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CHAPTER TWO

The Roman Empire

Early blown glass

1st century AD

THE MOST far-reaching innovation in the manufacture of glass in antiquity was the invention of blowing. This happened in the first century BC, probably in the Syro-Palestinian area long associated with glassmaking. In the middle of the first century BC a collection of waste from a glass factory was dumped in a stone stepped bath in the Jewish quarter of the old city of Jerusalem, but the small number of tiny blown bottles and inflated glass bulbs in this deposit (Jerusalem, Israel Museum) were made by using the glass tubes found with them. One end of a glass tube was pinched shut and then inflated by blowing through the open end while still hot to form a small bottle. Bottles may well have continued to be produced simply in a manner requiring no elaborate furnace or technology, although only by using a metal pipe could a glassmaker in antiquity produce tableware and storage containers in many shapes and sizes in a much wider variety and more easily and quickly than by any other technique known to him.

Blowing therefore heralded a complete change in the industry that was never to be matched or, rather, surpassed until the development of a power-driven machine for glassmaking in the 1820s to 1840s. Nonetheless, blowing has remained to this day the foremost method for making glass by hand. While the available evidence suggests that credit is due to the east for the invention of this new technique, it is not so apparent whether it reached its full potential first in the east or the west. At present the earliest known examples of true blown glass are for the most part small perfume bottles of coloured glass found chiefly on sites in Sicily, Italy and southern Switzerland and evidently produced in newly founded factories in central and northern Italy. They were found in contexts of the last quarter of the first century BC and the first decade of the first century AD. To the same period belong deposits from sites in Rome which contained fragments of blown glass, some identifiable as dishes of a typical western variety, together with non-blown glass vessels of the period.

The eastern evidence consists of a quantity of early Roman blown glass, mainly everyday natural greenish- or bluish-colourless vessels, found on sites in Syria, Palestine and Cyprus, although few groups can be dated more precisely than 'first century AD'. However, early blown glass, again principally small bottles for perfume or oil, is

75 Cameo-glass amphora known as the Portland Vase after its former owners, the Dowager Duchess (d. 1785) and the Dukes of Portland. The bottom was broken in antiquity, but evidently ended in a point like that of another cameo-glass amphora found in a tomb at Pompeii and now in Naples Museum. The identification of the figures, and therefore the meaning of the scene, is much disputed, but the scenario appears to be one of love and marriage with a mythological theme and in a marine setting. Perhaps from Rome, where it was probably made in the early 1st century AD. H. 24 cm.

For the making of a cameo-glass vessel, by flashing ('dip-overlay method') see pp.227-8, Figs 98-108.

Figs 65-





76 Detail from a wall-painting in the House of Oplontis, Torre Annunziata in the Bay of Naples, Italy, showing a bowl of clear blown glass filled with fruit. 1st century BC.

known from elsewhere in the eastern Mediterranean, as at Priene on the west coast of Asia Minor (modern Turkey), on the Greek island of Samothrace and at Corinth in mainland Greece, these last examples being found together with non-blown glass vessels. These groups come from contexts of the first half of the first century, if not the first two decades, suggesting that already in the age of the emperor Augustus the technique was rapidly being adopted in many parts of the Roman Empire.

The familiarity of the Romans in Italy with blown glass towards the end of the first century BC is also shown by representations of obviously blown vessels in paintings on the walls of villas in Rome and at sites such as Pompeii and Herculaneum around the Bay of Naples.

76 Most of the glass vessels are large bowls, no doubt chosen for illustration because their transparency allows the fruit with which they are filled to be seen clearly. The paintings are usually dated to the first century BC, but no blown glass vessels of comparable shape or size have been found in excavations of that date in Italy or elsewhere. Painters in antiquity made use of 'pattern books' and so need not necessarily have had 'hands on' experience of such blown glassware, but one may assume that the Romans who commissioned or painted these pictures were acquainted with blown glass vessels in representations, if not in reality.

