

# The “Molten Sea” Revisited

*David Shapira*

Independent scholar

*shap1@netvision.net.il*

## Abstract

According to the biblical account (1 Kgs 7:23–26), in the middle of the courtyard of the temple stood a large water vessel of cast brass. Commentators and researchers have put forward various suggestions as to the form of the Molten Sea and its purpose in the temple.

In this article, I argue that the description in 1 Kings offers definitive conclusions as to the biblical author’s intent regarding the form of the “Sea” and its volume (in בַּת units), and can resolve the outstanding question in the literature as to the equivalent of a בַּת in modern units of volume measurement. I shall also point to evidence in support of the view of other researchers that the Molten Sea held a purely symbolic role, while the practical functions of water for sacrificial purposes were provided by the bases (1 Kgs 7:27).

## Keywords

Solomon temple – בַּת (bath) units – first temple’s vessels – bronze basin – symbols of El

According to the biblical account (1 Kgs 7:23–26), a large water vessel of cast bronze, measuring ten cubits in diameter and five cubits high, stood in the middle of the courtyard of the temple. Although water reservoirs of various kinds appeared in many ancient temples, this “Molten Sea” (1 Kgs 7:23–39; 2 Chron 4:1)—or in Hebrew, simply יַם הַנְּחֹשֶׁת (‘‘the Bronze Sea,’’ Jer 52:17)—was unique both in form and in composition, insofar as no bronze water reservoir of this sort has been found elsewhere.

The “Molten Sea” is also described in 2 Chron 4:2–5—but with one difference: there it is said to measure 3,000 בַּת (*bath*) in volume, while according to 1 Kings its capacity was 2,000 (בַּת).

Josephus notes that this container was referred to as a “Sea” because of its imposing size (Ant. 8:79). According to the BDB, the Hebrew word יָם is from the Hebrew root *ymm* and to be simply the word for ‘sea’, but Tvedtnes thinks it odd for such an epithet to be given to a bronze vessel. More likely, he thinks, it was a symbolic object that represented the ancient waters in the Creation story.<sup>1</sup>

As to why the volume cited in 2 Chron (3,000 בַּת) is different from that in the 1 Kings account, Shmuel Yevin suggests that this is due to differences in the Sea’s form: According to Yevin, the discrepancy between the two accounts is because the 1 Kings’ description assumed that the vessel’s rim was deeply notched in the shape of lotus flowers—preventing it from being filled to the brim—while the author of 2 Chron did not believe these notches to be deep, and therefore that the Sea was capable of containing more.<sup>2</sup> Powell attributes the difference to the fact that the author of Chronicles based his calculations on dry volume, while the ratio of liquid to dry volume is in fact 3:2.<sup>3</sup> As we shall see below, a simple arithmetic check suffices to demonstrate that the 2 Chron calculation is wrong.

According to the text, the Sea’s rim was round, 10 cubits (approximately 5 meters) in diameter, thirty cubits in circumference קו (*qav*), and five cubits high. It sat upon twelve oxen, which were arranged in four groups, each facing one of the four winds. Together, the Sea and the oxen (the height of which is not given) measured at least five cubits in height. The missing information is the form of the vessel, and the size of a בַּת.

On the latter point there is no consensus among the scholars. The word בַּת appears on thirteen different occasions in the Hebrew Bible—always as a measure of liquid volume. Based on the archaeological findings, some scholars (Inge, Montgomery, Gray, and others) believe that a בַּת is equivalent to 46 liters,<sup>4</sup> while others (Albright, Busink, De Vaux, and others) argue that it

1 Tvedtnes, “Egyptian Etymologies,” 216.

2 Yevin, “Mikdash,” 342.

3 Powell, “Weights,” but first discussed by the Sages, e.g., Tractate Eruvin 14b.

4 Gray, 1 & 2 Kings; Montgomery, *Book of Kings*; Inge, “Excavation,” 106.

is approximately 22 liters,<sup>5</sup> and the Talmudic Sages estimated it to be about 40 liters.<sup>6</sup>

