

The Mobile Bronze Basins- Study Art 1.1

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DISCLAIMER:

Please feel free to use my work as a “jumping-off point,” but please be careful to NEVER use it to replace your own Biblical study or thought! Bible study is a wonderful, personal, and essential part of learning and growing in faith, and should never be sidelined or replaced by ANY artist’s rendering.

Intent:

To provide visuals fit for presentations or classes. This material was created as part of a personal study on the structures and furnishings of Solomon’s Temple. I have created a full breakdown of temple measurements and descriptions here: <https://www.biblicaltoolbelt.com/l/solomons-temple-study-chart/>

Important Notes:

Descriptions:

II Chronicles 4:

“⁶ He then made ten basins for washing and placed five on the south side and five on the north. In them the things to be used for the burnt offerings were rinsed, but the Sea was to be used by the priests for washing.”

I Kings 7:

“²⁷ He also made ten movable stands of bronze; each was four cubits long, four wide and three high.^[r] ²⁸ This is how the stands were made: They had side panels attached to uprights. ²⁹ On the panels between the uprights were lions, bulls and cherubim—and on the uprights as well. Above and below the lions and bulls were wreaths of hammered work. ³⁰ Each stand had four bronze wheels with bronze axles, and each had a basin resting on four supports, cast with wreaths on each side. ³¹ On the inside of the stand there was an opening that had a circular frame one cubit^[s] deep. This opening was round, and with its basework it measured a cubit and a half.^[t] Around its opening there was engraving. The panels of the stands were square, not round. ³² The four wheels were under the panels, and the axles of the wheels were attached to the stand. The diameter of each wheel was a cubit and a half. ³³ The wheels were made like chariot wheels; the axles, rims, spokes and hubs were all of cast metal.

³⁴ Each stand had four handles, one on each corner, projecting from the stand. ³⁵ At the top of the stand there was a circular band half a cubit^[u] deep. The supports and panels were attached to the top of the stand. ³⁶ He engraved cherubim, lions and palm trees on the surfaces of the supports and on the panels, in every available space, with wreaths all around. ³⁷ This is the way he made the ten stands. They were all cast in the same molds and were identical in size and shape.

³⁸ He then made ten bronze basins, each holding forty baths^[v] and measuring four cubits across, one basin to go on each of the ten stands. ³⁹ He placed five of the stands on the south side of the

temple and five on the north. He placed the Sea on the south side, at the southeast corner of the temple. ⁴⁰ He also made the pots^[w] and shovels and sprinkling bowls.

So Hiram finished all the work he had undertaken for King Solomon in the temple of the Lord.”

Additional Measurements

Depth of the Basin

Given the diameter and the total capacity of the basin, I was able to determine the approximate depth of the basin using AI.

If I have a bowl that is 6 feet in diameter and can hold 232 gallons of water, how deep is the bowl?

💡 Thought for 1s

The bowl is hemispherical (a half-sphere shape, which is the standard assumption for a "bowl" that holds water unless specified otherwise).

Step-by-step calculation:

1. **Volume of water:**

232 gallons.

Convert to cubic feet (using 1 US gallon \approx 0.133681 cubic feet):

$232 \times 0.133681 = 31.034$ cubic feet.

2. **Radius of the bowl:**

Diameter = 6 feet, so radius $r = 3$ feet.

3. **Volume formula for a hemisphere:**

$$V = \frac{2}{3}\pi r^3.$$

Plug in the values:

$$31.034 = \frac{2}{3}\pi(3)^3.$$

$$31.034 = \frac{2}{3}\pi(27).$$

$$31.034 = 18\pi.$$

$\pi \approx 3.1416$, so $18 \times 3.1416 \approx 56.549$ cubic feet (this is the full hemisphere capacity).

Your bowl holds only 31.034 cubic feet, which is about 55% of a full hemisphere, so the water forms a **spherical cap** (partial hemisphere), not a full one.

4. Depth of a spherical cap:

The formula for the height (depth) h of water in a sphere of radius r is:

$$h = r - \sqrt{r^2 - \frac{3Vr}{2\pi}},$$

but it's easier to solve directly from the cap volume formula:

$$V = \frac{1}{3}\pi h^2(3r - h).$$

Rearrange to solve for h :

$$\pi h^2(3r - h) = 3V.$$

$$\pi h^2(9 - h) = 93.102 \text{ (since } 3 \times 31.034 = 93.102\text{)}.$$

$$h^2(9 - h) = \frac{93.102}{\pi} \approx 29.65.$$

This is a cubic equation: $h^3 - 9h^2 + 29.65 = 0$.

5. Solution:

Solving the cubic equation (using numerical methods or a calculator) gives the realistic root:

$h \approx 1.61$ feet.

Final answer:

The water is **1 foot 7 inches deep** (1.61 feet = 1 foot + $0.61 \times 12 \approx 7.3$ inches; commonly rounded to 1 foot 7 inches).

