The manufacturing process of the gold bust of Marcus Aurelius: evidence from neutron imaging
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This paper presents the results of applying neutron imaging methods to the gold bust of Marcus Aurelius, an analytical procedure that was carried out in 2006 at the Paul Scherrer Institut in Villigen (Switzerland). The results have produced a better understanding of the gold repoussé manufacturing techniques for large pieces.

Given the number of gold statues that existed at Rome and in its provinces, the preserved pieces represent only a tiny fraction; to recover the precious metal, most gold objects were eventually melted down, with the result that only a very small number of pieces are left. That scarcity explains our difficulties in studying the characteristics of this category. Just 6 gold busts of the Roman period have been documented. The bust of Marcus Aurelius was found in a sewer running beneath a sanctuary of Aventicum (figs. 1, 6a and 16). Then there is the bust of Septimius Severus discovered at Didymoteichon (NE Greece), a small fragment from the shoulder pteriges of a breastplated bust of the 2nd c. A.D. found at the fort of Dambach (Germany), the Late Roman head inserted into the 9th-10th c. statue of St. Fides in the Abbeye of Conques (France), and the much smaller busts of (possibly)

2. The original (inv. no. 39/134) is not on permanent display in the Römermuseum Avenches but a copy of the bust is. H. 33.5 cm; wt. 1589.07 gm, 22 carat. The first publication was by P. Schazmann, “Buste en or représentant l’empereur Marc-Aurèle trouvé à Avenches en 1939,” ZSchwArch 2 (1940) 69-93. When found, the bust was only slightly damaged; it was cleaned and restored in the Swiss National Museum in Zurich (ibid. 70). No restoration report exists, but there are photographs in the archives of the Swiss National Museum.
4. Bust of Septimius Severus from Didymoteichon, now in the Archaeological Museum Komotini, inv. no. 207, h 25 cm, wt 980 gm). It was found without an archaeological context. See Lahusen (supra n.3) fig. 4; Riccardi (supra n.3) pl. 20.3; Hochuli-Gysel and Brodard (supra n.3) 96, fig. 104; Lapatin (supra n.3) 83, pl. 52, with p. 235. Publication is in preparation by A. de Pury-Gysel. Archäologische Staatsammlung, Munich, inv. no. 1985.2505. Found in a military context of the 2nd c. A.D. Fragment of the board from the pteriges, the leather shoulder protection of the cuirass; l. 4.5 cm. See B. Steidl, “Die goldene imago eines Kaisers vom räetischen Limes,” in M. Kemkes and C. Sarge (edd.), Gesichter der Macht. Kaiserbilder in Rom und am Limes (Schriften des Limesmuseums Aalen 60; 2009) 108, fig. 150; V. Selke, Römische Funde aus Dambach am Limes (1892-2007) (Materialhefte zur Bayerischen Archäologie 100; 2014) 76, pl. 49, no. 1561.
5. Now in the Abbeye de Conques; h 16 cm. Provenance unknown; mediaeval re-use. See J. Taralon and D. Taralon-Carlini, “La majesté d’or de sainte Foy de Conques,” BMon 155.1 (1997) 7-73; Le trésor de Conques (exh. cat., Paris); Hochuli-Gysel and Brodard (supra n.3) 98, fig. 105.