

## **Estimating the Sanctuary Shekel At the Time of Moses in Building the Tabernacle**

**Abstract:** In trying to determine how to show the amount of silver and gold that was brought for the construction of the tabernacle in Exodus 38:25-26, calculations were made using the conversions implied in the immediate texts. Then, the total was compared with Ezekiel's description of setting up the new Temple measuring system, and using the Babylonian mina which is presumably the measuring system with which Ezekiel would have been familiar. It is also reasonable that he was re-establishing the original temple/tabernacle/sanctuary shekel's weight, since his conversion between shekels and mina do not match the reported Babylonian conversion factor. By substitution, then, the Sanctuary Shekel as described in Exodus 38:25-26 is very likely 10.0 g. A literature search confirms this conclusion in at least 2 sources. The conclusion that there were therefore only 50 shekels per mina in the Hebraic system is confirmed in at least one source. The Troy system of weights may be based on the talent from the Mosaic era which uses the 10.0 g per sanctuary shekel.

**Introduction:** How much silver was brought for the construction of the tabernacle? In trying to show the amount of silver brought as listed in Exodus 38:25-26, I did the following calculations:

1. Exodus 38:25 “And the silver from those who were numbered of the congregation was one hundred talents and one thousand seven hundred and seventy-five shekels, according to the shekel of the sanctuary: a bekah for each man (that is, half a shekel, according to the shekel of the sanctuary), for everyone included in the numbering from twenty years old and above, for six hundred and three thousand, five hundred and fifty men.” NKJV
2. One observation is that it is likely there were at least two different values for something called a shekel, since this verse specifies the shekel of the sanctuary. Therefore, we should be able to find two “standard” shekels in the Egyptian system, and one of them was going to be used for the sanctuary system, as opposed to a regular trading system.
3. Calculating the number of shekels total brought:  
 $603,550 \text{ men} \times 0.5 \text{ shekel/man} = 301,775 \text{ shekels}$

Subtracting out the remainder of shekels listed gives the number of shekels per talent.

$301,775 \text{ shekels total} - 1,775 \text{ shekels} = 300,000 \text{ shekels}$ , which is 100 talents.

Therefore, there are 300,000 shekels per 100 talents or

**3,000 sanctuary shekels per talent.**

4. Ezekiel was contemporary with Daniel, who was taken away captive to Babylon. The Babylonians had taken over the rulership of the Jews, and were the significant power over most of the world. It is therefore a reasonable assumption that Ezekiel would be familiar with the Babylonian system of weights and measures. Ezekiel was given the vision about the new temple that has yet to be built. He was given a set of equivalents in capacities and weights to use in the new temple. I am making two assumptions with this data.
  1. Ezekiel is re-establishing the original values God set up with the first tabernacle in Exodus.
  2. Ezekiel's measurements are different in some respects from the Babylonian system, or else he may not have needed to restate them with such detail.

“And the shekel *shall be* twenty gerahs: twenty shekels, five and twenty shekels, fifteen shekels, shall be your maneh.” Ezekiel 45:12

3. **Case I:** Assuming the “maneh” in Ezekiel 45:12 is the same thing as the Babylonian mina (Strong's Hebrew 4488, “maneh, mina (a measure of weight or money)”), and the Babylonian mina had the following conversions, according to this source:<sup>1</sup>
4.
  1. 1 mina = 499.8 g = 1.100 US pounds (original seems to be 500.0 g)
  2. Now, substituting the equivalents that Ezekiel set up:
    1. 1 mina = (20 shekels + 25 shekels + 15 shekels) = 60 shekels.
    2. 60 shekels = 499.8 g. (substitute 1 and 2)
    3. 1 shekel = 499.8 g/60 = 8.33 g (Using Babylonian equivalents)

Using the mina as the same standard as the Babylonians, but using the 3000 shekels/talent, then we have a possibility of

301,775 shekels x 8.33 g/shekel = **2,513,785 g silver brought.**

However, this would make a sanctuary shekel to be exactly the same weight as the “normal” shekel in Babylon, according to the source above. The difference seems to be in the number of shekels per talent.

