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Purple Reign?: Towards a clearer view of an enigmatic colour

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The study of ancient glass is a crossroads for all manner of specialisms and offers valuable opportunities to take advantage of the close connections and spirit of collaboration between researchers following different paths of inquiry. Some of the most productive projects are those where scholars look beyond their usual areas of investigation and draw on data from elsewhere. Danièle Foy exemplifies this holistic approach. Her work brings together evidence from across the academic disciplines, embracing archaeology, classical literature, materials science and economic history, revealing a scholar with a remarkable personal expertise and a breadth of understanding across many different fields.

It is in this spirit that we offer the following discussion, combining typological and archaeological considerations with compositional analysis, to examine an intriguing and striking range of early imperial Roman vessels, those made in purple glass.

Early purple glass

Purple glass has a very ancient history, stretching back over four millennia. A purple glass ingot produced in a cylindrical crucible was found in the cargo of the late Bronze Age shipwreck off the coast of Turkey at Uluburun (Aruz et al. 2008, 313-4). The colour occasionally features in Assyrian vessel production, as at Nimrud (Schmidt 2019, 194, Nim.11, pl.14) and decoration with spiral threads of purple glass is one of the distinguishing features of the core-formed vessels of Mediterranean Group I, Class I:A of the late 6th - early 4th century B.C. (Fig.1.a.; Grose 1989, 111-2, fig.60). Purple is seen more extensively in the manufacture of later Hellenistic bowls. It is often used as a translucent matrix for opaque elements such as spirals or strips in polychrome mosaic bowls (Fig.1.b), and it is also during this period that it is used, though more rarely, as the principal vessel colour, seen for example in two monochrome conical bowls from a burial dated to the 2nd century B.C. at Todi, northern Italy (Fig.1.c; Manconi 2015, 21, tomb 7, fig.14).

a

b

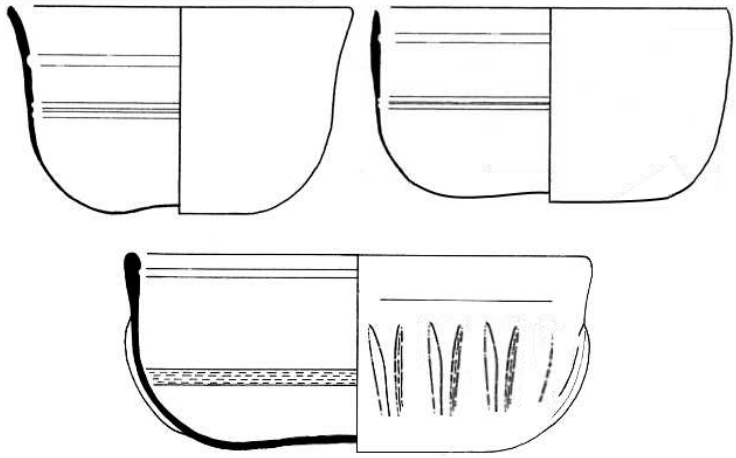
c

Fig 1. Pre-Roman glass vessels using purple glass. a. British Museum. 1864,1007.1232 b. Corning Museum of Glass. 55.1.81, c. Museo Archeologico di Perugia. Photo © Giovanni Dall'Orto

In glass assemblages of the Augustan/Tiberian period, purple again appears as an element within polychrome mosaic designs, such as strip mosaic bowls (fig.2.a), and features prominently as a monochrome colour in the manufacture of the class of vessels known as linear-cut bowls and their contemporary ribbed counterparts (fig.2.b and c). These bowls,

remarkably homogenous in style and internal cutting, are one of the first empire-wide vessel forms of the Roman industry and were produced in blue/green, greenish colourless, dark blue, yellow-brown and purple glass. Their popularity is notable in Augustan/Tiberian assemblages throughout the Mediterranean region (Grose 1989, 245-247; Foy et al 2008, group 2, 13-23). Particularly striking is the frequent occurrence of purple in the linear-cut bowls recovered from the cargo of the ship that was wrecked off the south-east coast of France at La Tradelière, (Îles de Lérins), in the late first century B.C. (Feugère and Leyge 1989). Here, nearly half of the variety of linear-cut bowls with deep convex profiles were purple. Feugère and Leyge noted the particular correlation between the colour purple and bowls with a convex shape in this particular cargo and suggested that it might reflect vessel manufacture in batches (Feugère and Leyge 1989, 172).

