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RHYTON? WRITE ON…

A decade or so ago, an extraordinary glass object appeared on the art market in London and eventually found its way to Sotheby's as a suitable article for sale. In the form of a rhyton, it appeared to be made of two sections of greenish and bluish glass, with additional trails of colored glass. The trumpet-shaped body curved upwards and terminated in a zoomorphic head, with an almond-shaped aperture, tiny eyes, and twin loops from which were suspended glass earrings (fig. 1).

The rim of the vessel was capped with a ring of transparent blue glass, and below the rim were turquoise trails laid in grooved rings. The trumpet-shaped body was also ribbed with parallel grooves terminating in petal-shaped panels, between each of which were clear glass oval pellets colored dark blue, set in similarly shaped grooves. Further down, three more trails of glass encircled the vessel, two of them joined by oval turquoise blobs. The tapering rhyton had further rings of pale blue glass and, at the point where it curved upwards, a ring of blue glass with a rough network of turquoise trails. Just below the zoomorphic head was a single ring of brown glass, and on the lower curved surface of the rhyton was a pinched-glass, double testicular foot on which the glass could balance.

What could the rhyton have been used for? As it was open at both ends, it would hardly have been practical as a drinking vessel, and with some mirth various suggestions were made: that it was a musical instrument, or even perhaps an ear trumpet. It does, in fact, perform both functions perfectly. As for its origin, although

Fig. 1. Glass "rhyton."

there seemed to be no exact parallel, many comparisons could be made with vessels of similar form and decoration. Vessels of this type have their origin in late Roman glass, and indeed the general form of this rhyton was similar to glass drinking horns manufactured in the Rhineland between the third and seventh centuries.[1]

As for the almond-shaped head, this repeats the shape of early Islamic glass ewers, for instance, one from the Serçe Liman wreck (ca. 1025),[2] and another in the Kuwait National Museum, which also has zigzag trailed decoration.[3] Another rhyton, said to be from Nishapur, has a globular body and a very similar head with two ears, but without the eyes and earrings.[4] An even simpler rhyton in the form of a bird again has a similar head.[5] A tiny glass figurine of a man in the Benaki Museum has two similar ears;[6] and a glass animal head has two dark blue applied eyes.[7] A plain glass horn with a loop handle and spiral trailed decoration has already been recorded.[8] And a bottle or ewer in the Cohn collection, with a flattened globular body and a long thin neck, has blue glass ears.[9] Finally, a drinking horn in the Corning Museum of Glass, decorated in luster, is thought to be Islamic, of Egyptian origin and ninth-to-eleventh-century date.[10] It has been argued that the vogue for glass drinking horns may have been transmitted to Arab traders by the Viking colonists in western Russia.[11] It is an interesting speculation that this form of rhyton may also have had its origins in Western Europe.

At first glance, this piece appeared to be exceptionally accomplished. The zoomorphic section would seem to have been made separately, of a slightly more bluish glass, and secured over the end of the body by a turquoise zigzag trailed ring. In order to apply the trails and pellets over the ground sections, the glass must first have been allowed to cool so that it could be cut and then reheated for the final application of the details. Indeed, the rhyton was so puzzling that it was an obvious candidate for scientific analysis.[12]

SCIENTIFIC INVESTIGATION

The reason for chemically analyzing different parts of the object was to identify the major, minor, and trace elements in the glass, and to infer thereby the raw materials used to make it. If the two principal components of the object were found to have different compositions, it could be argued that they were made at different times; analysis of the decorative glass would provide additional compositional information that could be related to the history of the object and to the sequence in which it was assembled.

Four micro-samples of glass were removed from various components of the object, and mounted in epoxy resin in preparation for chemical analysis using an electron microprobe.[13] The samples were taken from:

(1) the translucent green wide end of the horn
(2) the blue trail applied to the wide end of the horn
(3) the pale green narrow end
(4) the opaque turquoise trail applied to the join between the two components

The compositional results are given in Table 1.

