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THE VALUE OF THE MAXIMIAN COTYLA IN *P. OXY. L 3595* AND *PSI XII*
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THE VALUE OF THE MAXIMIAN COTYLA IN *P. Oxy. L 3595* AND *PSI XII 1252*

H. Cockle, in her article on pottery manufacture in Roman Egypt (*JRS* 71 [1981] 88-97) brought to light the two documents cited above which dealt with jars of a type identified as the "Oxyrhynchite tetrachoun" containing a fixed number of Maximian cotylae: 20 in *P. Oxy. 3595* and 15 in *PSI 1252*. An attempt to reconcile these two numbers in terms of the value of the Maximian cotyla or the capacity of an Oxyrhynchite tetrachoa came to nought.

In *P. Oxy. 3595*, a contract dated to A.D. 243, a potter agrees to produce (line 10) 15,000 "empty, so-called Oxyrhynchite tetrachoun jars" (κοῦφα Ὀξυρυγγειτικὰ τετάρχ[ο]α λεγόμενα). Among other considerations he guarantees (35-38), handing over to the purchaser "each tetrachoun holding up to the rim (of the jar) twenty Maximian cotylae" (ἐκάστου τετραχόου χωροῦντος μέχρι χεῖλου κοτύλας Μαξιμιανὰς εἴκοσι).¹ *PSI 1252*, on the other hand, is a receipt for the purchase of wine in advance in which the vintner states that from the vintage of the present year he will provide (8-11) "200 jars of wine, each with 15 cotylae of wine (measured) by the Maximian cotyla, in jars which are the so-called Oxyrhynchite tetrachoa" (κεραμίων ἑκατὸν δύο ἀνὰ κοτύλας δεκαπέντε Μαξιμιανῆ κοτύλη, ἃ ἔστιν τετράχοα Ὀξυρυγγειτικὰ [λεγ]όμενα--).

The crux in the interpretation of the two documents is the differing numbers of Maximian cotylae per Oxyrhynchite tetrachoun. Cockle (p. 95) cites with reservation Segrè's figure of 19.41 l for a tetrachoun keramion from Oxyrhynchus which would make a Maximian cotyla of *PSI 1252* 1/15 of 19.41 l or 1.294 l. Since *P. Oxy. 3595* calls for 20 Maximian cotylae, she cannot accept Segrè's figure and "strongly suggests that the chous was of variable capacity, sometimes defined by reference to a measure of fixed capacity."²

¹ Cockle translates χεῖλου as "rim" without any further explanation. I believe the "rim" referred to by the potter was the point at which the neck (i.e., the constricted part of jar) was fitted into the shoulder of the jar's body. A clay jar was generally made in two steps: the neck and the handles (if any) were joined to the fabricated body in a separate operation before being put into the kiln for firing. Bowls may be filled to the "rim" (v. *LSJ*) but wine jars were not filled to the top. Space had to be provided for stoppers and for the wine to "breathe" lest it overrun while fermentation was in process. For illustration of the relationship of the neck of a jar to its body, see H.E. Winlock, *The Monastery of Epiphanius at Thebes* (1926), p. 82; pl. 38d; M. Egloff, *Kellia: la poterie copte* (1977), pls. 19, 21, 22.

² See also *PSI 1252*, note to line 8 sqq. (p. 58).

The apparent difficulty in reconciling these two documents rests not so much in the difference in the numbers of Maximian cotylae but in their character and context. *P. Oxy.* 3595 is a contract that spells out in fine detail the production of empty (κοῦφα) jars and the exact capacity of the each jar when turned out by the potter: it will be a tetrachoun of a type called Oxyrhynchite with a precise capacity of 20 Maximian cotylae up to the "rim" of the jar (see n. 1).

PSI 1252 bears no relationship to *P. Oxy.* 3595. In *PSI* 1252, a "sale on delivery" receipt, a vintner of Oxyrhynchus attests that, for the received price, he will provide wine to a certain Aurelius Calpurnius Firmus of Alexandria in 200 tetrachoun jars of the Oxyrhynchite type, each jar containing 15 Maximian cotylae. The potter of *P. Oxy.* 3595 is merely producing 15,000 empty Oxyrhynchite tetrachoa, each with a capacity of 20 Maximian cotylae. The vintner's contract on the other hand deals, not with the capacity of a jar, but with amount of wine he will put into each (ἀνά) Oxyrhynchite tetrachoun, namely 15 Maximian cotylae. The jar may hold 20 cotylae, but he is only putting in 15.

