17. SCALE WEIGHTS

by Kathleen J. Birney and Ely Levine

IN ANCIENT precoinage economies, commodities were often bought and sold in exchange for quantities of silver. The silver was in the form of cut-up pieces of jewelry or segments of "chocolate bar" ingots (see Thompson 2003:figs. 2–5). These were weighed out on a two-pan balance, measuring them against known weights. The desired quantity of silver was obtained when the two pans of the scale were at an even height.

Scale weights were made in several shapes and materials. The objects published in this chapter are identified as weights by comparison with objects that are depicted as weights in ancient artwork or by inscriptions on the objects themselves (Petrie 1926; Davies and Gardiner 1933; Pulak 1996). In some cases, objects are identified as weights because of their contextual association with balances, weighing, or commercial activity in general (Eran 1982:94).

In addition, there are several criteria by which objects can be included in, or excluded from, the category of scale weights:

1. The object shows signs of having been worked, indicating that it was intended to be a particular shape and size.

2. The object has a discernible base on which it could have stood in the balance pan of a scale without rolling off.

3. The object displays a combination of shape and material or inscriptional pattern known elsewhere to have been used for scale weights.

4. The object has a mass that is an integer multiple or common fraction of a known base unit.

Objects that meet only some of these criteria could undoubtedly have been used as weights. Occasionally, naturally formed pebbles whose mass fit into the metrological system were used as weights. Their identification as weights must therefore rely upon determining the local system (or systems) in use.

A total of 37 objects from contexts dated to the seventh century B.C. at Ashkelon have been identified as possible weights. Some candidates were excluded on the basis of the criteria described above, namely, unworked stones whose mass did not fit any known weight standard or multiple. Spherical objects were excluded, not only because their mass did not fit any standard but, more importantly, because it was clear that such objects would be unwieldy on a balance pan. Some of these are better understood as hammerstones because they are pocked from repeated pounding (e.g., Eran 1994:98, no. 30—one of several such objects wrongly classified as weights).

The following catalogue presents all of the objects that can be reasonably classified as weights. They are presented typologically, according to shape, and then according to size within their respective categories. The mass for each object is given as preserved. We have noted the cases where there is reason to expect that the preserved mass is significantly different from the original intended mass. This can occur when the object is broken or otherwise incomplete (indicated by an asterisk). It can also occur when a metal object has become corroded, a circumstance that may have either increased or decreased the mass, depending on the particular chemical changes in a given object (indicated by a dagger).

In these cases, the weight cannot be studied metrologically. Attempting to reconstruct the original mass of an object is fraught with difficulty. In the case of broken objects, one must know the original shape quite accurately in order to extrapolate from it based on the density of the material, which might not have been consistent to begin with. And for metal weights, the fact that metal corrodes in different ways in different environments, sometimes gaining and sometimes losing mass, makes it impossible to guess the original mass without knowing the depositional history of each object. In such cases, because the possibility of error is high and the margin for error in metrological analysis is small, we have decided not to attempt a reconstruction.

Figure 17.1: Weights and balance from South Street in the marketplace (Grid 50 Square 58 Layer 262)

Typology

There are several generally recognized categories of weight shapes: cuboid, domed, discoid, rectangular, sphendonoid, pyramidal, cylindrical, and zoomorphic. These categories tend to be rather fluid, however. It must always be kept in mind that function ultimately took precedence over form in shaping the weight. As a result, there is a fine line separating dome-shaped weights from discoid weights, for example, and assigning a given weight to one or the other of these categories is often a subjective decision (e.g., Petrie 1926:pls. 3–5).

Furthermore, there are weights that do not fit neatly within a single category. They are classified here as "Weights of Mixed Character." Some of these weights might have originated as stones that naturally approximated one of the common shapes and whose mass was close to a known standard. For this reason, they were worked only partially in order to achieve the desired mass. Others were secondarily reworked from one shape to another in an effort to change their mass to match a different standard unit.

Cuboid Weights (cat. nos. 1–12)

The most frequent combination of shape and material among the weights found in late seventh-century B.C. contexts at Ashkelon is the bronze (copper alloy) cuboid. This type constitutes nearly a third of the corpus (12 of 37 items). Morphologically, the "cuboid" category, at Ashkelon and elsewhere, includes not just cubes but also parallelogram, trapezoidal, and flat-topped pyramidal shapes. These are classified as cuboid if the lengths of the sides are roughly equal.

Even though they are mold-cast, there is significant variation in shape within this category. Some of the weights are lopsided, although this could be due in part to corrosion. The Ashkelon cuboids range in size from 0.7 to 1.8 cm on a side. This is a rather limited range, considering that bronze cuboid weights found elsewhere can be as large as 7 cm on a side (Elayi and Elayi 1997:69). The larger examples are typically shorter than they are wide.

There are numerous typological comparanda for the Ashkelon examples. Cuboid weights are known from a wide range of sites and periods, from as far back as the fourth millennium B.C. at Mohenjo Daro, and extending as late as the Hellenistic period. Metal cuboids, however, tend to be restricted to the Iron Age. Bronze cuboid weights are sometimes treated together (inappropriately) with lead cuboid weights. The latter are more characteristic of the Persian period and later, and they are metrologically more con-

sistent with Greek than Levantine commercial standards, despite their pan-Mediterranean usage (Cour-Marty 1990:26–27). Bronze cuboid weights, on the other hand, were most common during the Iron Age II and Persian period in the Levant, as is shown by both typological and epigraphic evidence, although a paucity of stratified examples makes precise dating very difficult. The Ashkelon cuboids in fact constitute the largest collection of stratified examples of Iron Age bronze cuboid weights. The only other sites from which stratified cuboid weights have been recovered in situ are Ḥorvat Rosh Zayit, dating to the ninth century B.C. (Kletter 1994), and the underwater site of Palmaḥim (Sharvit and Galili 2005).

There is, however, no shortage of unprovenanced collections of cuboid weights. Perhaps the largest group are the 120 or so bronze cuboids from several unpublished or only partially published nineteenth-century collections that have been presented by Josette and Alain Elayi (1997). None of these comes from a confirmed archaeological context; however, general provenances have been proposed on the basis of collectors' notes, although these provenances are admittedly very broadly defined.

Additional (similarly unprovenanced) cuboid weights can be found among the larger collections published by Kletter (1998:59), Heltzer (2001), and Hendin (2006), as well as in other published series of inscribed "Phoenician" weights (Kletter 2000; Bron and Lemaire 1983; Lemaire 1982; etc.). All are dated between the ninth/eighth and fourth centuries B.C., based on a combination of paleography and similarity to other known weights.

Figure 17.2: Bronze cuboid weight
Cat. no. 9; reg. no. 44613; scale 1:1.

Dome-shaped Weights (cat. nos. 13–21)

The Ashkelon corpus includes nine dome-shaped weights. This is perhaps the most common shape of weights in the ancient Near East. The shape of the dome varies, yielding several subtypes, including a sharply carinated form, a nearly spherical form, and a thick disk with rounded edges.

It has been suggested that the carinated dome is an Egyptian form (Petrie 1926:5; Cour-Marty 1990:24–25; Kletter 1994:35). Indeed, they do constitute a surprisingly large proportion of the weights found in Egypt, perhaps as much as 40 percent. Moreover,

most of them appear to correlate to the Egyptian *qedet* standard of 9.5 g (Cour-Marty 1990). However, the Egyptian carinated domes are most often made from volcanic stone and only rarely of bronze. Raz Kletter (1994:36–37) proposes that the bronze carinated domes found at Ḥorvat Rosh Zayit were, in fact, Phoenician. This is supported to some extent by the high frequency of the carinated dome shape at Ugarit, although those weights span the Late Bronze Age to Persian period (Courtois 1990:120). More evidence is needed to resolve this question.

Rounded (uncarinated) dome-shaped weights appear all over the Levant. They were plentiful in the Late Bronze Age Uluburun and Cape Gelidoniya shipwrecks (Pulak 1996), and were dominant in the Iron Age Judahite system (Kletter 1998).

Dome-shaped weights were manufactured from bronze or were carved from stone. Stone was the favored material in the southern Levant. The weights of the Judahite system from the Iron Age IIC were usually inscribed limestone domes, although other shapes and materials, as well as uninscribed examples, are also found. Six inscribed dome-shaped weights based on the Judahite system have been discovered at Ashkelon, but only one from contexts dated to the seventh century B.C.; the others were found in secondary contexts, primarily in Persian-period fills.

Figure 17.3: Dome-shaped weight
Cat. no. 13; reg. no. 39126; scale 1:1.

