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From the Seventh through the Fifteenth Century*

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Byzantine Weights

Christopher Entwistle

Metrology

The metrological system employed throughout most of the Byzantine period was a duodecimal one. The linchpin of this system was the Byzantine pound or *litra*, derived from the late Roman pound. The *litra* was divided into 12 ounces, the ounce into multiples of the *scripulum*, the smallest unit of the libral system. The *litra* was also divisible into 72 solidi: the solidus, later known as the nomisma, was the standard gold coin introduced by Constantine the Great in 309, which was to retain its weight and fineness well into the tenth century. Imperial legislation of the fourth century records that 72 solidi were struck to the pound. The theoretical weight of the solidus is generally taken by numismatists to be 4.55 g, thus giving a theoretical weight for the late Roman/early Byzantine pound of 327.60 g. These figures should be treated with caution. Not only is it clear that the weight of the solidus, and hence the pound, fluctuated, but it is also extremely unlikely that an administrative system of sufficient complexity existed to impose a standard weight system throughout the vast expanse of the late Roman Empire. In a recent study of Byzantine metrology, based on the weights of surviving coins, the following figures for the pound during the late Roman and Byzantine eras are proposed: about 324 g from the fourth to the sixth century, 322 g in the sixth and seventh centuries, 320 g from the seventh to the ninth century, 319 g between the ninth and the beginning of the thirteenth century, and subsequently declining below 319 g.¹ On the evidence of surviving weights, at least for the fourth to the seventh centuries, these figures should also be treated with skepticism.²

¹ E. Schilbach, *Byzantinische Metrologie* (Munich, 1970), 166–68. On weights, cf. S. Bendall, *Byzantine Weights: An Introduction* (London, 1996).

² The British Museum possesses thirteen 1 pound weights dating from between the 3d and 7th centuries. These weigh, respectively, 323.76 g, 323.71 g, 322.53 g, 322.10 g, 321.80 g, 321.71 g, 319.90 g, 318.11 g, 315.92 g, 311.20 g, 309.14 g, 301.15 g, and 300.63 g. In some instances, these weights have lost their inlays or are damaged in other respects. Most, however, are in an excellent state of preservation, and their deviation from a theoretical weight for the late Roman pound of between 324 g and 327 g cannot be explained by their condition alone. The metrological evidence supplied by these and other pound weights strongly suggests the existence of local weight standards.

Administration

The administration of weights and measures devolved to a number of officials. Chapter 15 of Novel 128 of Justinian states that the praetorian prefect and the eparch of the city were responsible for commodity weights and the *comes sacrorum largitionum* for coinage weights of gold, silver, or bronze. It has recently been argued that the importance of the latter official declined considerably during the sixth century and his responsibilities were subsumed by the eparch of Constantinople.³ This official was certainly responsible for the issuance of glass weights during the sixth and seventh centuries, and, by the ninth century, according to the *Book of the Eparch*, his control of all forms of weights and measures in the capital was absolute.⁴ In reality, as the inscriptions on surviving weights indicate, other officials not mentioned in imperial legislation also issued weights. In the western half of the empire these included various proconsuls, *viri laudabiles* and *viri clarissimi*; in the East the titles *anthypatos*, *comes*, and *ephoros* have been recorded.

Typology and Chronology

Three materials were commonly employed in the manufacture of Byzantine commodity and coinage weights: bronze, glass, and lead. In very rare instances, gold and silver were also used (Fig. 1). Copper-alloy weights take three main forms: a flattened sphere doubly truncated, a square, or a disk; occasionally octagonal or polygonal examples have survived. The very limited archaeological and epigraphical evidence suggests the following tenuous typological chronology. From the beginning of the third to the end of the fifth century, weights in the form of a truncated sphere were the dominant type (Fig. 2). These were derived from earlier Roman lead and stone examples, and nearly all bear the *omicron/upsilon* (Ϟ) abbreviation for the ounce. Although the use of the *gamma/omicron* (Γ̄) as an uncial abbreviation is known as early as the first century, it does not become the standard abbreviation until its appearance on square weights during the course of the fourth century. The square type appears to have been the dominant form until the latter half of the sixth century, when the discoid type gradually superseded it. Finds from such sites as Yassı Ada, Beth Shean, Mafraq, and San Vincenzo al Volturno, suggest that the discoid type was predominant from the seventh to the early ninth century (Fig. 3).⁵ If the suggested chronology at Corinth is correct—

That these existed in the Roman period at least is proved by weights with inscriptions explicitly stating that they belonged to a local system. A. Kushnir-Stein, "Two Inscribed Weights from Banias," *IEJ* 45.1 (1995): 48–51.

