The Bronze Hut Urn in The Metropolitan Museum of Art: Technical Report

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WHEN THE URN was first examined, a survey was made of the corroded surface. While it was rapidly realized that much of the supposed corrosion was actually paint, the metal beneath the paint in general looked rather convincingly old. This suggested that the urn had been partially stripped and repatinated but might otherwise be authentic.

Preliminary radiographs revealed a bewildering network of solder seams in unexpected places, despite the external evidence that the object was riveted together. Once it was noted that the eight rivets fastening the roof to the urn had been soft-soldered in place rather than headed over, they were easily unsoldered and the roof was removed. In addition to being soldered in place, the rivets turned out to have shanks of modern threaded brass rod. As far as can be seen in the radiographs, all the rivets in the urn were made by screwing threaded rod into holes drilled into the external rivet heads. No attempt was made to fasten the rivets in place by the usual method of hammering the free ends of the shanks; they were all soft-soldered into the holes drilled for them.

After disassembly, the roof and urn were radiographed separately to better reveal their construction (Figures 1, 2). The roof exclusive of the boat is made of sheet bronze but not in one piece as one might expect. The sloping sections are apparently made of eighteen separate pieces of metal, the edges of which for the most part are cut in precise and rectilinear patterns rather than naturally broken and repaired. All the seams are butt-joined with soft solder (an alloy of lead and tin), and many of them are reinforced on the interior with shim brass strips likewise soldered in place. These brass strips were hidden with a heavy application of a colored putty.

The four radial "rafters" divide the roof into four sectors: two long sides and two triangular ends. The radiographs show a distinct hammer texture in the sheets making up the sides and ends, with the hammer blows arranged in concentric rows. There are two different types of hammer marks: one is broad and indistinct; the other is small and quite distinct, produced by a sort of pecking. The broad marks seem to have shaped the slight convexity of the essentially conical roof. The small marks, on the other hand, appear irrelevant to the shaping of the roof and to be instead an attempt to give the metal a distressed surface texture.

The rafters themselves are made of separate strips of metal that show extensive longitudinal cracking as well as a distinctly darkened surface, indicative of severe cold working and annealing. The metal is so cracked that it must indeed have been previously embrittled by corrosion, as the actual degree to which the metal is embossed is not that great. The working and annealing were obviously done before the roof of the urn was assembled by soldering.

The eaves are also formed from a separate piece of metal and have numerous quasi-radial cuts. Most of these cuts do not traverse the full width of the metal, and all have been filled with soft solder.

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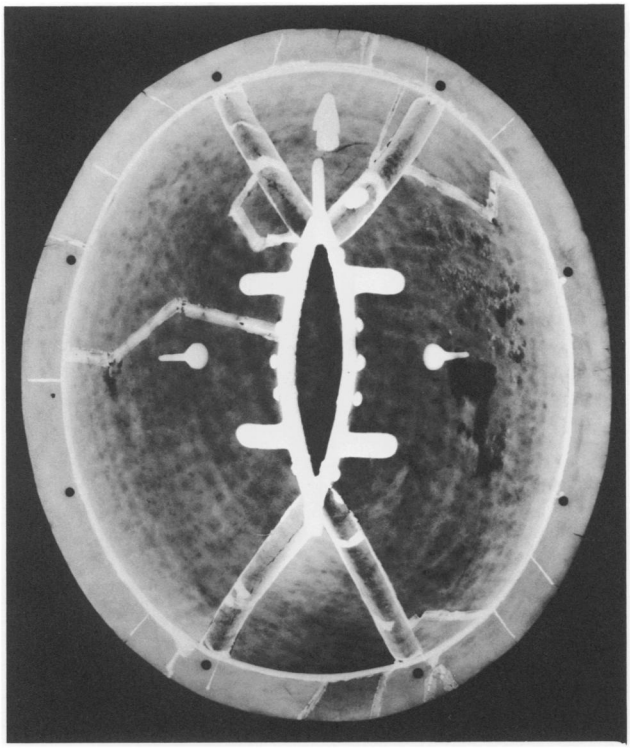
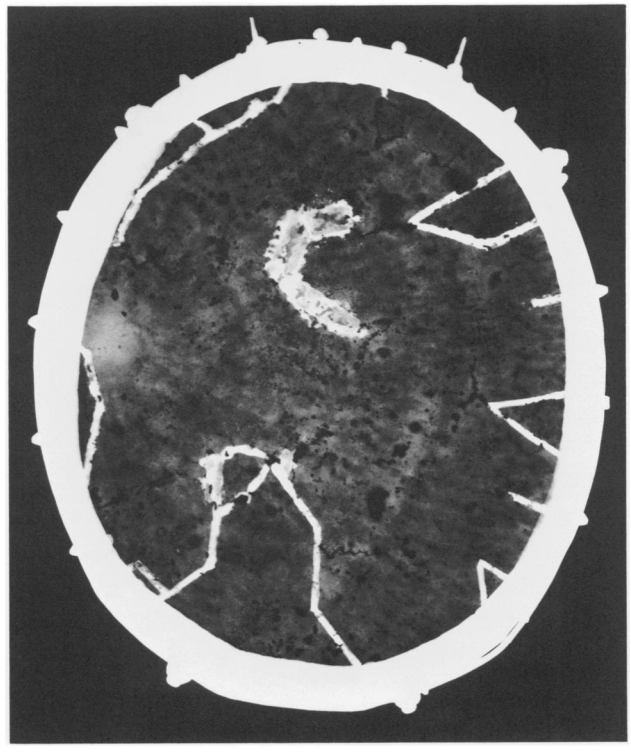
1, 2. Hut urn. Bronze, max. H. 29.4 cm.; diam. of base 36.2 cm. (long axis), 31.6 cm. (short axis). The Metropolitan Museum of Art, Fletcher Fund, 38.11.14 (radiographs: Stone)