75 It was probably in this experimental age, when the blowing technique was still in its infancy (the years around the turn of the first century BC/AD), that cameo-cut glass vessels were first made. The majority being certainly blown (and therefore not earlier than the time when the technique was properly practised) and demanding particular care and attention, they may well be seen as products – or rather masterpieces – from one or possibly more workshops exploring the potential of a new technique. As such, they were probably all made within a comparatively short period, not more than about two generations. Amphorae like the Portland Vase, jugs, cups (*skyphoi*) and bottles of cobalt blue, purple or occasionally green glass were flashed in white and the designs formed – perhaps by a gem-cutter – by

77 Cameo-glass disc cut down from a larger composition. It shows a pensive young man, possibly Paris, the son of King Priam of Troy, called upon to judge between the charms of the goddesses Hera, Athena and Aphrodite, who were perhaps portrayed in the missing portion. The disc was added as a new base to the truncated Portland Vase (Pl. 75), perhaps even in antiquity, but it clearly does not belong to it, differing in colour, composition and style. Perhaps from Rome, where it was probably made in the early 1st century AD. D. 12.2 cm.





78 A fragment from what must have been a magnificent cameo-glass plaque. In white glass against a deep blue ground are the legs of a male figure, attended by a bull of tiny proportions, of which only the body, legs and lotus garland around its neck survive. The iconography and style appear to be completely Egyptian. Presumably early Roman period, about 1st century B C–1st century A D. W. 9 cm.

cutting away part of the outer white layer. The scenes show Egyptian or Egyptianising motifs, love scenes, elaborate vine scrolls and cupids and various paraphernalia associated with the myths and rites of the Greek god Dionysos. Cameo-glass plaques similar to the vessels in their range of colours and designs, but evidently made in open moulds with one colour overlaid on the other, were used as wall decorations or perhaps sometimes for furniture. These cameo-cut glass vessels and plaques have long been thought to be the products of Alexandria, which had an established tradition for the stone vessels on which they were thought to have been modelled. However, the fact that known find-spots are predominantly in Italy, notably Pompeii, and the similarity in the designs of vine scrolls with those of certain first-century AD Roman monuments, together with other evidence for a flourishing early Roman blown glass industry, make Italy the most likely source. Bowls of flashed glass used as drinking vessels, undecorated except for abraded or deeper-cut horizontal lines on the outer surface, were made in the middle years of the first century AD, probably in the same or neighbouring factories. These are white on the inside and coloured on the outside. Monochrome glass examples of this particular shape and decoration are common, and are known as 'Hofheim' cups after a site in the Rhineland where many have been found. They were probably made in several western centres and traded locally.

77, 78

By the close of the second quarter of the first century AD blown glass vessels had become the norm, and within the next fifty years other techniques had all but disappeared, at least as far as vessel manufacture was concerned. A new development of about AD 25 was that of mould-blowing. Factories already established in the Syro-Palestinian area and in Italy increased their output and new glasshouses were set up, so that blown glass tableware came to be produced throughout the Roman Empire and became as ubiquitous as fine pottery. It is indeed one of the means of identifying Roman contact with areas at the confines of the Empire. The fictitious *nouveau riche* Trimalchio, in the *Satyricon* written in the early AD 60s by the Roman author Petronius, laments that he would have preferred vessels of glass to gold and silver, had glass not recently become so common.

79

Glass factories at Rome and in Campania are mentioned in literature

79 Glass lamp, the body blown and the handle and nozzle attached afterwards. Lamps of this shape are much more common in pottery and bronze, but quite a few similar Roman glass necklace pendants have been found. Perhaps made in Italy, 2nd century AD. L. 10.3 cm.



of the first century AD, as we have seen. The existence also of factories in northern Italy, in the Po Valley and at Aquileia, is suggested by the numerous finds from sites in this area as well as from Switzerland, notably from Locarno and Vindonissa. This is confirmed by the signature of one glassmaker, Sentia Secunda, who records her origin as Aquileia on the bases of two late first-century rectangular bottles found at Linz in Austria (Linz, Oberösterreichisches Landesmuseum). This is also a rare example of a female glassmaker. Other signatures are male, and documentary evidence suggests that glass-making was generally a male preserve.

