The Metrology of Judaean Small Bronze Coins

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Based on the the weights of over 10,000 bronze coins dating from 134 BC to AD 70, this study offers a comprehensive analysis of the weight standards for each series, and the role of fudiciary coinage in ancient Judea.

Introduction

The denominations and weight standards of ancient Jewish bronze coins have previously been discussed. However, the samples used for study were often limited only to examples in the British Museum collection[1] or to samples from a specific hoard or site.[2] Further, average weights for Judaean small bronzes have generally been presented without statistical information beyond generic ranges and averages.

This is a metrological study of 10,312 Jewish bronze coins of 27 general types and various denominations. The majority of the coins were weighed by the author, while other weights were obtained from published sources. The coins range in date from those of John Hyrcanus I (134–104 BC) to those struck during the Jewish War (AD 66–70). The specific types of coins studied were mainly dictated by supply: some coin types are so rare that it was difficult to collect enough samples for meaningful statistics. Our statistical analysis of the material (see Tables 1–4 below) provides averages and the average standard deviations for these groups, in order to

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1. Kindler (1967), 194.
2. Kindler (1954), 170–185; *TJC*, 72, n.35.

provide a basis for future study and to make some observations.[3]

The actual names of the ancient Jewish bronze coin denominations are not known. For some 60 years it has been standard practice to refer to the most common denomination with the Hebrew word *prutah*,[4] (pl. *prutot*) but this word is known to us only from later rabbinic literature.[5] The contemporary writer Josephus, for example, does not mention bronze coins or any terminology associated with them. However, since the *Mishnah* was codified early in the third century AD, and was based upon discussions among the rabbinical sages during the mid-first and second centuries AD, we can assume that the use of the word *prutah* was current during the time the small Jewish bronze coins were minted, c. 134 BC–AD 70. The first *prutot* were the Jerusalem bronze lily/anchor coins issued under Antiochus VII/Hyrcanus I (Fig. 1), which were equivalent to a Seleucid *chalkous*, and which aligned with the weight standard introduced by Alexander Balas (150–145 BC).[6] During the first century AD, a *prutah* was the price of one pomegranate.[7]

Also, the Greek word *lepton* (pl. *lepta*) is used in the New Testament to describe the smallest bronze coin in circulation during the time the gospels were composed (c. 1st c. AD), which was equal to half a Roman *quadrans*.[8] Kindler suggests that during the Hasmonean period Jewish bronze coinage consisted mainly

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3. 10,312 Judaean bronze coins were recorded for this study. From October 2008 to January 2009, more than 7,000 coins were weighed by the author from coins in his possession as well as from the Israel Museum in Jerusalem, the Sofaer Collection at the American Numismatic Society, and the following dealers in Jerusalem: J. Zadok, Maxim Schick, J. Wazwaz, J. Abou Eid and Son, and S. Taha. Additional information regarding coin weights has been supplied by Yigael Ronen, Isadore Goldstein, Harlan J. Berk, and Cecelia Meir for coins in the Eretz Israel Museum in Tel Aviv. We also recorded data from the Gamla and Masada excavation reports, Agora Auctions I and II, Hill (1914), Baramki (1974), Meshorer (1981), Kaufman (1995, 2004), Houghton and Spaer (1998), Oliver (2007), V-Coins.com, and the Menorah Coin Project.org.

During data gathering care was taken to avoid duplication. Further, data collection was limited to a relatively short period, so coins disbursed would not enter the market and be repeated in the sample. We also eliminated coins that were broken, heavily worn, heavily encrusted, or not clear as to type.

4. According to Y. Meshorer (per. com.), Israeli numismatists have used the word *perutah* (by Israelis who emigrated from Europe) or *prutah* (by native Israelis) since at least the late 1950s. Klimowsky (1963, 68–69) was the first to explain the term in this context.

5. E.g., Mishnah *Kiddushin*, 1:1.

6. *SC*, II, vol II, 41.

7. Sperber (1974), 104.

8. In context (Gospel of Mark 12:42) *lepton* seems to be a coin rather than a denomination, which usage modern students have applied to the term. Although the word is used in the New Testament, it is never mentioned in the Talmud. The term *lepton* is further discussed in *RPC* I: 31.

