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WEIGHT STANDARDS OF THRACIAN TOREUTICS AND THRACO-MACEDONIAN COINAGES

There is an intimate connection between ancient coinage and artifacts in precious metal. About two decades ago, Michael Vickers, David Gill, and other scholars began to emphasize the quasi-monetary function of ancient gold and silver vessels as high-level stores of value and as an occasional medium of exchange. (*) They cited surviving temple inventories from Athens and Delos, where vessels in the treasury were recorded by weight. (2) Similarly, the letter of Seleucus I to the Milesians specifies the weights of the gold and silver vessels he had donated to the sanctuary of Apollo at Didyma. (3) The units of weight in these inventories are the same as for coinage, and as with coinage the value of gold objects is often specified in terms of silver drachms. Objects of silver were conventionally weighed to the nearest half obol, objects of gold to the nearest...
quarter obol. A few extant vessels bear inscriptions recording their weight. This practice gained currency until in Roman times the weight was one of the most common types of inscription placed on precious metal vessels.

Vickers, Gill, and their colleagues have hypothesized that precious metal vessels were normally crafted so that their weights came out to round numbers. (4) This idea gains credence from inscriptions awarding honorary crowns that stipulate their value in terms of round numbers of monetary units. (5) But the interpretations of vessels that have been offered until now often involve weights that are not particularly round, and many recorded weights, whether in temple inventories or inscribed on the vessels, are indisputably uneven. To save the hypothesis, both Vickers and Gill have resorted to several additional assumptions. They have submitted that the round number often lay in the total weight of sets of vessels, rather than in the weights of individual vessels. (6) They have reasoned that non-round weights may reflect weight loss resulting from wear to the vessels. (7) And they have argued that worn coins were used to weigh vessels, so that recorded weights are rarely round. (8)

Vickers and Gill have usually analyzed ancient plate in terms of just three weight standards, the Attic, the Persic, and the Thraco-Macedonian, though Vickers recently added the Ptolemaic standard to the repertory. (9) Their analyses are limited by an incomplete knowledge of North Greek weight standards. It is nearly half a century since Doris Raymond demonstrated the existence of three interlocking weight standards employed for North Greek tribal coinages, derived from the Babylonian light mina and congruent at several points with the Attic standard. (10) In fact, the metrology of North Greek coinage was even more complex than Raymond indicated, because both the Attic and


(5) *IG VII, 412*, from Oropos; *IGBulg I*, 302, from Mesembria, which gives a value of 50 gold staters. In his commentary on the latter inscription, G. Mihailov noted (p. 261) that Mesembria struck drachmai, not staters, and suggested that the inscription referred to gold staters of Alexander the Great.


tribal weight standards were subject to reduction. In some cases these reductions appear to have been historical developments, but in other cases they may represent preexisting weight standards. No less than ten distinct but usually interrelated standards were employed for Thraco-Macedonian coinages of the sixth through fourth centuries B.C. When the weights of surviving vessels from Thrace and Macedon are compared against this framework, it is possible to identify very round numbers indeed. Furthermore, non-round weights inscribed on vessels can almost always be explained as the result of weighing the vessels on a standard other than the one to which they were originally made.

Thracian and Macedonian vessels are sometimes inscribed with the names of their owners. Represented in the Rogozen treasure are the names of the Odrysian prince Satokos, the great Odrysian king Kotys I (382-359 B.C.), and his son Kersebleptes, along with inscriptions indicating that the vessels were presented to Kotys by the villages of Beos, Apros, Ergiske, Sauthaba, and Geistoi, either as gifts or as tax payments. Thucydides and Diodorus indicate that at the time of the Peloponnesian War gifts of precious metal vessels and textiles comprised about half the revenues of the earlier Odrysian king Seuthes II, amounting to 400-500 talents. The town names inscribed on the vessels seem to imply their local manufacture by royal workshops established in each of these fortified settlements. Such workshops are thought to have been attached to the royal treasury and to have processed taxes and gifts of precious metal by refining the metal and crafting it into vessels. Ivan Marazov has reconstructed a rite of presenting such vessels to the king at the city gates in the course of royal tours of the Odrysian kingdom.

The accompanying table records more than 150 intact Thracian and Macedonian vessels and classifies them according to their weight stan-


(13) Thuc, 2.97.3; Diod., 12.50.


(16) I. MARAZOV et al., op. cit. [n. 14], p. 65.
standards. The first column briefly describes the object, and subsequent columns give the findspot; a published reference, location, or inventory number; the weight in grams; the weight in ancient units; and the implied weight of the ancient unit (drachm or stater). The table illustrates a truly pervasive tendency to craft vessels to a few standard weights, expanding on the hypotheses of earlier scholars. The same practices apparently applied in the creation of gold jewelry and other ornaments, which varied in size and consequently filled the spectrum between plate and coinage.

Attic standard

In North Greek coinage the Attic standard was at first used almost exclusively by the Greek colonies of the Chalkidike, from the late sixth century B.C. to the beginning of the last quarter of the fifth. Their principal monetary unit was a stater, typically divided into sixths, rather than a tetradrachm divided into drachms. (17) Some early staters, e.g. those of «Olynthos» ca 500-480/75 B.C., appear to have been struck to a norm of about 17.20-17.45g, implying a drachm of 4.30-4.36g. The Odrysian king Sparadokos (ca 460-430 B.C.) also employed the Attic standard in eastern Thrace, but struck tetradrachms, drachms, diobols, and hemiobols. (18) Exceptionally, the early «Olynthian» staters are today found mainly in the Strymonian region, though coins from the Chalkidian peninsula did not circulate further east in the Thasian Peraia. (19) The geographic range of the Attic standard expanded beyond the Chalkidike, the Strymon, and the Hebros Valley when Philip of Macedon (359-336 B.C.) adopted it for his gold staters. Alexander the Great (336-323 B.C.) issued both staters and tetradrachms on the Attic standard after ca 333 B.C., in Macedonia and throughout his empire. (20)

(17) S. Psoma, art. cit. [p. 11], p. 88-89; on Sermylia in particular, see id., ΣΤΑΤΕΡ MAXON, in NomChron, 20, 2001, p. 13-44. Akanthos is one of the few Chalkidian mints that may have struck drachms on the Attic standard, see H. Gaebler, Die antiken Münzen Nord-Griechenlands, III, Part 2, Berlin, 1935, p. 90, 5 (described, however, as an oktobol). Psoma cites an Athenian inventory of the fifth century (IG I² 383) to prove that the principal denomination of Akanthos was also called a stater.


(19) Personal communication from S. Psoma. 4 February 2008.

We should probably not insist on a relation between the fabrication and/or use of Attic-weight vessels and the production of Attic-weight coinage, if only because of the international prestige of Athens. The table of artifacts includes vessels crafted to the Attic standard by royal Odrysian workshops at the time of Kotys I (n° 9, 15), yet the small silver coins of this king, with weights ranging from 0.63 to 0.98 g, do not appear to conform to the Attic standard. More ambiguous is an example from the Macedonian kingdom, a silver gilt strainer from Tomb II at Vergina (n° 12). Manolis Andronikos, the excavator of Vergina, identified Tomb II as the royal tomb of Philip II. (21) If this interpretation is correct, the interment of the strainer antedated the Attic-weight silver coinage of the Macedonian kingdom. Other scholars, however, have argued persuasively that Tomb II was the burial site of Philip III Arrhidæus. (22) In that case the Attic weight of the strainer would match the weight standard of contemporary coinage.

Vickers expressed the belief that vessels on the Attic standard are extremely rare. (23) The present survey, however, found the Attic to be one of the more popular standards for North Greek precious metal objects. The breakdown reveals a strong tendency to craft phialai at either 20 drachms (n° 1-7) or 40 drachms (n° 8-10), with the latter a standard weight for other vessels as well. We shall encounter these two standard weights with nearly every weight standard examined below. There is reason to believe that these values could also be reckoned in staters (4 drachms = 1 tetradrachm/stater), making these standard weights equivalent to 5 and 10 staters respectively — figures we shall also encounter repeatedly. These were the preferred values for smaller precious metal vessels, regardless of the weight standard employed. Larger vessels of various shapes typically weighed a mina (n° 14-16) or several minas (n° 17-20). (24)

Two of these Attic-weight vessels bear inscriptions recording their weights. Characteristically, these inscriptions reckon the weight on a standard other than that on which the vessel was originally wrought.

(23) M. VICKERS, art. cit. [n. 2], p. 620; Id., art. cit. [n. 6], p. 173.
(24) N° 14 was identified as an Attic mina by D.W.J. GILL, see M. VICKERS, in B.F. COOK (ed.), op. cit. [n. 1], p. 111 n. 12. M. VICKERS, art. cit. [n. 2], p. 616, suggests an Athenian origin based on the fact that the decoration depicts an apobates race, a type of race practiced only in Attica or Boiotia according to Theophrastos. N° 16 was identified as an Attic mina in E. SIMON, Der Goldschatz von Panagjursite — eine Schöpfung der Alexanderzeit, in AK, 3, 1960, p. 2-29, see the appendix by H.A. CAHN, De Geschichte der Goldgefäße, p. 26-29, especially p. 27-28.
N° 19, a gold amphora-rhyton from the Panagyurishte treasure, is inscribed ΣΨ (= 200 + tetebol), indicating a weight of 200 Persian darics and a fraction. N° 12, the silver gilt strainer from Vergina, bears the name Machatas, presumably the owner of the vessel, and the weight ΔΔΔΔΨ (= 41 drachms), yielding a drachm of 4.18g. In publishing this vessel Andronikos did not comment on the weight standard, but it is a reduced Attic standard used for coinage in the North Greek region in the late sixth and fifth centuries B.C.