Discoid Weights (cat. nos. 22–24)

The three discoid weights in our assemblage can be considered variants of the dome-shaped type. This is true especially of our catalogue no. **24** (reg. no. 46784), which is very similar to the dome-shaped examples except that the top of the dome is flattened. The discoid weights can also be considered variants of the cylindrical type (see below), but conventionally the discoid type has been distinguished from the cylindrical by an arbitrary ratio of base to height.

Discoid weights have been found at other sites, including the Iron Age II levels at Ashdod (e.g., Eran 1982:pl. 31:35). One of the Ashkelon discoid weights (cat. no. **22**; reg. no. 39845), which unfortunately is incomplete, is inscribed with a single large × on one face (see figure 17.4).

Figure 17.4: Discoid weight with incised × on one face
Cat. no. 22; reg. no. 39845; scale 1:1.

Rectangular Weights (cat. nos. 25 and 26)

Another of the less common shapes is the rectangular block. More than its shape separates it from the cuboid type because the rectangular type seems to include only stone weights. Excavations at Tell Keisan produced several examples of rectangular stone weights (Briend and Humber 1980:pl. 94:10, 14). At Ashkelon, several other rectangular weights were found in addition to the seventh-century B.C. examples, mainly in Persian-period contexts.

Sphendonoid Weights (cat. nos. 27 and 28)

Sphendonoid weights are among the most common in the ancient Near East (Pulak 1996).[1] They are poorly attested at Ashkelon, however. Only two were found in contexts dated to the late seventh century B.C. Sphendonoid weights are typically made of hematite or bronze. They occupy the lighter end of the range of weight units and are often used for fractional weights. They vary in the relative sizes of their bases, from completely circular in section, with no base (e.g., Petrie 1934; 1937:no. 5963, IAA no. 1935-

---

[1] The term sphendonoid means "shaped like a sling-bullet," but these weights probably imitate kernels of grain. The grain-kernel shape evokes the possible origin of the metrological system in the measuring of grain. The largest unit of weight, the talent, was probably the weight of the grain carried in a single donkey-load. The smallest fractional unit was probably the weight of a single barley kernel. In the Mesopotamian system, three barley kernels were equivalent to one carob seed (Heb. *gērâ*).

4298 [Tell el-ᶜAjjul]), to semicircular in section, with a flat base whose width is the maximum width of the weight (e.g., Kletter and Sharvit 2005 [Palmaḥim]).

Teardrop-shaped Weight (cat. no. 29)

The teardrop-shaped weight (cat. no. **29**; reg. no. 39382) looks like a cross between the sphendonoid and dome-shaped types. It is possible that the shape originated as a larger sphendonoid but was reworked to reduce the mass. Such forms appear both in Petrie's 1926 register as well as Cour-Marty's more recent catalog (Petrie 1926:pl. 7:77–78; pl. 8 nos. 913–15); Cour-Marty 1990:figs. 6:35–40; 8:1–16, 27). Among their examples are some in which the wider end is rounded and others in which it is flat. The large number of examples and their internal variation suggest that teardrop-shaped weights should be regarded as a distinct type.

Pyramidal Weights (cat. no. 30)

The object classified below as pyramidal (cat. no. **30**; reg. no. 39640) does not resemble the other pyramidal weights found at Ashkelon, or those found elsewhere. Its shape is more precisely described as a tetrahedron. This hematite weight has a triangular base, in contrast to most pyramidal weights, which have square or rectangular bases and are much taller than they are wide, are often truncated at the peak, and are pierced horizontally near the top.

Cylindrical Weights (cat. nos. 31 and 32)

Cylindrical weights are relatively rare. Sometimes they are grouped with discoid or dome-shaped weights. They are used primarily for larger multiples of a unit of mass. Catalogue no. **31** (reg. no. 40963), a heavy stone cylinder, weighs 205.66 g and probably corresponded to twenty-five Mesopotamian shekels (8.3 g per shekel).

Zoomorphic Weights (cat. no. 33)

The Late Bronze Age ship whose wreck was found at Uluburun off the southwestern coast of Turkey carried several bronze weights made in zoomorphic and anthropomorphic shapes (Pulak 1996). Petrie's (1926:pl. 9) catalogue of weights from Egypt contains many examples of zoomorphic weights, including some made from stone of various kinds. At Ashkelon, zoomorphic weights are underrepresented; the bronze "hedgehog" weight (cat. no. **33**; reg. no. 42873) is the only example.

Figure 17.5: Zoomorphic bronze "hedgehog" weight
Cat. no. 33; reg. no. 42873; scale 1:1.

Weights of Mixed Character (cat. nos. 34–37)

Four of the weights catalogued below exhibit a mixture of different morphological types. Naturally occurring water-washed pebbles, ovoid in shape, are placed in this category. Some show signs of having been worked, with the flattening of one side to make a base on which the weight could sit securely on the scale. Others appear to be in their natural state but are likely to have been used as weights because they have a suitable mass.

Metrology

Identifying the relevant unit of mass for a given weight must take into account the variance in mass among weights purporting to represent the same unit. Studies of ancient balances have shown that they permitted an error of up to 3 percent (Skinner 1967); that is, objects whose masses were within 3 percent of one other would register as equal on the scale. This means that weights replicated from an original could deviate up to 3 percent from the original weight. But that is not to say that all weights based on a single standard would have varied within only 3 percent of a hypothetical ideal weight. Ancient weights were rarely calibrated against a single standard weight. If every newly made weight diverged as much as 3 percent from the weight from which it was copied, then within a short period of time a far larger degree of error could creep into the system.

A better indication of the acceptable degree of error can be obtained by examining a group of weights that we are certain were based on the same standard and were in use during the same period of time. The Judahite inscribed weights come from a small geographical region, they have a narrow chronological range, and they are inscribed to indicate their putative value. An analysis of Kletter's (1998) catalogue of one-, two-, four-, and eight-shekel weights shows that their standard deviation is 4.7 percent of the mean (Levine 2008:19).

Few of the weights from Ashkelon are preserved well enough to determine their original mass. This

makes it difficult to obtain meaningful results by means of statistical analysis of the masses of the objects. For this reason, rather than attempting to determine inductively by statistical means the metrological standards used in this group of weights, we must rely upon knowledge of existing standards in the Near East.[2]

The most common weight system found in the broader Levant during the Late Bronze and Iron Ages is based on a shekel of 9.1–9.4 g. This is attested at Ugarit (Courtois 1990) and in the Late Bronze Age shipwrecks (Pulak 1996). This shekel standard is very close to the Egyptian *qedet* standard, which was typically set at 9.5 g (Cour-Marty 1990).

In contrast, the Judahite weight system was based on a shekel of 11.3 g (Kletter 1998). This corresponds to the so-called Sidonian shekel, which is attested by inscribed bronze weights (Elayi and Elayi 1997:47, nos. 3, 296, 319, 321). It also corresponds to the earlier hypothesized Hittite shekel of 11.75 g (Parise 1984:127). Despite the long history of discussion of the supposed Hittite unit, studies of Hittite weights have yet to confirm its existence (Castle 2000:158–61).[3] In Mesopotamia, weights were based on a shekel of 8.3 g (Parise 1991:513; Powell 1989).

Another weight unit, centered around 7.8 g, is variously identified as the unit of Ebla (Archi 1987), Carchemish (Parise 1981), or Phoenicia (Kletter 1994). It may also have been the primary subdivision of the Aegean Bronze Age unit (Petruso 1978) and is noted at Lefkandi (Kroll 2008:41–42). A mass of 7.8 g also fits a unit defined in Egyptian mathematical texts as the twelfth part of a *deben*, called a *snỉw* (Castle 2000:44), and it corresponds also to the *pym*, a common fraction in the Judahite shekel system equivalent to two-thirds of a shekel.[4]

In addition to these known units, we may consider the results of a statistical study of all of Ashkelon's Iron Age weights by one of the present authors, Ely Levine (2008). This study employed two separate statistical analyses to compare the masses of our weights to a range of possible unit masses. The first was Kendall's Statistic, a periodic equation that can be used to determine how close a given mass comes to being a perfect multiple of each possible unit mass. The figures are then totaled for each unit mass and compared. Kendall (1974) initially developed the statistic to determine the greatest common factor of units of length and it has since become a common tool in metrological studies (Petruso 1978; Pulak 1996; Castle 2000). Given its original function, however, Kendall's Statistic is poorly suited to accommodate fractional values. Moreover, it does not discriminate between values that appear in sets of weights (base units and common multiples such as 1, 2, 5, 10, etc.) and those that do not (7, 9, 13.25, etc.). Levine (2008:35–38, 345–52) addressed these difficulties by applying an equation designed to check for particular multiples and fractions, and to allow for variance. As a result, several probable unit masses were identified.