Figure A

of "the *dilepton*…commonly named *Perutah* (*sic*)."[9] Hence a *lepton* was equal to a half-*prutah*, and the *prutah* equaled two *lepta*, as mentioned in the Gospel of Mark (12:42).

For our purposes, the terms *prutah* and *lepton* are used for the sake of consistency and comparison. The *prutah* (and its half) and the *lepton* should not, then, be considered weights as such, but rather coin denominations, individual examples of which had greatly varying weights.

General Observations on Judaean Bronze Coinage

The data discussed in more detail below (Tables 1–4) clearly show that Judaean bronze coins were manufactured *al marco* and not *al pezzo*. As Meshorer (1982, 59) observed: "[a]lthough it is likely that the mint masters knew the amount of coins to be produced from a specific amount of bronze, the exact quantity of the metal included in each coin would have been exceptionally difficult to control. It would not have been expedient to remove bronze from coins that were too heavy or to add bronze to the lighter issues." He also remarked (2001, 30) that the range of weights of the Jewish bronzes was so great that "[i]t is difficult to assume that these light coins were given the same value in the market as the heavier *prutot*."[10]

Our results, however, allow us to suggest that in Judaea, when coins were struck in the same metal, with the same or very similar designs, lacking indications on the coins to the contrary, they were intended to represent coins of the same denomination. Even with small bronzes, differences of 1 or 2 or even 3 grams would not have been of great concern between coins that shared types, since the relative weights of the coins were of little consequence in circulation. For example, Fig. A shows three coins of the same types dated to the year 5 of Nero, weighing (from left) 1.49, 2.43, and 3.67 g.—the lightest of which weighs only 40% of the heaviest.

9. Kindler (1967), 186.
10. Meshorer was specifically discussing the Jannaeus anchor/star-in-diadem coin (Fig. 4; *TJC*-K, *GBC*-469). From our data, however, it is clear that the same range existed for every issue that we have studied.

It is almost impossible for a person using quick weighing by hand to determine between the weights of these three coins. This group is only one of many examples of similar and even more drastic weight ranges within a single type. Despite the great variance in weight, these coins were undoubtedly the same denomination since type, not weight, was the determinant.[11] Indeed, similar extreme variances in weight were noted in every group of similar types we studied, wherein the heaviest coins weighed 2x to 4x those of the lightest.

Although we did not measure diameters, the range generally from narrowest to widest for any given denomination is within approximately 2–4 mm. While there is no doubt that in multiple-*prutah* and even half-*prutah* denominations the diameter relative to the *prutah* was, in addition to type, an indication of denomination,[12] the diameter of the *prutot* themselves were subject to change over time as the coins became smaller and lighter. We also noted the diameter of a particular coin is not necessarily a reflection of its weight. From handling thousands of coins, it was observed that the largest variable regarding the weight of a coin is most frequently the *thickness*, not the diameter, which was determined by the molds in which the planchets were cast.[13]

While the data gathered indicate that even though the weights of any coin type could vary dramatically, nevertheless the statistical analysis of the weights show trends in both denomination and standards among coins issued under specific political authorities.

HASMONEAN COINS

The first Hasmonean coins from the Jerusalem mint (Table 1) may be the lily/anchor issue with the name of Antiochus VII, struck in conjunction with Hyrcanus I (Fig. 1). Our average weight for this series, 2.47 ± 0.03 g, is similar to coins classified by Houghton and Lorber as "denomination D," the probable equivalent to the *chalkous* denomination of Alexander Balas and the early Roman period.[14]

11. Meshorer (*TJC*, 71) states that "[t]he decisive factors in determining the denominations in a series of coins are their relative weights and designs that appear on them." Here he refers specifically to the four coins in the Herodian dated series. While the weights of these denominations certainly overlap, one may be absolutely certain which coin is being dealt with because the motifs are quite different.

12. Le Rider and de Callataÿ (2006) provide useful comparanda for these problems of correlating the weights, diameters, and types with probable denominations in their survey of both Seleucid bronzes (pp. 31–36) and Ptolemaic bronzes (pp. 38–42).