Still favouring coloured glass, these Roman-Italian factories produced a series of attractive blown vessels which to some extent imitate the colours and decoration of their non-blown counterparts. These include bottles for perfume or oil, and bowls usually of purple, amber or blue glass. The bowls have ribs decorated with marvered white trails; the bottles, too, may be decorated with marvered white trails or unmarvered threads of various colours, or be made of bands of different coloured glass. Other vessels, often jugs, jars or flasks, are decorated with white or coloured blobs embedded in the surface. Less often the specks or blobs are in relief. These early Italian glassmakers were therefore blowing polychrome glass vessels, and for the banded variety must first have fused together monochrome canes of different colours. Very occasionally a gather of slices of monochrome or mosaic canes was blown to form a complete vessel or to decorate one. Curiously, Roman glassmakers never exploited the technique: this was to be left to their Venetian successors more than a thousand years later.

Particularly attractive is a group of jugs and jars of coloured glass with masks attached under the handles. Bird-shaped flasks for perfume or cosmetics were often of natural bluish or greenish glass, but bright colours were also used. The tails were sealed by heat after filling and so needed to be broken before the contents could be used. Another series of bowls are decorated by enamelling, principally with animal and floral scenes. They usually have a rosette on the bottom, indicating perhaps a single factory, probably located in the northern part of Italy. It was from these western (Roman-Italian) glasshouses that vessels travelled further westwards and northwards to military sites in Germany, Gaul and Britain, as well as to Austria (as we have seen), Switzerland and Spain. A few characteristically Italian types have also been found elsewhere, such as a jug with blobbed decoration from a site on an island in the Aegean Sea (British Museum) and enamelled bowls from Algeria.

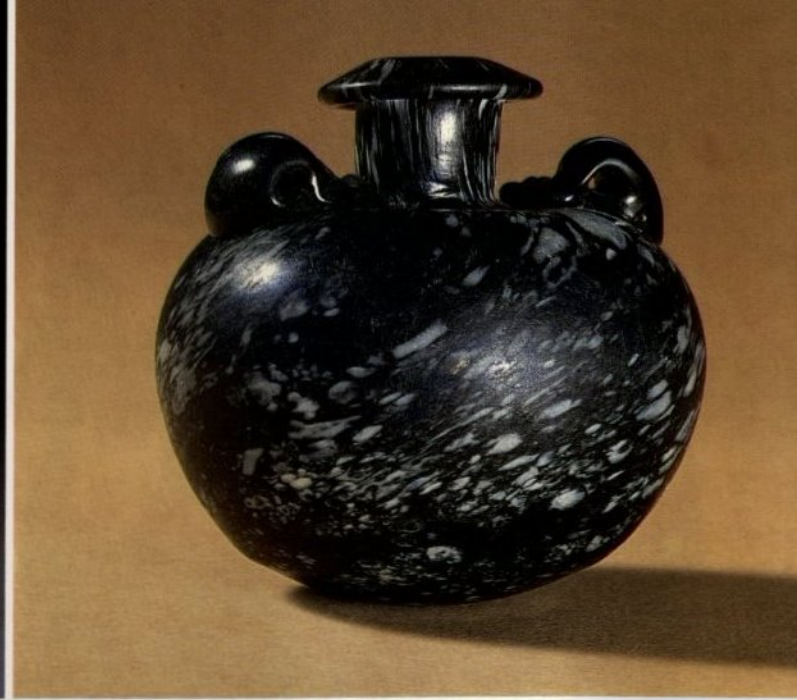
It is not always apparent when glass was first made at, as well as imported to, these northern and western sites, but excavations at Cologne in the Rhineland have pointed to the existence of a glasshouse there from quite early in the first century AD. It was perhaps founded in AD 50, when the emperor Claudius made the town a colony at the request of his wife, Agrippina the Younger. Among the earlier products of the Rhineland workshops (made in the second half of the first and the second centuries) are flagons and jars decorated with ribbing. They are often of coloured glass, usually amber, blue or yellowish-green, but some are of natural greenish or bluish glass. The flagons have long necks, angular handles – usually attached like a claw on the shoulder – and globular or conical bodies. The handles of

80 OPPOSITE, LEFT Squat bowl of blown glass with pinched ribs decorated with marvered white trails, now mostly weathered away. Probably made in Italy or another western province, where such bowls are particularly common; AD 50–100. H. 3.9 cm.