Of the 32 Iron Age weights he studied, all but five are accommodated reasonably well by a unit of mass of ca. 9.0 g, identified using Kendall's Statistic (Levine 2008:366). The 9.0-g unit may be a slightly lighter version of the Levantine shekel and the Egyptian *qedet*; in fact, when this unit appears at other Philistine sites, its average mass seems relatively low. Other possible units of mass present at Ashkelon center around 10.00 g, 11.40 g, and 7.50 g. A unit just above 10 g was identified by Pulak in the Uluburun shipwreck (Pulak 1996) and is found among the weights at Tell Jemmeh (Levine 2008:358–62). A mass of 11.40 g approximates the mass of the Judahite shekel, but such a unit appears in Philistia throughout the Iron Age in weights that are not made of limestone, are not dome-shaped, and are not inscribed (Levine 2008:393). This seems to indicate that the Judahites adopted an existing unit of mass and developed a coherent weight system based on it. A unit near 7.5 g may correspond to the apparent Phoenician shekel; however, it is also found at other Philistine sites (Levine 2008:381).

---

[2] Petrie (1926) reconstructed nine different weight standards based on weights found primarily in Egypt. He demonstrated ancient origins for units of mass such as the stater, daric, sela, etc. His later studies (e.g., Petrie 1928) continued along the same lines. The data he presented can be interpreted differently, however, so we will refrain from using Petrie's terminology, except where it has been verified by other, more reliable methods. For a fuller discussion and analysis of Petrie's approach, applying statistical methods in addition to Petrie's own typological analysis, see Levine 2008:43–52.

[3] The initial proposal for this Hittite weight unit was based on a text that describes a 40-shekel mina (Otten 1954–1955) but does not specify the size of the mina. Parise proposed a conversion with the Syrian 50-shekel mina (Parise 1981; 1989).

[4] Misunderstood from the beginning of the twentieth century, the inscription of *pym*, in conjunction with 1 Sam. 13:21, led Petrie to suggest that this was an independent

Philistine unit. Despite several demonstrations that the *pym* is instead part of the Judahite system (Scott 1959 and Kletter 1998, inter alia), this misconception has persisted in the literature (e.g., Ben-David 1979; Pulak 1996:39; 2000:259, 261, 265 n. 13).

Assigning a given weight to only one standard can be difficult, however. Ancient weight systems, whether by design or by accident, were often related to one other by simple ratios. As Mederos and Lamberg-Karlovsky (2004) point out, these simple ratios allowed for easy conversion by buyers and sellers who hailed from diverse geographical regions, from Egypt to Central Asia. The Egyptian *qedet* and Levantine shekel (9.4 g) were approximately four-fifths of the mass of a Judahite shekel (11.3 g), that is, four Judahite shekels were equivalent to five of the smaller units.[5] The Mesopotamian shekel (ca. 8.3 g) was, in turn, seven-eighths of the *qedet* and almost equivalent to the Egyptian *sniw* (7.8 g).

Table 17.1: Ratios of the Standard Weight Units

	7.8	8.3	9.4	11.3
7.8	1			
8.3	0.95	1		
9.4	$^4/_5$	$^7/_8$	1	
11.3	$^2/_3$	$^3/_4$	$^4/_5$	1

These ratios take into consideration the precision of the equipment and approximations necessary when moving from one cultural group to another. With such a small amount of data, we cannot reliably infer other, hitherto unknown, standard units. We can, however, correlate our weights with the systems known to have been in use in the area at the time. Because of the conversion ratios, it is not always possible to identify a single system in which a given weight was used, but in some cases we can be relatively certain. In most cases, there was no centralized standard, especially across a large region. For this reason, preferring one standard over another based entirely on small degrees of error is methodologically faulty.

Given the prominence of the *qedet*/Levantine shekel unit of just over 9 g, catalogue no. **14** (reg. no. 39300), a carinated dome with mass of 91.09 g, is most likely equal to ten of these units. This is especially likely in light of the suspected association of carinated domes with Egypt, in which case this weight would equal one *deben*. Kletter, in his analysis of the weights from Ḥorvat Rosh Zayit (1994), suggested that this shape may instead be native to Phoenicia and may be based on a unit of ca. 7.6 g. In

that case, our no. **14** would represent twelve units. At Ḥorvat Rosh Zayit, two carinated domes were found that have a similar mass; there is also a teardrop-shaped weight with approximately the same mass. No. **14** may also represent eight units of ca. 11.3–11.4 g. Only one of our weights, a stone discoid weighing 29.13 g (cat. no. **23**; reg. 46172), is almost certainly based on the unit of approximately 9.4 g. It represents three units of the Egyptian *qedet* or the Levantine shekel.

The teardrop-shaped weight (cat. no. **29**; reg. no. 39382; 10.93 g) and an irregularly shaped weight (cat. no. **37**; reg. no. 50775; 11.79 g) fit most closely into a system based on a unit equivalent to the Judahite shekel. These weights are not the same shape as the Judahite weights and are not inscribed (unlike cat. no. **20**; see below), so they should probably be understood as belonging to a distinct weight system with an equivalent unit mass. As mentioned above, it is possible that no. **29** was originally a larger weight that had been reworked, and when the desired mass was achieved, the craftsman stopped in the middle of reshaping it. The limestone discoid or dome-shaped weight (cat. no. **24**; reg. no. 46784), whose mass is 222.21 g, can be understood most easily as a twenty-shekel weight with the same base unit. This may be an example of a Judahite uninscribed weight (Kletter 1998:Appendix 4), but twenty-shekel weights are so uncommon as not to have been counted.

The small hematite dome with a mass of 2.61 g (cat. no. **17**; reg. no. 40032) cannot confidently be assigned to any one system. Fractional weights, in general, are particularly difficult to pigeonhole because smaller weights show greater variance.

Four weights seem to fit best a system based on the Mesopotamian shekel of 8.3 g. Catalogue no. **31** (reg. no. 40963), a squat cylinder weighing 205.66 g, corresponds to twenty-five Mesopotamian shekels. No. **26** (reg. no. 48083; 79.87 g) and no. **35** (reg. no. 49731; 85.03 g) are probably ten-shekel weights, and the schist dome (cat. no. **18**; reg. no. 46543; 41.66 g) is five Mesopotamian shekels.

Statistical analysis of the whole corpus of Iron Age weights from Ashkelon had pointed away from a base unit near 8.3 g. Closer examination of just the seventh-century weights suggests, however, that the 8.3-g base unit is the most likely choice for these four weights. Two other units that seemed likely, one between 7.6 and 7.8 g and one near 10.0 g, turned out not to be the best choice for any of the weights. This conclusion will guide our analysis of objects that are not obviously weights, that is, unworked or slightly modified stones of convenient mass which were probably used as weights. Identifying them as such

---

[5] Thus, among the inscribed Judahite weights, four-, eight-, twelve-, and sixteen-shekel weights are inscribed with the hieratic numerals 5, 10, 15, and 20, respectively.

requires fitting them into an existing weight system. For example, the ovoid pebble (cat. no. **34**; reg. no. 45986), which weighs 23.96 g, is equivalent to three units of 8.3 g or two units of 11.3 g.

Inscribed and Altered Weights

One inscribed dome-shaped weight (cat. no. **20**; reg. no. 40873) was found in a late seventh-century B.C. context. It is made of highly polished light beige limestone and bears several lightly incised marks on the top of the dome (figure 17.6). Among these markings it is possible to recognize the Judahite shekel sign and the hieratic numeral 10. Together, these typically indicate an eight-shekel weight in the Judahite system. In this case, the two symbols are askew from one another, with what appear to have been additional attempts to incise the hieratic numeral. With a mass of 86.38 g, this piece is rather light for an eight-shekel weight; in fact, it is lighter than all but one of the eight-shekel weights in Kletter's catalogue and weighs 4.7 percent less than the mean mass for this group (Kletter 1998). This is likely due to a loss of mass resulting from damage to its base.

Figure 17.6: Inscribed dome-shaped weight
Cat. no. 20, reg. no. 40873; scale 1:1.

Two additional inscribed weights were found in primary contexts at Ashkelon: a damaged discoid (cat. no. **22**; reg. no. 39845) and a damaged sphendonoid (cat. no. **28**; reg. no. 47039). Each is inscribed with an × or +. Given their poor condition, it is difficult to reconstruct their original mass. At best, we can say that the sphendonoid is missing somewhat less than half its original mass and the discoid is missing perhaps 20 percent.

The inscribed sphendonoid has three nearly exact parallels in Petrie 1926 (nos. 3682, 5527, and 5621). Petrie's no. 3682 is a flattened hematite sphendonoid weighing approximately 18.93 g. Unfortunately, although the other two weights (nos. 5527 and 5621)

are illustrated, Petrie provides no information concerning their mass, material, size, or provenance. A weight from Tell el-ᶜAjjul with a similar marking is reported as weighing 4.763 g (Petrie 1931:pl. 36 and pl.51:5692).