13. Planchet strips were cast in chalk-stone molds (*TJC*, 50–51). The space for each planchet was drilled, but the controls for measuring exact depth of the drilling were not accurate and some coins are more than double the thickness of others, with resultant increase in weight.

14. *SC*, vol II: 4.

NAME	Sample Size	Avg. Wt. g	Range in g	Avg. Std. Deviation Calc.
Antiochus VII *GBC* 451; *TJC* (Fig. 1)	(162)	2.47 ± 0.03	(1.62–3.41)	.33547 / 12.72792 = 0.0264
Yehohanan *GBC* 453–455, 459, 460; *TJC* A, B, D, E, F, G, I (Figs. 2, 2a–b)	(599)	1.92 ± 0.01	(1.12–3.06)	.33631 / 24.47448 = 0.0137
Jannaeus *GBC* 467, 478; *TJC* N, T (Figs. 3, 3a)	(344)	2.15 ± 0.02	(1.04–3.50)	.44343 / 18.547237 = .0239
Jannaeus *GBC* 469; *TJC* K (Fig. 4)	(523)	1.71 ± 0.03	(0.64–3.85)	.59961 / 22.86919 = .0262
Jannaeus *GBC* 471; *TJC* L1, L2 (Fig. 5)	(200)	1.20 ± 0.02	(0.61–1.79)	.23919 / 14.142136 = .0169
Jannaeus *GBC* 472; *TJC* L3–L17 (Fig. 6)	(1251)	0.81 ± 0.01	(0.20–1.70)	.24731 / 35.369478 = .0070
Yehonatan *GBC* 473–475; *TJC* P, Q, R (Figs. 7, 7a–b)	(520)	1.81 ± 0.02	(0.96–3.57)	.37566 / 22.80351 = .0165
Jannaeus *GBC* 476; *TJC* M (Fig. 8)	(196)	4.10 ± 0.07	(2.36–7.96)	.94631 / 14 = .0676
Yntn *GBC* 479; *TJC* S (Fig. 9)	(432)	2.00 ± 0.02	(0.85–3.27)	.36689 / 20.784610 = .0177
M. Antigonus *GBC* 481; *TJC* 36 (Fig. 10)	(171)	14 ± 0.09	(11.67–17.64)	1.19389 / 13.076697 = .0913
M. Antigonus *GBC* 482; *TJC* 37 (Fig. 11)	(106)	7.19 ± 0.07	(4.47–8.79)	.74409 / 10.29563 = .0723
M. Antigonus *GBC* 483; *TJC* 40 (Fig. 12)	(144)	1.68 ± 0.02	(1.18–2.34)	.18976 / 12 = .0158

Table 1.Hasmonean Coins

The average weight drops 20 per cent to 1.92 ± 0.01 g for the coins with the title "High Priest" and name Yehohanan (Hyrcanus I) in paleo-Hebrew script (Fig. 2). There is a drift down to 1.81 +/- 0.02 g for the similar coins struck by Jannaeus (Fig. 7). But when Jannaeus' mint issued the first coins that mentioned his Hebrew name Yehonatan and the title "King" in both Greek and Hebrew (Fig. 3, 3a), the average weight goes up 16 per cent to 2.15 ± 0.02 g. From that first royal coin on-