The shape of the vessel is also a matter of dispute. Josephus thought that it was hemispherical, i.e. bowl-shaped (Ant. 8:79)—in keeping with the description that it was “round about” (1 Kgs 7:23). A royal cubit measured 525 mm, which means its volume was half of  $\frac{4}{3}\pi \cdot 2.625^3$ , or approximately 37,860 liters. Based on the stated circumference of 30 cubits, however, the diameter is  $30 \div 2\pi = 4.77$  meters, and therefore the vessel’s volume was only  $\frac{4}{3}\pi \cdot 2.385^3 = 28,400$  liters. Rashi, however, based on the Sages’ commentary (Eruvin 14), thought that only the upper part of the Sea was round, while the lower part was square. Busink agrees, and based on his reconstruction (Fig. 1), suggests that the Sea was placed on the floor, and the oxen were merely for ornamentation, due to the weight involved.<sup>7</sup> Powell and Hognesius<sup>8</sup> both contend that the Sea was cylindrical in shape—on the grounds that people in the ancient East were capable of calculating the volume of a cylinder, but not that of a hemisphere, and therefore the cited figure was likely estimated by the author (rather than measured in practice).<sup>9</sup> However, researchers have recently found that the ancient Egyptians of that period were in fact able to measure volume. The unit of liquid volume used by the Egyptians at this time—the *hekat* was 4.77 liters, and computer analysis of hundreds of pottery vessels found in the Levant and Egypt indicates that between the 14th and 10th centuries BCE, the Egyptians and Phoenicians used simple methods to measure the volume of spherical

5 Most scholars agree that a **בַּת** was equivalent to 19–22 liters: see Lipschits et al., “Enigma,” 458, n. 7.

6 In the Talmud (Eruvin: Mavoi), the Sages discuss what is the minimum size of beam to be placed across the opening of an alley to prevent the alley from being considered part a public realm (for the purposes of Sabbath rules). One of their conclusions was that the critical dimension is not the beam’s circumference, but its thickness—or, in the case of a beam with a round cross section, its diameter. Citing the biblical description of the Molten Sea, they determined that a beam’s thickness is equivalent to a third of its circumference. Using similar reasoning, they deduced the dimensions of the Molten Sea, and its shape. Tractate Eruvin (14b) states that a **בַּת** is equivalent to three **סֵאָה** (*seah*), and the Molten Sea contained the equivalent of 150 ritual **בַּת** (each measuring of 40 **סֵאָה**)—i.e. 6,000 **סֵאָה** or 2,000 **בַּת**. Therefore, based on the Talmudic Sages’ calculation, a **סֵאָה** is approximately 13.36 liters, which means that a **בַּת** is approximately 40 liters. However, after examining potsherds with the Hebrew inscription *bt lmlk*, Inge determined that a **בַּת** is 46 liters (Montgomery, *Book of Kings*). Novak and Benziger calculated it to be 36.44 liters (Mulder, 1 *Kings*), while Albright (*Iron Age*) argues that it is 22 liters, based on a vase from Tell Beit Mirsim with the inscription *bt*.

7 Busink, *Tempel*.

8 Powell, “Weights,” 897–908, n. 3, and Hognesius, “Capacity.”

9 Hognesius, “Capacity,” 356. Cf. Byl, “Capacity.”

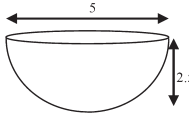
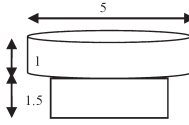
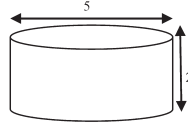
vessels, based on the length of the royal cubit (about 52 cm). Specifically, they knew that the volume of a spherical pottery vessel one royal cubit in circumference was half a *hekat*, i.e. about 2.4 liters. This formula, which was known in Egypt as early as the Late Bronze Age, tallies with modern mathematical calculations.<sup>10</sup> However, we do not know whether the author of 1 Kings was aware of this formula, or based his figure on information provided to him about the quantity of water used to fill the Sea.

The information provided in the biblical text helps to resolve the question of the shape of the Molten Sea. The consensus among all scholars in the field is that the rim of the container was round, as this is explicitly stated in the verse. Furthermore, it seems clear that the container stood on the backs of the oxen rather than on the floor, as this, too, is explicitly stated in 2 Kgs 16:17 (“[...] and took down the sea from off the brazen oxen that were under it, and put it upon the pavement of stones”). Presumably, if the Sea were indeed in the form of a hemisphere, it would have been necessary to build a stand to enable it to stand on its round base, but the text makes no mention of such a device. It follows that the Sea had a flat, rather than bowl-like, bottom—else it could not be placed on the stone floor.