Cour-Marty (1990) notes that hematite sphendonoids were popular along the Palestinian coast. Her 432 examples of this shape (in both bronze and hematite) seem to adhere for the most part to three weight standards, 8–9 g, 40–45 g, and 86–95 g, although she implies a fourth category with much smaller mass, around 2 g.

Our inscribed sphendonoid, of which slightly less than half is missing, has an extant mass of 3.38 g. It is conceivable that its intended mass, in keeping with Cour-Marty's data, was originally between 8 and 9 g, although a smaller mass is probable.

Our inscribed discoid weight appears to have more parallels in the dome-shaped category than among its fellow discoids. Petrie records six bronze domes inscribed in the same way: a rounded bronze dome (Petrie 1926:no. 5128) weighing 10.5 g; a bronze carinated dome (no. 5238) weighing 6.9 g; a bronze carinated dome (no. 5255) from Defeneh weighing 7.1 g; and three more dome-shaped weights (nos. 5436, 5479, and 5509) for which we are given no other information.

The × markings, which were damaged when the weights were broken, may have indicated the original value of these weights. This symbol does not appear on any of the published Judahite dome-shaped stone weights. We therefore have an × inscribed on weights with the following masses: 4.763 g, 6.9 g, 7.1 g, 10.5 g, and 18.93 g (although three are bronze weights subject to corrosion and are thus not altogether reliable). If the × marking is to be understood in the same way in each of these cases, it may either represent the unit of mass on which these weights are based or it may represent the number of units of these weights in different systems. It is difficult at this point to construe these masses as being part of a single coherent system, as multiples or fractions of a particular unit of mass. If the latter alternative is the case, then this would have different implications for mass depending on the weight system in use. It is also possible that this symbol indicated different values in different systems. The available data are thus insufficient to determine the meaning of the × marking.

Two weights, catalogue no. **19** (reg. no. 42526) and catalogue no. **31** (reg. no. 40963), show signs of intentional alteration for the purpose of changing their mass. There are a few other weights that show signs of scratching or minor damage, but this is

probably attributable to simple use-wear and does not appear to have significantly altered the mass of the weights (e.g., cat. no. **17**; reg. no. 40032).

Catalogue no. **19** (reg. no. 42526) is a rounded stone dome into which a hole was drilled that is nearly 0.75 cm deep and roughly 1 cm in diameter at its base. Traces of lead were found in the base of the hole. The volume of the hole is equivalent to 1.5 cm^3. If filled to capacity, the lead would have added an additional 17.1 g to the original mass of the weight (90.68 g), bringing the total mass to 107.78 g. Barring brazen cheating (which we are not ruling out), it is unlikely that the depression would have been filled to capacity, because 108 g does not correspond well to the established weight standards. The hole may have been only partially filled, perhaps very slightly indeed, to achieve a mass closer to ca. 95 g, which is equivalent to ten units of 9.4 g; that is, ten Egyptian *qedet*s or ten Levantine ("Syrian") shekels.

The practice of boring and filling a weight with lead is not unprecedented. Similarly altered weights were found at Tell el-ᶜAjjul; for example, a large sphendonoid weighing 87.37 g (Petrie 1934:pl. 23). There is also a hematite dome from Tell eṣ-Ṣāfi with two bronze "plugs" (Levine forthcoming) that weighs 87.25 g.

The second altered weight in the Ashkelon assemblage, catalogue no. **31** (reg. no. 40963), is somewhat more ambiguous. It is a large stone cylinder weighing 205.66 g that shows signs of gouging in the center of both the top and the base, although not to any great depth. This may reflect an abortive attempt to alter the overall mass, yet its present mass corresponds nicely to twenty-five Mesopotamian shekels of 8.3 g and actually falls on the lighter, rather than the heavier, side of this value. The gouging may instead be simply the result of use and therefore incidental and unintentional.
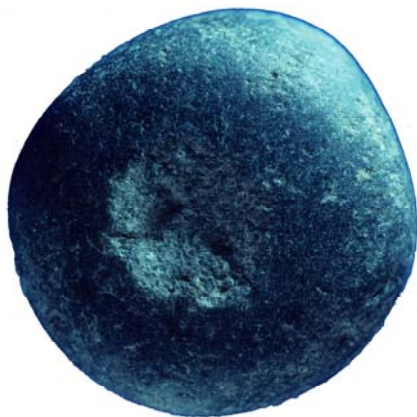

Figure 17.7: Altered cylindrical stone weight
Cat. no. 31, reg. no. 40963; scale 1:1.

Bronze Cuboid Weights

Finally, we turn to the bronze cuboid weights said to be representative of the "Phoenician" system. Unfortunately, the condition and composition of the bronze cuboid weights makes a reconstruction of their original mass all but impossible, even though other scholars have either attempted such reconstructions (Elayi and Elayi 1997:44) or have simply reported the extant mass as though it were the original mass, with no mention of corrosion (Kletter 1998).

Obviously, some weights are better preserved than others, but because we cannot know the density of the original metal, we cannot reliably determine what difference even a small degree of corrosion has made in the overall mass. Even a seemingly well-preserved bronze weight is likely to have suffered some change in mass. All of the Ashkelon cuboid weights exhibit some corrosion, so their extant masses cannot be considered a reliable basis for statistical metrological study. We must therefore rely primarily on typological parallels, comparing the Ashkelon examples with a broad range of bronze cuboid weights in order to note possible relationships to known categories, while still acknowledging the large potential for error. The collections of Elayi and Elayi (1997), Kletter (1994; 1998; 2000), and Hendin (2006) provide a broad corpus of parallels for this purpose.[6]

Of the twelve bronze cuboid weights in the Ashkelon seventh-century assemblage, eight are in sufficiently good condition to be included in this exercise. The extant masses of these better-preserved weights are, from largest to smallest: 26.02 g (cat. no. **4**), 19.39 g (cat. no. **10**), 17.35 g (cat. no. **9**), 15.3 g (cat. no. **5**), 10.84 g (cat. no. **12**), 7.65 g (cat. no. **8**), 5.47 g (cat. no. **1**), and 1.05 g (cat. no. **2**). If we assume that the same potential for corrosion exists for the larger collections of bronze cuboid weights, then we can at least identify some weight "classes" (to be distinguished from "mass units"—we are defining here groups and not systems) in which the Ashkelon weights might comfortably fit.[7] We have applied

---

[6] Note that these catalogues contain overlapping material and the vast majority of these weights are unfortunately unprovenanced.

[7] Obviously, the chemical composition of the bronze, the pH and water content of the soil, the duration of burial, and the environment at the site all play a part in corrosion. Thus, we cannot assume that they would all have undergone the same rate or kind of corrosion, in view of their diverse histories. We propose only that broad similarities might perhaps be visible across the total spectrum of known bronze cuboid weights, despite varying degrees of damage.

Kletter's 4.7-percent standard of deviation in assessing possible mass parallels for the Ashkelon bronze cuboids.

Catalogue no. **1** (reg. no. 20320), a cuboid weight of 5.47 g, has one uninscribed and six inscribed parallels that fall within the 5-percent margin of error. Of the inscribed cuboids, three are marked with ͨayin (Elayi and Elayi 1997:nos. 56 and 58; Lemaire 1980: 23 no. 7), one with *šin* (Lemaire 1980:27 no.5), one with a sign interpreted by Kletter as *šin* (Kletter 2000:no. 10), and one marked with an enigmatic semicircle or horseshoe (Kletter 2000:no. 30). The uninscribed cuboid weighs 5.42 g. All are damaged.

Catalogue no. **8** (reg. no. 43698), a cuboid weight of 7.65 g, has the following parallels: an inscribed bronze cuboid in the Elayi catalogue (Elayi and Elayi 1997:no. 53), which is inscribed with ⌐ (possibly the hieratic numeral 5); two weights inscribed with *pym* (Barkay 1978:216; Lemaire 1982:19); a single cuboid inscribed *lzkryhw y*ᵓ*r* (Kletter 1998:210, Pym.44); and three uninscribed cuboids that weigh 7.95 g, 7.6 g, and 7.5 g (Kletter 1998:210, Pym.45–46).

Catalogue no. **12** (reg. no. 40614), which weighs 10.84 g, has the greatest number of parallels. They are also the most consistently inscribed. Each of the seven inscribed parallels is marked with ͨayin (Elayi and Elayi 1997:nos. 42–45; Kletter 2000:no. 23; Hendin 2006:nos. 256–57). There is also one additional uninscribed example published by Hendin (2006:no. 258). These weights range in mass from 10.2 to 10.9 g.