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Figures for Table 1

Figure 1. *GBC* 451

Figure 2. *GBC* 454

Figure 2a. *GBC* 455

Figure 2b. *GBC* 457

Figure 3. *GBC* 467

Figure 3a. *GBC* 478

Figure 4. *GBC* 469

Figure 5. *GBC* 471

Figure 6. *GBC* 472

Figure 7. *GBC* 473

Figure 7a. *GBC* 474

Figure 7b. *GBC* 475

Figure 8. *GBC* 476

Figure 9. *GBC* 479

Figure 1 . *GBC* 481

Figure 11. *GBC* 482

Figure 12. *GBC* 483

Figures for Table 2

Figure 13. *GBC* 486   Figure 14. *GBC* 487   Figure 15. *GBC* 488

Figure 16. *GBC* 489   Figure 17. *GBC* 490   Figure 18. *GBC* 491

Figure 19. *GBC* 499   Figure 20. *GBC* 500   Figure 21. *GBC* 501

Figure 22. *GBC* 505   Figure 23. *GBC* 50

Figures for Table 3

Figure 24. *GBC* 635   Figure 24. *GBC* 650   Figure 24a. *GBC* 636

Figure 24a. *GBC* 649   Figure 24b. *GBC* 637   Figure 24b. *GBC* 649a

Figure 24c. *GBC* 638

Figure 24d. *GBC* 639

Figure 24e. *GBC* 640

Figure 24f. *GBC* 641

Figure 24g. *GBC* 642

Figure 24h. *GBC* 643

Figure 24i. *GBC* 644

Figure 24j. *GBC* 645

Figure 24k. *GBC* 646

Figure 24l. *GBC* 647

Figure 24m. *GBC* 648

Figure 25. *GBC* 6553

Figure 26. *GBC* 652

Figure 26a. *GBC* 653

Figures for Table4

Figure 27. *GBC* 661

Figure 27a. *GBC* 664

ward, the weight of the *prutah* under Jannaeus falls to a low of 1.20 ± 0.02 g for the coins of Jannaeus dated year 25 in both Greek and Aramaic (Fig. 5).

The succeeding series (Fig. 6) are those referred to by Hill (1914: xcv) as "wretched" imitations of the Jannaeus coins. They may have been issued under Jannaeus, but due to the sheer volume produced, it seems possible that they were issued through the reigns of his widow Salome Alexandra (76–67 BC), and their sons Aristobulus II (67–63 BC) and Hyrcanus II (67 and 63–40 BC).[15]

The average weight of these poor anchor/star coins (Fig. 6) is 0.81 ± 0.01 g, but it fluctuates dramatically from coins as light as 0.20 g to coins weighing 1.70 g (8.5x). These coins may well be degraded *prutot* and *not* half-*prutah* coins.[16] Hyrcanus I (*GBC* 458, 461) and Jannaeus (*GBC* 468) issued coins with different designs or inscriptions that were intended to be smaller denominations, probably half-*prutot.* Both types are so scarce we could not include them in this study.

The controversial coins with the *Yntn* inscription in paleo-Hebrew script weigh 2.00 ± 0.02 g (Fig. 9). Hendin and Shachar have established that the overstruck series with the name *Yntn* are coins of Jannaeus and not, as previously believed coins of his widow Queen Salome Alexandra as regent for their sons Hyrcanus II and Aristobulus II.[17] In a recent metallurgical study focusing on cluster analysis of alloys, Krupp suggested that these *Yntn* coins may be from a different period than that of Jannaeus.[18] However, more certain chronological proof is provided by the overstruck coins than by the ambiguities inherent in Krupp's analysis.

15. If indeed no coins were issued in Judaea between the death of Jannaeus and the rule of Mattathias Antigonus (40–37 BC), there would have been a gap of 36 years without coins being struck by Jewish rulers, which seems like a very long period.

16. The Talmud recognizes some coins, possible these, as devalued *prutot* since it assigns the *prutah* a very small value indeed. The Talmud indicates that through the first century AD there were 768 *prutot* to the silver shekel (Baba Bathra 166b; 192, *prutot* equal one zuz or quarter-shekel). The smallest possible version of the *prutah* is apparently used in this calculation to insure that in any financial transactions that involved the Temple, which surely accounted for a large number of transactions in Judaea at the time, the value of the *prutah* was at the lowest rate possible vis-à-vis an actual silver equivalent in order not to deprive the Temple of its proper due. This reflects the early rabbinic principal of "Yafeh Koach Hekdesh," stating that the Temple must be the greater beneficiary of any transaction. The Talmud, of course, reflects discussions of Jewish life around the first and second centuries AD, yet the devalued *prutot* were issued between c. 76 and 40 BC. Bijovsky (2002, 202) notes, however, that these poor, small coins were actually used in the area for hundreds of years, up to at least the fifth century AD.

17. Hendin and Shachar (2009), 87–94. This conclusion is based upon the discovery of one of the overstruck *Yntn* coins (GBC 478) that has been again overstruck by an established Jannaeus type (GBC 469), thus proving the *Yntn* coin's earlier attribution.