So, case II:

**Case II.** Using the Babylonian talent weight, and adjusting the sanctuary shekel:

If we use the Babylonian talent weight of 1 talent = 60 mina = 3600 shekels = 30.00 kg, then

1 talent = 30,000 g

Leftovers: 1775 shekels/3,000 shekels per talent = 0.591 talents leftover

Add 100 talents = 100.59 talents brought.

100.59 talents x 30,000 g/talent = **3,017,700 g silver brought.**

3,017,700 g / 301,775 shekels = 9.9998 g/shekel, which is effectively 10.000 g/shekels

Or **10.0 g/sanctuary shekel**, which would denote a different standard for the sanctuary shekel than the prevailing “regular” shekel of 8.333 g.

If the standard 1000 troy ounce silver bar = talent, then

1 Troy ounce = 31.1034768 g,

Therefore, a 1000- troy ounce silver bar = 31,103.47 g.

This seems to match the weight of a talent in the Mosaic era. It is 31,103.47 g vrs 30,000 g. This is only a 3.6% difference. From this, we can make a guess as to where the Troy system of measuring gold and silver came from.

## Discussion

Based on the mina = 500 g, and the shekel = 10 g, and the talent = 30.00 kg, and the shekels/talent =

<sup>1</sup> Van Der Spek, Bert. "Money, Weights and Measures in Antiquity." *Money, Weights, and Measures in Antiquity*. N.p., 24 Feb. 2007. Web. 07 June 2017. <<http://www.livius.org/w/weights/weights.html>>.

3000, then we have a perfectly even conversion system.

1 gerah = 0.5 g

20 gerah = 1 shekel = 10 g

There would be 50 “sanctuary” shekels of 10 g each in a 500 g mina. There would be 3000 sanctuary shekels in a sanctuary talent, and then 60 minas per sanctuary tabernacle talent.

This consequence of a 10.0 g sanctuary shekel to match the prevailing weight of the Babylonian mina then resulting in 50 sanctuary shekels, seems to be borne out by this article:

They are stating that because of Ezekiel 45:12, there were 50 shekels per mina. This matches my calculations, but does not match the literal number of shekels per mina stated in Ezekiel 45:12 (60 shekels per mina). Therefore, I suspect my case II is correct, and the people started using the 50 “sanctuary” shekels per mina.

“It may possibly be inferred from Ezek. xlv. 12 that in the exilic period and the time which immediately preceded it the division of the mina into 50 shekels became customary among the Jews, and that this was simultaneous with the division of the shekel into 20 gerahs גרה, since this coin is mentioned only in Ezekiel and in the Pentateuch (Ex. xxx. 13; Lev. xxvii. 25; Num. iiii. 47).”<sup>2</sup>

This also matches a value for a **kite** in Egypt, from this source: It is stated as being used to measure money. This would be consistent with the application of the shekel.

“After the [12th Dynasty](#), a smaller unit known as a **kite (qedet)** with a weight of 9 to **10 grams** was used and the deben itself was increased to ten kite. In reality, while the deben was a general measure of copper, [silver](#) and [gold](#), the **kite was only used for measuring silver and gold, but mostly only silver.**”<sup>3</sup>

Another source also confirms the Egyptian kite at 10 g, and that the Jewish people used a similar-value coin later, called the NECEF. Both of these coins meant “half”, matching Exodus 30:13, and Exodus 28:25-26. Exodus 30:13 says that the half-shekel was to be brought as the offering, and that 20 gerahs was a whole shekel. So, in the source below, we can be pretty sure, then, that the NECEF was 10 grams, and that it was half of an original Egyptian shekel, which was by Exodus 30:13, 20 gerah. This means that the gerah was 1 gram.

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2 Hirsch, Emil G., and Wilhelm Nowack. "Shekel." *Jewish Encyclopedia*. N.p., n.d. Web. <<http://jewishencyclopedia.com/articles/13536-shekel>>.