Catalogue no. **5** (reg. no. 39484), a cuboid weight of 15.3 g, has five parallels that fall within the 5-percent margin of error. Four of them are inscribed (Elayi and Elayi 1997:nos. 32–35) and all are described as being in good condition. Two of them (nos. 32 and 33) are inscribed with *ḥet* and two with *šin*. One additional weight (Kletter 2000:no. 17) bears an unclear mark. There is also a single uninscribed weight, mildly corroded, which weighs 16 g (Elayi and Elayi 1997:no. 107).

Catalogue no. **9** (reg. no. 44613), a cuboid weight of 17.35 g, has two uninscribed parallels in the Elayi catalogue that weigh 16.9 g and 16.55 g (Elayi and Elayi 1997:nos. 105, 106).

Catalogue no. **10** (reg. no. 44680), a cuboid weight of 19.39 g, has one parallel in the Elayi catalogue: a single ͨayin-inscribed weight with a mass of exactly 20 g (Elayi and Elayi 1997:no. 29). It is described as damaged, however.

Catalogue no. **4** (reg. no. 39007), a cuboid weight of 26.02 g, has two inscribed parallels, both marked with *šin* (Elayi and Elayi 1997:no. 23; Kletter 2000: no. 5).

Catalogue no. **2** (reg. no. 38975), a cuboid weight of 1.05 g, is too small to fit any recognizable standard within a reasonable margin of error.

It appears, then, that there are some distinct weight classes into which the bronze cuboid weights from Ashkelon can be sorted. The largest classes cluster around 5.5 g, 7.65 g, 10.5 g, and 15.3 g. Mass units of ca. 5.5 g have been connected with the Persian "sigloi" (Vickers 1991:33; Kletter 2000:39) and could likewise represent half of a ca. 10.5-g unit. The prevalence of weights close to 7.65 g and weights twice as heavy that are close to 15.3 g may indicate that there was a linkage between the bronze cuboid weight system and a system based on a weight of 7.6 g, whether this was the Judahite *pym* or a Phoenician unit, as Kletter (1994) has argued. Catalogue no. **12** may likewise correspond to a known unit of roughly 10.5 g. Kletter (2000:35–40) has proposed that the inscriptions on bronze cuboids can be interpreted as markers of differing base units. In particular, he proposes that those marked with ͨayin indicate a base unit of ca. 10.5 g. It is admittedly unclear whether uninscribed cuboid weights necessarily belong to the same weight categories as inscribed cuboid weights of equivalent mass. There is the added difficulty that inscribed parallels within the same weight class are at times marked with different letters, particularly on smaller values that could serve as useful fractions of a number of different base units (see, e.g., the parallels for cat. no. **1** above). Nonetheless, we note with interest that each of the seven inscribed parallels for our catalogue no. **12** is inscribed with ͨayin, which may collectively indicate a common system. The base unit of 10.5 g has been variously associated with Tyre or Samaria (Elayi and Elayi 1997:319) and may have been the precursor to the later Persian stater (Lemaire 1980:30). We must remember that the Ashkelon weights constitute only a small percentage of the known corpus of bronze cuboids, so the "peaks" in our assemblage are mere blips in the overall spectrum. Moreover, we must acknowledge that, given the potential for changes in mass due to damage and corrosion, the groupings do not necessarily imply original standards or multipliers precisely at 5.5 g, 7.65 g, 10.5 g, and 15.3 g. Still, these peaks do match well the known mass units represented throughout the Iron Age Levant.

Although it cannot be statistically confirmed, the Ashkelon bronze cuboid weights appear to represent base units that are not well represented among the remainder of our seventh-century corpus of weights. Within the broader assemblage, peaks were noted most often at 8.3 g, 9.4 g, and 11.3 g and their multiples, suggesting interaction with the Mesopotamian,

Egyptian, and Judahite systems, respectively. The cuboids reflect a probable standard in the range of 7.6–7.8 g which, while possibly attested in the broader corpus, is relatively uncommon. However, the peak at 10.5 g and the possible half-unit at 5.47 g (cat. no. **1**) appear to be unique to the bronze cuboid assemblage, and are rare among the other weight types.[8]

Bronze Cuboid Weights and the Phoenician Question

A substantial proportion of bronze cuboid weights (nearly 70 percent in the Elayi catalogue) bear "Phoenician" inscriptions. These range from a single letter (ᶜayin, ḥet, and šin are common), to an indicator of multiples (rbᶜ šql), to what appear to be possessives (lmgn or the more ambiguous lmlk). This has led many scholars to treat these weights as representative of a "Phoenician" standard (Lemaire 1980; Bron and Lemaire 1936; Elayi and Elayi 1997). Although a Phoenician attribution is certainly possible, there is no clear evidence by which to tie these weights to a specifically Phoenician cultural sphere, nor even to a single metrological standard.

First, the language of the inscription is not always clear. There are cases in which the so-called Phoenician inscription could be Aramaic (Heltzer 2001: 133). It is thus incorrect to designate the bronze cuboid weights as representative of a Phoenician standard simply by virtue of the epigraphic evidence. Moreover, the relationship between inscriptions and the corresponding values of the weights has long been problematic because an inscription does not necessarily reflect the original intended value of a weight but may instead reflect its value in a complementary system. This is clearly demonstrated in the four-shekel dome-shaped weights of the Judahite system, which are often marked with the hieratic numeral 5, as noted above (Kletter 1998:122).

A similar principle seems to be operative among at least some of the cuboid weights, as illustrated by two unprovenanced bronze cuboids, both dated paleographically to the seventh century, which bear the inscription *pym* (Barkay 1978:216; Lemaire 1982: 19). Although the bronze cuboid is not a form typical of Judahite weights, the masses of these *pym* cuboids, both of which weigh 7.95 g, fit within the accepted standard deviation from the conventional *pym* value of 7.5 g and indicate that the merchants using them

were engaging in transactions that involved the Judahite system. These *pym* weights thus highlight the risk inherent in classifying "Phoenician" inscribed weights and, by extension, uninscribed bronze cuboids, because such weights do not necessarily reflect a Phoenician standard. They may instead have been used in several systems and the Phoenician markings simply helped the merchants to carry out the necessary conversions between systems.

Context, too, is of very limited value in determining the "ethnicity" of the bronze cuboids. To date, bronze cuboid weights have been recovered from clear archaeological contexts at only three sites: Ḥorvat Rosh Zayit (one cuboid), Palmaḥim (three cuboids), and Ashkelon, which has produced a total of 28 cuboid weights from Iron II contexts (twelve from late seventh-century contexts). Admittedly, this distributional pattern—or lack thereof—may reflect both the difficulty of discerning such tiny objects in the archaeological record and their popularity on the antiquities market. Yet we are left with the curious conundrum that not a single bronze cuboid weight has been excavated in Phoenicia, despite Kletter's assertion that this kind of weight is typical of northern and coastal sites (Kletter 2000:35).

The metrology is no less complicated, for not only do the bronze weights fail to reflect any single system, but there is no agreement among scholars concerning what the hypothetical Phoenician unit actually was. Indeed, during the period in question (the eighth–fourth centuries B.C.), there is some evidence that each of the individual Phoenician cities had its own standard (e.g., the notorious *šql sdn* weight; Bron and Lemaire 1983:765). Kletter tentatively proposes a Phoenician weight standard of 7.6 g, which suits the weights from Ḥorvat Rosh Zayit (most of which are dome-shaped). However, the larger Elayi catalogue shows a much greater variation in possible standards, both among the inscribed and uninscribed bronze weights. Most of the weights are attributed to standards of 8.4 g, 9.5 g, or 10.5 g, which correspond to the Babylonian, Egyptian/Syrian, and Persian systems, respectively (Elayi and Elayi 1997:319). The apparent absence of a single standard at 7.6 g and the overall diversity of systems represented seem to indicate that neither the inscribed nor the uninscribed bronze cuboid weights belonged to a single system. This may explain why the bronze cuboid weights from Ashkelon, and other isolated examples, likewise fail to conform to a single system.

Kletter (2000:39) resolves this difficulty by suggesting that bronze cuboids reflect, not a single base unit, but a single set of weights, which allowed a merchant to weigh any quantity in any system. This

---

[8] Catalogue no. **29** (reg. no. 39382), which weighs 10.93 g, also fits within the accepted 3–5 percent deviation from a ca. 10.5 g standard, although it might be better suited to the Judahite standard of 11.3 g.

may in fact be the case with respect to the group of ten weights recovered from the South Street in the marketplace at Ashkelon (Grid 50 Square 58 Layer 262). Six of the ten are bronze cuboid weights (cat. nos. **2–6** and **11**). The others are a bronze carinated dome (cat. no. **13**; reg. no. 39126; 27.58 g), a bronze sphendonoid (cat. no. **27**; reg. no. 39259; 27.12 g), a stone dome (cat. no. **14**; reg. no. 39300; 91.09 g), and a stone teardrop (cat. no. **29**; reg. no. 39382; 10.93 g). With one exception (cat. no. **5**; reg. no. 39484; 15.3 g), the bronze cuboid weights recovered from Layer 262 were too damaged to be metrologically useful. But even within this small group at least three standards are attested with base units at 9.1 g, 10.5 g, and 11.3 g—a testament to the international character of the transactions conducted on a single street.

