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BRONZE II. IN ISLAMIC IRAN

BRONZE

ii. In Islamic Iran

The most important copper-tin alloy used in Islamic Iran was a high-tin bronze with a tin content of about 20 percent. The production of bronze alloys was dependent on the supply of components. Copper mines were common in Iran, but tin was not produced in the Islamic Near East in medieval times. It had to be imported either from southeast Asia, particularly an unidentified place called Kalah in the texts (e.g., Abū Zayd, *Aḵbār al-Ṣīn wa'l-Hend*, in Reinaud, p. 90; Bīrūnī, p. 248) or, beginning in the Il-khanid period, from Europe (Allan, 1979, pp. 23-28).

The most common copper alloys in use in Iran were brass and a quaternary alloy of copper, lead, zinc, and tin (See berenj). As for bronze, two alloys should be differentiated: low-tin bronze, with a tin content of 10 percent or less, and high-tin bronze, with a tin content of about 20 percent. So far only two objects of low-tin bronze from Islamic Iran have come to light: two mirrors in the British Museum (Craddock), which contain about 10 percent tin and small amounts of lead. The reason for the rarity of this alloy is unclear. The present article is concerned with high-tin bronze.

High-tin bronze is known in the medieval sources as *asfīḏrū(ḥ)ī* or *safīdrū(ḥ)ī*, lit. "white copper" (Bīrūnī, pp. 264-65; Kāšānī, pp. 244-45). In Western publications it is called "high-tin bronze," "white bronze," or "bell metal." This kind of

alloy can be easily cast: It becomes plastic at about 550° C, melts at 725° C, and is fully molten at 800° C. It can be forged red hot. If cooled slowly it will shatter when hammered, but if quenched it becomes moderately hard and reasonably malleable, though not as malleable as low-tin bronze. With time it acquires a black patina (C. S. Smith, apud Allan, 1979, p. 46).

High-tin bronzes from early Islamic Iran can be recognized by several features. First, they have a very silvery color. Second, they often have pieces missing, leaving sharply defined edges or clean breaks across the body. These breaks or gaps result from the brittleness of the alloy at room temperature and are quite different from equivalent types of damage to brass, low-tin bronze, or more complex alloys. Third, they are generally very simple in form: hemispherical bowls or stem bowls of the most straightforward kind. This simplicity reflects the fact that they have been forged at red heat, which does not allow for the subtlety of contour possible with sheet metal in alloys of different composition.

According to Bīrūnī (p. 264), the popularity of high-tin bronze in the Islamic world originated with Ḥajjāj b. Yūsof (ca. 41-95/661-714), who, for reasons of piety, substituted it for gold and silver; its silvery appearance made it an ideal base-metal alternative for the latter. Bīrūnī also mentions the objects for which it was used in his own day (4th-5th/10th-11th centuries), in particular drinking vessels, water jugs, and various basins. Surviving examples in fact show that the alloy continued in use throughout the Islamic period. In earliest Islamic times a variety of bowls, cups, jugs, and bottles were produced and often decorated with incised dot-and-circle motifs or disk-like facets (Melikian--Chirvani, 1974; see Plate xxv). A number of high-tin bronze basins of Ghaznavid origin are known. Later, in the 6th/12th and 7th/13th centuries, when inlaid brasses and quaternary alloys became fashionable, high-tin bronzes were also decorated with elaborate designs and rich inlays. The most splendid surviving pieces are once again drinking cups, notably the “Wade cup” (Rice) and the lidded “Vaso Vescovali” in the British Museum (see Plate xxvi), though fine dishes also survive. High-tin bronze was also used in the manufacture of mirrors. The reflecting side of an example found at Sīrāf is of this alloy, whereas the back is of brass (Allan, 1978, table 21).

Less is known about the later uses of high-tin bronze in Iran, largely owing to a lack of published objects. Under the Il-khanids, high-tin bronze cups continued to be manufactured, a Timurid bucket is known, and among surviving Safavid objects are a phiale, a hawking drum, and four bowls

(Melikian-Chirvani, 1982, nos. 84-85, 115, 117, 128, 136, 161-63), indicating continued use of the alloy at least into the l7th century.

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Plate xxv. Bowl, high-tin bronze, Khorasan, 8th-10th century, ht. 11.3 cm, diam. 21.1 cm (Ashmolean Museum, Oxford, 1984.640, Afshar Gift)

Plate xxvi. Bowl with lid, the so-called "Vaso Vescovali," high-tin bronze, Khorasan, ca. 600/1200, ht. 11.2 cm, diam. 17.6 cm (British Museum, 1950.7-25.1)