81 OPPOSITE, RIGHT Blown glass oil flask with embedded white blobs. Made in northern Italy about AD 1–50 and probably found with an imported pottery cup of about AD 80–90 near Richborough in south-east England. H. 9 cm.

For the technique of blobbing, see p.266, Figs 88–92.

82 OPPOSITE A small speckled blown glass jar and a jug with embedded opaque white and blue blobs. The speckles on the jar are proud and so must have been picked up on the gather towards the end of the manufacturing process. The jar is said to come from Pozzuoli near Naples, in Campania (Italy) where both were probably made in the first half of the 1st century AD. H. of jug 13.4 cm.





83 LEFT Blown jar of wine-coloured glass with opaque white theatrical masks and white stripes embedded in the handles. The effect of the contrasting colours resembles that of cameo glass, but the manufacture of this piece would have required none of the skill of the cameo glassmaker or cutter. Said to be from Santelpido near the ancient Atella, in Campania (Italy) where it was probably made in the 1st century AD. H. 24.8 cm.

84 ABOVE Close-up of the jar in Pl. 83, showing the masks under one of the handles. Blobs of white glass were applied and mould-pressed *in situ* before the handles were attached.



85 LEFT Bird-shaped flask for perfume or cosmetics. The vase was blown and filled, after which the tail was sealed by fusing; it therefore had to be broken before the contents could be used. Probably made in northern Italy, since such flasks are particularly common there and in the Alpine region; about AD 50–100. L. 17.1 cm.



86 Two flagons with handles and ribbed conical bodies, typical products of the early Roman glass industry in the Rhineland, centred at Cologne. The angular handles have a central rib extending in a long tail down the body; in the two-handled piece this rib is pincer. Both were found in eastern England, the blue example in the cemetery at Barnwell in Cambridgeshire and the green one in a grave at Bayford in Kent, and date from about AD 75–125. H. of blue flagon 29.3 cm.

the conical-bodied flagons have a single rib which extends in a long tail down the body. The globular-bodied flagons usually have a three- or four-ribbed handle, sometimes with a medallion showing a head of the mythical Medusa added underneath the handle attachment. The jars are globular, with folded collar-like rims. The letters CCAA or CCA which occur on a few glass vessels of similar date – including square bottles or flagons of a type to be considered below, one from Bonn in Germany and two from Silchester in Britain, and a perfume bottle from Cologne itself – probably stand for *Colonia Claudia Agrippiniensis*, the Roman name for the city, a further indication that this was a glassmaking centre. In addition, a terracotta mould probably for such a square bottle was found in the city and is now in the Römisch-Germanisches Museum there. It has a negative impression of four concentric circles with right-angled lines in the corners.

Enamelled vessels including flasks (*amphoriskoi*) of a type not known in the west have been found at Kerch (ancient Panticapaeum) on the Black Sea (St Petersburg, State Hermitage Museum) and in Cyprus (Corning Museum of Glass), and a bowl with a pointed star rather than a rosette on the bottom comes from Greece. Was there therefore a factory in the east as well? A group of tall beakers with polychrome enamelled decoration are similar in shape to colourless glass beakers with facet-cut designs (discussed below), with which they also share a



87 Blown glass bowl with enamelled decoration of a duck and a basket of flowers. On the underside is a star, which distinguishes this example from a group of enamelled bowls from a north Italian factory which have rosettes on the bottom. The fact that this bowl was found in Greece is another reason for suggesting that it is the product of an eastern workshop. About AD 50–75. H. 7 cm.

particular feature, a ledge below the ornamented field. They must therefore be contemporary, as must some undecorated examples (c. AD 70–117). Several of the enamelled beakers come from Begram in Afghanistan, beyond the political frontiers of the Roman Empire but on an important trade route leading to India and the Far East. Similar enamelled glasses are known from Egypt, North Africa and also the west, and some have facet-cut panels underscoring the enamelled decoration.

