

ARCH1855 Write-Up 1

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The object I have selected is a bronze bell-shaped artifact (Figure 1) in the case labeled “Bronze: Ladles, Lighting and Personal Adornment” on the east side of the Joukowsky Institute on the second floor.

The bronze object in question has the shape of a bell, but might have been used as a candle/flare snuffer. The item has radial symmetry, with a wide circular base (diameter ≈ 2 in) and sides that are concave inwards which rise up to the rounded top (diameter ≈ 1 in) of the object. On the top of the object is a bronze loop (the plane of which is parallel to the axis of radial symmetry of the snuffer), by which the object might have been suspended.



Figure 1: Bronze Object

The object looks well preserved. There are no noticeable large-scale defects, such as cracks or chips. The surface of the object appears to have a rough, flaky texture in some places. This could either be the result of some other material that has been caked on the object during its use or after it was discarded, or they could be localized degradation of the bronze itself through some corrosion reactions that may have occurred over the years.

The method of construction seems to have been casting into a mold. Craddock *et al.* discuss the archaeometric evidence that suggests bronze was originally made by combining copper and tin metals, and not by co-smelting the metals together, so perhaps this object was made in that way. If this is the case, the direct variables in smelting the separate metals would be the selection of ores and fuels to use and the amount of each to put into a smelting furnace, along with the air pumped into the system. The smelter would also control how often and from where he would drain the slag, though he would have no direct control over its composition. Through his manipulation of these directly controlled variables, a smelter would also have indirect control over the temperature and reducing atmosphere of the furnace. Once the separate metals were made, the artisan producing the object from its component metals would be able to choose the ratio of one metal to another in combining them to produce a bronze. Once again, in controlling the furnace used for casting, the artisan would have direct control over the charges and fuels added to the furnace, but the actual furnace temperature would be an indirect result of his actions.

The high level of radial symmetry present in the object suggests that the object was intentionally made that way, and that it was crafted successfully. The good state of preservation also indicates that there probably were no major flaws during its construction that would've led to fracture or failure during use (e.g. inclusions of other materials which would make the bronze less ductile and more breakable, or voids which would have the same effect). However, there are minor asymmetries present. The hole in the loop on the top is clearly off-center, which seems to indicate a flaw in the making of the hole, if the hole was made by hammering something through the already-cast object, or in the casting mold itself. Also, the widths of the ridges at the base of the object are not constant, but close to it, which may indicate a flaw in the casting mold.

Finally, scientific examination would be useful in examining this object to learn more about its production. The actual composition of the object remains unknown (i.e. what metals are present in the alloy). X-ray diffraction could be used to determine the crystal structures and lattice parameters of the metals in the object, and therefore determine the metals present. The energy dispersive X-ray spectroscopy discussed by Craddock *et al.* also could be useful to this end. Also, the asymmetry of the hole in the loop suggests that the hole may have been hammered through after the object was cast, but this is not known for certain. Microscopy (optical or SEM, depending on the resolution scale required) could be used to examine the metal grains in this area to look for evidence of high plastic deformation which might indicate that the hole was hammered through and not cast with the rest of the object.