Reduced Attic standard

Numismatists commonly assume that the reduction of the Attic standard was an historical development of the Hellenistic period. But a reduced Attic standard can be identified in the late sixth and fifth centuries in both coastal Thrace and the Chalkidike, where it appears to have coexisted with the full Attic standard. Ainos employed the reduced Attic standard, striking tetradrachms of 16.35g in May Period I (ca 475-450 B.C.), rising to 16.50g in May Period II (ca 435-405 B.C.), together with drachms of about 4g in both periods. The neighboring Odrysian king Sparadokos struck his drachms to this same reduced standard (ca 4g), even though his heaviest surviving tetradrachm is of the full Attic weight. Coins conforming metrologically to the reduced Attic drachm were minted at Neapolis (3.85g) and Thasos (4g) in the late sixth century, but their interpretation is somewhat problematic in light of Thasian epigraphic testimony. (25) In the first half of the fifth century Skione issued staters featuring the helmeted head of the civic founder Protесilaos, with weights ranging from 16.40 to 16.80g, implying a drachm of 4.10 to 4.20g. In the fourth century the reduced Attic standard found new favor in the Pangaian region. The earliest gold drachms of Thasos, issued from ca 390 B.C. and marked with a bearded head of Dionysos, have a well-defined weight of 3.95g and thus conform to this standard. (26) In the 360s or early 350s Amphipolis produced one issue of

(25) Contemporary epigraphic materials from Thasos reckon sums in staters, hektai, hemiektai, and halves of hemiektai, see S. Psoma, art. cit. [n. 11], p. 92-93. Psoma identifies the mystery denomination as a trite, based on a weight of 3.23 grams, but this weight does not conform to the mode calculated from weights collected for the present study.

drachms on the reduced Attic standard, as well as two others on a reduced tribal standard. (27)

The objects crafted according to the reduced Attic standard belong mostly to northern Thrace, though the inscription on the strainer from Vergina (n° 12) may attest to its use in the Macedonian kingdom. As with the full Attic standard, we see a 20 drachm (5 stater) standard weight strongly preferred for silver phialai (n° 23-27). A 40 drachm (10 stater) standard weight also recurs (n° 28-36), again associated with various vessel shapes, notably kalyx cups and jugs. It may be significant that no gold vessels have been identified on this reduced standard, though it was apparently acceptable for ornaments (n° 37-39), including large items of jewelry.

N° 35, a silver phiale of 40 drachms from Branichevo, bears a double inscription, one indicating weight of 50 1/2 drachms and 2 obols (i.e. 50 drachms, 5 obols), the other a weight of 101. The first figure yields a drachm of 3.23g, corresponding to Raymond's Series 2 (see below). The other figure points to a unit of 1.64g, a triobol on the same weight standard. The triobol, however, was not a standard unit of reckoning. Thus the significance of the second inscription remains unclear.

Chian standard

There is a more deeply reduced version of the Attic standard, with a tetradrachm of ca 15.85g, usually termed Chian or Rhodian by numismatists. It seems to have won a foothold in some mint cities of coastal Thrace in the fourth century B.C. In the first half of the century Ainos struck facing head staters of this weight (15.85g). The corresponding drachm was struck contemporaneously by Neapolis (3.75-3.80g) and in the second half of the fourth century by Ainos (3.80-3.90g). The mid-century Thasian gold drachms with the young head of Dionysus are slightly lighter than the preceding Thasian gold issues and their weight of 3.90g conforms to the Chian standard.

In 1960, Herbert A. Cahn identified the gold jug-rhyton from Pangeyurishte (n° 42) as equivalent to a mina on the Chian standard, and cited the gold drachms of fourth-century Thasos for comparison. (28) The present study adds only three further items on this weight standard, two of them jugs of Thracian manufacture, with a standard weight of 40 drachms (10 staters).

(27) C.C. LORBER, Amphipolis: The Civic Coinage in Silver and Gold, Los Angeles, 1990, p. 34-35; for use of the term drachm in contemporary sale documents from Amphipolis, see S. Psoma, art. cit. [n. 11], p. 91.
Persic standard

Probably the most famous of all inscribed vessels, and one of the earliest, is a spectacular gold phiale from the Panagyurishte treasure (н° 44). On the external surface of its rim it bears a double inscription, the letter H, indicating its equivalence to 100 Persian darics, and a longer inscription HΝΑΔΔΑΓΓ-Ι-Τ. After some early misinterpretations by Bulgarian scholars, Cahn deciphered the second inscription to read 196 drachms and a quarter obol, which yields an Attic-weight drachm of 4.313g. (29)

The Persic standard was enormously popular for vessels made and/or used in Macedon and Thrace, and was favored by both the Odrysian and Triballian court workshops. The preferred unit was neither the daric nor the siglos, but rather the stater. The Macedonian kings from Archelaos I (413-400/399 B.C.) to Amyntas III (394/3-370/69 B.C.) struck silver coins conforming to the stater on the Persic standard, with a pattern of declining weights beginning at ca 10.60-10.69g under Archelaos (30) and collapsing at 8.80g under Amyntas III. In Thrace, the neighboring coastal cities of Abdera and Maroneia also produced Persic-weight staters in the middle quarters of the fourth century. At Abdera, about a third of the staters exceeded 11g in Period VII (360-350 B.C.), after which the modal weight fell from 11.30g in Period VIII (346/5-336 B.C.) to 10.05g in Period IX (336-311 B.C.). Maroneia minted staters only in its last period of coinage (Period VIII, ca 365-mid-330s B.C.), when the mode is 10.90g, with secondary spikes at 11.30g and 10.55g. Around the mid-fourth century the town of Orthagoreia also struck Persic-weight staters (10.65g) with a facing head of Artemis. Greek writers have left two conflicting traditions relating to Orthagoreia: Strabo and Pliny associated it with Maroneia, while the Geographici minores suggests it was the later name of Stageira. The evidence of the weight standard would seem to support a location near Maroneia.

The extensive catalogue of Persic-weight vessels shows a 5 stater standard weight for silver phialai (н° 45-47) and a very prevalent 10 stater standard weight for silver phialai, jugs, and other vessels (н° 48-69). Gill identified the weight of н° 48 as 250 Attic drachms, based on a drachm of 4.29g. (31) Gill's interpretation is not to be dismissed. Because there is a fundamental relation between the Attic and Persic standards, it is entirely possible that some or all of these 10 stater vessels

(30) U. WESTERMARK, The Staters of Archelaus: A Die Study, in M. PRICE et al. (eds), Essays in Honour of Robert Carson and Kenneth Jenkins, London, 1993, p. 22. On p. 19 Westermark calculated a theoretical weight of ca 10.80g and identified the weight standard as a reduced Thraco-Macedonian standard, unrelated to other contemporary standards and thus restricting Archelaus' coinage to local circulation only.
were «bilingual». In this regard it is interesting to note that a set of ritual vessels inscribed for Odrysian king Kotys I and dedicated to Apollo includes a phiale and jug ostensibly on the Attic standard (n° 9 and 15) and three phialai of 10 staters ostensibly on the Persic standard (n° 51, 55, and 61). This ritual set is discussed in some detail in the section on methodology (below).

A further standard weight of 50 staters is attested for just three vessels (n° 70-72), two of them gold rhyta. A gold bowl from Kazichene weighing 100 staters (n° 73) apparently documents the use of the Persic standard in the Thracian hinterland in the seventh century B.C.

Some North Greek coinage on the Persic standard exhibits a local peculiarity. We know from Polyainos 3.10.14 that in Macedon the silver stater could be divided into five drachmae. (32) In this case the light tetrobol of Perdikkas II, i.e., of Raymond’s Series 2 (2.18g), was treated as a drachm to generate the pentadrachm/stater of Archelaos I. Other examples of the «light» drachms/fifth staters in North Greek coinage include the «light» drachms of Mende (33) in the late fifth to early fourth century (2.00g) and those of Perdikkas III (2.06g). Three silver vessels (n° 74-76) and a gold wreath (n° 77) seem to be equivalent to a mina based on this «light» drachm, while a silver phiale in the Metropolitan Museum (n° 78) represents 2 minas.

Indigenous Thraco-Macedonian standards

Taken all together, the indigenous Thraco-Macedonian weight standards appear as important as the Attic and Persic standards combined. Almost all of the objects cited in the catalogue under these weight standards are of Thracian workmanship. The very few exceptions may be explained as objects commissioned from foreign craftsmen by Thracian patrons, though we have evidence for the use of some of these standards in the Hellenistic east (see the section on chronological horizons, below).

(32) The passage was signaled by M.J. Price, Coinage of the Macedonians, London, 1974, p. 20. See also U. Westermark, Remarks on the Royal Macedonian Coinage c. 413-359 B.C., in G. Le Rider et al. (eds), Kraay-Merkholm Essays, Louvain, 1989, p. 303; Id., art. cit. [n. 30], p. 19; S. Psoma, Τάς πωλούς πεντάδραχμας un stratégeme de Polyen et le monnayage d’argent des rois de Macédoine de 413 à 360 av. J.-C., in RN, 155, 2000, p. 123-136. Psoma criticizes Price’s and Westermark’s use of the passage in Polyainos but emphasizes the derivation of Archelaos’ stater from the light tetrobol. She also suggests (p. 135) that the stater could be considered a tridrachm based on the Thraco-Macedonian drachm of 3.60 g, i.e., the drachm of the first reduction of Raymond’s Series 3 (congruent with the drachm of the Phoenician standard).

Objects weighed out on the indigenous standards fall into six groups, representing the three series identified by Doris Raymond, a reduction of her Series 1, and two reductions of her Series 3.

**Raymond Series 3**

Raymond's Series 3 includes a tetradrachm with a theoretical weight of 14.73g and an oktadrachm with a theoretical weight of 29.46g. Slightly underweight oktadrachms — equivalent to triple staters of Raymond's Series 1, apparently in its reduced version — were issued during the second quarter of the fifth century by the Macedonian king Alexander I (494-451 B.C.) (29.00-29.10g), by the Bisaltai (28.70g), by King Getas of the Edones, and by Ichnai, the Oreskioi, and the Tyntenoi, demonstrating the wide diffusion of this standard from the Macedonian kingdom to the Pangaian region. (29) Large coins of this standard struck at Abdera exceed their theoretical weights, with oktadrachms averaging 29.80g in Periods I and II (ca 520/15-475 B.C.) and tetradrachms averaging 14.85g in Period I (ca 520/15-500 B.C.) and 14.95g in Periods II-III (ca 500-450). It is these heavier norms that apparently served as units for Thracian metal artifacts of the fifth and fourth centuries. N° 80-84 attest to a 40 drachm (10 stater) standard weight for silver vessels, especially silver jugs. N° 85-87 suggest that royal rings in gold were wrought to a 4 drachm (1 stater) standard weight, equivalent to 40 drachms (10 staters) in silver, the standard weight for vessels.