Quick verification:

If the water were 1.61 ft deep in a 6 ft diameter hemispherical bowl:

Cap volume ≈ 31 cubic feet ≈ 232 gallons, which matches exactly.

If you meant a **cylindrical** bowl (straight sides) instead, the depth would be about 2.19 feet (simple $V = \pi r^2 h$). Let me know if that's the case! Otherwise, for a typical bowl shape, **1 foot 7 inches** is the answer.

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↳ Derive the spherical cap formula

↳ Volume of full hemisphere

Weight of a Mobile Basin (Basin Only)

Given the size and material density of the basin, we can also approximate the weight of the basin using AI. This is for the basin ONLY, not the cart or any water added to the basin.

How much would such a bowl weigh if it was made from cast bronze and it was an inch thick?

The bowl is a **hemispherical shell** with outer diameter 6 ft (outer radius **R = 3 ft**), uniform thickness 1 inch (**t = 1/12 ft ≈ 0.0833 ft**), and made of cast bronze.

Step-by-step calculation:

1. Material volume (bronze only):

For a hemispherical shell, the volume is half the difference between the outer and inner full-sphere volumes.

Inner radius = $R - t = 3 - 1/12 = 35/12 \text{ ft} \approx 2.9167 \text{ ft}$.

Volume of outer full sphere: $\frac{4}{3}\pi R^3 = \frac{4}{3}\pi(3)^3 = 36\pi \text{ ft}^3$.

Volume of inner full sphere: $\frac{4}{3}\pi(35/12)^3 \approx \frac{4}{3}\pi(24.801) \approx 104.07 \text{ ft}^3$ (exact calc gives precise difference).

Difference (full shell): $\approx 36\pi - 104.07 \approx 9.165 \text{ ft}^3$.

Hemisphere shell volume: **≈ 4.583 cubic feet** (matches precise computation: 4.5827 ft³).

(For thin shells like this, an approximation is surface area × thickness: outer hemispherical surface $\approx 2\pi R^2 = 18\pi \approx 56.55 \text{ ft}^2$, $\times t \approx 4.71 \text{ ft}^3$ — close, but the exact sphere-difference method is more accurate here.)

2. Density of cast bronze:

Cast bronze (typically tin bronze or similar alloys like C83600/C93200 bearing bronze) has a density of about **8.7 to 8.9 g/cm³**, often around **8.8 g/cm³** for common castings (accounting for minor porosity in cast pieces). This converts to approximately **550 lb/ft³** (using $1 \text{ g/cm}^3 \approx 62.43 \text{ lb/ft}^3$; $8.8 \times 62.43 \approx 549 \text{ lb/ft}^3$). Many engineering sources use **530–560 lb/ft³** for bronze, with $\sim 550 \text{ lb/ft}^3$ typical for cast varieties.

3. Weight:

Weight = volume × density $\approx 4.583 \text{ ft}^3 \times 550 \text{ lb/ft}^3 \approx \mathbf{2,520 \text{ pounds}}$.

Using a slightly more conservative 540 lb/ft³ (common for some cast bronzes): $\approx 2,475 \text{ lb}$.

Using 530 lb/ft³: $\approx 2,430 \text{ lb}$.

The bowl would weigh roughly **2,500 pounds** (give or take 100 lb depending on the exact alloy and casting porosity). That's over a ton — very heavy, as expected for thick cast bronze!

If this is for a specific bronze alloy (e.g., silicon bronze, aluminum bronze, or a particular UNS number), or if you have more details on the casting method, the weight could be refined slightly. Otherwise, **about 2,500 pounds** (or 1.25 tons) is a solid estimate for a 1-inch-thick cast bronze hemispherical bowl of that size.

My Suggestions

Use:

My initial supposition was that these carts were parked along the Temple, but they were totally mobile and could go anywhere water was needed.

However, II Chronicles 4:6 demonstrates that these basins had very specific use- they were used for washing processed offerings, particularly burnt offerings (Leviticus 1:9,13). Burnt offerings would have been killed at the entry of the Temple, while other offerings would have been killed north of the Altar (Lev ch 1-6). The specified locations of the basins likely coincide with where these offerings would have been killed and processed- likely in the court of the Temple closer to the court entry than the back (similar to the Tabernacle arrangement).

Offerings would have been heavy, would have to be transported farther, and there would have been far more of them offered than before. As a result, much more water would have been required and containing it would have been important since the floor would have been stone, not absorbent sand (as it was in the Tabernacle).

The weight of the mobile basin (even approximate) is about that of a modern automobile. These would have been heavy and hardly maneuverable. It is likely that they only moved forward and backward, perhaps even along track or grooves built to contain them. (NOTE: this reminds me of the four wheels described in Ezekiel 1:15-21)

The basin carts are also somewhat tall. I wonder if these didn't run under a dressing/ hoist system near where the offerings were processed. The carcass could be lifted, then dipped in the water, cleaned, then lifted again-- while the mobile basin was removed to another spot where it could be drained, cleaned, and refilled.