18. Krupp (2007–08), 57–75.

Meshorer noted that in the modern period the value of lead has been about half that of copper. Assuming an analogous price differential in antiquity, and noting the lead coins of Jannaeus (Fig. 8) appeared to be about double the weight of the comparable bronze coins (Fig. 3), he suggested that "one can reasonably assume that the lead coins were *prutot*."[19] Our study confirms the weight difference: the weight of the lead anchor/Aramaic coins (4.10 ± 0.07 g) is around twice the weight of the heaviest bronze coins of Jannaeus, the anchor/lily coins and overstrikes of them (Fig. 3a ; 2.15 ± 0.02 g). Even though there was a minor difference in types, one side of these lead coins (*GBC* 476) was directly patterned on the Jannaeus anchor/lily (*GBC* 467) type. The significant difference in the weight, but likely not the denomination of the coins, suggests that the commodity price of non-precious metals may have played a role in the creation of fiduciary coinage in certain circumstances.

Mattathias Antigonus' three denominations (Figs. 10–12) struck on double-thick planchets, can be broken clearly into the denominations of eight *prutot* (14.00 ± 0.09 g), four *prutot* (7.19 ± 0.07 g), and one *prutah* (1.68 ± 0.02 g). Meshorer noted that the weight of these particular coins "was not of fundamental significance."[20] This study reaffirms that when average weights are drastically different between coins clearly intended to represent separate denominations, weight fluctuations *within a specific denomination* are clearly not significant.

Mattathias Antigonus' *prutot* are *twice* the weight of the previous smaller small *prutah* coins issued by Jannaeus or one of his successors (*GBC* 472), and may have been intended to fit proportionately with his new, larger denomination coins. Even though this was low value fiduciary coinage, there was some merit, even if mainly political, to coins with more heft; otherwise many more coins could have been manufactured from the same amount of bronze. It further seems likely that the innovative larger coins of Mattathias Antigonus are related to the principal denominations of the SC coinage of Antioch, which was struck on a standard of around 15 g, and these could be considered 8 *chalkoi* coins.[21]

Herod I and Herod Archelaus

One surprising observation from this study is that the dated coins struck under Herod I may be based on a different denominational system than those of Mattathias Antigonus.[22] While the M. Antigonus coins are clearly 8/4/1 units, described here

19. *TJC*, 47.
20. *TJC*, 54.
21. *RPC* I: 33–34. Somewhat inexplicably, Meshorer (*TJC*, 54) suggests that these large denominations should be considered to be one *chalkous* denominations, but without further discussion.
22. Meshorer (*TJC*, 59; 71–72) recognized a difference in weights, but dismissed it on the

NAME	Sample Size	Avg. Wt. g	Range in g	Avg. Std. Deviation Calc.
Herod I *GBC* 486; *TJC* 44 (Fig. 13)	(354)	6.93 ± 0.07	(2.75–11.46)	1.28202 / 18.81489 = .0681
Herod I *GBC* 487; *TJC* 45 (Fig. 14)	(130)	4.45 ± 0.07	(2.91–6.52)	.81476 / 11.40175 = .0715
Herod I *GBC* 488; *TJC* 46 (Fig. 15)	(76)	3.12 ± 0.08	(1.7–5.34)	.70509 / 8.717798 = .0809
Herod I *GBC* 489; *TJC* 47 (Fig. 16)	(73)	2.50 ± 0.05	(1.55–3.62)	.4035 / 8.54400 = .0472
Herod I *GBC* 490; *TJC* 49 (Fig. 17)	(194)	2.94 ± 0.05	(1.30–4.6)	.63719 / 13.92839 = .0457
Herod I *GBC* 491–4; *TJC* 50–54 (Fig. 18)	(153)	1.48 ± 0.03	(0.78–2.6)	.33279 / 12.36932 = .0269
Herod I *GBC* 499; *TJC* 61–64 (Fig. 19)	(298)	.94 ± 0.01	(0.49–1.78)	.18902 / 17.262677 = .0109
Herod I *GBC* 500; *TJC* 59 (Fig. 20)	(480)	1.42 ± 0.01	(0.81–2.11)	.24499/21.90890 = .0112
Herod I *GBC* 501; *TJC* 66 (Fig. 21)	(278)	.86 ± 0.01	(0.41–1.42)	0.1924/16.67333 = .0115
Archelaus *GBC* 505; *TJC* 73–74 (Fig. 22)	(317)	2.06 ± 0.02	(0.70–3.37)	.44349 /17.804493 = .0249
Archelaus *GBC* 506; *TJC* 72 (Fig. 23)	(391)	1.19 ± 0.01	(0.44–2.1)	.29426 / 19.773719 = .0149

