

TECHNOLOGICAL INNOVATION AND BYZANTINE AESTHETICS IN THE REPRESENTATION OF THE AVAR ELITE:

Re-evaluation of the unique polychrome gold buckle from Kunbábony (extended abstract)

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The 7th-century burial discovered at Kunszentmiklós–Kunbábony is the richest known Avar period grave. Located in the Danube–Tisza Interfluve, the central territory of the Avar Khaganate’s elite, the find represents the highest echelons of nomadic society (Figs. 1–2). Recent archaeogenomic research has confirmed the East Asian origins and genetic homogeneity of this elite. The deceased, a 60–70-year-old man, was a central figure of the realm – not unlikely the Khagan himself – as evidenced by his extensive kinship ties traced through various Avar period burials. Among the exceptional gold objects, a massive buckle stands out as a unique masterpiece of early Byzantine craftsmanship. This extended abstract summarises its technological and stylistic re-evaluation (see the full version of this study in the current issue of Magyar Régészet), based on a comprehensive multidisciplinary framework and analytical results – including those concerning gold purity and garnet provenance – established in HORVÁTH et al. 2025.

Keywords: Avar elite, early Byzantine metalwork, polychromy, gemstone inlay, stone marquetry, puzzle picture, digital reconstruction

The application of a combined methodology relying on optical microscopy, Raman spectroscopy, and scanning electron microscopy (SEM-EDX) resulted in the identification of 86 garnets, alongside white magnetite, green malachite, blue lapis lazuli, and various coloured glasses. Despite significant surface weathering, analysis allowed for the differentiation of 28 blue and 11 green glass inlays. These findings enabled a precise digital reconstruction of the original appearance of the object, compensating for centuries of physical degradation and revealing a vibrant, intentional color scheme that served imperial representation.

One of the key findings of the study concerns the central polychrome panel of the buckle, which, in the absence of analytical confirmation, was described as *millefiori* glass or glass mosaic for a long time (Fig. 3). Our investigation proves this element to be a sophisticated miniature stone marquetry. Unlike the common *cloisonné* technique of the period, this panel lacks metal compartments. The visual continuity is provided by the seamless surface of gemstones, glass, and gold pieces embedded in an organic binder. The required precision of assembly was ensured by the intentionally beveled edges of the *lapis lazuli* frame.

This technique represents a highly specialised adaptation of the Roman *opus sectile* tradition, usually applied to monumental floor and wall decorations, executed on a miniature scale, and serves as a technological precursor to the Renaissance *commesso* (or *pietre dure*). This innovative application on jewellery is truly unique in the early Byzantine world, strongly suggesting that the buckle was produced in the Byzantine imperial court of Constantinople to meet the highest aesthetic, artistic, and technical demands of 7th-century craftsmanship.