a



b

c

d

Fig.2 Augustan/Tiberian ‘cast’ vessels either in purple or using purple glass. a. top © Corning Museum of Glass, bottom Fréjus © Durham University b. Types of linear-cut bowl c. © Corning Museum of Glass d. Fréjus © Durham University

The use of Purple in the Early Imperial Glass Industry

During the early-mid 1st century A.D. the Roman glass industry experienced a remarkable expansion. Alongside increased levels of vessel production came a growing diversity of forms, with the introduction of blown and mould-blown techniques and the continuing manufacture of non-blown (cast) vessels (Larson 2016, 361, 365-367; Cool and Price 1995, 211-3). These years also witnessed an adventurous use of colour, with glassmakers drawing on a wide spectrum of translucent and opaque colours and innovative polychrome techniques. During this brief period, until the third quarter of the 1st century A.D., purple was one of several strongly coloured glasses used in the production of some of the most vivid and flamboyantly decorated glass vessels to emerge from the Roman industry. It is at this point too that vessel fragments begin to be recovered in sufficient quantities to allow useful observations to be made about the extent to which purple was being used in comparison to other strong colours, and the types of vessels produced in purple.

These considerations provide a context that enables purple to be considered in more detail, which in turn highlights some intriguing aspects of the use of the colour in the 1st century A.D. In this paper we will focus on vessel form and in particular the relative quantities of purple glass being used in comparison with other strong colours during this period.

Purple Glass and Vessel Form

An association between certain colours of glass and individual vessel forms, or classes of form, has long been recognised in discussions of 1st century A.D. glass. Facet-cut vessels, such as 1st-early 2nd century A.D. conical beakers, are almost always produced in good quality colourless glass. Utilitarian storage vessels and bottles are predominantly blue/green, and there appears to be a strong association between dark green glass and some non-blown forms such as Isings 2 and 22 (Grose 1991, 8; Jackson and Cottam 2015). The connection between vessel colour and form has been variously linked to issues of production, supply,

chronology and functional or aesthetic suitability. Purple, however, is not a colour that has specific connections with a defined form or category of vessel. From the Augustan to early Flavian period, purple was used across an extensive range of cast (non-blown), mould-blown and blown forms, although with differing levels of frequency. Some of the forms found to a greater or lesser degree in purple glass are listed here:-

Sometimes found in purple glass

- Augustan monochrome 'linear cut' cast bowls
- Augustan monochrome ribbed cast bowls
- Polychrome (purple and opaque white) 'pillar moulded' bowls (Isings form 3)
- Polychrome (purple with opaque white trails) blown ribbed bowls (Isings form 17)

Very occasionally found in purple glass

- Hofheim cups (Isings form 12)
- Mould-blown 'almond knob', 'mythological' and similar beakers
- Conical jugs
- Convex jars
- Convex and globular flasks/unguent bottles

However, a closer examination of its occurrence in 1st century assemblages reveals that purple is noticeably rare, or even absent as a colour for certain forms where it might be expected.

Rare or unknown in purple glass

- Monochrome 'pillar moulded' bowls (Isings form 3)
- Cast 'ceramic' forms (e.g. Isings forms 2 and 22)
- Mould-blown 'sports' cups
- Monochrome cast bowls/plates with wide or over-hanging rim edges

As we have seen, purple was quite often used in the production of Augustan cast linear-cut bowls as well as the contemporary ribbed bowls. However, the more robust 'pillar-moulded'

ribbed bowls, that appear in the first half of the 1st century A.D. have a more varied relationship with purple glass. Monochrome examples in purple glass are very rare; we know of an example in the Ernesto Wolf collection (Stern and Schlick-Nolte 1994, 310-1 no.90), there is a fragment from York (Yorkshire Museum YORYM:1995.431)and a fragment from the fort at Newstead in Scotland is described as 'claret coloured' (Curle 1911, 272).

Conversely, polychrome pillar moulded bowls with a translucent purple ground and opaque white spirals or rods are regularly noted. In this respect, the way in which purple glass was used in the production of pillar moulded bowls closely follows the pattern observed with emerald green glass, which was used as a ground colour in polychrome bowls, but not as a monochrome colour (Jackson and Cottam 2015, 140-1).