Table 2. Coins of Herod I and Herod Archelaus

as *prutot*, the Herodian series is not only struck on a different weight standard, but also divided differently. The largest coin struck by Herod (6.93 ± 0.07 g) (Fig. 13) is only half the weight of the Mattathias Antigonus coin (14.00 ± 0.09 g) struck at nearly the same time. While it is accepted that the coins of M. Antigonus are from the Jerusalem mint, Meshorer argues convincingly that the Herodian coins were struck at Samaria.[23] It is possible that the Herodian coins were intended as 4 *prutot*,

grounds that the difference was not significant. The systems of multiple denominations, however, show again that the weight of bronze coins in aggregate, rather than individually, was relevant.

23. Meshorer (*TJC*), 61–62.

since they are the weight of M. Antigonus' half denomination (*GBC* 482), it seems equally possible that Herod decided to set a new standard for his new reign.[24]

It is not likely that these changes of weight represented any devaluation, such as that discussed by Martin Price regarding bronze coinage in the Classical Greek world. Once people were willing to accept overvalued pieces of small bronze, size and weight simply became general indicators of their value at that particular time and place; size and weight therefore could be subject to change and the same denomination could be represented by coins of differing weights and sizes.[25] Herod may have been attempting to create more coinage with fewer raw materials, and also increase his profits from the creation of coinage.[26]

Meshorer suggested that the denominations of the Herodian series (Figs. 13–16) were 8/4/2/1 *prutot*, which in spite of lighter weight still seems likely.[27] The "tripod table" series from the Jerusalem mint consists of a larger coin of 2.94 ± 0.05 g (Fig. 17), most likely a double *prutah*, and a *prutah* (Fig. 18) averaging 1.48 ± 0.3 g. There is also a series of rare coins in this series that were apparently meant to be half-*prutah* denominations (*GBC* 495–497). Due to the rarity of the smallest coins, they are not included in this analysis. However, they fit well as the smallest in a series of three denominations since there are obvious design differences and weight differences among them.

Herod's most common coin, the anchor/cornucopias with caduceus (Fig. 20) weighs 1.42 ± 0.01 g and fits into the *prutah* series. Herod's well known eagle coin (the first Judaean coin portraying the image of a living creature) with a single cornucopia reverse (Fig. 21), may well be a half denomination (as suggested by the single rather than double cornucopias), weighing 0.86 ± 0.01 g. We can suggest that the coins of Herod Archelaus (Figs. 22, 23) studied here are also probably *prutah* and half-*prutah* denominations respectively.

Agrippa I and the Roman Administration of Judaea

After Archelaus was banished, the government of Judaea was assigned to a series of Roman governors, the prefects or procurators, who ruled on behalf of Rome

24. Since the Herodian coinage, like the Hasmonean coinage before it, was both fiduciary and intended for local circulation, this is credible.

25. Price (1979), 358.

26. Price (1968) noted the possibility of producers issuing bronze coins for the sake of generating income. Certainly, with his wide range of expensive building projects, Herod needed to generate funds wherever he could.

27. Ariel (2006, 118) calls our attention to another possibility. He cites a series of four bronze denominations struck at Aigion, which Kroll was able to correlate with obols. The denominations were 1 hemiobol / 1/3 obol / ¼ obol / 1/6 obol; use of the name "obol" is not necessarily relevant, but the ratios 1/ ⅔ / ½ / ⅓ may suggest a "similar distant ancestor in common," according to Ariel.