It is not always easy to determine the relationships between the eastern workshops, located principally – at least in the first century AD – in the region of Syria, Palestine and Phoenicia, and those in Italy and the west. In both areas vessels were decorated with trails wound around the outside of the body. These may be of the same colour as the body of the vessel, but a fine jug of opaque white glass from an Italian workshop has a trail of opaque light blue glass. Found in Italy, its date in the late first century AD is confirmed by the handle, which splays out at the rim in the same way as those of the contemporary metal jugs that it obviously imitates. Another link is illustrated by the work of a group of glassmakers, including those named Artas, Philippos and Neikon, who were probably active in the second and third quarters of the first century AD and so virtually contemporary with the early group of named makers of mould-blown glass which we shall be considering shortly. Together, these are the first named glassmakers. Artas and his fellows made free-blown two-handled cups, often signed on the thumb-pieces in Greek and sometimes in Latin as well. Their names were impressed together with that of their home town, ‘Seidon’ (Sidon), a city in Phoenicia. The use of Latin suggests that they were working in Italy where, as in the western provinces, it was the *lingua franca*, while Greek was generally used in the eastern parts of the Empire. In addition, the handles of one of Artas’ signed cups are of blue glass streaked and speckled with opaque white, a decorative technique exploited in Italian workshops, as we have seen.

Mould-blown glassware, too, seems to have developed along similar lines in both regions. A fine earlier group, made for one or two generations after about AD 25 when the technique was introduced, consists of jugs, beakers, cups and two-handled bottles of clear yellowish-brown, blue or greenish-colourless glass blown into decorated moulds. They may carry Greek inscriptions, often drinking slogans such as ‘your good health’ and ‘success to you’ (literally ‘seize the victory’). More significant is the presence of the names of the makers, Ennion, Jason, Meges and Aristreas. These usually occur in a formula with ‘made me’ and sometimes ‘let the buyer be remembered’ on the other side of the vessel, but in one case Aristreas is described as ‘Cypriot’. The discovery of so many of Ennion’s cups in northern Italy has given rise to the suggestion that, having started work in the Levant, he moved there, perhaps with other glassmakers from Syria and Phoenicia, to found factories making mould-blown glass vessels of similar varieties before the middle of the first century AD. A further connection between these eastern and western glasshouses is provided by two mould-blown jugs found at Kerch on the Black Sea which so closely resemble Ennion’s signed pieces that they were probably made by him, or at least in his workshop. They have embedded blob decoration like that favoured by the Italian work-

88 Blown opaque white glass jug with a blue trail wound all around it. Similar in shape to contemporary metal jugs, it was made in northern Italy in the late 1st century AD, and found in a tomb at Ventimiglia (Roman Albintimilium) on the modern border between Italy and France. H. 15.2 cm.



89 Box of opaque white glass with a separate lid, round at the top and bottom but with eight sides in the middle. Mould-blown, probably in a four-part mould, and decorated with palmettes, leaves and geometric motifs. Said to be from Sidon, in Phoenicia where it was probably made about AD 25–50. H., including lid, 8.5 cm.





90 ABOVE, LEFT Mould-blown glass cup signed by Ennion, one of the known glassmakers of the early Roman period. The Greek inscription, in two parts of four lines each enclosed in rectangles, reads on the illustrated side 'Ennion made [me]' and on the other 'Let the buyer be remembered'. Found in a tomb at Tremithousa, Cyprus, and probably made in Syria or Phoenicia about AD 25–50. H. 9.7 cm.



91 ABOVE, RIGHT Mould-blown beaker with three zones of decoration showing a Roman circus (arena for chariot-racing). In the top zone the names of the charioteers are inscribed in Latin, each ending in an abbreviated greeting. The middle zone shows the central barrier of the circus, adorned with monuments. The turning-posts continue down into the lower zone, which shows four four-horse racing chariots. Made in a western workshop, probably in Gaul or Switzerland in the mid-1st century AD and found at Colchester, England. H. 7.9 cm.

shops. On the other hand, the discovery in recent years of more examples of mould-blown cups and other vessels in the eastern provinces means that the precise location of the workshops must for the moment remain uncertain. All mould-blown glass vessels of this group could have been produced in one centre in the Mediterranean, reaching their different destinations in the hands of traders.