Another intriguing gap in the use of purple is in the production of mould-blown 'sports' cups. These highly distinctive vessels, featuring scenes of chariot racing, gladiatorial combat and other activities, are found quite regularly on Claudian/Neronian sites, so the lack of purple examples is likely to be statistically valid. Natural blue/green glass is the most common colour for these cups, but they were frequently produced in deliberately coloured glass. In the 1998 gazetteer of mould-blown sports cups from France, a third of the recorded examples were made in strong colours such as emerald green, yellow/brown and dark blue (Sennequier et al 1998, 100). The absence of purple is all the more puzzling as other 1st century A.D. mould-blown forms are known in purple glass. Small hexagonal mould-blown bottles with high-relief decoration, were occasionally produced in purple (e.g. Stern 1995, 138-9 no.43) as occasionally were truncated conical mould-blown beakers (Isings form 31). Examples include both those with mythological figures, such as the example in the Kunstmuseum, Düsseldorf (Weinberg 1972, 31 no.6 figs.7 and 8) and those with 'almond knob' bosses, such as the example believed to be from Colophon, Turkey and now in the Ashmolean Museum, Oxford (Caton 1914, 118, no.36, pl. XII).

Some possible explanations for these gaps in the archaeological record will be discussed below, but there is another feature of purple glass that sets it apart, and that is its overall rarity in comparison with other contemporary strong translucent colours such as yellow/brown, dark blue and dark green.

The Prevalence of Purple Glass in the 1st century A.D.

As we have noted, the widespread use of deliberately coloured glass, either on its own or in polychrome combinations, is one of the defining characteristics of early-mid 1st century A.D. assemblages across the Roman world. The dining tables of the affluent presented an array of colours, with glassware sitting alongside vivid ceramics and gleaming metal wares.

Typically, large groups of glass fragments from Augustan-early Flavian sites will include a dozen or more individual colours. Figure 3 provides a snapshot of nine assemblages from this period showing the occurrence of individual monochrome colours and polychrome vessels (the latter grouped together).

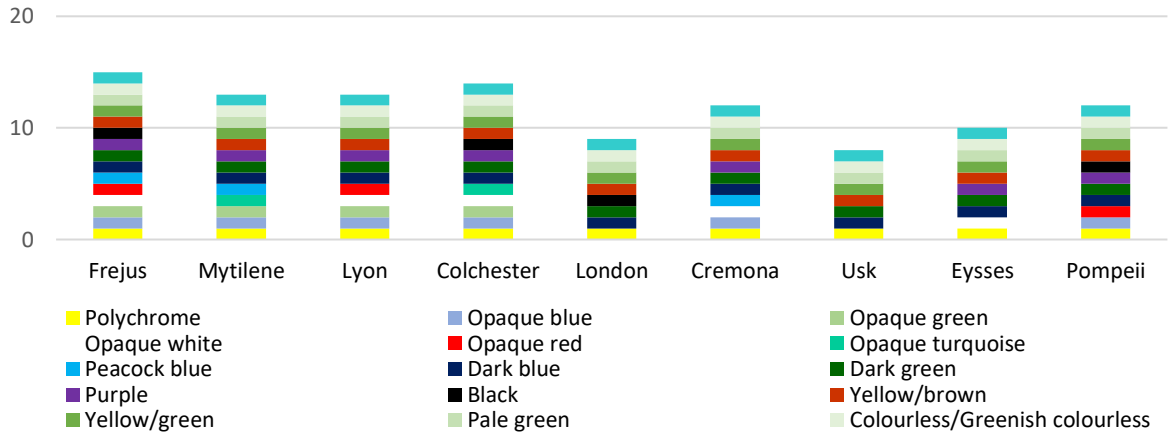


Fig.3 Occurrence (presence/absence) of colours at selected 1st century A.D. sites:Fréjus (Cottam and Price 2009) Mytilene (Price and Cottam 2000) Rue Bourgelat, Lyon (Robin 2011) Colchester (Harden 1947; Charlesworth 1985), London (Cottam 2019) Cremona (Diani 2018), Usk (Price 1995), Eysses (Chabrié 2010), Pompeii (Scatozza-Höricht 2012)

Purple is present in most of these groups, but not as consistently as the other strong translucent monochrome colours. A closer examination of these and other closely dated groups from this period also demonstrates just how rare purple is in comparison to the other strong colours. Figure 4 shows the same nine 1st century assemblages with the *relative proportion* of the colour groups in each assemblage (omitting natural blue/green).