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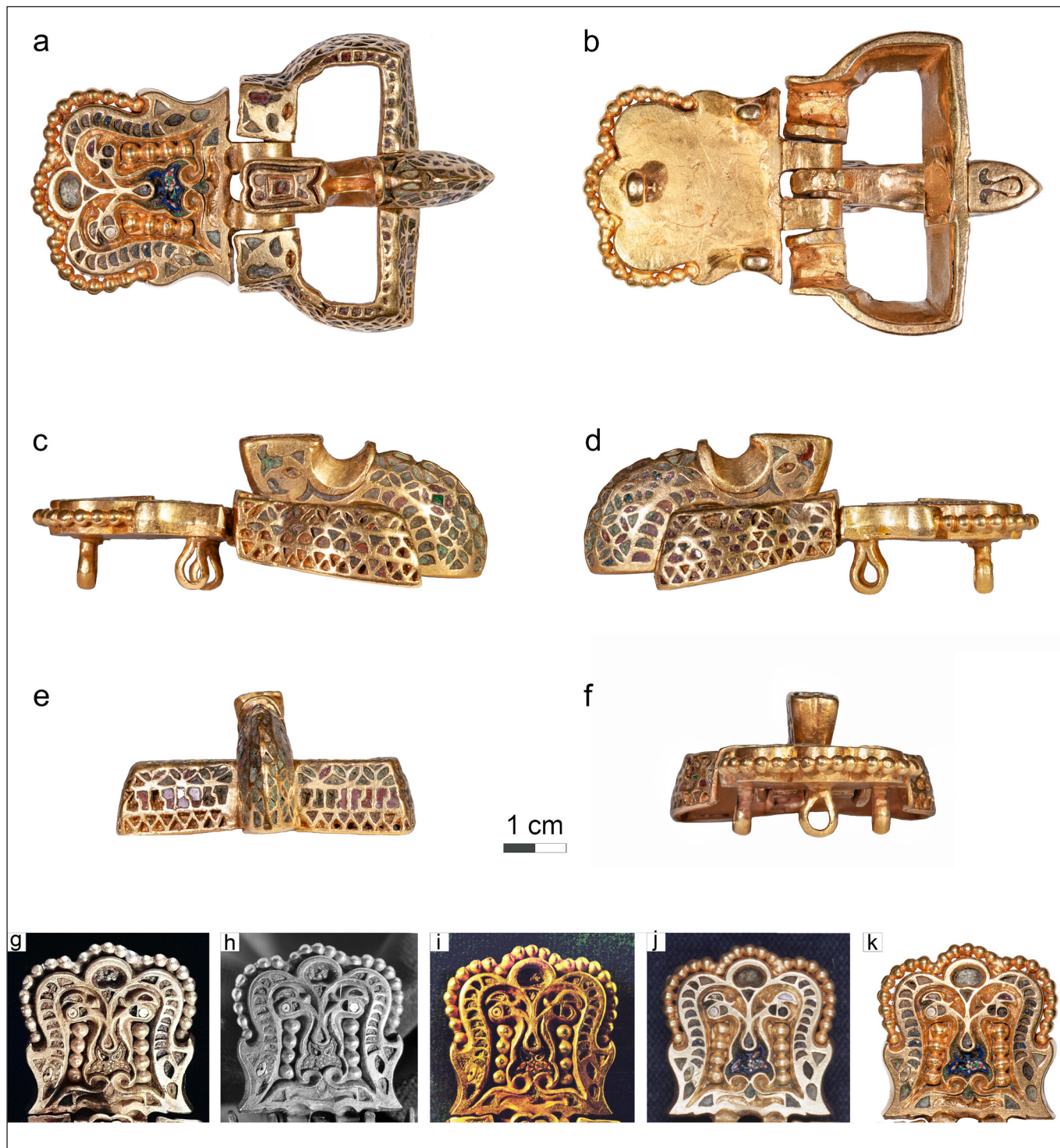


Fig. 1. A–f, macrophotos of the Kunbábony belt buckle (Katona József Museum, Kecskemét), g–j, archive photos of the buckle plate compared to k, the photo taken at the time of analysis (photos a–f, k by E. Horváth, g–h, j by B. Kiss, and i, by L. Roboz, Katona József Museum, Kecskemét)

The digital reconstruction (Fig. 4) proved essential for reinterpreting the complex iconography of the buckle. Instead of contradicting previous theories, our findings complement and reinforce the earlier identification of the central motif as a realistic lion’s head. This ‘puzzle-picture’ composition is characterised by a sophisticated visual ambiguity: the eyes and mouth of the lion simultaneously function as bird’s heads, possibly peacocks (Fig. 5). Furthermore, the reconstruction revealed previously unrecognised figural elements, representing composite monsters, possibly *senmurvs*. Reflecting intertwining Greco-Roman and

Persian-Sasanian influences in Early Byzantine art, this hybrid imagery draws from a shared repertoire of motifs to represent power and offer apotropaic protection. Additionally, the geometric patterns, such as interlocking circles, semicircles, and 'L' motifs, reflect the direct influence of Byzantine decorative art.

Among the corpus of Early Byzantine goldwork, the late 6th-century Munich saddle mount (attributed to the Armenian leader Vardan Mamikonian) provides the closest material, technological, and stylistic parallel