Why 15 cotylae in a jar that could hold 20? Why not a smaller jar? The potter of *P. Oxy.* 3595 as well as the potters of 3596-97 were turning out two other types of Oxyrhynchite jars with specific capacities of Maximian cotylae: dichoa, each of which held 10 Maximian cotylae; diplokeramia each of which held 40 Maximian cotylae (Cockle, p. 91). If the vintner of *PSI* 1252 was to meet the amount requested by the buyer Aurelius Calpurnius, he would have to "fill 300 dichoa or 150 tetrachoa literally "up to the rim." Wine, even fully-fermented wine, is never bottled to the brim of a jar (v. Cato, *RR* CXIII; Pliny, *NH* XIV 135; *Geop.* VI 12). When unfermented wine is being bottled, as is evidently being called for in *PSI* 1252, a considerable amount of free space in a stoppered jar must be available to allow the fermentation process to take place. How much space is spelled out in a Talmudic reference, Tosefta Menahot 9, 10: "One ought not to fill a jar up to its top (literally, to its mouth), but only up to two-thirds of it so that its fumes can diffuse." The 15 Maximian cotylae bottled in a 20 Maximian cot. tetrachoun is precisely what was required under the terms of the contract.

Once *PSI* 1252 is divorced from *P. Oxy.* 3595, we remove the difficulty of having to reconcile two unrelated documents, leaving the 20 Maximian cotylae of 3595 as the sole figure for estimating the capacity of a single unit of an Oxyrhynchite tetrachoun. Judging from *P. Oxy.* I 9.13-14 and other metrological observations, we assume there are 12 nominal cotylae to a chous or 48 to a tetrachous.³ Since 20 Maximian cotylae are the equivalent of 48 nominal cotylae, each Maximian would be 2.4 times greater than the nominal cotyla (20 vis à vis 48). In terms of liters, if the range of a nominal cotyla at Oxyrhynchus ran between 0.24 and 0.27, it would be between 0.576 and 0.624 l; at 0.22 and 0.25, a Maximian cotyla would range between 0.528 and 0.6 l.⁴ In either case, the Maximian cotyla would approximate the Roman sextarius of Duncan-Jones' figure of 0.549 l.

Leaving aside exactitude to the third decimal point, the relationship between a cotyla and the sextarius was generally considered as 2 to 1; i.e., two nominal cotylae to one sextarius.⁵ Since the Maximian cotyla was twice the nominal cotyla, it was in effect the equivalent of one Roman sextarius. Therein may be the rationale at Oxyrhynchus for creating the Maximian cotyla.⁶ If so, the potter of *P. Oxy.* 3595 was producing 15,000 Oxyrhynchite wine jars, each with a capacity of 20 sextarii of about 11 or 12 liters. The potential capacity of those 15,000 jars would be c. 165,000 liters of wine. As for *PSI* 1252, the vintner contracted to place 15 sextarii of wine in each of the 200 Oxyrhynchite tetrachoa for a total of c. 35,000 liters.

³ The cotyla in metrological observations is sometimes referred as "normal" but it is far from normal. Its absolute value in various local systems ranges from 0.21 to more than 0.33 liters, the most usual being 0.24 to 0.27 (*OCD*³ p. 943.).

⁴ See Viedebant's article on κοτύλη in *RE* (col. 1548). Citing a reference in *Metrol. script.* I.208.16 that the Alexandrian cotyla held 9 ounces of water, he estimates that it was possibly the equivalent of 0.245 l.

⁵ Eriphanus, *de mens. et pond.* 756: κοτύλη ἥμισυ ξέστου ὑπάρχει in E. Moutsoulas, ed. "Τὸ Περὶ μέτρων καὶ σταθμῶν ἔργον Ἐπιφανίου τοῦ Καλαμίνος", *Θεολογία* 44 (1973) 157-198. See also *Metrol. script.* I.233.13.

⁶ Perhaps viewed as Latin *cotyla maxima*, "a very large cotyla".

In sum, it appears that the Maximian cotyla in third-century Oxyrhynchus was devised as a means of converting the Greek cotyla into the Roman sextarius/xestes on a one-to-one basis, from a variable cotyla into an established Roman measure. The Roman sextarius (ξέκτης) ultimately superseded the Greek cotyla and became the accepted standard liquid measure of Egypt.

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