The drachm of Raymond's Series 3 has a theoretical weight of 3.68g, but individual specimens vary widely and are not easily distinguished from drachms on the two reduced versions of this standard. The only clear examples are the drachms of Mosses, an Edonian king of the mid-fifth century (3.75-3.85g). The drachms of Dikaia by Abdera ca 480-460 B.C. (3.60-3.65g) and of Maroneia ca 500-430 B.C. (3.55g, later 3.50g) appear to conform to the first reduction of this standard (see below). But they were struck to circulate alongside the Series 3 tetradrachms of Abdera and should probably be considered underweight coins on the same standard.

Precious metal artifacts probably based on the drachm of Raymond Series 3 include silver and gold phialai (n° 88-89) and gold ornaments (n° 90-91). N° 89, a gold phiale in the Metropolitan Museum, is equivalent

(34) The octadrachms of Alexander I have also been identified as decadrachms on the Corinthian standard by J.A. Schell, *Observations on the Metrology of the Precious Metal Coinage of Philip II of Macedon: The «Thraco-Macedonian» Standard or the Corinthian Standard?* in AJN, 12, 2000, p. 7. He reinterprets other denominations of Alexander I in terms of the Attic standard. In Schell's view, these congruencies disprove the existence of a local Thraco-Macedonian standard. The present author would argue, rather, that such congruencies are typical of Thraco-Macedonian weight standards.
to 20 silver minas but bears the Phoenician inscription 180, indicating a drachm of 4.15g, corresponding to the reduced Attic standard.

N° 90, a group of 36 gold harness ornaments from Kralevo tumulus in northeastern Thrace, supports the hypothesis of Vickers and Lewis that the significant weight is sometimes to be found in sets. In this case the weight of each individual appliqué has no obvious significance, but the group has a combined weight equivalent to 10 drachms. We may imagine that the goldsmith was entrusted with 10 drachmae of gold and ordered to convert it into horse trappings.

N° 91, a torque from Veliko Turnovo in north central Thrace, has a pendant that is perhaps really an earring, of a form used between the fifteenth and eighth or seventh centuries B.C. (35) The torque itself is dated to the seventh or sixth century, apparent evidence for the early use of this indigenous standard.

First reduction of Raymond Series 3

A modest reduction of Raymond's Series 3 yields a tetradrachm/stater of ca 14.25-14.50g. The standard is congruent with the Phoenician standard and Hugo Gaebler identified it as such. (36) Selene Psoma has termed it «the Chalkidian version of the Thraco-Macedonian standard» and has suggested that it was identical to the standard later employed by the Ptolemies. (37) Its introduction to Macedon and Thrace has been associated with the campaign of Brasidas in 424 B.C., but in fact tetradrachms on this standard were struck by the Chalkidian city of Terone in the early fifth century. Examples from the first half of the fourth century are localized in the Chalkidike and the Strymonian region: staters of the Chalkidian League (14.40g) and Akanthos (14.25g), and tetradrachms of Amphipolis (14.30g). These coinages did not normally penetrate the Macedonian kingdom before the reign of Philip II, but they inspired him to strike his royal tetradrachms to the same standard (14.45g). The few vessels on this standard, all of silver, attest to the familiar standard weights of 20 drachms/5 staters (n° 92) and 40 drachm/10 staters (n° 93-95). It is interesting to note that the 20 drachm standard is represented only at Loukovit, the 40 drachm standard only at Rogozen, a distinction that is

(37) S. PSOMA, art. cit. [n. 11], p. 92. It should be noted that the weight of the principal denomination varies considerably from one North Greek mint to another, see C.C. LORBER, op. cit. [n. 27], p. 31-33, whereas the weight of the Ptolemaic tetradrachm was carefully controlled and maintained an average weight of 14.27 grams for approximately two centuries. This corresponds to the modal weight of the tetradrachm at Akanthos and Amphipolis but falls far short of the weight of tetradrachms of the Chalkidian League and Philip II.
more pronounced for objects on the second reduction of Raymond Series 3, but which obtains for no other weight standard.

The drachm of this standard has a theoretical weight of 3.60g. Undoubted North Greek examples are relatively rare, because most Chalkidian mints treated their principal denomination as a stater and divided it into sixths. An early instance is the series of archaic drachms with a profile bee on the obverse and an average weight of 3.50g, produced in the central Chalkidian peninsula from about 530 to 510 B.C. Terone appears to have issued a few drachms alongside its early tetradrachms, and Amphipolis struck two drachm emissions on this standard shortly after 370 B.C (3.60-3.76g). Drachms of Philip II weighing ca 3.55g illustrate the common practice of skimping on the weight of smaller denominations. Drachms on Raymond Series 3 and those on this first reduction overlap in weight, but it seems appropriate to identify the standards on the basis of their different geographical distribution, with Series 3 extending from the Macedonian kingdom though Bisaltia and the Pangaian region to coastal Thrace, and its first reduction more narrowly localized in the Chalkidian peninsula and the Strymonian region until the reign of Philip of Macedon.

The North Greeks placed their own stamp on this standard by dividing the tetradrachm into fifths, or "light" drachms, with a normative weight of 2.85g. The principal example is from the coinage of Philip of Macedon (2.80g). (38) As with other small denominations, this "light" drachm overlaps the norms of "light" drachms struck on other weight standards and could also function as a half siglos on the Persic standard. (39) The catalogue lists several silver vessels (n° 96-98) weighing a mina each, based on the "light" drachm of the Phoenician standard. No jewelry has been identified on this standard.

**Second reduction of Raymond series 3**

A deeper reduction of Raymond's series 3 yielded a tetradrachm/stater of 13.50-14.00g. S. Psoma has called this standard the "Chalcidian divergence" of the Thraco-Macedonian standard. (40) Arguably the earliest mint to employ this standard was Argilos, whose staters were poorly con-

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(39) J.A. SCHELL, *cit. cit. [n. 34]*, p. 1-8, emphasizes the congruence of this drachm with the Corinthian drachm. He suggests that Philip chose the Corinthian standard for its easy convertibility with the Attic standard and rejects "the Thraco-Macedonian" standard as an artifact of modern numismatic scholarship.
trolled, ranging in weight from 12.3 to 14.3g, with an average of 13.45g. (41) More clearly adhering to the standard are the earliest archaic staters of Sermyle (ca 13.85g). (42) In coastal Thrace, Raymond Series 3 was immediately succeeded by this second reduction: tetradrachms were minted on this standard by Abdera and Maroneia (both 14.00g) in their respective Period Vs (ca 415-395 B.C. at Abdera, ca 430-400 B.C. at Maroneia). This direct succession is evidence that we should not consider this standard as a further reduction following the first reduction of Series 3, but rather as a distinct standard. From about 410 B.C. the Paionian city of Damastion struck tetradrachms averaging 13.50g, perhaps evidence for a lighter version of the standard in the west. A western range for this standard is also supported by the many Saloniki provenances reported by Svoronos for coins of Argilos. (43)

Theoretically the drachm of this standard should weigh 3.40-3.50g. Late fifth century Thasian drachms of soft classical style apparently conform to the first reduction of Series 3 (3.65g), but they should probably be classified under the second reduction, since the latter standard was in use at this time at Abdera and Maroneia. The Thasian drachms bear the same puzzling metrological relation to contemporary Thasian staters that we observed in the mint's archaic coinage. (44) These drachms may perhaps have complemented the contemporary currency systems of Abdera and Maroneia, which did not include regular drachms (Abdera struck «light» drachms, i.e., fifth staters). The fourth century drachms of Neapolis with full ethnic (3.45-3.55g) adhere more closely to the second reduction of Series 3.

Vessels on this indigenous standard are quite numerous. The standard weight of 40 drachms/10 staters is particularly well attested (n° 103-110), but there are also phialai of the standard 10 and 20 drachm weights (n° 99-102). As with the first reduction of Raymond Series 3, the lighter objects are all from Loukovit, the heavier all from Rogozen. The significance of this contrast is unclear.

(41) K. LIAMPI, Argilos: A Historical and Numismatic Study (Kerma, 1), Athens, 2005.
(42) These have sometimes been considered tribal imitations. For the mint attribution, see S. PSOMA, art. cit. [n. 11], p. 88, and Id., Συνθηκηκτικοι κανόνες στην Χαλκιδική κατά τον 5ο και 4ο αι. π.Χ., in ΠΕΦΩΤΟΣ, 4, 2000, p. 225-236.
(43) J.N. SVORONOS, L'hellénisme primitif de la Macédoine, Paris-Athens, 1919, p. 120-122.
(44) O. PICARD, Monnayage thasien du v° siècle av. Jésus-Christ, in CRAI, 1982, p. 413-418, demonstrated that Thasian inscriptions reflecting the division of the stater into thirds and sixths proved that system was still in place after 411 B.C. The late fifth century stater has a modal weight of 8.75g and its trite should weigh something on the order of 2.92g, not 3.65g.
Three cups and a kantharos (n° 111-114) provide evidence for a larger standard weight of 20 tetradrachms/staters. (45) An amphora-ryton from Duvanlii (n° 115) corresponds to 100 tetradrachms or 4 minas. A single piece of jewelry, an Odrysian gold ring inscribed for Skythodakos, has a weight equivalent to 1 tetradrachm or 40 drachms in silver.

Two silver kylikes from Vergina (n° 113-114) exemplify the 20 stater norm of this weight standard. Each bears a weight inscription on the external surface of the base: n° 113 is inscribed Ἐγα, no. 114 Ἐβα. The letters clearly indicate the numbers 63 and 62 in alphabetic numeration. The horizontal striations probably signify a diabol and an obol. The slightly larger vessel, with a weight of 269.8g, yields an Attic drachm of 4.25g. The slightly smaller kylix, with a weight of 266.2g, yields an Attic drachm of 4.26g.