Assuming that the container had a volume of 2,000 בת, we may be able to resolve two matters of dispute in the research literature: the size of a בת, and the form of the container. As evident from the following table, we can rule out the possibility that the container was hemispherical, because if it were, even based on the calculation of 22 liters per בת, we would get maximum volume of only 1,500 בת.<sup>11</sup> Another thing we can conclude from the table is that a בת was the equivalent to 22 liters.

10 Zapassky et al., “Ancient Relation.”

11 For the sake of convenience, these calculations in accordance with Powell and Hognessius’s assumption of a cubit = 50 cm (give or take 10%), based on Powell’s analysis of several hypotheses—see notes 8–9 above. This article, however, sides with the view of Scott, Barkai, and others (Scott, “Weight,” esp. 23–27; Barkai, *Measurements*, 37) that the author of 1 Kings was referring to the Egyptian royal cubit, which measured 52.50 cm (as opposed to the ancient cubit, which was 45 cm). It should also be noted that the measurements given in the text are approximate, since the authors did not have the benefit of Archimedes’ formula  $d = 2\pi r$ , and therefore if the circumference was precisely 30 cubits, the diameter should have been  $30 \div \pi = 9.55$  cubits, and not ten, as stated (עֶשֶׂר בְּאֲמָה—1 Kgs 7:23).

	Option 1	Option 2	Option 3
			
According to	Josephus, <i>Ant.</i> 8:79; Albright	Busink <sup>4</sup>	Powell; Hognesius; Vincent
Volume (cub.m.)	33 m <sup>3</sup>	44 m <sup>3</sup>	49 m <sup>3</sup>
Volume בת = 22 li.	1,500	2,000	2,227
per Albright			
Volume בת = 40 li.	945	1,125	1,225
per Talmud; Novak; Benziger			
Volume בת = 46 li.	2,821	978	1,065
per Inge; Montgomery; Gray			

\* According to Tractate Eruvin, the square walls were about ten cubits long (approx. 5 meters) and therefore the container measured 57 cubic meters, or 2,590 בת (based on 22 liters per בת).

This table presents the three options discussed in the study: a hemispherical shape,<sup>12</sup> a cylindrical one,<sup>13</sup> and a combination of the two.<sup>14</sup> The third row in the table represents the maximum volume according to mathematical calculations. In the following three rows, the maximum volume in each case, based on varying estimates of the size of a בת (22, 40 or 46 liters, respectively).

The table gives rise to the following conclusions:

1. Of the three possible options, the maximum size of the Molten Sea is represented by option C (49 cub.m., or 2,227 בת)—so in any event it could not have contained 3,000 בת as stated in 2 Chron 4:1.

12 Ant. 8:79.

13 Vincent, *Jérusalem*; Powell, “Weights”; Hognesius, “Capacity.”

14 Busink, *Tempel*. For the sake of simplicity, the precise dimension of the royal cubit (52.5 cm) is rounded to 50 cm.

2. Busink's proposed reconstruction of the form of the Molten Sea, like that of the Sages (Tractate Eruvin), is the most likely—namely, that the container was wide at the top and narrow at the bottom.
3. Of all the proposed sizes of a בת, the 22 liter estimate, based on the description in 1 Kings, is the closest to the truth.

The Molten Sea sat on top of two dozen oxen.<sup>15</sup> The researchers differ as to whether these were in a kneeling position (as surmised by Josephus, Vincent, and others—see Fig. 2 below) or standing (Busink and others—Fig. 1 below); and whether the container sat on the ground (Busink), or on the backs of the oxen. There is also no way of knowing how high it was. Its walls were one טפח (*tefah*) (~ 7.5 cm) thick; its rim was approximately 30 cubits in circumference (31.4, to be precise, based on the mathematical formula  $2\pi r$ ); and its rim was “lily work”—i.e., sculpted like a lotus flower.<sup>16</sup> An explanation for the association between the Sea and the lotus flowers along its rim may be provided in the research by Joachim Quack of a rare text that he calls the Egyptian *Book of the Temple*—specifically, in its description of a “purification lake,” which is adorned with lotus flowers.<sup>17</sup>

Several suggestions have put forward regarding the purpose of the Molten Sea—including that it served as the temple's main reservoir, or as a ritual bath for the priests to wash and purify themselves in. However, the Sea's very large dimensions would have made it extremely difficult and awkward to use for this purpose—nor is there any mention in the text of the use of ladders. Therefore, we must assume that it was not a bathing facility, but a ritual object. Terrien surmises that, since the temple was thought to be the hub of the world, the Sea

15 The Hebrew term used—בקר (*baqar*)—is the collective name for all bovine animals: ox, bull, cow, and calf. In any case, this is a kosher animal permitted for slaughter and a sacrifice.