1. The roof after disassembly of the urn



2. The bottom after disassembly of the urn

Clearly, the eaves must have been made from a longitudinal metal strip which had triangular gores cut on the inner side to enable the strip to be bent into a flat polygon approximating an ellipse. The shape was further refined by bending and filing, and the gores, now reduced to seams, were filled with solder. The eaves were then joined to the roof by soldering, the seam being hidden on the exterior by the round molding. On the interior the raw filed edge of the seam is quite conspicuous, even where the paint has not been removed.

It is obvious that the roof was executed by someone trained in the methods of the modern coppersmith, who works with metal that is preformed into sheets. A preindustrial craftsman would almost certainly have fashioned the roof just as he would have made a bowl, by raising it in a single piece. The complex piecing of the roof is primarily an effort to avoid the technique of hammer raising. Nowhere in the entire urn is there an extensive surface of double curvature except for the slopes of the roof; there, as we have seen from the radiographs, evidence of hammering does indeed exist. Otherwise, the work is entirely fashioned in surfaces of single curvature: the cylinder, cone, and flat sheets. The walls of the urn are a good example of the process. With the exception of the door surround and four pilasters, the walls are made from a single sheet of metal shaped into the frustum of a cone. The top edge of the metal sheet has been bent back to form a near-horizontal seat for the roof; as with the eaves, triangular gores have been cut into this flange to facilitate bending of the walls to an elliptical plan.

The bottom of the urn, like the roof, is made of a metal sheet carefully pieced together with soft solder and brass reinforcing strips. The bronze is considerably thinner than that of the roof and is riddled with penetrating corrosion pits. Much of the patching

seems to have been done in order to mend the corroded metal rather than to serve any structural function as in the roof. The metal sheet has apparently been cut from the bottom of a much larger flat-bottomed vessel, for in the radiograph one can see a typical pattern of concentric hammer blows not around the center of the elliptical bottom but around a thick spot virtually at its edge. There are no small "pecking" hammer marks since the metal here, unlike that of the roof, had a sufficiently irregular surface to begin with.

As previously indicated, there is considerable evidence that much of the metal is old and reused if not necessarily ancient. Even if we maintain that the craftsman was trying to avoid raising techniques out of habit, the roof is so pieced together as to suggest the exigencies of fitting together an available stock of old metal. Furthermore, genuinely old metal would be too brittle to raise without extensive annealing. Although this could have been done, so much of the patina of age would have been lost by heat treatment as to obviate the use of old metal in the first place.

Radiographs of the boat show coarse porosity, indicating that the boat was cast. It was made, however, not in a single piece but in six separate ones: the prow, the stern, and two segments on each side. Each cast segment of side wall has its integral projecting cylinder and all four segments are essentially identical. There is a vertical solder seam at the center cusp on each side, with lapping seams at the bow and stern. The bottom of the boat is a separate piece of thin hammered bronze sheet again soldered in place. The ten rivets supposedly fastening the boat to the roof are dummies, the shanks of which do not pierce the sides of the boat; this is actually held in place by heavy fillets of solder on the underside. As with the rest of the urn, the boat has been pieced together from scraps of old metal, and the seams are hidden under skillful applications of colored putty and paint.

It is clear that the urn as a whole is a clever pastiche made of both old and new metal, with enough genuinely old surfaces exposed so as to disarm the viewer's critical judgment.