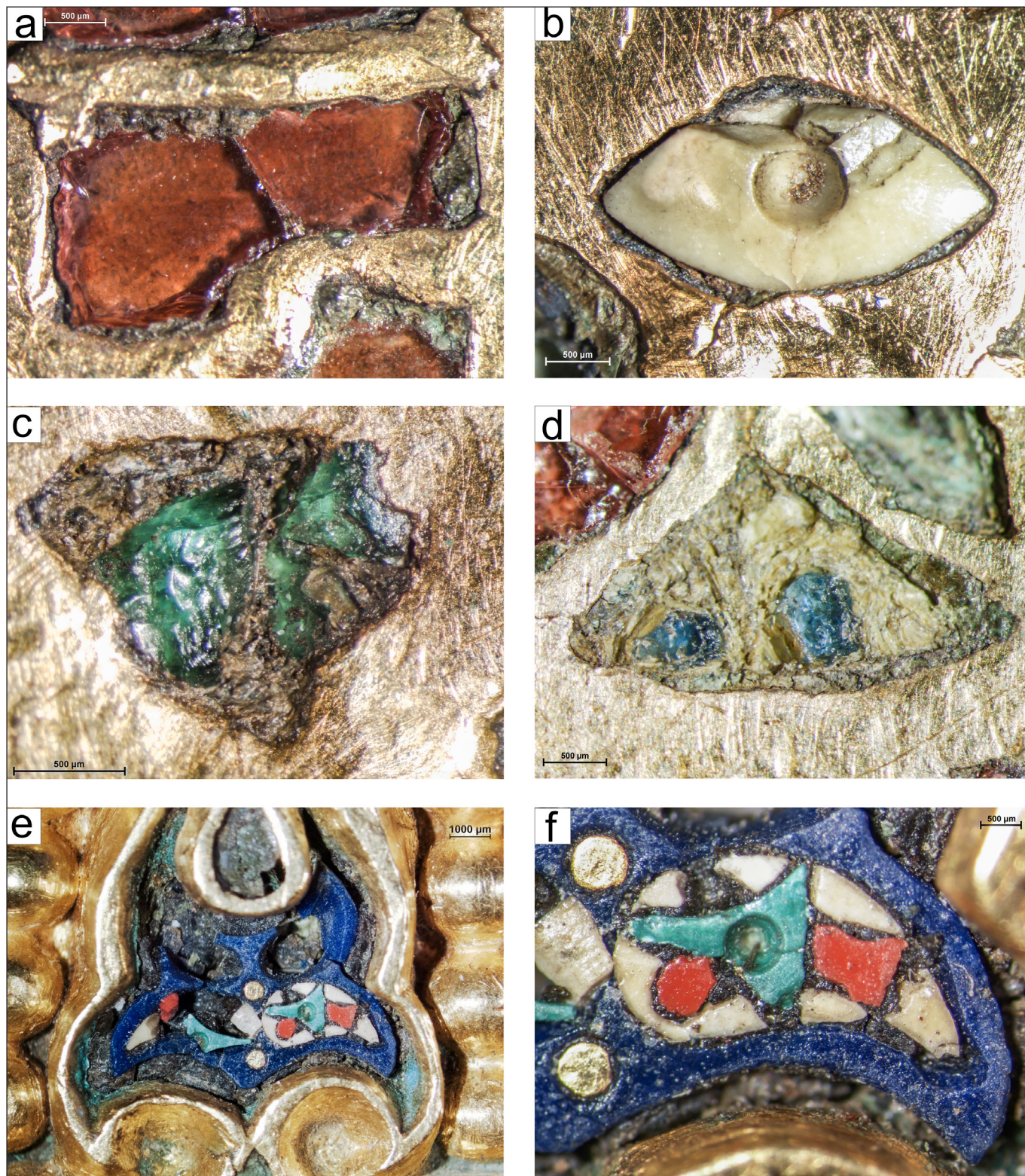


Fig. 2. Various inlays of the buckle. A, garnet; b, magnesite; c, green glass; d, blue glass; e–f, stone marquetry comprising lapis lazuli, malachite, magnesite, opaque red glass, and gold (photo by E. Horváth)

