Studia Hellenistica* V, Leuven 1948, p. 22.

[13] This is an extremely rough estimate. We base ourselves on the count of D.J. Thompson: 135 villages for the Fayum, accepting that Philadelpheia is bigger than average. Another way of counting would be based on the total population of the Fayum in the third cent. (*P. Count*, forthcoming) of somewhat less than 100,000 and the actual popula-

576,000 hl, i.e. more than twice the 222,000 hl of *P. Köln*. We would explain this as follows: the topoi of Philadelphia are more than just a village. We refer to *P. Sorb.* I 56, where the toparchy of Panetbeus is subdivided in three zones: «the settlements around (τὰ περί) Arsinoe, those around Bakchias (the villages of Bakchias, Psenarpsenesis, Karanis and Soknopaiou Nesos) and those around Philadelphia». Philadelphia and its topoi could thus be one third of a toparchy.

Perhaps Boubastos was a typical village, with its 3000 dr., whereas Philadelphia with its topoi covers a larger area, like Bakchias, which covers four villages. If we start from Boubastos and multiply its production by 135, the total of Fayum villages according to *P. Count*, we arrive at the following result:

3000 dr. = apomoira of 600 metretai => production of (600 x 8 =) 4,800 metretai = 1920 hl
1920 hl x 135 (villages) = 259,200 hl for the whole Arsinoites

This is unbelievably close to the total of 222,000 hl of *P. Köln* V 221. Some deduction should be made for the paradeisoi, because in the 3000 dr. of the Petrie papyrus, the apomoira on paradeisoi is included. In *P. Köln* V 221 l.9 and l.19 the figure for paradeisoi (there called μετέωροι κάρποι) is negligible, but in l. 37 it looks more substantial. In any case the figures for paradeisoi were far outnumbered by those of the ampelones.

(4) The apomoira on the total production of 297,200 1/2 1/12 metretai is 37,965 1/2 metretai or 12.78%. This is the result of the existence of two rates in the apomoira: a normal rate of 1/6 or 16.7% and a privileged rate of 1/10 or 10% for cleruchic land (see above: B). The present figure shows that no less than 58.5% of the apomoira was at the privileged rate: thus more than half of the wine in the Arsinoite nome was grown by cleruchs. For the first time we are able to see the Greek impact on the production of wine in Ptolemaic Egypt. Among the remaining 41.5% there must have been some civilian Greeks. Greeks clearly dominated

tion figure of Philadelphia in the early Roman period (A. Hanson, see D.W. RATHBONE, *Villages*, *Land and Population in Graeco-Roman Egypt*, *PCPhS* 36 (1990), p. 133). We then accept that Philadelphia had an average wine production, but perhaps this village, with a lot of cleruchs, produced more wine than most, in which case the figure for the nome would be too high. Given a yield of 20 hl/ha the 5,760 hl of Philadelphia would cover 288 ar. The village has, again in the early Roman period, 550 ar. of garden land and 2,826 ar. of private grainland (figures from D.W. Rathbone).

the wine business, which was meant not only for their private consumption, but also for export. How important this business was for the Greek community can be roughly calculated as follows:

Yearly wine production in the Fayum:	600,000 metretai
Deduction for taxes (apomoira and epigraphe) at 30%:	– 200,000 metretai
remainder	400,000 metretai
Deduction for vineyards owned by Egyptians at 30%:	– 132,000 metretai
remainder for the Greeks	268,000 metretai
Value in drachmai at 5 dr. per metretes:	1,340000 dr.

If we reckon with some 7,000 Greeks households in the Fayum (see *P. Count*), this amounts to an average yearly income of 191 dr. for each Greek household. This should be set against the average wage of an agricultural worker: 2 obols a day, i.e. 120 dr. a year.

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