³ D. Feissel, "Le préfet de Constantinople, les poids-étalons et l'estampillage de l'argenterie au VIe et au VIIe siècle," *RN* 28 (1986): 119–42.

⁴ J. Nicole, ed., *The Book of the Eparch* (London, 1970), 32, 45, 47, 48, and 56.

⁵ For Yassı Ada, see G. F. Bass and F. H. van Doorninck, Jr., *Yassı Ada*, vol. 1, *A Seventh-Century Byzantine Shipwreck* (College Station, Texas, 1982), 203, fig. 10-2; the weights from Beth Shean in



1. 1 ounce silver-gilt weight with the Mother of God. Blachernitissa, Constantinople, between 11 January 1055 and 31 August 1056. British Museum, Medieval and Later Antiquities 1992, 5-1, 1



2. 3 ounce copper-alloy spheroidal weight, ca. 200-400. British Museum, Medieval and Later Antiquities 1853, 2-25, 1



3. 3 ounce copper-alloy discoid weight. Eastern Mediterranean, 7th-9th century. British Museum, Medieval and Later Antiquities 1982, 5-6, 20



4. 6 ounce copper-alloy weight. Eastern Mediterranean, 5th-6th century. British Museum, Medieval and Later Antiquities 1938, 10-4, 4



5. 2 ounce copper-alloy weight. Eastern Mediterranean, 5th–6th century. British Museum, Medieval and Later Antiquities 1938, 10–4, 14



6. 6 ounce copper-alloy weight. Eastern Mediterranean, 4th–6th century. British Museum, Medieval and Later Antiquities 1921, 6–17, 1



7. 3 ounce copper-alloy weight. Eastern Mediterranean, 5th–6th century. British Museum, Medieval and Later Antiquities 1985, 10–15, 2



8. Four silver inlaid copper-alloy weights with imperial figures. Probably Constantinople, late 4th–5th century. British Museum, *Medieval and Later Antiquities* 1863, 12–28, 1; 1980, 6–1, 2, 3 and 5



9. Copper-alloy exagium solidi with three imperial figures. Western Roman Empire, late 4th century A.D. British Museum, CM 48, 8–19, 157



10. Glass coin weight with box monogram: "of Pelagios." Eastern Mediterranean, 6th century A.D. British Museum, Medieval and Later Antiquities 1980, 6–11, 11



11. Glass coin weight with cruciform monogram: "of Akakios." Eastern Mediterranean, ca. 550–650. British Museum, Medieval and Later Antiquities 1991, 5–12, 13

this is the only site to have produced quantities of commodity weights dating from the middle Byzantine period—then discoid weights were still being produced as late as the twelfth century.⁶

Of the few thousand Byzantine weights that have survived, most fall into the category of “miscellaneous”: that is, they are simply marked with their relevant denomination and perhaps a subsidiary decorative motif such as a cross. It is possible, however, to isolate and roughly date certain iconographic types. The most common in the early Byzantine period is the “cross within wreath” type. This takes two forms: a wreath enclosing a prominent Latin cross flanked by the denominational mark (Fig. 4), or a wreath enclosing a cross above the denominational mark (Fig. 5). These two designs are commonly found on square weights dating from the fifth and sixth centuries. Other distinctive types include weights with architectural decoration—either a single arch enclosing a cross and the denomination (Fig. 6), or a facade composed of two triangular arches and one rounded arch enclosing the same (Fig. 7)—or “imperial” weights, that is, weights decorated with one or more imperial figures. The standard format for this type depicts two imperial busts, nimbed, diademed, and wearing paludamenta fastened by stylized fibulae on the right shoulder, within a wreath. More elaborate examples show standing emperors with shields, spears, or bows engaged in abbreviated hunting scenes or juxtaposed with other figures such as *tyches* or Victories (Fig. 8). Such weights, more than any other, are clearly vehicles of imperial propaganda and were mainly issued in the late fourth and early fifth centuries at a time when the empire was split for administrative purposes. The only other series of weights exclusively decorated with imperial figures are *exagia solidi* (Fig. 9). These were issued specifically as coin weights, seemingly to check the weights of the *solidus* and *semissis*. Introduced by Julian, most are to be dated to the late fourth or the early fifth century, although examples dating from the reigns of Marcian and Leo are known.