NAME	Sample Size	Avg. Wt.	Range in g	Avg. Std. Deviation Calc.
Procur. pre Agr. I *GBC* 635–50; *TJC* 311–339 (Figs. 24, 24a–m)	(759)	1.90 ± 0.01	(0.83–2.85)	.33795 / 27.54995 = .0123
Agrippa I *GBC* 553; *TJC* 120 (Fig. 25)	(428)	2.33 ± 0.02	(1.13–3.40)	.37602 / 20.68816 = .0182
Procur. post Agr.I *GBC* 651–53; *TJC* 340–45 (Figs. 26, 26a)	(476)	2.27 ± 0.02	(1.15–3.66)	.42016 / 21.817424 =.0193

Table 3. Agrippa I and the Roman Administration of Judea

NAME	Sample Size	Avg. Wt.	Range in g	Avg. Std. Deviation Calc.
Jewish War *GBC* 461, 464; *TJC* 196–198, 204–206 (Figs. 27, 27a)	(1257)	2.51 ± 0.02	(0.93–4.24)	0.63921 / 35.45420 = .0180

Table 4. The Jewish War

between AD 6 and 66, excepting the years of Agrippa I. The weights of the coins struck by the procurators between AD 6 and 37, during the reigns of Augustus and Tiberius, were slightly lower than the coins issued by Archelaus (1.90 ± 0.01 g). When Herod I's grandson Agrippa I (AD 37 to 44) took over for a brief interval, the average weight of the *prutah* jumped 18 per cent to 2.33 ± 0.02 g.[28] After Agrippa I's death, procuratorial rule returned to Judaea under Claudius and Nero, and they continued to strike coins of about the same weight as those of Agrippa I. The coins of Agrippa I and the procurators who followed him approach the weight of a Roman *quadrans* of the first century.[29]

THE JEWISH WAR

The political situation as well as the geography of the Jewish War encouraged the Jews to strike coins of their own. The average weight of the *prutot* (2.51 ± 0.02 g) of

28. These *prutot* are the coins Agrippa I struck in Jerusalem for circulation in the immediate area of Judaea, which was the part of his territory with a heavy Jewish population. While they are found in all parts of ancient Palestine and Transjordan, and also even as far away as the Acropolis in Athens, their main use was local. These coins differed from Agrippa I's other coinage since they did not carry either the names or the images of the Roman emperors; see *TJC*, 97–98.

29. Sutherland 1984: 3. The Augustan standard for the *quadrans* was about 3 g, but a review of Flavian and Antonine examples listed at CoinArchives.com suggests it dropped slightly after the Julio-Claudians (Oliver Hoover, per. com.).

the second and third years (Figs. 27, 27a) of the war saw an increase of 10 per cent over the heaviest procuratorial coins. Perhaps the Jews purposely produced heavier bronze coins as a political statement. After 200 years of fluctuations in the weights of the *prutot* of Judaea, it is, however, interesting to note the coincidence that the bronzes of the Jewish War (2.51 ± 0.02 g) were struck at almost the exact weight as the first bronze coin of the Judaean series (*GBC* 451; Fig. 1)(2.47 ± 0.03 g).[30]

Conclusions

In general, this study has shown that while the average weights ("Avg. Wt. g" in the Tables) for the various issues fluctuate in a relatively insignificant manner (generally ± > 0.5 g), there is a significant range of weigh ("Range in g" in the Tables) within each denomination or series. This great variation in range proves that these coins were probably heavily overvalued relative to the intrinsic value of their metal content.[31] This fiduciarity in Judean bronzes had a number of ramifications.

During the Hellenistic period in Judaea, the issuance of coins was a royal prerogative, and the grant made to the Jews by Antiochus VII appears only to have been good for bronze coinage.[32] Silver coins were struck in ancient Judaea only during the two revolts against Rome, AD 66–70 and AD 132–135. Based on finds of coins dated from 132 BC to AD 135 in Judaea and the immediate region, it is clear that the bronze coins were widely used in daily transactions; silver coins were far less common. Thus locally issued bronze coinage played a key role in local economies and in the economic policies of the Jewish state. Significantly, the fiduciary nature of this bronze coinage also caught the attention of the Talmud, one of the most important cultural (and religious) documents we possess from roughly the same period as the coinage in this study.