16 The biblical author clearly attributes great importance to the “lilies” in the temple of Solomon. The capitals of the pillars Jachin and Boaz were “lily work,” and “the brim thereof was wrought like the brim of a cup, with flowers of lilies.” The Hebrew word for lily שושן (*shushan*)—means a lotus flower, and is a transliteration of the Egyptian term *sšn*. Solomon's choice of lotuses as an ornamentation of the pillars and the Sea is indicative of Egyptian influence. The lotus held political and religious significance as one of the incarnations of the sun god, Khafre—who rises every morning from the primordial waters in Egypt—and accordingly served as a symbol of Upper Egypt and featured on most of its temples in the New Kingdom period.

17 The Egyptian *Book of the Temple* is a text that prescribes in detail what an ideal Egyptian temple should look like—including its design and guides its operation. Joachim Quack (“Buch”; “Dienstanweisung”; “Manuel”) found approximately fifty fragments of manuscripts which, although dated from the Roman period, feature texts that linguistically and programmatically suggest they originate from the late Middle Kingdom period; their geographical distribution and quantity attest to the practical importance of the text.

held a cosmic significance linked to the mythic notion of *tehom* (Tiamat)—i.e., the “abyss.”<sup>18</sup>

An alternative idea—put forward by Mulder—is that the Sea’s symbolic significance that harked back to the pre-Solomonic period:<sup>19</sup>

We are of the opinion that the bronze basin was primarily, if not exclusively, intended for symbolic purposes, and, like the pillars Jachin and Boaz, stood and functioned in the pre-Solomonic El-temple at Jerusalem.<sup>20</sup>

Gray points to a similar object found at Amathus, Cyprus: a huge stone sink, measuring 2.20 meters in diameter, and 1.85 meters high, which currently resides at the Louvre Museum in Paris (Fig. 3). Although it bears a certain similarity to the Molten Sea, it is made of stone, while the Molten Sea is bronze. He adds that a similar water vat existed at the Marduk temple in Babylon, where it was known as *ta-am-tu*—in apparent allusion to Marduk’s mythological battle and triumph over *Tiamat*.<sup>21</sup> Water, according to Gray, symbolizes the triumph of the cosmos over chaos.<sup>22</sup> Ernest Wright<sup>23</sup> sees the Sea as a Canaanite theological reference.

It is possible that the oxen that the Sea rested upon (per the biblical account) symbolized the god El within the temple. Avigdor Hurowitz also argues that the Molten Sea may have symbolized El.<sup>24</sup> This is supported by Ezekiel’s prophecy (Ezek 28:2) about the king of Tyre (“Because thine heart is lifted up, and thou hast said, I am a God, I sit in the seat of God, in the midst of the

18 On the symbolic meaning of the “Molten Sea”, see Terrien, “Omphalus Myth,” esp. 323 and n. 2, and its references.

19 Some scholars believe that the temple of Solomon was built on the foundation of a Jebusite temple—see Rowley, “Zadok”; Hollis, “Sun Cult.” Hollis (“Sun Cult,” 90) points out that Jerusalem was founded long before David’s time, since the Amarna Letters (14th c. BCE) attest to Jerusalem’s presence as a city state ruled by a vassal of Egypt by name of Abdi-Habbah. It is reasonable to assume that when David conquered Jerusalem from the Jebusites, he found an active temple that was probably built at the highest point of the city, as is customary for many temples of this period.