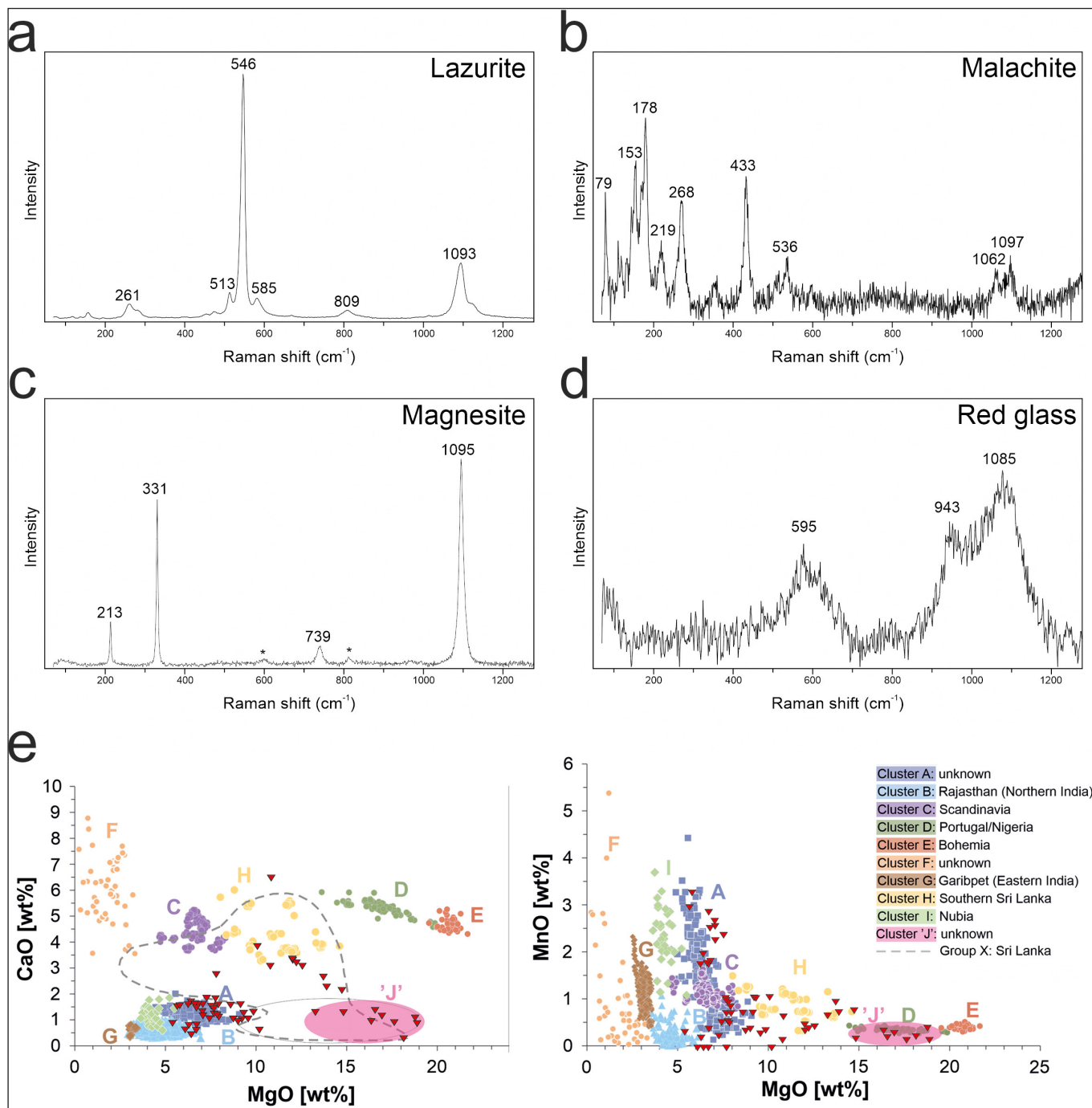


Fig. 3. A–d, Raman spectra of the inlays in the polychrome panel; arabic numerals indicate characteristic Raman bands of the identified phases. A, lapis lazuli; b, malachite; c, magnesite; d, red opaque glass. E, CaO–MgO and MnO–MgO plot showing the composition of the garnets based on SEM-EDX measurements (graphics a–d by L. E. Aradi, e by Zs. Bendő)

to the Kunbábony buckle. Although they differ in function and typology, our investigation suggests a strong workshop affinity between these two objects. This connection confirms the dating of the buckle to the early 7th century, suggesting that it was also commissioned specifically for a high-ranking barbarian leader.

Beyond its role as a status symbol, the buckle stands as a manifestation of the sophisticated diplomatic and cultural exchange between the Byzantine Empire and the Avars Khaganate. The identification of the stone inlay technique – as a precursor to the Renaissance *commesso* – fundamentally enhances our understanding of Early Byzantine art and craftsmanship. Through digital reconstruction, this masterpiece is preserved for posterity in its full original glory, allowing us to perceive the object as its 7th-century audience once did: as a powerful symbol of authority and classical splendour.