Glass as a material for weights had distinct advantages. Unlike lead or bronze, it was not prone to oxidation or corrosion, and attempts to alter its weight were more readily detectable. The method of manufacturing glass weights—some, if not all, were produced by pouring a blob of glass onto an iron plate and then stamping it with an iron die—had an additional advantage: those weights significantly above or below the relevant mean could be remelted and reused.

A recent statistical analysis of more than five hundred glass weights shows that the majority of them were used to weigh the *solidus/nomisma* (theoretical weight 4.55 g) and its divisions, the *semissis* (theoretical weight 2.27 g) and *tremissis* (theoretical

Israel are as yet unpublished; for Mafrag, see J.-P. Humbert, *El-Fedain: Mafrag, Jordanie: Rapport préliminaire de la campagne de fouilles 1986* (Jerusalem, 1986), 20, pl. 7; the weight from San Vincenzo was a 2 ounce discoid example (Small find no. 1393) found in an early 9th-century context in a workshop at the southern end of the site (J. Mitchell, personal communication, 15 November 1993).

⁶ G. R. Davidson, *The Minor Objects*, Corinth 12 (Princeton, N.J., 1952), nos. 1595, 1602, 1605, and 1606, pp. 209–10, pls. 94–95.

weight 1.55 g).⁷ A very rare group of glass weights stamped with denominational marks illustrate that they were made to weigh not only lightweight solidi and multiples of the solidus, but also multiples and divisions of the ounce.

More than twenty different iconographic types of glass weights have been identified. These can be conveniently compressed into the following eight categories: weights stamped with a box monogram; with a cruciform monogram; with a central monogram enclosed by an inscription; with one or more imperial busts sometimes juxtaposed with a monogram or a bust of an eparch or Christ; with a bust of an eparch with identifying inscription; with a bust of an eparch without inscription; with a denominational mark; and finally, weights with debased monograms or busts, sometimes referred to as “Arabo-Byzantine.”⁸ Of these categories, the most typical are those simply stamped with a box (Fig. 10) or cruciform monogram (Fig. 11). So many different types have survived that it suggests that if the rough chronology for glass weights is correct—most are dated to the sixth and the first half of the seventh century—then the monograms must refer not only to the eparchs of Constantinople but to the eparchs of the major cities of the empire. The eventual disappearance of glass weights during the course of the seventh century can probably be ascribed to both the contraction of the economy during this period and the disruption of the administrative apparatus involved in their manufacture and distribution following the loss of such key provinces as Syria and Egypt to the Persians and Arabs.

⁷ I. Freestone and M. Leese, “Byzantine Glass Weights: Composition, Manufacture and Weight Standards,” in C. J. S. Entwistle, *A Catalogue of the Late Roman and Byzantine Weights and Measures in the British Museum* (forthcoming).

⁸ The bibliography on glass weights is extensive. Most iconographic types are illustrated in the following: U. Monneret de Villard, “Exagia bizantini in vitro,” *RIN* 35 (1922): 93–107; M. Jungfleisch, “Les dénéraux et estampilles byzantins en verre de la Collection Froehner,” *Bulletin de l’Institut d’Égypte* 14 (1932): 233–56; P. Balog, “Poids monétaires en verre byzantino-arabes,” *RBN* 104 (1958): 127–37.