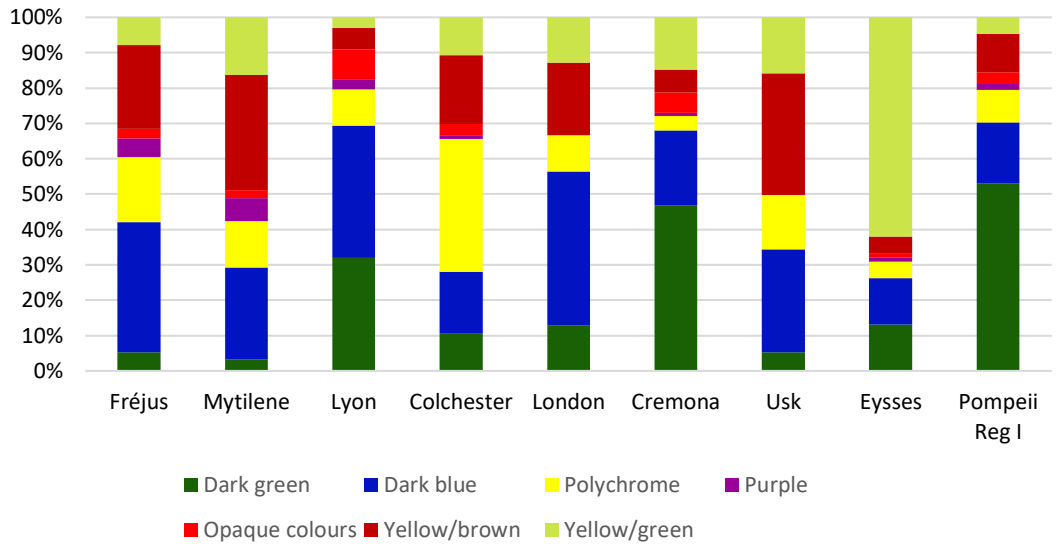


Fig.4 The relative proportion of each colour group in selected assemblages, omitting natural blue/green (for key to sites and references see Fig 3 legend).

The contrast in the quantity of monochrome purple glass is even more sharply illustrated when compared directly with the occurrence of the three main translucent monochrome strong colours in these assemblages (fig.5). The scarcity of purple as a monochrome colour is clear. In the Fréjus and Mytilene groups monochrome purple vessels made up just 2% of the total, whilst elsewhere the colour is either entirely absent or barely registers.

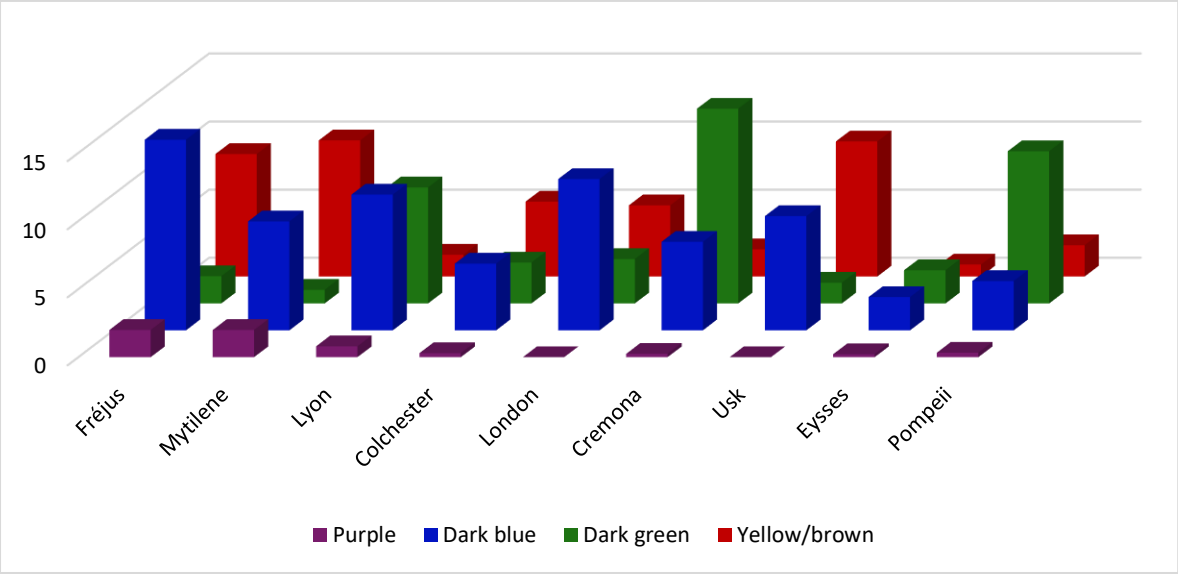


Fig.5 The quantity of monochrome purple glass compared with the occurrence of the three main translucent monochrome strong colours in each assemblage (for key to sites and references see Fig 3 legend).