The first three samples (Table 1, analyses 1–3) are of a soda-lime-silica composition, and the fourth of a lead oxide-soda-lime-silica composition. The wide green end of the horn appears to be slightly weathered and is in a somewhat more deteriorated state than the narrow end. It contains elevated levels of alumina, magnesia, and potassium oxide. Although the published data at the time of the analysis provided few matches (see Table 1, analysis 1),[14] there are now a sufficiently large number to place the glass. One can infer from the composition that the glass was fused from a plant ash and sand. Although it contains a slightly high soda level, the composition is, in fact, very similar to an Islamic one in use between the ninth and eleventh centuries.[15] The blue trailing on the wide end of the horn also contains an elevated alumina level (Table 1, analysis 2). The high alumina in the blue glass could conceivably indicate an Egyptian origin for the cobalt used, because the use of Egyptian cobalt (alum) would have introduced aluminium into the glass melt. However, bearing in mind that the same alumina level is present in the green glass body (analysis 1) to which the blue trail has been applied, a more likely explanation is that it too was fused from an alumina containing sand. The relative levels of iron (a mineralogical impurity in sand) and manganese oxides are also consistent with the levels found in Islamic glasses dating to between the ninth and the eleventh centuries.

The chemical composition of the pale green narrow end of the object is significantly different from that of the wide end (Table 1, analysis 3). Although it too is of the soda-lime-silica type, this glass, in comparison to those used to make the wider end of the horn, is characterized by relatively low alumina and a relatively high level of magnesia; these two compositional characteris-

CHEMICAL COMPOSITION OF THE GLASSES IN THE "HORN"
(weight percent oxide)

Color:	(1) translucent green	(2) translucent blue trail	(3) translucent pale green	(4) opaque turquoise
Location:	wide end	wide end	narrow end	across two components
Na_2O	16.5	17.6	11.3	11.0
MgO	4.6	2.9	5.5	2.4
Al_2O_3	2.8	2.8	1.3	1.8
SiO_2	62.4	63.9	71.3	45.3
P_2O_5	0.3	0.4	0.1	0.1
SO_3	0.3	0.3	0.2	0.3
Cl	0.8	0.8	0.7	0.5
K_2O	3.9	3.3	2.3	1.8
CaO	6.5	4.9	6.6	4.5
TiO_2	0.1	0.2	ND	ND
Cr_2O_3	ND	ND	ND	ND
MnO	0.8	1.7	0.6	ND
Fe_2O_3	1.0	1.8	0.6	0.6
CoO	ND	0.1	ND	ND
NiO	ND	ND	ND	ND
CuO	ND	ND	ND	1.0
ZnO	ND	ND	ND	ND
As_2O_3	ND	ND	ND	ND
SnO_2	ND	ND	ND	6.8
Sb_2O_3	ND	ND	ND	ND
BaO	ND	ND	ND	ND
PbO	ND	ND	ND	24.5

ND = not detected

Typical levels of detection in p.p.m. (95.5% probability level):

Na_2O	760
K_2O	250
CaO	170
Fe_2O_3	340
CuO	1200
PbO	200

Table 1.

tics are also found in ninth- to eleventh-century Islamic glasses. The inference is that the glass was fused from a purer silica source (perhaps ground-up quartz pebbles) and a plant ash with a higher magnesia level (and therefore perhaps of a different species) than those used to fuse the glass forming the wider end (Table 1, analyses 1 and 2). The narrower end was therefore made using a technology different from that of the wider end.

The opaque turquoise glass trail, which straddles the join between the two components of the object, is also of an Islamic composition (Table 1, analysis 4). It contains elevated levels of lead and tin, indicating that the white opacifier used was crystals of tin oxide; the turquoise color is produced by cupric oxide. These compositional characteristics are typical of other Islamic opaque turquoise glasses and enamels.[16] Because the glass contains 24.5% lead oxide, the balance of components is correspondingly lower. Nevertheless it contains a relatively low alumina and relatively high magnesia and potassium oxide levels. Like analysis 3, it also contains significantly lower soda levels than were found in the analysis of the glass making up the wider end of the horn.