20 Mulder, *1 Kings*, 330. I also argue that these symbols are references to El—see Shapira, “Meaning”, 115

21 Cogan, *1 Kings*.

22 Gray, *1 & 2 Kings*, 190, n. 4.

23 Wright, “Salomon’s temple.”

24 Hurowitz, “Exalted House,” notes that Ezekiel, in his vision of the future temple, ignores the “Molten Sea,” yet describes the river that flows from the point where the “Sea” was placed parallel to the “river [that] went out of Eden” (Gen 2:10–14). The Garden of Eden represented God’s own garden.

seas”<sup>25</sup>—and may explain why, in the time of King Ahaz (743–727 BCE), the oxen were removed and the Sea was lowered and placed on “the pavement of stones” (2 Kgs 16:17). Ahaz also had the bas-reliefs of bulls on “the borders that were between the ledges” removed (1 Kgs 7:29), and some researchers argue that he gave these bronze fixtures as tribute to the king of Assyria, in order to remove such blatant references to the northern deity (El) within the temple.<sup>26</sup> Josephus goes as far as to say that the inclusion of the bulls was the first of Solomon’s sins, “that he erred and sinned against the laws of the Torah, and did not preserve them, by doing the figures of the bronze bulls beneath the sanctuary” (Ant. 8:195). It should also be noted that the Molten Sea does not appear in the Second temple, nor is it mentioned in any of the four chapters devoted by Ezekiel, son of Buzi the Priest, to his vision of the temple in the future (Ezek 40–43). Ezekiel’s vision is in keeping with the spirit of the priestly school that he belonged to,<sup>27</sup> and the conspicuous absence of the Molten Sea from his vision and from the Second temple that came to be, are further indication that it was thought to be inappropriate.

Water reservoirs in temples in the ancient world were common, and held both a symbolic and practical purpose. As previously noted, the Marduk temple in Babylon had such a vessel as a symbol of Marduk’s victory over Tiamat. In the research literature it is widely accepted that vestiges of this myth—which appears in various guises in the Ugaritic epic, in Hittite, and in Egyptian writings—are also to be found in the Hebrew Bible, possibly in connection with the Molten Sea, in passages such as Pss 74:12–14; 89:10–11; 93:3–4; 104:6–9; Isa 51:9–10, and elsewhere.

A large stone pool (measuring 3.5 m × 2 m, 0.7 m) was found in the excavations of the temple at ‘Ain Dara. The person in charge of the dig, Ali Abu Assaf, believes that based on the location of the pool and its proximity to the temple, its purpose was likely ritual rather than practical (i.e., for bathing).<sup>28</sup> Artificial pools—usually rectangular in shape were also found in ancient Egypt at a number of temples (for example, the temple of Amun in Karnak).<sup>29</sup> They were fed by the river Nile, and included stairs for entering into the water, to accommodate the variable changes in the river’s level. These pools served a dual purpose: for rituals and for purifying the priests as they entered the temple,

25 Hurowitz, “Exalted House,” 24, and Hurowitz, “Tenth Century BCE,” 79. For more on the symbolism of the Molten Sea and the pillars of Jachin and Boaz at the temple and the polemic surrounding “Yahweh” and “El,” see Shapira, “Meaning,” 104–105, 115.

26 On the symbols of the northern deity in the temple, see Shapira, “Meaning.”

27 See Shapira, “Meaning,” 118–119; and cf. Cogan, *1 Kings*, 271.

28 Abu Assaf, *Tempel*.

29 See Wilkinson, *Complete Temples*, 72–73.



and to symbolize the primordial waters and the primal forces of Creation, with the daily sunrise over the water symbolizing vitality and creative power.<sup>30</sup>

Unlike these water pools in Egypt, however, the Molten Sea served no practical purpose, due to its great height. Instead, it is possible that the "bases" (1 Kgs 7:27) were used for bathing.<sup>31</sup>

The symbols of El in the temple of Solomon, the Molten Sea and the bases, all disappeared in the course of the First temple's history, and no longer featured in the temple in the post-Babylonian period, nor in Ezekiel's vision of the future temple (Ezek 40–43).

In conclusion, based on the dimensions of the Molten Sea as cited in 1 Kgs 23–26, the questions presented at the start of this article may be resolved. First, we must accept the account given in 1 Kings that the Molten Sea had a capacity of 2,000 בָּת, and as such could not have been in the form of a hemisphere or a cylinder, but rather broad at the top and narrow at the bottom, as depicted in Busink's proposal and in the Sages' exposition in Tractate Eruvin. Finally, based on the biblical author's calculations, a בָּת was equivalent to approximately 22 liters.