In light of the paucity of excavated examples of bronze cuboid weights in Phoenician contexts and in view of the potential ambiguity in identifying the inscriptions (most of which are merely single letters) as clearly Phoenician, it seems premature to assign the bronze cuboids to any particular cultural sphere. It may well be that bronze cuboids are a category of weights deliberately designed for conversion rather than for simple assessment of weight. If so, it is not surprising that so many of them should appear at Ashkelon, or indeed any seaport, whether Phoenician, Philistine, or otherwise.

Conclusion

Any analysis of materials excavated from a destruction context is admittedly somewhat tricky. In effect, we are taking an arbitrary slice of history and using it to extrapolate the broader conditions that obtained at the end of the seventh century B.C. However, when viewed against the wider backdrop of the other Iron Age weights discovered at Ashkelon, it is possible to reconstruct a more general picture of the economic and commercial environment in which the city played a role.

The presence in seventh-century Ashkelon of at least three different weight systems based on the Egyptian *qedet*/Levantine shekel (9.4 g), the Mesopo-

tamian shekel (8.3 g), and the Judahite shekel (11.3 g) confirms that the city's inhabitants engaged in active commerce with people of diverse origin. It is not surprising that the merchants of Ashkelon traded with Egypt, in light of the latter's geographical proximity, its extensive natural and economic resources, and its attempts to assert its power in the region during the period of Assyrian decline. The Mesopotamian system may be a holdover from the period of Assyrian hegemony in the region, or it may be evidence of an attempt by the Babylonians to exert economic control before their ultimate destruction of Ashkelon and other kingdoms in the southern Levant. Since none of these weights appears to be obviously Mesopotamian in origin—there are no duck-shaped weights, for example—we may also consider the possibility that participation in the Mesopotamian economic system was a choice made by Ashkelonian merchants. The standard of ca. 10.5 g represented among the bronze cuboid weights might be indicative of interaction with a Mesopotamian, or at least northern (perhaps Phoenician or Syrian), trading system.

As for Judah, not only did Ashkelon share a border with the kingdom of Judah in the seventh century B.C., but Weiss and Faust (2005) have shown that the agricultural hinterland necessary to feed the population of Ashkelon must have extended well into the Judahite Shephelah. In fact, it has been demonstrated that some of the grain found in at Ashkelon came from the Judean hills (see chapter 23 in this volume). Trade with Judahites would have been essential.

Trade relations can be observed in the archaeological record through the preservation in one region of artifacts native to another. In many cases, however, the traded commodities themselves are not preserved. Fortunately, scale weights such as those presented in this chapter provide another kind of evidence of commercial relations that can give us additional information concerning the geographical zone in which the trade was conducted and on whose weight system. Weights expand our understanding of the dynamics of ancient commerce and give us a better understanding of how Ashkelon fit into the Mediterranean world.

Table 17.2: Scale Weights from Contexts Dated to the Seventh Century B.C. at Ashkelon

Catalogue No.	Shape	Material	Findspot
1	Cuboid	Bronze	Grid 50 Square 57 Layer 134
2	Cuboid	Bronze	Grid 50 Square 58 Layer 262
3	Cuboid	Bronze	Grid 50 Square 58 Fine-grid 14 Layer 262
4	Cuboid	Bronze and lead	Grid 50 Square 58 Fine-grid 34 Layer 262
5	Cuboid	Bronze	Grid 50 Square 58 Fine-grid 53 Layer 262
6	Cuboid	Bronze	Grid 50 Square 58 Fine-grid 33 Layer 262
7	Cuboid	Bronze	Grid 50 Square 48 Fine-grid 40 Layer 428
8	Cuboid	Bronze	Grid 50 Square 46 Fine-grid 68 Layer 56
9	Cuboid	Bronze	Grid 38 Square 84 Fine-grid 65 Layer 299
10	Cuboid	Bronze	Grid 50 Square 57 Layer 259
11	Cuboid	Bronze	Grid 50 Square 58 Fine-grid 23 Layer 262
12	Cuboid	Bronze	Grid 50 Square 57 Fine-grid 50 Layer 206
13	Dome	Bronze	Grid 50 Square 58 Fine-grid 34 Layer 262
14	Dome	Stone	Grid 50 Square 58 Fine-grid 33 Layer 262
15	Dome	Bronze	Grid 38 Square 74 Layer 480 Feature 480
16	Dome	Bronze	Grid 38 Square 83 Fine-grid 50 Layer 342 Feature 342
17	Dome	Hematite	Grid 50 Square 58 Fine-grid 88 Layer 291
18	Dome	Schist	Grid 50 Square 48 Layer 453
19	Dome	Stone	Grid 50 Square 48 Layer 390
20	Dome	Stone	Grid 38 Square 74 Layer 482
21	Dome	Bronze	Grid 50 Square 67 Fine-grid 36 Layer 61
22	Discoid	Stone	Grid 50 Square 48 Layer 384
23	Discoid	Stone	Grid 50 Square 48 Layer 453
24	Discoid	Stone	Grid 50 Square 49 Layer 453
25	Rectangular	Stone	Grid 50 Square 47 Layer 302
26	Rectangular	Basalt	Grid 50 Square 48 Layer 453
27	Sphendonoid	Bronze	Grid 50 Square 58 Fine-grid 54 Layer 262
28	Sphendonoid	Hematite	Grid 50 Square 47 Layer 302
29	Teardrop	Stone	Grid 50 Square 58 Fine-grid 23 Layer 262
30	Pyramidal	Hematite	Grid 50 Square 58 Fine-grid 81 Layer 264
31	Cylindrical	Stone	Grid 50 Square 49 Fine-grid 6 Layer 401
32	Cylindrical	Bronze	Grid 50 Square 49 Layer 425
33	Zoomorphic	Bronze	Grid 50 Square 49 Fine-grid 29 Layer 418
34	Mixed	Stone	Grid 50 Square 48 Layer 453
35	Mixed	Stone	Grid 50 Square 48 Layer 496
36	Mixed	Stone	Grid 50 Square 58 Layer 99
37	Mixed	Stone	Grid 50 Square 67 Fine-grid 36 Layer 61

Catalogue of Scale Weights from Contexts Dated to the Seventh Century B.C. at Ashkelon

Thirty-seven objects found in contexts dated to the seventh century B.C. can be classified as weights. They are listed here by shape. An asterisk * next to the mass indicates that it represents only the extant portion of an incomplete or damaged weight and thus cannot be used in metrological analysis without reconstruction or extrapolation. A dagger † next to the mass indicates that the figure is unreliable due to a high level of corrosion (i.e., of a metal weight). Note that the term "bronze" is used here to refer to any copper alloy.

CUBOID WEIGHTS

Catalogue no. 1

Registration no.: 20320
Year excavated: 1987
Findspot: Grid 50 Square 57 Layer 134
Mass: 5.47 g †
Dimensions: Not available.
Material: Bronze
Shape: Cuboid
Remarks: Well preserved. No drawing or photograph available.

Catalogue no. 2

Registration no.: 38975
Year excavated: 1992
Findspot: Grid 50 Square 58 Layer 262
Mass: 1.05 g *
Dimensions: ca. 5 × 5 mm
Material: Bronze
Shape: Cuboid
Remarks: Some wear at the corners.
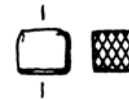
Scale 1:1

Catalogue no. 3

Registration no.: 38978
Year excavated: 1992
Findspot: Grid 50 Square 58 Fine-grid 14 Layer 262
Mass: 13.3 g * †
Dimensions: ca. 17 × 15.7 mm (before cleaning)
Material: Bronze
Shape: Cuboid
Remarks: Found in seven pieces, severely damaged and corroded. Outer sections and sides had broken away from the core.
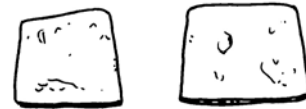

Scale 1:1 (largest piece)

Catalogue no. 4

Registration no.: 39007
Year excavated: 1992
Findspot: Grid 50 Square 58 Fine-grid 34 Layer 262
Mass: 26.02 g * †
Dimensions: 16 × 15 mm
Material: Bronze and lead
Shape: Cuboid
Remarks: Large cracks at each edge and one damaged corner.
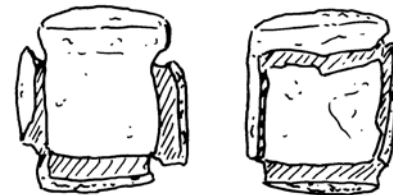
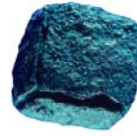

Scale 1:1

Catalogue no. 5

Registration no.: 39484
Year excavated: 1992
Findspot: Grid 50 Square 58 Fine-grid 53 Layer 262
Mass: 15.3 g †
Dimensions: 16 × 16 mm
Material: Bronze
Shape: Cuboid
Remarks: Surface corroded and discolored to black.
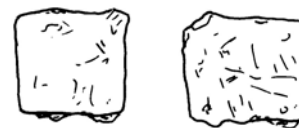
Scale 1:1

Catalogue no. 6

Registration no.:	40724
Year excavated:	1992
Findspot:	Grid 50 Square 58 Fine-grid 33 Layer 262
Mass:	6 g * †
Dimensions:	14 × 13 × 12 mm
Material:	Bronze
Shape:	Cuboid
Remarks:	Poor condition. Sides cracked and bursting away from core.