Almost all examples of another fine series of decorated mould-blown vessels, consisting of cups and bowls of blue-green or greenish-colourless glass, have been found on military sites in Switzerland, France and Britain. These normally show chariot races in the Roman arena or gladiators in combat, or sometimes the two scenes combined. The contestants are nearly always named in Latin. The find-spots, as well as the language of the inscriptions, suggest that these are products of a western workshop, probably in Gaul or Switzerland, and fragments of a mould which may have been used to make cylindrical cups showing chariot races have been found at Borgo in Corsica. However, about ten years ago a fragment of a chariot race scene was found with an inscription in Greek (Paris, James Barrelet collection). This appears to have an Egyptian source, and it therefore seems possible that such cups and bowls were also made in the east. The same western workshops were probably responsible for a small group of mould-blown beakers whose bodies are in the form of Negro heads. Two found in Britain (Cardiff, National Museum of Wales, and British Museum) have the same Latin inscription on the back of the neck and appear to have been made in the same mould.

An interesting series of small bottles, jugs and boxes (*pyxides*) made in three- or four-part moulds have several sides, normally six, decorated with fruit, flowers or other symbols whose meanings are now obscure. They are made either of translucent glass in deep shades of amber, green, blue or violet, or of opaque white or blue glass. Some of the motifs compare with those decorating the mould-blown vessels of Ennion and his fellows, suggesting that they were made in the same workshops together with some rarer decorated types such as small cylindrical boxes. Confirmation of this is provided by a unique two-

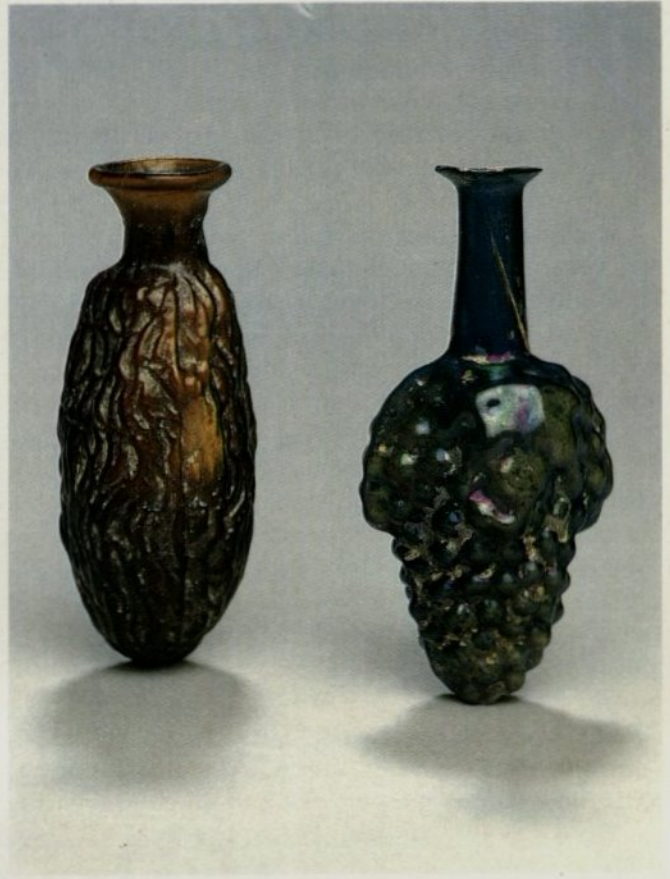
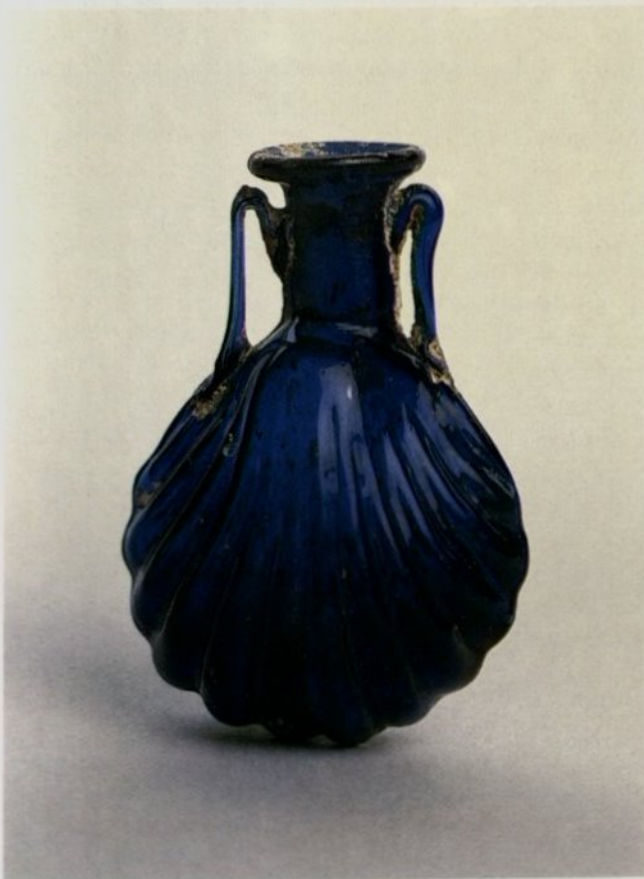
handled hexagonal scent bottle with floral designs in the panels (British Museum), which is a smaller version of a signed Ennion bottle from Cyprus in the Metropolitan Museum, New York. The distribution of the examples of opaque glass, at least, suggests that such workshops were located in the east, perhaps in Phoenicia. Of western manufacture are four-sided flasks of deep coloured translucent glass decorated with masks. Other mould-blown pieces of the first century AD, such as a flask of cobalt blue glass whose body is in the form of a shell, could have come from either end of the Roman Empire. 92