Mechanisms?:

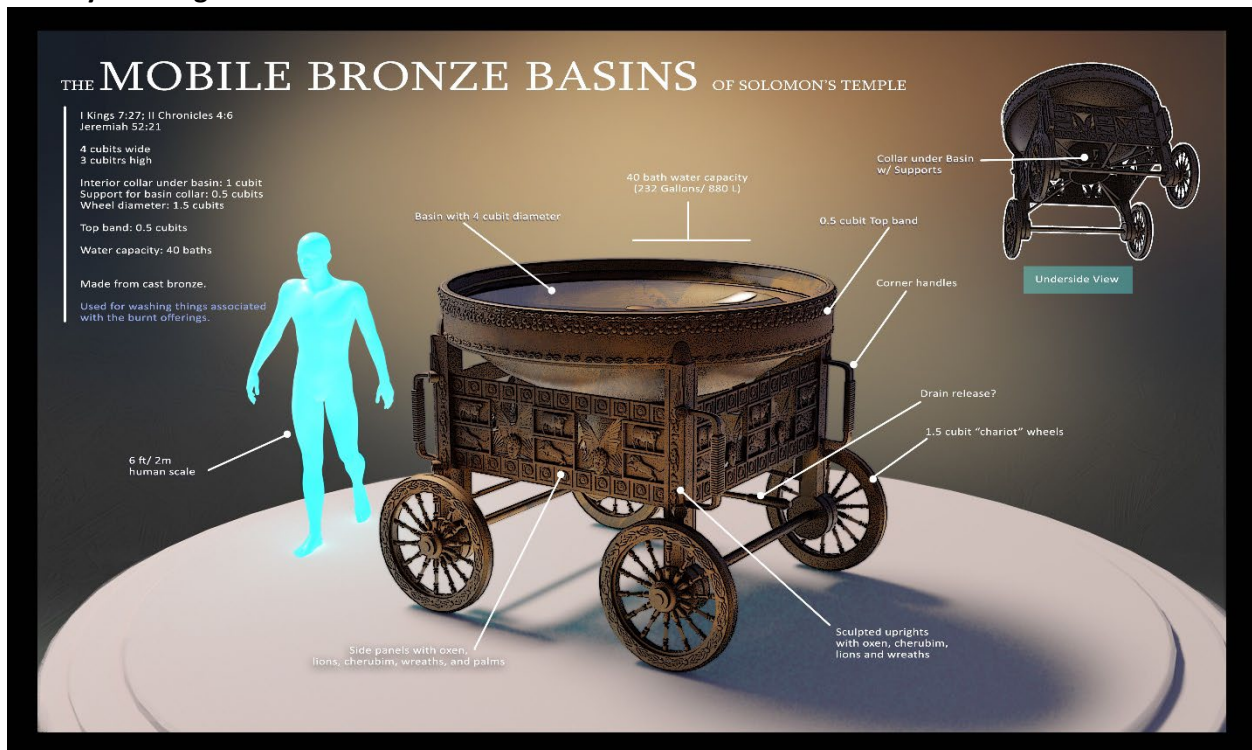
The cubit long circular "collar" described under the basin, along with its supports indicate (to my mind) that this may have been housing for a drain, and perhaps even simple mechanics for operating it. It is described as being "engraved," but it is unclear why, since such an engraving would have been difficult to see.

One possibility is that the engraving is not "etched" into the metal, but punctures the metal housing to create some sort of simple "lock" for a drain mechanism.



(Lift and pull to one side to open and lock drain)

Artistry & Changes Under Ahaz



These mobile basins were massively detailed, and were far more beautiful than what I have created.

The "wreaths" are a translational guess based on something that means "thin work" or perhaps

“woven” or “spiral” work. I see no issue with “wreaths,” but the indication seems to be that whatever was sculpted here was highly detailed and required great skill on the part of the artisan, Hiram.

It appears that there was a great deal of detail all over the surface of these elaborate carts—patterns that included oxen, lions, cherubim, palms, and wreaths. It is unclear if these were smaller panels cast separately and joined together later as I have in my image, or if the panel work was even more involved and artistic (I suspect that may be the case).

All the worse then to read that King Ahaz took these beautiful furnishings and cut them for scrap in deference to foreign kings. 2Kings 16 says:

“⁷ King Ahaz cut off the side panels and removed the basins from the movable stands. He removed the Sea from the bronze bulls that supported it and set it on a stone base.”

Final Reminder:

Again, much of this is my own assumption and should not be taken as absolute! Perhaps with further study and research better alternatives will present themselves. As usual, I strongly encourage Bible students to consider my underlying questions and assumptions for themselves and determine if the concept I’ve presented works.

Production Notes:

All of these illustrations were created over a few days using digital media. Most elements were fabricated in 3D (with a few purchased Daz human/ animal models to save time) to create a uniform model, then painted in Photoshop.

Special thanks to the Village Ecclesia (my home ecclesia) for helping to fund some of my Daz source models for this and other works!