Factors influencing the use of purple glass

The scarcity of monochrome purple vessels, at a time when they might be expected to mirror trends in other translucent strong colours, is puzzling. A recent investigation into dark green glass examined a number of different avenues in an attempt to explain the uneven uptake of that colour (Jackson and Cottam 2015). Similar possibilities can be raised here. These include the production of purple glass, the supply of the colour, and attitudes and restrictions regarding the acquisition and use of purple vessels.

Production of Purple glass

Purple was achieved by the addition of minerals rich in manganese to the basic glass recipe, either in a processed or unprocessed form. Manganese-containing minerals (for example pyrolusite) are geologically plentiful. They were used not only in the production of purple in the Roman world, but also as a decoloriser in some colourless glasses (up to the 1st century A.D.) and are found as a minor component of other glasses, for example blue-green glasses, as they influence the final glass hue (Bingham and Jackson 2008).

However, this availability of colourants does not necessarily translate into ease of manufacture, and this could be a possible factor influencing the relatively low quantities of purple-coloured glass being produced. The production of purple glass requires the manganese ion to be in the oxidised form (Mn3+), achieved by the selection of suitable manganese compounds and the careful control of the furnace temperature and atmosphere. Bidegaray et al. (2019, 11) have suggested that the most important parameters affecting the production of purple contra. colourless is an excess of manganese relating to iron. Thus, increasing the amount of manganese in the glass is more likely to produce a purple hue, although the shade and intensity, from wine coloured to deep bluish purple, is influenced by the glass composition and other colouring elements present (Weyl 1981, 122).

The production process and the type of furnace would also influence the ease of the creation of purple. Glass melting in large tank furnaces which were often used to produce translucent colours, tends to favour a reducing atmosphere, such as those used for the production of blue-green glasses (Bingham and Jackson 2008). Small-scale furnaces may allow a more oxidised atmosphere. The organisation of early Roman strongly-coloured glass production has yet to be fully understood, making any attempt to replicate the exact production parameters difficult. However, the production of a Roman-composition purple glass using modern furnace arrangements (a neutral atmosphere) and an excess of manganese by the authors has been relatively straightforward. It is clear though that the balance between the production of purple and colourless glasses was sometimes an issue in the Roman industry. This is demonstrated by occasional appearance of vessels streaked purple/colourless (fig.2c) and the often pink or grey tinge to glasses decolorised with manganese.

The production of purple may then have encountered challenges, however these seem no greater than those encountered in the production of other strong colours such as dark green which entailed a complex recipe and/or a precise control of furnace conditions (Jackson and Cottam 2015). If this is the case, then other factors must be responsible for the rarity of the colour. It is well known that strongly coloured vessels declined in number in the later 1st century A.D., and blue-green and colourless came to dominate most assemblages. However, this does not explain why purple is so much less common than other strong colours. It could perhaps be argued that purple glass was disproportionately collected for recycling and is therefore scarcer in the archaeological record after the Augustan period, though it seems unlikely that purple would be recycled to a greater extent than other strong colours such as dark blue or dark green. For these reasons it is worth looking beyond the practical questions of production and survival for an explanation of the rarity of monochrome purple vessels.

The Supply of Purple Glass

Investigations into the use of emerald green glass in the production of early Imperial vessel forms have reflected upon the availability of different coloured glasses to glassmakers across the Roman world (Jackson and Cottam 2015, 146). It is generally understood that vessel production during this period involved multiple agents with diverse skills within an extended

chain of activities. A simplified model of this sequence highlights four main stages; the manufacture of raw glass, the transfer of glass to secondary workshops, the production of vessels using hot processes and the cooling and further finishing of vessels when cold. It is still uncertain whether all glass was coloured during the initial manufacturing process, or whether this happened for some glasses further along the supply chain. The current evidence only allows us to suggest that *some* translucent shades, such as blue-green, colourless or dark blue, were coloured at source, before being transported to secondary furnaces where vessel production took place. The discovery of coloured and de-colourised blocks of raw glass in the shipwrecks at Les Sanguinères and Embiez Ouest 1 for example, suggests that for some glass at least, colour was being manipulated early in the supply chain (Foy and Nenna 2001, 24 & 29 figs.3 & 12; Foy and Fontaine 2007).