Raymond Series 2

Raymond's Thraco-Macedonian Series 2 was based on a drachm of 3.27g, equivalent to a third of the stater of her Series 1. Both Raymond and Price emphasized its utility as a bridge between the Attic and indigenous standards. (46) Raymond's Series 2 was the basis for the tetradrachm/staters of the Macedonian king Alexander I (13.15g) and for the later tetradrachm/staters of Argilos after ca 475 B.C., pairing a Pegasus obverse with a reverse type (13.00-13.07g). Fourth-century examples of the drachm tended to run a little on the light side. Drachms of 3.15g were struck in Period VI (ca 400-377 B.C.) at Maroneia, where their metrology is confirmed by a one-mina civic weight of Maroneia weighing 318.4g. (47) Drachms of similar weight were produced at Philippoi ca 356-350 B.C. (3.10-3.15g), and by the Paionian kings Lykkeios (ca 3.15g), Patraos (3.10g), and Audoleon (3.00-3.10g), whose reigns span the years ca 359-286 B.C. It is striking that series 2 seems to have succeeded the second reduction of Raymond's Series 3 in the coinage of Argilos, Maroneia, and Paonia.

The list of vessels on Raymond's Series 2 is impressively long. Eleven phialai adhere to the standard weight of 20 drachms/5 staters (n° 117-127). Another eleven vessels conform to the standard weight of 40 drachms/10 staters (n° 128-138), which was apparently favored for jugs and heavier phialai. The catalogue also attests to standard weights

(45) N° 112, from Egypt, is not certainly on this weight standard.
(46) D. Raymond, op. cit. [n. 10], p. 24, 27; M. Price, op. cit. [n. 32], p. 4.
(47) Personal communication from S. Psoma, 6 February 2008. She will publish this weight, along with others that represent multiples and fractions of the mina on the same weight standard, in an appendix to a forthcoming article on problems of historical topography.
of a mina (n° 141-142) and 2 minas (n° 143-144). For the last of these, a gold rhyton from Panagyurishte (n° 144), the weight of 2 minas in gold represents a value of 20 silver minas. Two articles of gold jewelry (n° 145-146) weigh in at 10 drachms, equivalent to a silver mina.

Raymond Series 1

Raymond Series 1 has been called the «Thasian» version of the Thraco-Macedonian weight standard by Psoma, who regards it as a civic rather than tribal weight standard; she once believed it originated at Thasos but now proposes an origin at Berge. (48) The standard is based on a stater of 9.82g, representing one fiftieth of the light Babylonian mina, and in Raymond’s view it was the source of the entire Thraco-Macedonian denominational system. (49) Such staters were among the earliest North Greek coins, beginning ca 525/515 with the satyr and nymph varieties formerly attributed to «Lete» but now thought to originate in the Pangaian region, perhaps at Eion or at Berge (9.85g). (50) They were also struck on Thasos before ca 465 (9.75g), in small numbers at Maroneia before 500 B.C., and at Dicaea-by-Abdera ca 515-480 B.C. or later (9.95g). Also conforming to this standard is the goat coinage of ca 490-465 B.C., traditionally attributed to «Aegae» but now given to the Mygdones or to Galepsos (9.80g). (51) The North Greek circulation of these staters was essentially limited to the region that produced them.

Vessels crafted according to Raymond’s tribal series 1 include a few apparently conforming to a 5 stater standard weight (n° 148-150). The common standard weights of 10 and 20 staters are also represented. Among the latter are two silver gilt calyx cups from Tomb II at Vergina (n° 158-159). Each is inscribed on its lip with letters indicating its weight. N° 158, with a weight of 192.2g, bears the letters ΒΒ, (92) yielding a drachm of 2.09g. N° 159, with a weight of 195.7g, is inscribed ΒΛ, (94) yielding a drachm of 2.08g. Andronikos confessed that he did not know

(48) S. Psoma, art. cit. [n. 40], p. 62-63, 69, 70, 76.
(49) D. Raymond, op. cit. [n. 10], p. 23.
(51) C.C. Lorber, The Goats of «Aigai», in S.M. Hurter and C. Arnold-Biucchi (eds), Pour Denyse: Divertissements numismatiques, Bern, 2000, p. 113-133; S. Psoma, Les «boucs» de la Grèce du Nord: Problèmes d’attribution, in RN, 159, 2003, p. 227-242. See also W. Fischer-Bossert, Die Ziegen von Aigai, in SNR, 86, 2007, p. 23-27, who draws attention to a goat head seal impression found in the Metroon of Vergina. Fischer-Bossert discusses the common use of goats as canting types for cities named Aigai or Aigeai but concludes that the root of these and similar names is not Aig- but rather Aig-. The etymology of this syllable from Mycenean Greek indicates that it denotes a coastal (or originally coastal) location.
of such a unit weight for the ancient drachma. (52) Price, however, identified the standard as that of Archelaos of Macedon and his immediate successors, i.e., the Persic standard, and the unit as the fifth stater attested by Polyainos 3.10.14. (53)

Raymond's Series 1 was apparently favored as a weight standard for gold jewelry in central and north central Thrace (no 163-166). All four of these objects are of local workmanship, and all date from the fifth century.

**Raymond Series 1, reduced**

The silver stater of Raymond's Series 1 was struck underweight by several tribes that employed the type of a centaur abducting a nymph, most notably the Oreskioi, whose signed and unsigned staters average 9.40g. Thasian staters of the second archaic style, datable after ca 465, have an average weight of 9g. Like the full-weight staters of Raymond's Series 1, these coins are never found in the Chalkidike and rarely in Mygdonia, even though they were metrologically compatible with the Series 3 oktadrachms of Alexander I of Macedon and the Bisaltai. Late fourth-century gold staters of Pantikapaion range from 9.10 to 9.20g.

It could be argued that these underweight staters do not represent a separate weight standard. Instead they may reflect the great variability of norms for the stater/shekel as attested by surviving weights and texts from Mesopotamia or, more generally, the broad deviation from the theoretical norm that can be observed in almost any group of surviving weights. (54)

This is the only one of the indigenous standards that seems to have been used by foreign toreutic workshops. No 170 is believed to be of eastern origin. No 171, a piece of fine Greek workmanship, and no 177-179, probably from the Dardanelles, were apparently commissioned from Thrace. The list shows the usual prevalence of a standard weight of 20 staters for assorted silver vessels, as well as a standard weight of 50 staters for rhyta, whether in gold or in silver.

**Chronological horizons of Thraco-Macedonian weight standards**

Weight standards in Mesopotamia and Egypt can be traced back for millennia. A few prehistoric treasures from the Thraco-Macedonian region

(52) M. ANDRONIKOS, _op. cit._ [n. 21], p. 158.
(53) M.J. PRICE, _op. cit._ [n. 32], p. 20.
suggest a considerable antiquity for several of the weight standards considered here.

The Vulchitrun treasure is a hoard of 13 gold vessels dating from the Late Bronze Age, when the original inhabitants of Thrace had been overwhelmed by Achaean invaders who claimed royal privilege. The treasure is thought to comprise a ritual set dedicated to a solar cult, and to have belonged to a priest-king. The workmanship demonstrates that Thracian goldsmiths were familiar with the styles and techniques of their contemporaries from Central Europe to Asia Minor to Mycenae.

The Appendix lists seven of the 13 gold vessels of the Vulchitrun treasure that appear to correspond to the metrological units of Thraco-Macedonian coinage. The weight standards represented are the Attic (two objects), the reduced version of Raymond's Thraco-Macedonian Series 1 (two objects), and Raymond's Thraco-Macedonian Series 2 (three objects). (55) These correspondences may indicate that these three weight standards were in use in north central Thrace as early as 1500 B.C. No A6 and A7, a pair of kyathoi of nearly identical weight, support the idea that Late Bronze Age goldsmiths were already crafting vessels to standard weights; their standard weight of 10 staters matches that of no 137, a kyathos of the classical period from Derveni, and that of A3, another Vulchitrun kyathos on a different weight standard. However two other factors suggest that caution is in order. No A2 and A4 are virtually identical niello lids with divergent weights that cannot be interpreted according to a single weight standard. Also troubling is the fact that only about half the objects in the Vulchitrun treasure appear to correspond to round weights on identifiable standards.

A more general consideration argues in favor of the antiquity of the Thraco-Macedonian standards. The best known of them can be related to the Babylonian light mina, which is attested by stone weights dating back to at least 2000 B.C. The cosmopolitan character of the Vulchitrun vessels allows us to accept that the Late Bronze Age Thracians might have received currents of influence from far afield.

Hélène Cuvigny has demonstrated the survival of Thraco-Macedonian weight standards into the Hellenistic period and in regions far to the east of northern Greece. (56) A hemispherical silver bowl in the Louvre, with sober decoration characteristic of Seleucid and Parthian art, said to come from the region of Van, weighs 418.9g. Its weight thus conforms to a

(55) If this is indeed the standard of these objects, we should be skeptical of regarding Raymond's Series 2 as a "bridge" between the Attic and indigenous standards. This may well have been its function in Thraco-Macedonian coinage, but it does not have any obvious application in a premonetary economy.

mina on the reduced Attic standard. A pointillé inscription names its owner and records a weight of 120 drachms, yielding a drachm of 3.49g. Cuvigny regards this weight as very close to the mean of «the Thraco-Macedonian drachm». It appears to correspond to the drachm of the second reduction of Raymond Series 3. Also acquired by the Louvre was a silver vase of Hellenistic date weighing 177.4g. This is not an obvious multiple of any unit treated in the present study. But the pointillé inscription recording a weight of 55 drachms yields a drachm of 3.225g, in Cuvigny’s view a bit light for «the Thraco-Macedonian drachm», but easily recognizable as the drachm of Raymond’s Series 2. The heavier of two silver fluted hemispherical bowls in the Fleischmann collection, said to be from western Asia Minor, weighs 470g. Once again its weight does not conform to a multiple of one of the metrological units treated here. An inscription records a weight of 140 drachms, yielding a drachm of 3g, probably another drachm of Raymond’s Series 2 (at the light end of the weight range).

Methodology and control group

The analysis offered here draws on ten weight standards which yield 17 different metrological units that could be used to interpret the weights of precious metal objects. With so many units to choose from, could the results be merely random?

Vickers’ inventory of the Rogozen treasure (57) provided 165 weights of precious metal vessels, of which 19 were eliminated because the vessels were described as damaged, usually with parts missing. Of the remaining 146 weights, 102 — about 70% — conformed to round weights on one or another of the North Greek weight standards and were included in the catalogue.

The traveling exhibit Wealth of the Thracians included 71 intact or nearly intact precious metal objects from the historical period whose weights were published in the exhibition catalogue. Of these weights, 42 — about 60% — conformed to round numbers on one or another of the North Greek weight standards and were included in the catalogue.