New mould-blown wares were made in the later part of the first century and are well represented among the finds from the cities of Pompeii and Herculaneum, which were destroyed by the eruption of Vesuvius in AD 79. These include flasks for perfume or oil, shaped like dates and usually of yellowish-brown or purple glass, made at least initially in Syrian or Phoenician workshops and found in contexts of about the mid-first to mid-second century AD. Less numerous but contemporary with these are flasks shaped like bunches of grapes. Both types no doubt came to be made in the west as well. Another type of flask, also represented at Pompeii, has a long neck and body in the form of a human head, often with two faces looking in opposite directions, Janus-fashion. These, too, came to be made in western as well as eastern workshops and were popular until the end of the Roman period. Many of these small flasks are of coloured glass. 93

Yellowish-green or brown are the shades favoured for some tall mould-blown beakers which were also made of more natural

92 BELOW, LEFT Mould-blown glass flask, the body in the form of a shell. Made about AD 25–50 in either an eastern or western Roman province. H. 8.5 cm.

93 BELOW, RIGHT Mould-blown flasks in the form of a date and a bunch of grapes. These varieties of mould-blown glass were made initially in Syria or Phoenicia, but later probably in the west as well, between about AD 50 and 150. H. of grape flask 8 cm.



greenish-colourless glass. These were also found in profusion at Pompeii and Herculaneum, but are known from all parts of the Mediterranean world. Some are decorated with almond-shaped bosses, sometimes described as lotus buds, while others show figures from Greek mythology or representations of the seasons (an early appearance of a theme that was to become very popular in Roman art) between leafy garlands or in niches. Beakers decorated with almond-shaped bosses come in several sizes, one particularly large example in the British Museum being of translucent amber-coloured glass.

94 The same motif decorates a drinking horn, which must be contemporary.

A special technique, described by the Elder Pliny and probably fashionable in his day, was the cutting of openwork designs in thin metal (silver), perhaps as casings for glass or some other material. One example, which may belong to the early Imperial period, was apparently found in Italy, where it could have been made. There is no real evidence for its date except that the deep blue glass beaker with bosses that protrude through the openings in the silver case is not unlike the tall mould-blown versions. The silver case of another example (Copenhagen, National Museum) is in the form of a cup with winged handles (*skyphos*) of a type usually dated no later than the first century AD. It has a blue glass lining, again blown into the case, and round the rim is an inscription in Greek suggesting that it was made in an eastern workshop or for an eastern (or Greek) client. It was, however, found in a tomb in Denmark with coins of the third century AD and so must either be an heirloom or belong with other openwork metal vessels with glass linings made in the later Roman Empire. Perhaps significant is the series of relief-decorated lost-wax cast glass *skyphoi* from tombs in the Rhineland of the same date, discussed in Chapter 1.