Given such a wide network of interconnected agents, there may have been an inconsistent supply of some coloured glasses to secondary furnaces around the Roman world. A sporadic use of purple glass across certain vessel forms, and perhaps individual workshops, has been identified here, with the absence of purple mould-blown 'sports' cups a candidate for particular attention. Whilst most are blue/green, dark blue, dark green or yellow/brown, examples in purple are so far absent. A chronological explanation which sees purple glass as having gone out of production by the mid 1st century A.D. (and before the production of 'sports' cups) is possible, although other contemporary and later mould-blown tablewares, such as conical beakers were occasionally made in purple glass. 'Sports' cups are generally regarded as a product of glassmakers from the western and north-western provinces, and another model for consideration might involve a regional aspect to the supply of purple glass or the colourant itself, with eastern provinces being in more widespread receipt of the product.

However, whilst variations in the types of vessel produced in purple are noteworthy, it is the overall scarcity of purple that is the colour's most puzzling feature.

The status of Purple in the early Imperial period

In many other categories of Roman material culture, the colour purple is noted as having particular status, and its role has been much debated by scholars of the ancient world. Discussions of the colour usually centre on the high premium placed on purple dyes extracted

from species of Mediterranean marine snail and the luxury value and elite status of purple-coloured products (Bradley 2009). In particular, the connection between purple textiles and high rank in the Roman world is well established and has been commented upon by both ancient authors (Pliny *Nat Hist* 9.60) and contemporary scholars (Bradley 2009, 197-201). All note that the colours described as purple cover a range of shades from dark reds through to blue/purple colours. A range in hues is also seen in glasses coloured with manganese (see Fig 2). Shades of purple also occur naturally in highly prized stones such as amethyst and fluorite. Individually crafted items in these materials are widely regarded as prestige pieces, and it has been suggested that they provided an inspiration for purple and white polychrome glass (Fleming 1999, 43-4 pl. E49).

Purple seems to have received particular attention in the various sumptuary laws of the late Republic and early Imperial period. Both Caesar and Octavian passed laws restricting the use of purple (Hunt 1996, 127), and Suetonius records an edict from Nero prohibiting the wearing of purple cloth by ordinary citizens (*Suet. Nero*, 32). Attitudes to purple in textiles and other classes of artifact may very well have had an influence on the reception of these shades in glass. The possibility that there were restrictions on the production and distribution of purple glass vessels is worth consideration. Even if no specific prohibitions were in place, the association of purple with high status may have influenced the type, and number, of purple glass vessels in production, or even the people to whom they were supplied.

Any restriction, whether official or tacit, on the distribution and use of purple vessels raises a plethora of questions. A special status governing purple glass, perhaps reflected in its price and availability, might account for the relatively small quantities of purple vessels seen in 1st century A.D. assemblages. It might also explain why purple is not quite so infrequent in the more complex, and perhaps more prestigious polychrome vessels such as cast ribbed bowls (Isings form 3) or blown ribbed bowls (Isings form 17), and why it was used for mould-blown beakers with mythological and religious scenes but not the more prosaic ‘sports’ cups.

Final Thoughts

The mineral used to colour glass purple is known to be widely available and in addition to its use in purple glass was also employed in small quantities in blue-green glasses to modify the hue, and to produce colourless glasses. Producing purple glass requires some degree of

expertise, but appears to be no more difficult than making some other strongly coloured glasses, in particular emerald green. Nevertheless, its frequency in the archaeological record is low and in some assemblages it is not found at all. In this paper we have proposed various hypotheses as to why this might be the case, including practical issues relating to production, distribution and chronology. These may go some way to explain why purple is so much less common than other contemporary strong translucent colours, but we suspect than there may be other reasons for the paucity of purple and its unusual distribution. One which we believe is particularly worthy of consideration is the possibility that purple vessels relate to consumption by higher status groups and were produced for, and acquired by, more affluent or elite sections of society. This idea can be explored further by a more holistic study of glass assemblages. Further research might explore of the occurrence of purple at sites of different status and function, using fully documented assemblages of sufficient size to provide a reliable sample.

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