The Talmud discusses, for example, whether bronze coins should be considered money or commodities when traded against silver coins. Typically, the authors of the Talmud weighed both sides of the argument: they are money because in areas where the bronzes were the common form of currency, they were more readily accepted and exchanged than silver coins; they are commodities because their greater acceptance increases their value.[33] Significantly the Talmud also re-

30. It is of course that the slight increase in weight was a political consideration making the local administration look better due to heavier coins; this must still be considered a political-economic consideration.

31. As Cathy Lorber noted (2009: per. com.), the lack of weight control for bronze coins is one of our major clues that they were fiduciary currency. Also, as Le Rider and de Callataÿ (see n.12 above) note in their discussion of Seleucid and Ptolemaic bronzes, we cannot assume that all bronze coinage was significantly overvalued.

32. I Maccabees 16:6 for the grant, discussed further in *RPC* I, 1; *TJC*, 23, and *GBC*, 110.

33. Baba Metziah 44b.

fers to a specific small piece of bronze—a *protitot*—described as "uncoined metal which bear[s] no imprint."[34] This seems to be a clear reference to unstruck coin planchets, often found in Israel.[35] Again, the Talmud discusses these in the context of whether they should be exchanged as commodities or as money. The conclusion is that while unstruck planchets could have value, they were strictly to be defined as "goods" and not as "money." Also, when the Talmud states that something is worth less than a *prutah* it means that it has no commercial value at all.[36] Thus, there was clear awareness of the social convention of fiduciarity in these objects and the fact that the same bronze object could have a range of values depending on its use.

When we consider these Talmudic insights alongside the dramatic weight variations within individual series of Judaean coins observed in this study, the extreme low value of these small bronze coins becomes still more readily apparent. This, of course, served the needs of those conducting daily transactions. But the issuance of these bronzes likely also served the state well. While all manufactured coins were fiduciary to some degree, bronze coinage "differed from that of coinages in the noble metals by the fact that the profit to the issuing authority was much greater, the bronze being used as a token coinage of very little intrinsic value." [37] The profit motive for striking coins thus joins both market and political issues in driving the desire for local rulers to obtain the right to strike their own coins.[38] Indeed, while the creation of Judaean bronze coinage certainly had economic elements, the need for Jews to establish and maintain an independent Jewish state at the time, suggests this coinage had a political significance nearly as great as its economic significance. Thus the ability to manufacture coins likely enriched the treasuries *and* underlined the political independence of the Hasmonean and Herodian rulers of Judaea, even though they were permitted only to issue bronze coins.

34. Baba Metziah 46a.

35. Among the 10,000 to 20,000 Judean bronzes I clean every year, roughly 0.2–0.5% of these are unstruck planchets.

36. The Talmud states that it is forbidden to steal even an amount less than a *prutah*, but if one does steal less than a *prutah* he cannot be subpoenaed to court. At the same time, he must answer to G-d even for such a tiny transgression. (Baba Metziah 55:1)

37. Mørkholm, O., Grierson, P., Westermark. 1991:6.

38. Ibid.

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The average weights and the standard deviations were calculated according to standard mathematical formulas and facilitated by using the Maths Calculator at http://www.easycalculation.com/statistics/standar-deviation.php. The average standard deviation, also a standard mathematical formula, is calculated by dividing the standard deviation by the square root of the number of specimens in a particular sample.

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RPC IBurnett, A., Amandry, M., Ripolles, P. *Roman provincial coinage* I, London 1992.

SC   Houghton, A., Lorber, C. 2002. *Seleucid coins, a comprehensive catalog*, Part I, Vols I & II, NY: American Numismatic Society and Classical Numismatic Group. Houghton, A., Lorber, C., and Hoover, O. 2008. *Seleucid coins, a comprehensive catalog*, Part II, Vols. I & II, NY: American Numismatic Society and Classical Numismatic Group.

TJC   Meshorer, Y. *A treasury of Jewish coins*. 2001. Jerusalem and New York: Yad Ben Zvi Press and Amphora.

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