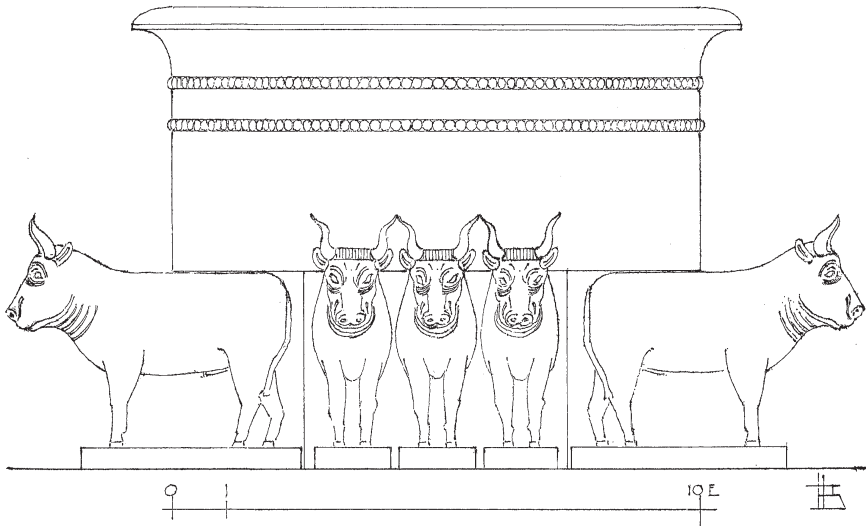


FIGURE 1 Busink's proposed reconstruction of the Molten Sea  
BUSINK, *Tempel*, 329

30 See Wilkinson, *Complete Temples*, 72.

31 See Shapira, "Meaning," 115

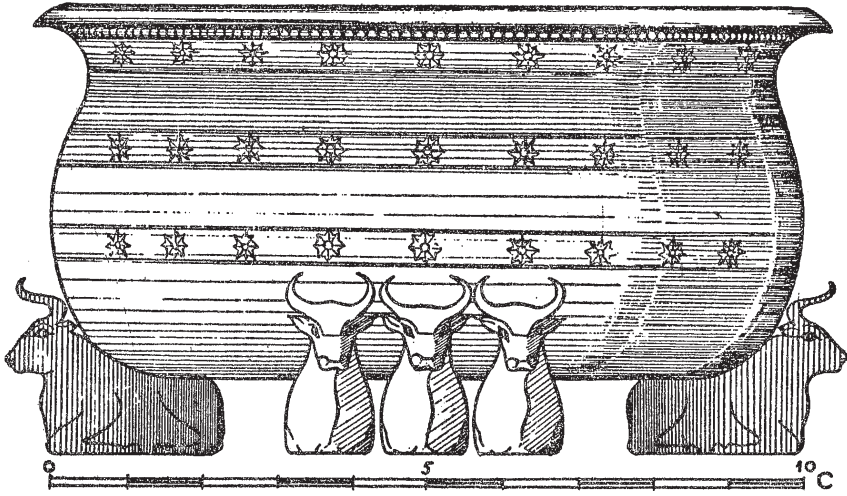


FIGURE 2 Vincent's proposed reconstruction of the Molten Sea  
BUSINK, *Tempel*, 329



FIGURE 3  
The huge stone basin from  
Amathus, Cyprus, at the Louvre  
Museum in Paris  
PHOTO: D. SHAPIRA

## Bibliography

- Abu Assaf, Ali. *Der Tempel von Ain Dara*. Mainz: von Zabern, 1990.
- Albright, William. Foxwell. *The Iron Age*. Vol. 3 of *The Excavation of Tell Beit Mirsim*. AASOR 21–22. New Haven, CT: American Schools of Oriental Research, 1943.
- Barkai, Gabriel. "Measurements in the Bible: Evidence at St. Etienne for the Length of the Cubit and Reed." *BAR* 12 (1986): 37.
- Busink, Theodor A. *Der Tempel von Jerusalem von Salomo bis Herodes*. Leiden: Brill, 1970.
- Byl, John. "On the Capacity of Solomon's "Molten Sea." *VT* 48 (1998): 309–314.

