

## Letter to the Editor

### Daniel Michelson: The Shape of the Menorah. B.D.D. n° 23 July 2010, pp. 29-54.

The paper of Daniel Michelson is an important contribution to the understanding of the shape of the Menorah. However it deserves some complements and remarks.

1. In the rabbinical literature the shekel of 17gr. championed by the geonim and Rambam was adopted by R. Joseph Caro in his Shulhan Arukh: Hoshen Mishpat 88:1 and Even ha-Ezer 27:10; 294:6 and 305:1. On this basis and according to the Talmudic tradition the shekel of Moses weighed about 14.167 gr. and the weight of the Menorah was 42.5 kg. However no shekel of 17 gr. was ever found. By contrast the shekels that were found support the theory of Rashi of a Talmudic shekel of about 14.16 gr. and a shekel of Moses of 11.80 gr. The weight of the Menorah would then be only 35.4 kg.
2. The paper of Michelson was written on the assumption of a shekel of Moses weighing 17 gr. and a Menorah weighing 51 kg. It appears that the proposed solution is near to the limit as the stress at the embedding of the external branches under the only action of own weight reaches 44 MPa. The author mentions a yield point of 70 Mpa for annealed 24 carat gold but on the site [www.utilisegold.com/jewelry\\_technology/colours/colour\\_alloys](http://www.utilisegold.com/jewelry_technology/colours/colour_alloys) I found a yield point of 45 MPa. A deflection calculation should also have been performed but I did not find any indication about the elasticity modulus. The author is obliged to assume that the cross sections are a regular convex dodecagon inscribed in a circle of diameter 2 cm. Furthermore, because of the lack of gold, the author is obliged to replace the generally accepted basis resting on three feet by three straight legs; this solution was never considered before.
3. The author's assumption of a shekel of 17 gr. in the time of Moses is supported by personal considerations and by a reference in Josephus, Jewish Antiquities 3.8. We must always be very cautious with proves derived from Josephus: possible internal contradictions, later interpolations and corrupted text. However in the present reference it is not likely that Josephus referred to the ancient Attic drachma, he referred probably to the Greek Provincial drachma of his time which had about the same weight as the Imperial silver drachma. This would correspond to a shekel of about 14.16 gr.  
Similarly Josephus writes in Jewish Antiquities 3. 6. 7 that the candlestick was of **cast** gold, **hollow** within and weighed 100 pounds or  $9600 * \sim 3.5 \text{ gr.} = 33.60 \text{ kg}$  or  $10000 * \sim 3.5 \text{ gr.} = 35 \text{ kg}$ . if we consider that Josephus did not make the

difference –as it is often the case in the Talmud and the rabbinic literature– between the denomination of the libra weighing 96 denarius and the mina weighing 100 denarius. This statement of Josephus supports the theory of Rashi giving the menorah a weigh of about 35 kg. This theory is also supported by the numismatic.

Furthermore it seems that Josephus was not aware of a re-evaluation of the shekel at a certain moment of history.

4. The author mentions in his introduction the bulky Menorah on the Arch of Titus. The assumption adopted in the paper lead to a much leaner Menorah. But on the contrary the bulky shape of the Menorah on the Arch of Titus should give us some hint about the true shape of the Menorah.
5. Ibn Ezra on Ex. 25: 18, in contrast with all the other commentators, understands **mishka**: equal and not beaten. **Zahav mishka** would then mean “overlaid with an equal layer of gold”. Prof Grinfeld and Aviezer in their article about the cubit<sup>1</sup> made the accountancy of the gold used in the Tabernacle according to Ibn Ezra’s assumption. We find the same expression in Ex. 25: 36, 37: 8 and 37: 17. It can then be argued that according to Ibn Ezra the Menorah could have been a wooden or even a copper Menorah overlaid with an equal layer of gold.
6. The author considered a cross section in the shape of a dodecagon inscribed in a circle of radius 1 cm and having a section of 3 cm<sup>2</sup>. If we consider a circular section of 2.5 cm and a layer of 0.7 mm of gold the section will be 1.08 cm<sup>2</sup>. This will allow us to consider a basis with three feet and we will have enough gold to cover it with gold. This would solve many problems related to the Menorah. The latter assumption of a bulky copper Menorah overlaid with gold would explain why it was a heavy piece which required four bearers on the Arch of Titus.
7. The statement on p. 31 bottom, that according to Rashi one log of water weighs 25 Talmudic (?) shekel is important but the reference is missing. If it concerns the Talmudic shekel, it would give a revi’it of 88.56 cm<sup>3</sup>, an etzba of 2.017 cm and a cubit of 48.397 cm.

## Conclusion.

The paper of Daniel Michelson is an important contribution to the solution of the conundrum of the Menorah. The paper was written in order to demonstrate that the classical (Talmud, Targum Onkelos Rashi and other commentators) understanding of a massive Menorah of gold, entirely hammered out of single piece of gold, without any casting, is possible. However this understanding is not without difficulties and it rests on assumptions that are not necessarily acceptable. I am afraid that the conundrum remains unsolved.

J. Jean Ajdler  
Civil Engineer  
Brussels, Belgium.

---

<sup>1</sup> See B.D.D. n° 1 of Summer 1995 where they considered 0.7% of the kikar of gold for the covering of the cherubins (layer of 0.7 mm of thickness).