As a control, the standard units of this study were compared against the weights of 122 precious metal artifacts from pre-Columbian Peru. (58) Dishearteningly, nearly half the Peruvian objects appeared to correspond to the metrological units of Thraco-Macedonian coinage, or to simple multiples thereof. Such correspondences were rare among artifacts of the

(57) M. VICKERS in B.F. COOK (ed.), op. cit. [n. 1], Appendix 1, p. 103-108.
(58) Oro del Peru, undated exhibition catalogue of Monterrico Museum.
Vicus culture but were common among artifacts of the Mochica, Nazca, and Chimú cultures. This disparity may be an indication that the latter three cultures employed weight standards that by coincidence approximated standards employed in the Thraco-Macedonian region.

The metrological correspondences between Peruvian artifacts and Thraco-Macedonian monetary units may seem to discredit the attempt to identify the original weight standards of North Greek vessels. But it is important to note that no patterns of standard weights emerged from the Peruvian control group. In contrast, the North Greek material reveals strong correlations between certain standard weights and certain types of vessels and ornaments.

There is nevertheless a problematic aspect to these correlations: they imply that toreutic workshops employed multiple weight standards more or less contemporaneously, even for vessels that were crafted together to form a set. Let us take a look at some products of the Odrysian royal workshops in the Rogozen treasure, all inscribed for or closely associated with Kotys I. A silver gilt jug inscribed «Kotys, son of Apollo» (nº 15) has been associated with four phialai of Achaemenid type, each with a facing head of Apollo on the omphalos. (59) In one case (nº 9) the facing head is an attached appliqué. The other three phialai are of identical design, made by the same craftsman, with the repoussé head of Apollo possibly formed on the same matrix (nº 51, 55, 61).

«Apollo set»

<table>
<thead>
<tr>
<th>Phialæ with Apollo applique, inscribed from Ergiske</th>
<th>Phialæ</th>
<th>Phialæ</th>
<th>Phialæ</th>
<th>Jug</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rogozen 42 (nº 9)</td>
<td>Rogozen 101 (nº 66)</td>
<td>Rogozen 102 (nº 61)</td>
<td>Rogozen 103 (nº 51)</td>
<td>Rogozen 112 (nº 15)</td>
</tr>
<tr>
<td>170.69 g</td>
<td>106.68 g</td>
<td>101.52 g</td>
<td>109.23 g</td>
<td>427.84 g</td>
</tr>
<tr>
<td>10 tetradracmas/staters</td>
<td>10 staters</td>
<td>10 staters</td>
<td>10 staters</td>
<td>1 mina</td>
</tr>
<tr>
<td>Attic standard</td>
<td>Persic standard</td>
<td>Persic standard</td>
<td>Persic standard</td>
<td>Attic standard</td>
</tr>
</tbody>
</table>

The three identical phialai are similar in weight and all are analyzed as vessels of 10 staters on the Persic standard. The fourth phialæ is of somewhat different design and perhaps from a different workshop, since it bears the signature of Ergiske. It too is a vessel of 10 staters, but on the Attic standard. The jug is of a characteristic mina weight, again on the Attic standard. The presence of two different weight standards in this ritual set is not especially troubling, as the Attic and Persic standards are fundamentally related. The total weight of the set (915.96 g) does not appear meaningful in terms of any of the weight standards employed in

(59) I. Marazov et al., op. cit. [n. 14], p. 219.
Northern Greece, unless it represents 100 staters of Raymond’s Series 1, reduced. If the phiale from Ergiske was a later addition, the set of three phialai together weighed 317.43g, a mina on Raymond’s Series 2 and very close to the official mina weight of fourth-century Maroneia.

The remaining vessels inscribed for Kotys present a less consistent aspect:

**Inscribed from Beos**

<table>
<thead>
<tr>
<th>Phiale</th>
<th>Rogozen</th>
<th>Dimensions</th>
<th>Weight</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phiale</td>
<td>Rogozen 28</td>
<td>12.7 x 4.5 cm</td>
<td>151.03 g</td>
<td>excluded</td>
</tr>
<tr>
<td>Phiale</td>
<td>Rogozen 29 (n° 98)</td>
<td>20.0 x 5.5 cm</td>
<td>272.50 g</td>
<td>1 mina 2.72 g 1st reduction Raymond Series 3,</td>
</tr>
<tr>
<td>Phiale</td>
<td>Rogozen 40 (n° 53)</td>
<td>12.0 x 3.4 cm</td>
<td>106.90 g</td>
<td>10 staters Persic standard</td>
</tr>
</tbody>
</table>

**Inscribed from Apro**

<table>
<thead>
<tr>
<th>Phiale</th>
<th>Rogozen</th>
<th>Dimensions</th>
<th>Weight</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phiale</td>
<td>Rogozen 30</td>
<td>14.2 x 4.9 cm</td>
<td>121.89 g</td>
<td>excluded</td>
</tr>
<tr>
<td>Phiale</td>
<td>Rogozen 31 (n° 50)</td>
<td>13.5 x 4.2 cm</td>
<td>110.05 g</td>
<td>10 staters Persic standard</td>
</tr>
</tbody>
</table>

**Inscribed from Ergiske**

<table>
<thead>
<tr>
<th>Phiale</th>
<th>Rogozen</th>
<th>Dimensions</th>
<th>Weight</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phiale</td>
<td>Rogozen 42 (n° 9)</td>
<td>14.8 x 4.6 cm</td>
<td>170.69 g</td>
<td>10 tetradrachms/ staters Attic standard</td>
</tr>
<tr>
<td>Phiale</td>
<td>Rogozen 43</td>
<td>13.2 x 5.2 cm</td>
<td>119.79 g</td>
<td>excluded</td>
</tr>
<tr>
<td>Phiale</td>
<td>Rogozen 44 (n° 136)</td>
<td>14.1 x 3.5 cm</td>
<td>124.25 g</td>
<td>10 staters Raymond Series 2 (drachm 3.27 g)</td>
</tr>
<tr>
<td>Phiale</td>
<td>Rogozen 46 (n° 109)</td>
<td>13.9 x 4.1 cm</td>
<td>134.13 g</td>
<td>10 staters Raymond Series 3, 2nd reduction</td>
</tr>
</tbody>
</table>

**Inscribed from Geistoi**

<table>
<thead>
<tr>
<th>Phiale</th>
<th>Rogozen</th>
<th>Dimensions</th>
<th>Weight</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phiale</td>
<td>Rogozen 45 (n° 134)</td>
<td>13.5 x 4.8 cm</td>
<td>128.31 g</td>
<td>10 staters Raymond Series 2 (drachm 3.208 g)</td>
</tr>
<tr>
<td>Phiale</td>
<td>Rogozen 47 (n° 105)</td>
<td>11.5 x 4.9 cm</td>
<td>136.12 g</td>
<td>10 staters Raymond series 3, 2nd reduction</td>
</tr>
</tbody>
</table>

Three phialai, one each from Beos, Apro, and Ergiske, were excluded from the catalogue despite being well preserved, because their weight standards could not be identified. The eight phialai included in the catalogue add three Thraco-Macedonian standards to the Attic and Persic standards already attested by the «Apollo set». The analysis thus points to the use of at least five different weight standards by the royal Odrysian workshops during a period of less than twenty-five years.

The Panagyrischte treasure provides another test case of a set of vessels that, with the possible exception of the phiale, appear to be products of a single workshop probably located in Thrace. (60)

(60) E. Simon, op. cit. [n. 24], p. 5-6.
The interpretations of no 16, 42, and 44 follow the metrological analyses offered in 1960 by Herbert Cahn. (61) Cahn identified three weight standards in the Panagyurishte treasure, the Persic, the Attic, and the Chian, and observed that the use of the Chian standard for fourth-century Thasian gold drachms permitted an assumption that the treasure originated in Thasos, particularly since this gold coinage seems to have circulated only locally. Our analysis adds two Thraco-Macedonian weight standards, with the somewhat troubling result that the two very similar stag head rhyta are assigned to two different weight standards. As noted earlier, a reduced version of Raymond Series 1 was employed for coinage in the Pangaian region and at Thasos in the early to mid-fifth century, and Raymond Series 2 was employed at Maroneia in the fourth century, though with a lighter norm for the drachm than that implied by the stag head rhyton no 144. These correlations may be consistent with Cahn’s tentative attribution of the Panagyurishte treasure to Thasos, but we should not forget that the Odrysian evidence indicates that the use of weight standards by metalsmiths was not directly linked to contemporary coinage. A Thasian origin for the Panagyurishte treasure seems unlikely for an historical reason: in the course of the fourth century Thasos lost most of its influence in Thrace while Maroneia gained control over the inland trade routes and main emporia. (62)

(61) H.A. CAHN, appendix to E. SIMON, op. cit. [n. 24], p. 26-28. Cahn used weights for two of the four rhyta that differ substantially from those employed in the present study: for one of the stag head rhyta (Plovdiv inv. 3197, no 144 in our catalogue) he gave the weight as 674.6g; for the second stag head rhyton (Plovdiv inv. 3198, no 71 in our catalogue) he gave the weight as 689g. The present study relied on the weights published in I. MARAZOV et al., op. cit. [n. 14], p. 142-148.