- Cogan, Mordechai. *1 Kings: A New Translation with Introduction and Commentary*. ABD. New York: Doubleday, 2000.
- Gray, John. *1 & 2 Kings: A Commentary*. 2nd ed. OTL. London: SCM, 1970.
- Hognesius, Kjell. "The Capacity of the Molten Sea in 2 Chronicles IV 5: A Suggestion." *VT* 24 (1994): 349–358.
- Hollis, Frederick Jack. "The Sun Cult and the Temple at Jerusalem." Pages 87–110 in *Myth and Ritual: Essays on the Myth and Ritual of the Hebrews in Relation to the Culture Pattern of the Ancient East*. Edited by S. H. Hooke. London: Oxford University Press, 1933.
- Hurowitz, Victor. "Tenth Century BCE to 586 BCE: The House of the Lord." Pages 14–35 in *Where Heaven and Earth Meet: Jerusalem Sacred Esplanade*. Edited by Oleg Grabar and Benjamin Z. Kedar. Yad Ben Zvi, Jerusalem, 2009.
- Hurowitz, Victor. "Yhwh's Exalted House Revisited: New Comparative Light on Biblical Image of Solomon's Temple." Pages 229–240 in *The Ancient Near East in the 12th–10th Centuries BCE: Culture and History*. Edited by in Gershon Galil, Ayelet Gilboa, Dan'el Kahn, and Aren M. Maeir. AOAT 392. Münster: Ugarit Verlag, 2012.
- Inge, Charles H. "Excavation at Tel ed-Duweir." *PEQ* 72–73 (1941): 106–109.
- Josephus, Flavius. (n.d.). *Qadmoniot Hayehudim [Antiquities of the Jews]*. Translated by Abraham Shalit. 10th ed. Jerusalem: Bialik Institute, Mosad Bialik, 2007.
- Lipschits, Oded, Koch Ido, Shaus Arie, and Guil, Shlomo. "The Enigma of the Biblical חב and the System of Liquid Volume Measurements During The First Temple Period." *UF* 42 (2010): 453–478.
- Montgomery, James. *A Critical and Exegetical Commentary on the Book of Kings*. Edited by Henry Snyder Gehman. ICC. New York: Scribners, 1951.
- Mulder, Martin J. *1 Kings*. Leuven: Peeters, 1998.
- Powell, Mark Alan. "Weights and Measures." *ABD* 6:897–908.
- Quack, Joachim Friedrich. "Das Buch vom Tempel und verwandte Texte: Ein Vorbericht." *ARG* 2 (2000): 1–20.
- Quack, Joachim Friedrich. "Die Dienstanweisung des Oberlehrers im Buch vom Tempel." Pages 159–171 in *5. Ägyptologische Tempeltagung Würzburg, 23–26. September 1999*. Edited by Horst Beinlich, Jochen Hallof, Holger Hussy, and Christiane von Pfeil. ÄAT 33/3. Wiesbaden: Harrassowitz, 2002.
- Quack, Joachim Friedrich. "Le manuel du temple: Une nouvelle source sur la vie des prêtres égyptiens." *Egypt, Afrique & Orient* 29 (2003): 11–18.
- Rowley, Harold Henry. "Zadok and Nehushtan." *JBL* 58 (1939): 113–141.
- Scott, Robert, and Balmorie Young. "Weight and Measurements of the Bible." *BA* 22 (1959): 143–149.
- Shapira, David. "The Meaning of the Pillars Jachin and Boaz in Light of Israelite Belief in the Early Kingdom Period." *Beit Mikra* 56 (2011): 100–128. (Hebrew)
- Terrien, Samuel. "The Omphalus Myth and Hebrew Religion." *VT* 20 (1970): 315–338.

- Tvedtnes, John A. "Egyptian Etymologies for Biblical Cultic Paraphernalia." Pages 215–221 in *Egyptological Studies*. ScrHier 28. Edited by S. Israelit-Groll. Jerusalem: Magnes Press, 1982.
- Vincent, Louis. Hugues. *Jérusalem de l'Ancien Testament: Recherches d'archéologie et d'histoire*. Paris: J. Gabalda et Cie Editeurs, 1956.
- Wilkinson, Richard H. *The Complete Temples of Ancient Egypt*. New York: Thames & Hudson, 2000.
- Wright, Ernest. "Solomon's Temple Resurrected." *BA* 4.2 (1941): 19–31.
- Yevin, Shmuel. "Mikdash: Batei Mikdash beYisrael." *Encyclopaedia Biblica* 5:328–346. (Hebrew)
- Zapassky, Elena, Yuval Gadot, Israel Finkelstein, and Israel Benenson. "An Ancient Relation between Units of Length and Volume Based on a Sphere." *PLoS ONE* 7.3 (2012), doi:10.1371/journal.pone.0033895.