The chemical compositions can therefore be divided into two sets of two: numbers 1 and 2 from the wide end of the horn, and numbers 3 and 4 from the narrow end. Overall, it is evident that the two components of the horn, with their different pairs of compositions, were made using different raw materials and therefore perhaps in different places. Both ends were made using Islamic glass, but slightly different alkali and distinctly different silica sources were used to make each end.

CONCLUSION

From the scientific analysis, one could only conclude that the object was an ancient composite artifact incorporating two sections, possibly of different origin. Further inspection revealed other intriguing details and discrepancies (fig. 2).

At the wide end, the green matrix and the blue trail are of genuine glass. Turquoise trails at the wide end, however, are plastic. And a blob of this substance can be observed at the beginning of the outer trail. The glass has been broken and mended, with cracks through the turquoise trails to suggest an antique fracture. The almond-shaped blobs and the undulating trail are of translucent green glass painted with blue; this paint is easily scratched off with a fingernail. The blue trail and the turquoise blobs joining the first to the second section are similarly modern.

The second section itself is of glass with bubbles in it, separated from the third section of similar design composition by a trail of translucent pale blue glass. The double foot on which the horn can rest stable is also of transparent green glass painted blue.

The final section is joined by a trail of turquoise glass having an Islamic character, which was analyzed, and a blue glass trail. The zoomorphic head has eyes and earrings of blue glass, and a brown glass ring round its neck.

Allowing for modern accretions, from what older

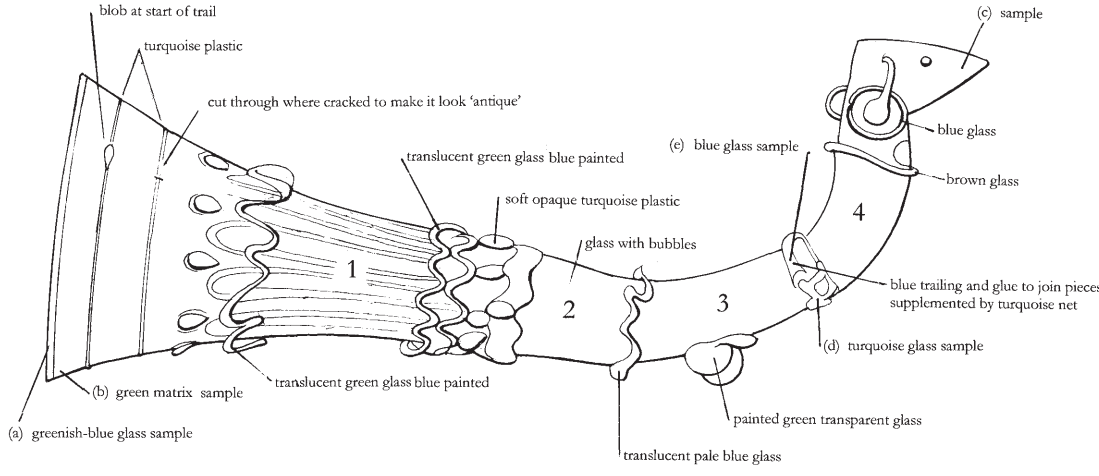

Fig 2. Drawing of rhyton, showing details and discrepancies.

glasses could the object have been manufactured? A late-eighth- or early-ninth-century glass horn with trailed-on decoration was excavated from one of the palace complexes at al-Raqqa, Syria (according to personal communication from the late Michael Meinecke). The trumpet-shaped section is a genuine Islamic product or, just possibly, formed part of a Venetian sixteenth-century goblet of a type known to have been exported to the Near East;[17] Venetian glassmakers imported plant ashes from the Levant. The zoomorphic head, which at first glance might appear the most suspect component of all, is a genuinely Islamic element, part of a vessel that originally had a flattened globular body, the parallel having been noted at the beginning of this article.[18]

Finally, whoever the anonymous craftsman who conjured up this object may be, he needs to be congratulated for the sophistication of his concept and the allusion to enough genuine art-historical sources to produce an early Islamic rhyton. But alas, as demonstrated, as a unique object the "rhyton' is a write-off.