Scale 1:1

Catalogue no. 7

Registration no.:	42534
Year excavated:	1993
Findspot:	Grid 50 Square 48 Fine-grid 40 Layer 428
Mass:	4.25 g †
Dimensions:	9 mm (longest side)
Material:	Bronze
Shape:	Cuboid
Remarks:	Almost trapezoidal in shape; the top is somewhat narrower than the base. No drawing or photograph available.

Catalogue no. 8

Registration no.:	43698
Year excavated:	1993
Findspot:	Grid 50 Square 46 Fine-grid 68 Layer 56
Mass:	7.65 g †
Dimensions:	17 × 15 × 13 mm
Material:	Bronze
Shape:	Cuboid
Remarks:	Middling preservation with a high degree of encrusted corrosion.

Scale 1:1

Catalogue no. 9

Registration no.:	44613
Year excavated:	1994
Findspot:	Grid 38 Square 84 Fine-grid 65 Layer 299
Mass:	17.35g †
Dimensions:	16 × 15 mm
Material:	Bronze
Shape:	Cuboid
Remarks:	Very good condition but with some visible pockets of corrosion.

Scale 1:1

Catalogue no. 10

Registration no.:	44680
Year excavated:	1994
Findspot:	Grid 50 Square 57 Layer 259
Mass:	19.39 g †
Dimensions:	ca. 20 × 20 mm
Material:	Bronze
Shape:	Probably cuboid
Remarks:	Very rough cube, extremely corroded on all but one side, which may be a worked, flat base.

Scale 1:1

Catalogue no. 11

Registration no.:	39381
Year excavated:	1992
Findspot:	Grid 50 Square 58 Fine-grid 23 Layer 262
Mass:	Not available.
Dimensions:	ca. 15 × 15 mm
Material:	Bronze
Shape:	Cuboid
Remarks:	No drawing or photograph available.

Catalogue no. 12

Registration no.: 40614
Year excavated: 1992
Findspot: Grid 50 Square 57 Fine-grid 50 Layer 206
Mass: 10.84 g †
Dimensions: ca. 13 × 13 mm
Material: Bronze
Shape: Cuboid
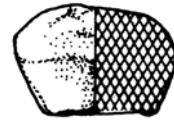Remarks: Cracks appear along the edges; corner is damaged. No drawing available.
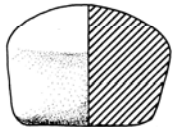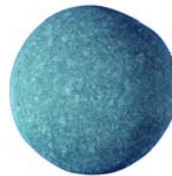

Scale 1:1

DOME-SHAPED WEIGHTS

Catalogue no. 13

Registration no.: 39126
Year excavated: 1992
Findspot: Grid 50 Square 58 Fine-grid 34 Layer 262
Mass: 27.58 g †
Dimensions: 23 × 16 mm
Material: Bronze
Shape: Carinated dome
Remarks: Dome is somewhat lopsided with shallow carination.

Scale 1:1

Catalogue no. 14

Registration no.: 39300
Year excavated: 1992
Findspot: Grid 50 Square 58 Fine-grid 33 Layer 262
Mass: 91.09 g
Dimensions: 42 × 32 mm
Material: Stone
Shape: Carinated dome
Remarks: Intact greenish-gray carinated dome with some scratches on the base.

Scale 1:2

Catalogue no. 15

Registration no.: 40872
Year excavated: 1992
Findspot: Grid 38 Square 74 Layer 480 Feature 480
Mass: 18.28 g †
Dimensions: 20 × 15 mm
Material: Bronze
Shape: Carinated dome
Remarks: Dented dome with high carination. Appears to be missing a small piece from the carinated edge on one side.

Scale 1:1

Catalogue no. 16

Registration no.: 44591
Year excavated: 1994
Findspot: Grid 38 Square 83 Fine-grid 50 Layer 342 Feature 342
Mass: 18.08 g †
Dimensions: 18.5 × 12 mm
Material: Bronze
Shape: Carinated dome
Remarks: Good condition although with some encrusted corrosion, especially along the top.
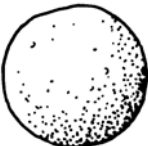

Scale 1:1

Catalogue no. 17

Registration no.:	40032
Year excavated:	1992
Findspot:	Grid 50 Square 58 Fine-grid 88 Layer 291
Mass:	2.61 g *
Dimensions:	13 × 8 mm
Material:	Hematite
Shape:	Rounded dome
Remarks:	Shallow dome with engraved circle just inside the edge of the base. Some gouging in the middle of the base; it is impossible to reconstruct exactly how much mass was lost.

Scale 1:1
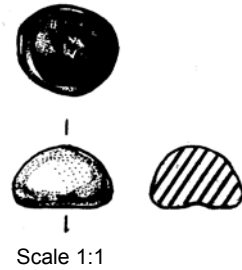
Catalogue no. 18

Registration no.:	46543
Year excavated:	1996
Findspot:	Grid 50 Square 48 Layer 453
Mass:	41.66 g
Dimensions:	32 × 23 mm
Material:	Schist
Shape:	Rounded dome
Remarks:	Grayish-green with a worked flat base. Slightly worn but otherwise in good condition. Short (< 1 cm) diagonal incision on one side.

Scale 1:2
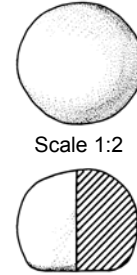
Catalogue no. 19

Registration no.:	42526
Year excavated:	1993
Findspot:	Grid 50 Square 48 Layer 390
Mass:	90.68 g
Dimensions:	42 × 34 mm
Material:	Stone
Shape:	Rounded dome
Remarks:	This weight, which is made of a light-gray stone, is unusual for several reasons. The form is irregular, being rather barrel-shaped or spheroidal, although the top is narrower than the base, so it bears some resemblance to a dome weight. A well-tooled hole ca. 3 cm in circumference was carved into the top. The hole contains traces of lead.

Scale 1:2
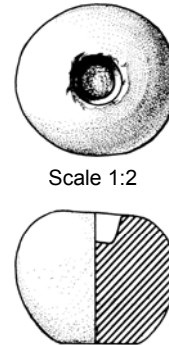
Catalogue no. 20

Registration no.:	40873
Year excavated:	1992
Findspot:	Grid 38 Square 74 Layer 482
Mass:	86.38 g
Dimensions:	diam. 39 mm
Material:	Stone
Shape:	Rounded dome
Remarks:	Light beige polished limestone. Inscribed on top of dome with a shekel sign and hieratic numeral 10; a few other stray marks. Base is slightly damaged and encrusted. No drawing available.

Scale 1:2

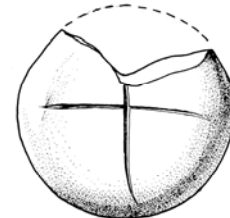**Catalogue no. 21**

Registration no.:	50424
Year excavated:	1998
Findspot:	Grid 50 Square 67 Fine-grid 36 Layer 61
Mass:	51.74 g
Dimensions:	Not available.
Material:	Bronze
Shape:	Rounded dome
Remarks:	Cracked. No drawing available.

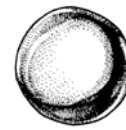## DISCOID WEIGHTS

Catalogue no. 22
Registration no.: 39845
Year excavated: 1992
Findspot: Grid 50 Square 48 Layer 384
Mass: 82.06 g *
Dimensions: 57 × 19 mm
Material: Stone
Shape: Discoid (incomplete)
Remarks: Lightly polished. Roughly 80 percent complete. Inscribed on one face with a large ×.
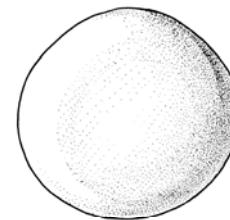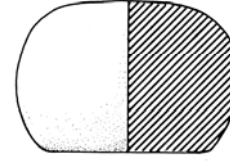
Scale 1:2

Catalogue no. 23
Registration no.: 46172
Year excavated: 1995
Findspot: Grid 50 Square 48 Layer 453
Mass: 29.13 g
Dimensions: 30 × 18 mm
Material: Stone
Shape: Discoid
Remarks: Thick disk of dark-gray stone polished on top and bottom with wear around the sides.