(62) Personal communication from S. Psoma, February 2008, citing the Pistiros inscription.
**SELECTED NORTH GREEK OBJECTS IN SILVER AND GOLD, BY WEIGHT STANDARD**

Archaic and Classical Period

**Attic standard**

Normative weight: Attic drachm, 4.30-4.36g

**Vessels — 20 drachm standard weight**

<table>
<thead>
<tr>
<th>No.</th>
<th>Material</th>
<th>Origin</th>
<th>Number</th>
<th>Weight (g)</th>
<th>Standard Weight</th>
<th>Value (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>69</td>
<td>86.48</td>
<td>20 drachms</td>
<td>4.324g</td>
</tr>
<tr>
<td>2.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>58</td>
<td>86.44</td>
<td>20 drachms</td>
<td>4.322g</td>
</tr>
<tr>
<td>3.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>72</td>
<td>86.34</td>
<td>20 drachms</td>
<td>4.317g</td>
</tr>
<tr>
<td>4.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>48</td>
<td>86.24</td>
<td>20 drachms</td>
<td>4.312g</td>
</tr>
<tr>
<td>5.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>66</td>
<td>86.00</td>
<td>20 drachms</td>
<td>4.300g</td>
</tr>
<tr>
<td>6.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>63</td>
<td>85.63</td>
<td>20 drachms</td>
<td>4.280g</td>
</tr>
<tr>
<td>7.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>25</td>
<td>84.91</td>
<td>20 drachms</td>
<td>4.245g</td>
</tr>
</tbody>
</table>

**Vessels — 40 drachm (10 tetradrachm/stater) standard weight**

<table>
<thead>
<tr>
<th>No.</th>
<th>Material</th>
<th>Origin</th>
<th>Number</th>
<th>Weight (g)</th>
<th>Standard Weight</th>
<th>Value (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>3</td>
<td>171.48</td>
<td>40 drachms</td>
<td>4.289g</td>
</tr>
<tr>
<td>9.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>42</td>
<td>170.69</td>
<td>40 drachms</td>
<td>4.267g</td>
</tr>
<tr>
<td>10.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>95</td>
<td>170.29</td>
<td>40 drachms</td>
<td>4.257g</td>
</tr>
<tr>
<td>11.</td>
<td>Silver jug</td>
<td>Rogozen</td>
<td>144</td>
<td>170.26</td>
<td>40 drachms</td>
<td>4.257g</td>
</tr>
<tr>
<td>12.</td>
<td>Silver gilt strainer</td>
<td>Vergina,</td>
<td>108</td>
<td>171.45</td>
<td>40 drachms</td>
<td>4.286g</td>
</tr>
</tbody>
</table>

**Doubtful example**

<table>
<thead>
<tr>
<th>No.</th>
<th>Material</th>
<th>Origin</th>
<th>Number</th>
<th>Weight (g)</th>
<th>Standard Weight</th>
<th>Value (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.</td>
<td>Silver phiale</td>
<td>Loukovit</td>
<td>8225</td>
<td>176.2</td>
<td>40 drachms</td>
<td>4.405g</td>
</tr>
</tbody>
</table>

**Vessels — 1 mina standard weight**

<table>
<thead>
<tr>
<th>No.</th>
<th>Material</th>
<th>Origin</th>
<th>Number</th>
<th>Weight (g)</th>
<th>Standard Weight</th>
<th>Value (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.</td>
<td>Silver gilt phiale</td>
<td>Bashova Mogila Duvanlii</td>
<td>1515</td>
<td>428</td>
<td>100 drachms</td>
<td>4.280g</td>
</tr>
<tr>
<td>15.</td>
<td>Silver gilt jug</td>
<td>Rogozen</td>
<td>112</td>
<td>427.84</td>
<td>100 drachms</td>
<td>4.278g</td>
</tr>
<tr>
<td>16.</td>
<td>Gold rhyton</td>
<td>Panagyurishte</td>
<td>3196</td>
<td>439.65</td>
<td>100 drachms</td>
<td>4.390g</td>
</tr>
</tbody>
</table>

**Vessels — multiple mina weights**

<table>
<thead>
<tr>
<th>No.</th>
<th>Material</th>
<th>Origin</th>
<th>Number</th>
<th>Weight (g)</th>
<th>Standard Weight</th>
<th>Value (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.</td>
<td>Gold phiale</td>
<td>Solokha tumulus</td>
<td>Duvanlii</td>
<td>86.5</td>
<td>20 drachms</td>
<td>4.325g</td>
</tr>
<tr>
<td>18.</td>
<td>Kantharos</td>
<td>Golemata tumulus</td>
<td>854</td>
<td>200 drachms</td>
<td>4.270g</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>Gold amphora-rhyton</td>
<td>Panagyurishte</td>
<td>Plovdiv inv. 3203</td>
<td>1695.25</td>
<td>400 drachms</td>
<td>4.260g</td>
</tr>
<tr>
<td>20.</td>
<td>Hydria</td>
<td>Macedon</td>
<td>Toledo</td>
<td>2537.28</td>
<td>600 drachms</td>
<td>4.230g</td>
</tr>
</tbody>
</table>

**Jewelry and Ornaments**

<table>
<thead>
<tr>
<th>No.</th>
<th>Material</th>
<th>Origin</th>
<th>Number</th>
<th>Weight (g)</th>
<th>Standard Weight</th>
<th>Value (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.</td>
<td>Gold appliques</td>
<td>Pandurska Mogila</td>
<td>Kustendil inv. II 225-II 240</td>
<td>0.86</td>
<td>Tenth stater</td>
<td>4.300g</td>
</tr>
<tr>
<td>22.</td>
<td>Gold pectoral</td>
<td>Goliamata Mogila</td>
<td>Plovdiv inv. 1643</td>
<td>86.60</td>
<td>20 drachms</td>
<td>4.330g</td>
</tr>
</tbody>
</table>

**Reduced Attic Standard**

Normative weight: Drachm, 4.10-4.20g

**Vessels — 20 drachm standard weight**

<table>
<thead>
<tr>
<th>No.</th>
<th>Material</th>
<th>Origin</th>
<th>Number</th>
<th>Weight (g)</th>
<th>Standard Weight</th>
<th>Value (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>23.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>21</td>
<td>82.22</td>
<td>20 drachms</td>
<td>4.110g</td>
</tr>
<tr>
<td>24.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>54</td>
<td>81.91</td>
<td>20 drachms</td>
<td>4.095g</td>
</tr>
<tr>
<td>25.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>16</td>
<td>81.54</td>
<td>20 drachms</td>
<td>4.077g</td>
</tr>
<tr>
<td>26.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>8</td>
<td>80.66</td>
<td>20 drachms</td>
<td>4.033g</td>
</tr>
</tbody>
</table>
WEIGHT STANDARDS OF THRACIAN TOREUTICS

27. Silver phiale
   Rogozen 13  80.24g  20 drachms  4.012g

28. Kalyx cup
   Vrubitsa  Sofia 51  168.50g  40 drachms  4.210g
29. Kalyx cup
   Asia Minor  BMFA 58.319  164.80g  40 drachms  4.120g
30. Kalyx cup
   Branichevo  Skoumen 408  164g  40 drachms  4.100g
31. Silver jug
   Rogozen  Rogozen 133  165.82g  40 drachms  4.150g
32. Silver gilt jug
   Rogozen  Rogozen 159  162.39g  40 drachms  4.060g
33. Silver jug
   Rogozen  Rogozen 152  161.96g  40 drachms  4.049g
34. Silver jug
   Rogozen  Rogozen 109  161.71g  40 drachms  4.040g
35. Silver phiale
   Branichevo  TTB 311  164g  40 drachms  4.100g
36. Strainer
   Derwi,  Thessalonke  162.93g  40 drachms  4.023g

37. Gold appliqué
   Kralevo Turgovishte inv. 8.1g  2 drachms  4.05g
   Tumulus  2305  (20 silver drachms)
38. Gold pectoral
   Strelcha  Sofia inv. 8431  40g  10 drachms  4.00g
   (1 silver mina)
39. Gold torque
   Tsibor Varosh  Sofia inv. 3242  410g  100 drachms  4.10g
   (10 silver minas)

Chian standard
Normative weight: Tetradrachm/stater, 15.85g
Example: Ainos, first half IV century (15.85g)
Normative weight: Drachm, 3.80-3.95g
Examples: Neapolis, first half IV century (3.75-3.80g), Ainos, second half IV century (3.80-3.90g)

Vessels
40. Jug
   Loukovit Loukovit 8212  157.7g  40 drachms  3.9425g
41. Silver gilt jug
   Rogozen Rogozen 156  157.45g  40 drachms  3.936g
42. Gold jug-rhyton
   Panagyurishte Plovdiv inv. 3202  387.2g  100 drachms  3.873g
   (10 silver minas)

Jewelry and Ornaments
43. Gold appliqué
   Pandurska Mogila Kiustendil inv. II 241  1.58g  tenth stater  15.80g

Persic standard (with Thraco-Macedonian adaptations)
Normative weight: Daric, 8.45g
44. Gold phiale
   Panagyurishte Plovdiv inv. 3204  845.7g  100 darics  8.457g

Normative weight: Stater, 10.55g
Examples: Archelaos (10.60-10.69g), Abdera Period VII, ca 360-350 (10.45-11.40g), Maroneia Period VIII, ca 365-mid-330s (10.55-10.90-11.30g), Orthagoreia (10.65g). The weight fell to 10.05g at Abdera in Period IX, ca 336-311.

Vessels — 5 stater standard weight
45. Silver phiale
   Rogozen Rogozen 98  50.78g  5 staters  10.16g
46. Silver phiale
   Rogozen Rogozen 61  50.60g  5 staters  10.12g
47. Silver phiale
   Rogozen Rogozen 36  50.53g  5 staters  10.11g