3 Dunn, Jimmy. "Tour Egypt." *The Weights and Measures of Ancient Egypt*. N.p., n.d. Web. 07 June 2017. <<http://www.touregypt.net/featurestories/measures.htm#ixzz3kJPBt8P0>>.

The oldest extant weights bearing Hebrew inscriptions date from the period of the Kingdom of Judah (tenth–sixth centuries BC). They are normally of limestone, dome-shaped with a flat bottom; a few bronze specimens exist. There are several types, all rare. The total number of known specimens of all groups is a few dozen. They are:

- **NECEF.** Average mass about 9.8 g. The *necef* is not mentioned in the Bible. The name means “half”: it may have originally been half of some more ancient unit. Scholars today identify the *necef* with the Canaanite/Syrian/Aegean unit already described. It is also equivalent to one Egyptian *qedet* and to four-fifths of the royal *shekel* of Judah (see below).
- **BEKA’.** This word also means “half” (Genesis 24: 22 – see above). The mean mass of this group is about 6 g. The *beka’* is one-half of the “shekel of the king” first mentioned in II Samuel 14:26.

There is evidence of two “standard” units of shekels in use in Egypt, from the source above, and also This source lists a fairly standardized Egyptian shekel as 12.4 g<sup>4</sup>

Therefore, there would have been at least two different shekels in use during the time of Moses, (all seeming to be larger than the “sanctuary” shekel of 10.0 g. This satisfies the observation #2 above.

This also would show that the “sanctuary” shekel would be different from the prevailing Babylonian shekel, which was 8.33 g, which was smaller than the “sanctuary shekel”, at 10.0 g. This satisfies the observation 4.1 and 4.2 above.

Therefore, relating only to weights:

1 gerah = 0.5 g<sup>5</sup>

20 gerah = 1 shekel = 10 g (Ezekiel 45:12)

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4“Weights and Measures in Egypt.” *Encyclopedia of the History of Science, Technology, and Medicine in Non-Western Cultures*. Ed. Helaine Selin. Dordrecht, Netherlands: Kluwer Academic, 1997. 1013. Google Books. Web. 07 June 2017. <[https://books.google.com/books?id=raKRY3KQspsC&pg=PA1013&lpg=PA1013&dq=an+Egyptian+hin&source=bl&ots=IUSQu562kd&sig=hARbB9Z1dI9blcQQG6w1J6aeOlc&hl=en&sa=X&ved=0CB8Q6AEwAGoVChMIlaif3ImDxwI VQ6keCh0\\_YQA9#v=onepage&q=an+Egyptian+hin&f=false](https://books.google.com/books?id=raKRY3KQspsC&pg=PA1013&lpg=PA1013&dq=an+Egyptian+hin&source=bl&ots=IUSQu562kd&sig=hARbB9Z1dI9blcQQG6w1J6aeOlc&hl=en&sa=X&ved=0CB8Q6AEwAGoVChMIlaif3ImDxwI VQ6keCh0_YQA9#v=onepage&q=an+Egyptian+hin&f=false)>.

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5“Gerah.” *Wikipedia*, Wikimedia Foundation, 28 Mar. 2017, en.wikipedia.org/wiki/Gerah. Accessed 7 June 2017.

50 shekel = 1 mina = 500 g (Ezekiel 45:12, using the original mina = 500 g)  
3000 shekel = 1 talent = 30,000 g = 60 mina (Using 3000 shekels/talent, Exodus 38:25-26)

This satisfies the constraints and observations above.

Rochelle A. Houser, 8/30/2015.

More somewhat-related topics follow.

## **A side discussion that is somewhat related to this topic:**

### **“The Pint's a Pound the World Around:”**

This has been a saying in the English-speaking world a very long time. I am not certain how long, but it probably dates to the time when the British Empire was ruling the world.