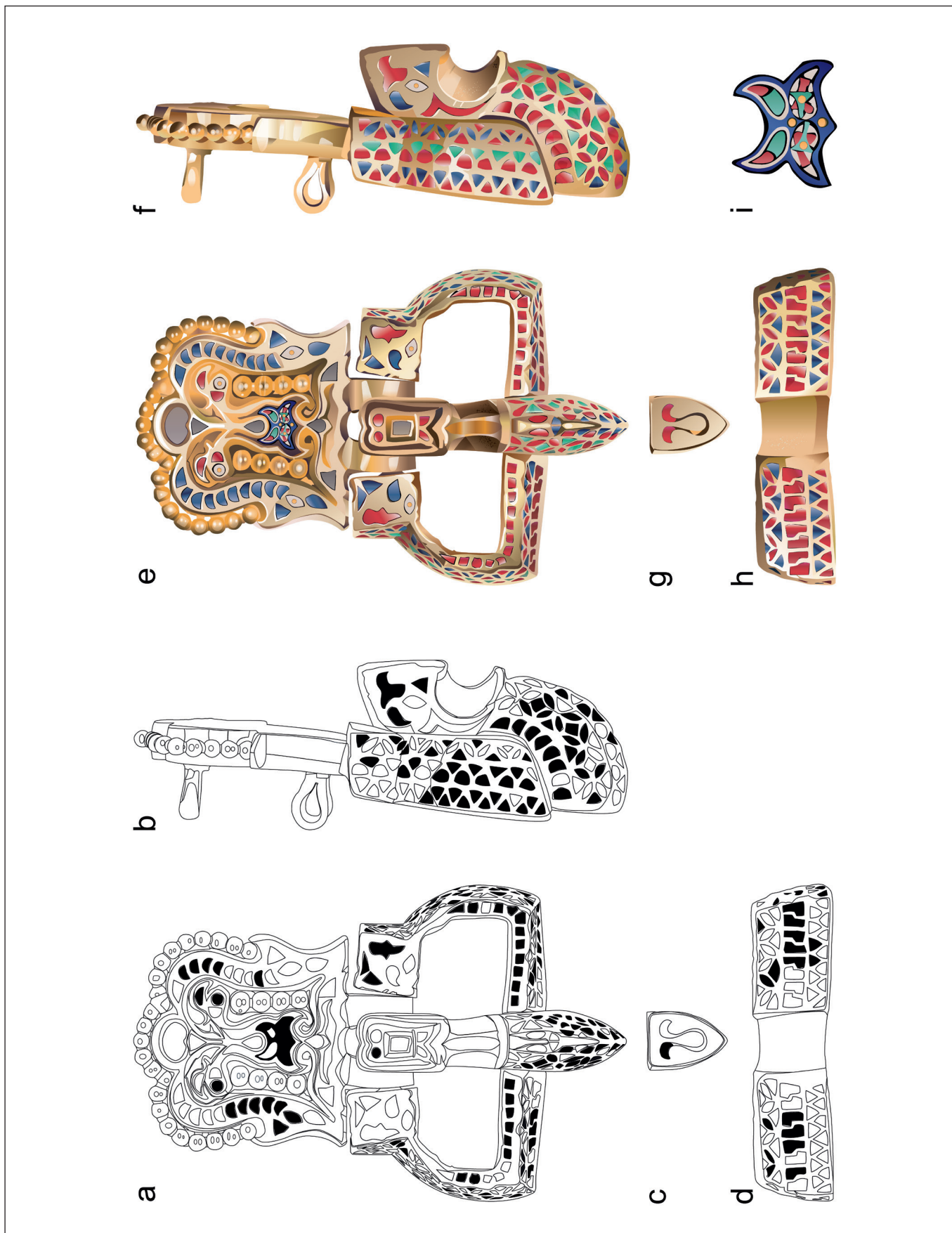


Fig. 4. Line sketch of the buckle. A–d, top, back, front, and side views, black indicates the most complete state of the inlay decoration, i.e. as seen upon discovery (the two sides are represented in a single image); e–i, digital reconstruction of the original colour scheme, with grey indicating empty settings of unknown content (graphics by N. Mészáros)



Fig. 5. Figural and geometric elements of the buckle. A, dolphin head and b, lion's eye/peacock head on the buckle plate; c, senmurv head and d, small dolphin head on the pin; e, interlocking 'L' motifs, semicircles, and circles on the frame and f, the pin (photo by E. Horváth)