Vessels — 10 stater standard weight
48. Silver gold-figure kantharos
   Goliama Mogila Duvanli inv. 1634  107.3g  10 staters  10.73g
<table>
<thead>
<tr>
<th>No.</th>
<th>Item Type</th>
<th>Origin</th>
<th>Location</th>
<th>Weight (g)</th>
<th>Stater(s)</th>
<th>Weight (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>49</td>
<td>Kalyx cup</td>
<td>Izmir</td>
<td>Newcastle upon Tyne</td>
<td>110</td>
<td>10 staters</td>
<td>11.00</td>
</tr>
<tr>
<td>50</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>Rogozen 31</td>
<td>110.05</td>
<td>10 staters</td>
<td>11.00</td>
</tr>
<tr>
<td>51</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>Rogozen 103</td>
<td>109.23</td>
<td>10 staters</td>
<td>10.92</td>
</tr>
<tr>
<td>52</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>Rogozen 71</td>
<td>107.66</td>
<td>10 staters</td>
<td>10.77</td>
</tr>
<tr>
<td>53</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>Rogozen 40</td>
<td>106.90</td>
<td>10 staters</td>
<td>10.69</td>
</tr>
<tr>
<td>54</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>Rogozen 105</td>
<td>106.67</td>
<td>10 staters</td>
<td>10.67</td>
</tr>
<tr>
<td>55</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>Rogozen 101</td>
<td>106.68</td>
<td>10 staters</td>
<td>10.67</td>
</tr>
<tr>
<td>56</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>Rogozen 12</td>
<td>104.75</td>
<td>10 staters</td>
<td>10.48</td>
</tr>
<tr>
<td>57</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>Rogozen 99</td>
<td>104.61</td>
<td>10 staters</td>
<td>10.46</td>
</tr>
<tr>
<td>58</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>Rogozen 18</td>
<td>103.28</td>
<td>10 staters</td>
<td>10.33</td>
</tr>
<tr>
<td>59</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>Rogozen 59</td>
<td>102.67</td>
<td>10 staters</td>
<td>10.27</td>
</tr>
<tr>
<td>60</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>Rogozen 89</td>
<td>101.97</td>
<td>10 staters</td>
<td>10.20</td>
</tr>
<tr>
<td>61</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>Rogozen 102</td>
<td>101.52</td>
<td>10 staters</td>
<td>10.15</td>
</tr>
<tr>
<td>62</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>Rogozen 33</td>
<td>101.12</td>
<td>10 staters</td>
<td>10.11</td>
</tr>
<tr>
<td>63</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>Rogozen 65</td>
<td>100.95</td>
<td>10 staters</td>
<td>10.10</td>
</tr>
<tr>
<td>64</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>Rogozen 83</td>
<td>100.91</td>
<td>10 staters</td>
<td>10.09</td>
</tr>
<tr>
<td>65</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>Rogozen 53</td>
<td>100.70</td>
<td>10 staters</td>
<td>10.07</td>
</tr>
<tr>
<td>66</td>
<td>Silver jug</td>
<td>Rogozen</td>
<td>Rogozen 149</td>
<td>109.91</td>
<td>10 staters</td>
<td>10.99</td>
</tr>
<tr>
<td>67</td>
<td>Silver jug</td>
<td>Rogozen</td>
<td>Rogozen 154</td>
<td>109.00</td>
<td>10 staters</td>
<td>10.90</td>
</tr>
<tr>
<td>68</td>
<td>Silver jug</td>
<td>Rogozen</td>
<td>Rogozen 138</td>
<td>107.63</td>
<td>10 staters</td>
<td>10.76</td>
</tr>
<tr>
<td>69</td>
<td>Silver jug</td>
<td>Rogozen</td>
<td>Rogozen 133</td>
<td>103.57</td>
<td>10 staters</td>
<td>10.36</td>
</tr>
<tr>
<td>70</td>
<td>Askos</td>
<td>Derveni</td>
<td>Plovdiv</td>
<td>511.32</td>
<td>50 staters</td>
<td>10.23</td>
</tr>
<tr>
<td>71</td>
<td>Gold rhyton</td>
<td>Panagyurishte</td>
<td>Plovdiv inv. 3198</td>
<td>505.5</td>
<td>50 staters</td>
<td>10.11</td>
</tr>
<tr>
<td>72</td>
<td>Gold rhyton</td>
<td>Panagyurishte</td>
<td>Plovdiv inv. 3199</td>
<td>505.7</td>
<td>50 staters</td>
<td>10.11</td>
</tr>
<tr>
<td>73</td>
<td>Gold bowl</td>
<td>Kazichene</td>
<td>Sofia inv. 3014</td>
<td>1050</td>
<td>100 staters</td>
<td>10.50</td>
</tr>
<tr>
<td>74</td>
<td>Gold pectoral</td>
<td>Pandurska Mogila</td>
<td>Kiustendil inv. II 224</td>
<td>10.57</td>
<td>1 stater</td>
<td>10.57</td>
</tr>
</tbody>
</table>

**Vessels — 50 stater standard weight**

**Vessels — Other weights**

**Jewelry**

**Normative weight:** «Light» drachm (fifth stater), 2.18g

Examples: Mende, late V-early IV century (2.00g), Archelaus (ca 1.95g), Pordikkas III (2.06g)

**Vessels — 1 mina standard weight**

**Vessels — 1 mina standard weight**

**Jewelry**

**Normative weight:** «Light» drachm (fifth stater), 2.18g

Examples: Mende, late V-early IV century (2.00g), Archelaus (ca 1.95g), Pordikkas III (2.06g)
WEIGHT STANDARDS OF THRACIAN TOREUTICS

25

Vessels — multiple mina weights
79. Silver phiale Metropolitan 422g 200 drachms 2.11g
    Treasury 12

Thraco-Macedonian standard, Raymond Series 3
Normative weight: Tetradrachm, 14.80g
Example: Abdera Periods I-III, ca 520/15-450 (14.85-14.95g)

Vessels — 10 tetradrachm (40 drachms) standard weight
80. Silver jug Rogozen Rogozen 124 149.14g 10 tetradrachms 14.91g
81. Silver jug Rogozen Rogozen 118 148.02g 10 tetradrachms 14.802g
82. Silver jug Rogozen Rogozen 134 148.02g 10 tetradrachms 14.802g
83. Silver phiale Rogozen Rogozen 64 147.55g 10 tetradrachms 14.755g
84. Silver jug Rogozen Rogozen 126 147.17g 10 tetradrachms 14.717g

Jewelry — 1 tetradrachm (4 drachms) standard weight
85. Gold ring Small Tomb Shipka Kazanluk inv. K a II-1586 14.83g 1 tetradrachm 14.83g
86. Gold ring Arabadzhiska Mogila, Duvanlii Plovdiv inv. 1640 14.80g 1 tetradrachm 14.80g
(40 silver drachms)
87. Gold ring Brezovo Sofia inv. 1579 14.75g 1 tetradrachm 14.75g
(40 silver drachms)

Normative weight: Drachm, 3.68-3.76g
Example: Mosses (3.75-3.85g). Maroneia, ca 500-430 (3.55g, later 3.50g), Dikaia-by-Abdera, ca 480-460 (3.60-3.65g)

Vessels
88. Silver phiale Rogozen Metropolitan 37.51g 10 drachms 3.751g
     Treasury 86 747g 200 drachms 3.735g
     (20 silver minas)

Jewelry and Ornaments — 10 drachm standard weight
90. 36 gold appliques Tumulus Kralevo Turgovishte inv. 2306 36.36g 10 drachms 3.636g
     (silver mina)
91. Gold torque Veliko Turnovo inv. Sofia 33067 35.50g 10 drachms 3.55g
     (silver mina)

First reduction of Raymond Series 3, congruent with Phoenician standard
Normative weight: Tetradrachm, 14.25-14.50g
Actual examples: Akanthos, IV century (14.25g), Chalkidian League (14.40g), Amphipolis (14.30g), Philip of Macedon (14.45g)
Normative weight: Drachm, 3.68g
Actual examples: Amphipolis (3.60-3.76g), Philip II (ca 3.55g)

Vessels — 20 drachm standard weight
92. Phiale Loukovit Loukovit 8224 71.8g 20 drachms 3.59g

Vessels — 40 drachm (10 tetradrachm) standard weight
93. Silver jug Rogozen Rogozen 119 144.38g 40 drachms 3.609g
94. Silver phiale Rogozen Rogozen 106 144.08g 40 drachms 3.602g
95. Silver jug Rogozen Rogozen 114 142.91g 40 drachms 3.573g

Normative weight: «Light» drachm (fifth stater), 2.85g
Example: Philip II (2.80g). There is an overlap with the norms of «light» drachms struck on other indigenous standards: Raymond Series 2, norm 2.70g, example Abdera Period V, ca 415-395 (2.70g); and second reduction of Raymond Series 3, norm 2.65-2.80g, examples Abdera Period VI, ca 395-360 (2.65-2.70g), Damastion, after 350/45 (2.80-2.95g).
The normative weight used here could also have functioned as a half siglos on the Persic standard.

<table>
<thead>
<tr>
<th>Vessels</th>
<th>1 mina standard weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>96. Cup-kantharos Derveni</td>
<td>286.17g 100 drachms 2.8617g</td>
</tr>
<tr>
<td>97. Silver gilt phiale Rogozen Rogozen 97</td>
<td>281.66g 100 drachms 2.817g</td>
</tr>
<tr>
<td>98. Silver gilt phiale Rogozen Rogozen 29</td>
<td>272.50g 100 drachms 2.725g</td>
</tr>
</tbody>
</table>

Second reduction of Raymond Series 3
Normative weight: Tetradrachm, 13.50-14.00g
Examples: Sermyle, early V century (ca. 13.85g), Argilos before ca. 475 (13.45g), Abdera Period V, ca. 415-395 (14.00g), Maroneia Period V, ca. 430-400 (14.00g), Damastion, from ca. 410 (13.50g)
Normative weight: Drachm, 3.40-3.50g
Examples: Thasos, ca. 411-404 (3.65g), Neapolis with full ethnie (3.45-3.55g)

<table>
<thead>
<tr>
<th>Vessels</th>
<th>10 drachm standard weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>99. Silver phiale Loukovit Loukovit 8220</td>
<td>35.1g 10 drachms (implies tet of 14.04g) 3.51g</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vessels</th>
<th>20 drachm (5 tetradrachm) standard weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>100. Silver phiale Loukovit Loukovit 8222</td>
<td>70.7g 5 tetradrachms 14.14g 20 drachms 3.535g</td>
</tr>
<tr>
<td>101. Silver phiale Loukovit Loukovit 8223</td>
<td>70.2g 5 tetradrachms 14.04g 20 drachms 3.51g</td>
</tr>
<tr>
<td>102. Silver phiale Loukovit Loukovit 8219</td>
<td>68.6g 5 tetradrachms 13.72g 20 drachms 3.43g</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vessels</th>
<th>10 tetradrachm (40 drachm) standard weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>103. Silver jug Rogozen Rogozen 150</td>
<td>140.24g 10 tetradrachms 14.024g</td>
</tr>
<tr>
<td>104. Silver jug Rogozen Rogozen 140</td>
<td>138.64g 10 tetradrachms 13.864g</td>
</tr>
<tr>
<td>105. Silver phiale Rogozen Rogozen 47</td>
<td>136.12g 10 tetradrachms 13.612g</td>
</tr>
<tr>
<td>106. Silver jug Rogozen Rogozen 122</td>
<td>135.32g 10 tetradrachms 13.522g</td>
</tr>
<tr>
<td>107. Silver jug Rogozen Rogozen 157</td>
<td>134.90g 10 tetradrachms 13.49g</td>
</tr>
<tr>
<td>108. Silver phiale Rogozen Rogozen 84</td>
<td>134.75g 10 tetradrachms 13.475g</td>
</tr>
<tr>
<td>109. Silver phiale Rogozen Rogozen 46</td>
<td>134.13g 10 tetradrachms 13.413g</td>
</tr>
<tr>
<td>110. Silver jug Rogozen Rogozen 125</td>
<td>132.41g 10 tetradrachms 13.24g</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vessels</th>
<th>20 tetradrachm standard weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>111. Cup-kantharos Derveni</td>
<td>271.55g 20 tetradrachms 13.58g</td>
</tr>
<tr>
<td>112. Kalyx cup Egypt Brooklyn 55.183</td>
<td>271.2g 20 tetradrachms 13.59g</td>
</tr>
<tr>
<td>113. Silver kylix Vergina, Tomb II</td>
<td>269.8g 20 tetradrachms 13.46g</td>
</tr>
<tr>
<td>114. Silver kylix Vergina, Tomb II</td>
<td>266.2g 20 tetradrachms 13.31g</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other Vessels</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>115. Silver amphora-ryton Kukuva Mo-gila Duvanlii</td>
<td>Sofia inv. 6137 1344g 100 tetradrachms 13.44g</td>
</tr>
</tbody>
</table>
Jewelry
116. Gold ring
   Goliama
   Odrysian
   Plovdiv inv.
   1639
   Duvañili
   13.70g
   1 tetradrachm
   13.70g