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NOTES

1. Vera I. Evison, "Ceramic Glass Drinking Horns," *Journal of Glass Studies* 17 (1975): 74–87.
2. George F. Bass, "The Nature of the Serçe Limanı Glass," *Journal of Glass Studies* 26 (1984): 64–69, figs. 1, 2.
3. Ghada H. Qaddumi, *Variety in Unity* (Kuwait, 1987), p. 110, LNS 81 G.
4. *Treasures of Persian Art after Islam: The Mahboubian Collection,* cat. of an exh. at University Art Museum of University of Texas, Austin (New York, 1970), no. 1109.
5. Sotheby's London, *Islamic Works of Art* (Nov. 22, 1976), *lot 181.*
6. Christopher W. Clairmont, *Benaki Museum: Catalogue of Ancient and Islamic Glass,* pl. 24, no. 385.
7. Sotheby's Geneva, *Islamic Works of Art* (June 25, 1985), lot 181.
8. Sotheby's London, *Islamic Works of Art* (Oct. 10, 1990), lot 43.
9. A. Von Saldern, *Glass 500 B.C. to A.D. 1900: The Hans Cohn Collection* (Mainz, 1980), p. 179, no. 183.
10. Inv. no. 69.1. For an illustration and discussion of this piece, see Robert Charleston, *Masterpieces of Glass: A World History from the Corning Museum of* Glass (New York, 1990), p. 76.
11. Evison, "Ceramic Glass Drinking Horns," p. 84.
12. This was undertaken by Prof. Julian Henderson when he was at the Research Laboratory for Archaeology and Art History, Oxford; he has contributed the following section.
13. The technique is described in detail in Julian Henderson, "Electron Probe Micro-analysis of Mixed-Alkali Glass," *Archaeometry* 30, 1 (1988): 77–79.
14. Julian Henderson and James W. Allan, "Enamels on Ayyubid and Mamluk Glass Fragments," *Archaeomaterials* 4 (1990): 167–83.
15. Julian Henderson and Sean D. McLoughlin, "Glass Production in al-Raqqa: Experimentation and Technological Changes," *Annales du 15e Congrès de l'Association Internationale pour l'histoire du verre* (New York, 2001, 2003), pp. 144–48; and Julian Henderson, Sean D. McCloughlin, and David S. McPhail, "Radical Changes in Islamic Glass Technology: Evidence for Conservatism and Experimentation with New Glass Recipes from Early and Middle Islamic Raqqa, Syria," *Archaeometry* (in press).

16. See James Allan, "Investigations into Marvered Glass 1" and Julian Henderson, "Investigations into Marvered Glass 2," in James Allan, ed., *Islamic Art in the Ashmolean Museum, Part One,* Oxford Studies in Islamic Art, 10 (1995), pp. 1–30 and 31–50 respectively.
17. See, for instance, Robert J. Charleston, "Types of Glass Imported into the Near East and Some Fresh Examples: 15–16th Century," *Festschrift für Peter Wilhelm Meister* (Hamburg, 1975), pp. 248–51, in particular three Venetian early-sixteenth-century goblets, figs. 6–8, one of which apparently was excavated in Syria; for the latter, see further details in S. Abdul-Hak, "Contribution à l'étude de la verrerie musulmane du VIIIe au XVe siècle," *Annales Archéologiques de Syrie* 8–9 (1958–59): 3–20, fig. 17.
18. *Mahboubian Collection,* no. 1109.