The Solonian system Ptolomaic equivalents is the “pint's a pound the world around.”<sup>6</sup>

Does 1 mina (mina) = 457.8 g = ? 1 hin = = 477 mL

If we use the specific gravity of water at 212 F, 0.958 g/mL, then

$457.8 \text{ g water} / 477 \text{ mL water} = 0.959 \text{ g/mL}$  Then divide by the specific gravity of water at 212 F =  $0.9589/0.958 = 1.0009 \text{ mina/hin} = 1.00 \text{ mina/hin}$  to 3 sig figs.

hin/mina (Ptolomaic)

1 pound = 1 pint. (at 212 F)

Today's pint = 474 mL

Today's pound = 454.5 g

Pint/Pound =

$454.5 \text{ g}/474 \text{ mL} = 0.9589$  Then repeat the process above. Divide by the specific gravity of water at 212F =  $0.959/0.958 = 1.009 \text{ pound/pint} = 1.00 \text{ pound/pint}$  to 3 significant figures.

These are the **same ratios, but smaller actual values!**

It looks as if we have kept the Ptolomaic values for the pound, in our United States pound, and revised our pint down a bit from the ancient Egyptian hin to match our pound. This is just too strange to be coincidental. May it be explained by changing atmospheric pressure? That will be left to another day.

Rochelle A. Houser, Chemist. 8/30/2015

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<sup>6</sup> Van Der Spek, Bert. “Money, Weights and Measures in Antiquity.” *Money, Weights, and Measures in Antiquity*, [www.livius.org/w/weights/weights.html](http://www.livius.org/w/weights/weights.html). Accessed 7 June 2017.

## Appendix I Calculation of Estimated Value of Money Brought for the Tabernacle:

### Range of value of the silver brought:

8.33 g/shekel x 301,775 shekels = 2,513,785.75 g silver = 80,820 troy ounces. Today's rate of \$14.25 per troy ounce silver = **\$1,151,685.00**

10 g/ shekel x 301,775 shekels = 3,017,750.00 g silver = 97,022 troy ounces. Today's rate of \$14.25 per troy ounce silver = **\$1,382,563.50**

12.4 g/shekel x 301,775 shekels = 3,742,010 g silver = 120,308 troy ounces. Today's rate of \$14.25 per troy ounce silver = **\$1,714,389.50**

Or, somewhere between **\$1.2-\$1.7 million US dollars.**

### Estimated value of Gold Brought:

Exodus 38:24 says the gold that was brought was 29 talents, and 730 shekels, after the shekel of the sanctuary.

If, as above, the talent was 3000 shekels, and the sanctuary shekel was 10 g then:

$(29 \times 30,000 \text{ g}) + (730 \times 10 \text{ g}) = 870,000 \text{ g} + 7300 \text{ g} = 877,300 \text{ g. total gold}$

877,300 g/31.1034768g/Troy ounces

Today's value: 28,205.85 Troy ounces x \$1109/Troy ounce gold = **\$31,280,287.61**

### Estimated value of Bronze (As Copper spot)

Exodus 38:29 says the bronze that was brought was 70 talents, and 2400 shekels.

If, as above, the talent was 3000 shekels, and the sanctuary shekel was 10 g, then:

$(70 \times 30,000 \text{ g}) + (2400 \times 10 \text{ g}) = 2,100,000 \text{ g} + 24000 \text{ g} = 2,124,000 \text{ g total bronze}$

2,124,000 g bronze/ 31.1034768 Grams = 68,288.18 Troy ounces copper

Today's value (9/14/2015): 68,288.18 ounces/\$0.99 per ounce = **\$68,977.97 USD.**

Total estimated value of the gold, silver, and bronze: (using 10.0 g/ sanctuary shekel)

Gold: **\$31,280,287.61**

Silver: **\$1,382,563.50**

Copper: **\$68,977.97**

**Total: \$32,731,828.58 on September 14, 2015**

**Estimated gift per person: \$32,731,828.28/603,550 men in the census: = \$54.23 avg.**

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