Thraco-Macedonian standard, Raymond Series 2

Examples: A drachm of 3.27g is implied by various tetradrachm/staters of the archaic period, including Alexander I tetradrachms (13.15g) and Argilos, after ca 475 (13.00-13.07g). IVth century examples tend to run somewhat lighter: Maroneia Period VI, ca 400-377 (3.15g), Philippoi, ca 356-350 (3.10-3.15g), Lykkeios of Paonia (ca 3.15g), Pitraos of Paonia (3.10g), Anaxilas of Paonia (3.00-3.10g)

Vessels — 20 drachm standard weight
117. Silver phiale
   Rogozen
   66.98g
   20 drachms
   3.34g

Vessels — 40 drachm (10 tetradrachm) standard weight
128. Silver jug
   Rogozen
   131.42g
   40 drachms
   3.285g

Vessels — 80 drachm (20 tetradrachm) standard weight
140. Silver phiale
   Rogozen
   260.22g
   80 drachms
   3.25g

Vessels — 1 mina standard weight
141. Silver jug
   Rogozen
   321.16g
   100 drachms
   3.15g

Vessels — 2 minas standard weight
143. Silver jug
   Rogozen
   324.55g
   200 drachms
   3.2455g

Jewelry — 10 drachm standard weight
145. Gold necklace
   Small Tomb,
   Shipka
   Kazanluk inv.
   32.76g
   10 drachms
   3.276g

1. Doubtful example
<table>
<thead>
<tr>
<th>Item Number</th>
<th>Item Description</th>
<th>Location</th>
<th>Weight</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>146.</td>
<td>Gold ring</td>
<td>Ezerovo</td>
<td>10 drachms 3.13g</td>
<td>(1 silver mina)</td>
</tr>
<tr>
<td>147.</td>
<td>Gold pectoral</td>
<td>Muletarofo</td>
<td>1.32g</td>
<td>tenth stater 13.20g</td>
</tr>
<tr>
<td>148.</td>
<td>Gold pectoral</td>
<td>Bashova</td>
<td>19.6g</td>
<td>2 staters 9.8g</td>
</tr>
<tr>
<td>149.</td>
<td>Gold pectoral</td>
<td>Golemani</td>
<td>48.86g</td>
<td>5 staters 9.77g</td>
</tr>
<tr>
<td>150.</td>
<td>Gold bracelet</td>
<td>Golemani</td>
<td>96.90g</td>
<td>10 staters 9.609g</td>
</tr>
<tr>
<td>151.</td>
<td>Gold pectoral</td>
<td>Mushovita</td>
<td>195.8g</td>
<td>20 staters 9.79g</td>
</tr>
<tr>
<td>152.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>49.68g</td>
<td>5 staters 9.91g</td>
</tr>
<tr>
<td>153.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>47.94g</td>
<td>5 staters 9.588g</td>
</tr>
<tr>
<td>154.</td>
<td>Strainer</td>
<td>Prusias,</td>
<td>49.2g</td>
<td>5 staters 9.85g</td>
</tr>
<tr>
<td>155.</td>
<td>Phiale</td>
<td>Loukovit</td>
<td>99.7g</td>
<td>10 staters 9.97g</td>
</tr>
<tr>
<td>156.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>97.69g</td>
<td>10 staters 9.769g</td>
</tr>
<tr>
<td>157.</td>
<td>Silver phiale</td>
<td>Rogozen</td>
<td>96.49g</td>
<td>10 staters 9.649g</td>
</tr>
<tr>
<td>158.</td>
<td>Silver jug</td>
<td>Rogozen</td>
<td>97.16g</td>
<td>10 staters 9.716g</td>
</tr>
<tr>
<td>159.</td>
<td>Silver jug</td>
<td>Rogozen</td>
<td>196.31g</td>
<td>20 staters 9.815g</td>
</tr>
<tr>
<td>160.</td>
<td>Silver jug</td>
<td>Rogozen</td>
<td>195.56g</td>
<td>20 staters 9.778g</td>
</tr>
<tr>
<td>161.</td>
<td>Silver jug</td>
<td>Rogozen</td>
<td>191.58g</td>
<td>20 staters 9.579g</td>
</tr>
<tr>
<td>162.</td>
<td>Silver gilt</td>
<td>Vergina</td>
<td>195.7g</td>
<td>20 staters 9.785g</td>
</tr>
<tr>
<td>163.</td>
<td>Silver gilt</td>
<td>Vergina</td>
<td>192.2g</td>
<td>20 staters 9.61g</td>
</tr>
<tr>
<td>164.</td>
<td>Silver beaker</td>
<td>Dalboki</td>
<td>193.5g</td>
<td>20 staters 9.675g</td>
</tr>
<tr>
<td>165.</td>
<td>Oinochoe</td>
<td>Derweni</td>
<td>192.39g</td>
<td>20 staters 9.62g</td>
</tr>
<tr>
<td>166.</td>
<td>Strainer</td>
<td>Kavalla or</td>
<td>190.5g</td>
<td>20 staters 9.575g</td>
</tr>
</tbody>
</table>

**Jewelry and Ornaments**

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Item Description</th>
<th>Location</th>
<th>Weight</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>167.</td>
<td>Gold bridle</td>
<td>Kraievo</td>
<td>18.2g</td>
<td>2 staters 9.1g</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tumulus</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Normative weight: Tetradrachm/stater, 13.09g**

Examples: Alexander I (13.15g); Argilos after ca 475 (13.00-13.07g); Philippoi (13.25g), Abdera Period VI, ca 395-360 (13.00g), Maroneia Period VI, ca 400-377 (12.80-12.90g), Patraos of Paeonia (12.90g), Damastia, after ca 350 (12.75-12.90g)

**Normative weight: Stater, 9.82g**

Examples: « Lete » (perhaps Eion or Berge), late VI-early V century (9.85g), Mygdones or Galepsos, ca 490-465 (9.80g), Dikaia-by-Abdera, ca 515-480 or later (9.95g), Thasos, before ca 465 (9.75g).
WEIGHT STANDARDS OF THRACIAN TOREUTICS

168. Gold ring ? Sofia inv. 8398 18g 2 staters 9.00g

Vessels
169. Silver phiale Loukovit Loukovit 8006 94.5g 10 staters 9.45g
170. Silver phiale Rogozen Rogozen 26 92.25g 10 staters 9.225g
171. Silver phiale Rogozen Rogozen 76 44.88g 5 staters 8.976g

Vessels — 20 stater standard weight
172. Silver phiale Rogozen Rogozen 82 188.78g 20 staters 9.439g
173. Silver gilt phiale Rogozen Rogozen 4 182.83g 20 staters 9.14g
174. Silver jug Rogozen Rogozen 137 186.62g 20 staters 9.33g
175. Silver jug Rogozen Rogozen 110 184.68g 20 staters 9.234g
176. Silver beaker Dalboki Oxford 1948.102 183.8g 20 staters 9.19g
177. Silver beaker Dalboki Oxford 1948.103 183.2g 20 staters 9.16g
178. Kalyx cup Metropolitan 1972.118.159 184g 20 staters 9.2g

Rhyta — 50 stater standard weight
179. Silver rhyton Rokovets Sofia inv. B-49 449.5g 50 staters 8.99g
180. Gold jug- rhyton Panagyurishte Plovdiv 466.75g 50 staters 9.339g
181. Gold jug- rhyton Panagyurishte Plovdiv 460.75g 50 staters 9.215g

Appendix: The Vulchitrun Treasure, ca 1500 B.C.
Attic standard
A1. Gold kantharos, Vulchitrun treasure (N central Thrace), 1500 B.C. 4395g (= 10 minas, based on drachm of 4.39g)
   Wealth of the Thracians n° 185
A2. Gold niello lid, Vulchitrun treasure (N central Thrace), 1500 B.C. 1755g (= 4 minas, based on drachm of 4.39g, cf. A1 above). But see A4, an identical lid apparently on a different weight standard
   Wealth of the Thracians n° 186
Thraco-Macedonian tribal standard, Raymond series 1
A3. Gold kyathos, Vulchitrun treasure (N central Thrace), 1500 B.C. 919g (= 10 staters, based on stater of 9.19g)
   Wealth of the Thracians n° 193
A4. Gold niello lid, Vulchitrun treasure (N central Thrace), 1500 B.C. 1850g (= 200 staters, based on stater of 9.25g). But cf. A2, an identical lid apparently made to the Attic standard
   Wealth of the Thracians n° 187
Thraco-Macedonian tribal standard, Raymond series 2
A5. Gold lid, Vulchitrun treasure (N central Thrace), 1500 BC 658g (= double mina, based on drachm of 3.29g)
   Wealth of the Thracians n° 188
A6. Gold kyathos, Vulchitrun treasure (N central Thrace), 1500 B.C. 132g (= 10 staters, based on stater of 13.20g)
   Wealth of the Thracians n° 195
A7. Gold kyathos, Vulchitrun treasure (N central Thrace), 1500 B.C. 130g (= 10 staters, based on stater of 13.00g)
   Wealth of the Thracians n° 196