Scale 1:2

Catalogue no. 24
Registration no.: 46784
Year excavated: 1996
Findspot: Grid 50 Square 49 Layer 453
Mass: 222.21 g
Dimensions: 55 × 39 mm
Material: Stone
Shape: Discoid or flattened dome
Remarks: Either a thick discoid weight or a dome-shaped weight with an unusually flattened top. Material is pinkish stone with red striations. Lightly polished.

Scale 1:2

RECTANGULAR WEIGHTS

Catalogue no. 25
Registration no.: 47040
Year excavated: 1996
Findspot: Grid 50 Square 47 Layer 302
Mass: 46.49 g *
Dimensions: 40 × 22 mm
Material: Stone
Shape: Rectangular
Remarks: Slightly rounded corners and edges. Made of polished stone, possibly diorite, with a slight, gouged indentation on one side.

Scale 1:2

Catalogue no. 26

Registration no.: 48083
Year excavated: 1997
Findspot: Grid 50 Square 48 Layer 453
Mass: 79.87 g
Dimensions: 48 × 26 mm
Material: Basalt
Shape: Rectangular
Remarks: Irregular with rounded (or poorly worked) edges and corners. One smoothed/flattened surface. Encrusted in places with whitish-brown sediment.
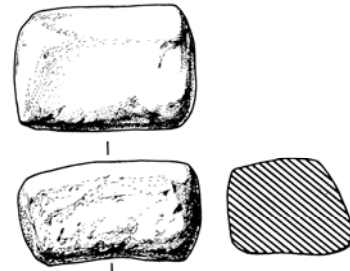
Scale 1:2

SPHENDONOID WEIGHTS

Catalogue no. 27

Registration no.: 39259
Year excavated: 1992
Findspot: Grid 50 Square 58 Fine-grid 54 Layer 262
Mass: 27.12 g †
Dimensions: Length 37 mm
Material: Bronze
Shape: Sphendonoid
Remarks: Badly dented with a flattened base. No drawing available.

Scale 1:1

Catalogue no. 28

Registration no.: 47039
Year excavated: 1996
Findspot: Grid 50 Square 47 Layer 302
Mass: 3.38 g *
Dimensions: 21 × 17 mm
Material: Hematite
Shape: Sphendonoid
Remarks: Polished to a high sheen. Flattened on the long sides. Both of the flattened sides are slightly damaged. One side is incised with an off-center ×. The tapered ends appear also to have been slightly flattened.
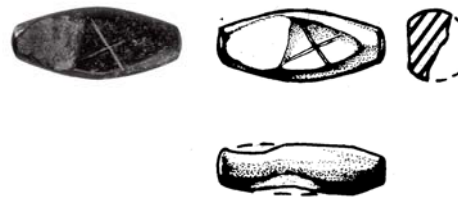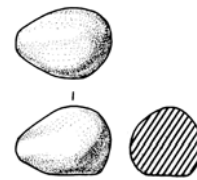

Scale 1:1

TEARDROP WEIGHT

Catalogue no. 29

Registration no.: 39382
Year excavated: 1992
Findspot: Grid 50 Square 58 Fine-grid 23 Layer 262
Mass: 10.93 g
Dimensions: 25 × 18 mm
Material: Stone
Shape: Teardrop
Remarks: Shaped like a teardrop with one narrower end gradually widening into a more rounded bulge. Flattened "base" on one side, which shows some wear around its edges.

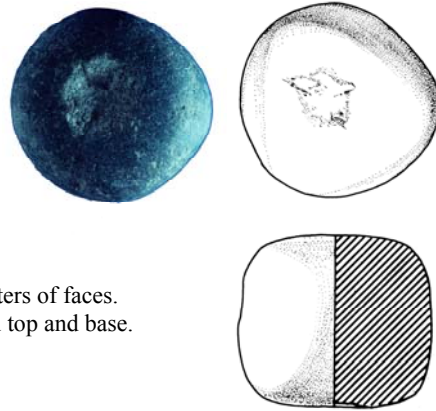Scale 1:2

PYRAMIDAL WEIGHT

Catalogue no. 30

Registration no.: 39640
Year excavated: 1992
Findspot: Grid 50 Square 58 Fine-grid 81 Layer 264
Mass: 13.03 g *
Dimensions: Not available.
Material: Hematite
Shape: Pyramidal

Remarks: Made from a piece of black hematite from which natural grooves and irregularities were not entirely removed. There is a large natural furrow on one side. Sides are otherwise well-polished and the object has a flat, triangular base. Possible scratchings on one side but nothing that resembles an inscription. On the long side is a shallow circular impression with small central divot, very regular and tool-carved. No drawing or photograph is available.

CYLINDRICAL WEIGHT

Catalogue no. 31

Scale 1:2

Registration no.: 40963
Year excavated: 1992
Findspot: Grid 50 Square 49 Fine-grid 6 Layer 401
Mass: 205.66 g
Dimensions: 50 × 44 mm
Material: Stone
Shape: Cylindrical
Remarks: Dark-gray with slight wear around sides and centers of faces. One side is irregular, faintly triangular. Flattened top and base.

Catalogue no. 32

Registration no.: 44181
Year excavated: 1994
Findspot: Grid 50 Square 49 Layer 425
Mass: 8.99 g
Dimensions: Not available.
Material: Bronze
Shape: Cylindrical
Remarks: Cracked vertically in several places around body and along the edges. Typologically, such bronze cylinders are close to bronze cuboid weights. No drawing or photograph is available.

ZOOMORPHIC WEIGHT

Catalogue no. 33

Registration no.: 42873
Year excavated: 1993
Findspot: Grid 50 Square 49 Fine-grid 29 Layer 418
Mass: 17.6 g
Dimensions: 20 ×18 mm
Material: Bronze
Shape: Zoomorphic ("hedgehog")
Remarks: The form is that of a hedgehog standing on an attached flat base. Apart from the ears, its features are not well-defined. The closest parallel for this weight is from the Mildenberg collection; its provenance was originally given by the collector as "the Levantine coast" and it was dated roughly to the early first millennium (Walker 1996:57). Yet the simplicity of the figure, which lacks any indication of either spines or a tail, led A. Walker to insist that the date must be earlier, perhaps as early as the late third or early second millennium B.C. Walker cites the simplified zoomorphic styles that appear in eastern Anatolia when Mesopotamian influence was prevalent, such as those known from the region of Tell Brak at that time.
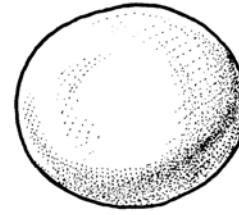

Scale 1:1

WEIGHTS OF MIXED CHARACTER

Scale 1:1

Catalogue no. 34

|	
Registration no.:	45986
Year excavated:	1995
Findspot:	Grid 50 Square 48 Layer 453
Mass:	23.96 g
Dimensions:	29 × 26 × 19 mm
Material:	Stone
Shape:	Dome-shaped or a flattened ovoid or disk
Remarks:	Flat base and a narrower flattened "plateau" on the top. Made from black stone flecked with beige. Lightly polished with some visible scratches on the sides.
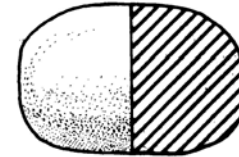
Catalogue no. 35

Registration no.:	49731
Year excavated:	1997
Findspot:	Grid 50 Square 48 Layer 496
Mass:	85.03 g
Dimensions:	Not available.
Material:	Stone
Shape:	Trapezoidal or a flattened dome
Remarks:	Grayish-green in color. No drawing or photograph is available.

Catalogue no. 36

Registration no.:	15358
Year excavated:	1987
Findspot:	Grid 50 Square 58 Layer 99
Mass:	2.1 g
Dimensions:	14 × 12 mm
Material:	Stone
Shape:	Flattened ovoid or disk
Remarks:	It is difficult to determine whether the flattening into a disk-like ovoid was intentional or natural. It may simply be a water-washed pebble.
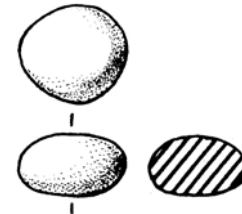
Scale 1:1

Catalogue no. 37

Registration no.:	50775
Year excavated:	1998
Findspot:	Grid 50 Square 67 Fine-grid 36 Layer 61
Mass:	11.79 g
Dimensions:	Not available.
Material:	Stone
Shape:	Irregular and oblong
Remarks:	Chipped in several places. No drawing available.

Scale 1:2