By AD 40 the first mould-blown square bottles, each with a single handle, of blue-green or light green glass were being made. The early examples were small. More common and widespread are taller polygonal versions that were first made in large numbers about AD 70. Most of these are square in section, but some have as many as thirteen sides or as few as three. Among the square group most are mould-blown, but some are free-blown with the sides simply flattened. Examples of another version, also usually mould-blown, have cylindrical bodies. All these were utilitarian vessels used to transport liquids: being easier to inspect and clean, they were rather more practical than their pottery counterparts. There was no standard size or capacity, the smallest being no more than about 5 cm (2 in) tall and the largest over 50 cm (20 in), although examples over 40 cm (16 in) or under 10 cm (4 in) are not very common. They were sometimes re-used as cinerary urns. More are known from Italy and the western provinces than from further east. The western square bottles often have designs on their bases, ranging from concentric circles to scenes and inscriptions naming the proprietor or the location of the glasshouse, or the maker. A particular group found in Britain and the Rhineland are inscribed with the letters AF, or AF enclosed in a Q. Many of those from the east are undecorated, though some have inscriptions with Greek letters or geometric designs. These vessels went out of circulation in the late second or early third century AD (the large cylindrical type seems to have ceased somewhat earlier, around AD

94 OPPOSITE, LEFT Mould-blown drinking horn with a metal cap on the nozzle. The decoration of bosses resembles that on one of the beakers in Pl. 96. Made about AD 50–100. L. 12.5 cm.

95 OPPOSITE, RIGHT Beaker of cobalt blue glass blown into a silver case with oval openings, through which the glass protrudes. Perhaps made in Italy, where it is said to have been found, possibly at Brindisi on the south-east Adriatic coast; about AD 50–100. H. 9.3 cm.

96 OPPOSITE Two mould-blown beakers. That on the left shows apparently mythological figures in niches, including the god Hermes (Roman Mercury) with his staff (*caduceus*) in his right hand and purse in his left. The other beaker is decorated with almond-shaped bosses. Both are said to come from the vicinity of Cyzicus on the south bank of the Bosphorus, and were probably made in an eastern workshop (or even in Asia Minor) about AD 50–100. H. of bossed beaker 13.3 cm.



110–20) and were joined and eventually replaced in some areas by another type, as we shall see.

The first century AD also saw the introduction of other forms which were to be made with variations for the next two to three hundred years. These include small bottles for perfume, often called 'tear bottles', and larger versions, probably for oil or wine, which were made in numerous different varieties and occur frequently in our early groups of blown glass vessels. Free-blown cups, plates, bowls, jugs and other vessels for eating and drinking, plain or with simple decoration of cut lines, were also made of natural bluish-green and light green glass from about AD 25 to the end of the Roman era. A complete set of coloured glass tableware was found in the ruins of a shop at Cosa (modern Ansedonia) in central Italy which was destroyed about AD 40. There are often subtle differences in the forms of these common blown vessels that make it possible to distinguish eastern from western products and even to assign certain groups to particular areas, though many of the types particularly popular in the west are not completely unknown in the east.

From about AD 70 much of the finest glassware was made of intentionally decolorised glass. This colourless glass came to replace not the natural shades with a greenish or bluish tinge, but those deliberately coloured such as blue, purple and amber. Among the earliest, if not the first, completely transparent blown glass vessels of the Roman era are pieces decorated with facet-cut designs, made between about AD 70 and 117 at about the same time as the colourless lost-wax cast series, some of which carry similar facet-cut decoration. Most are cups or tall beakers, but a few other shapes are known, such as jugs of a type made also in pottery. These were particularly popular in Italy and the western provinces, but not unknown in the east. Cut and engraved figured decoration was rare at this time, but fragments of a cup (Cardiff, National Museum of Wales) similar in shape to many of the faceted pieces show a cut scene of a chariot race in the zone usually filled with facets. In the upper zone are traces of an inscription in Greek, indicating an eastern origin, but perhaps of the client rather than the cutter and so not providing indisputable evidence for an eastern origin for the technique of facet-cutting, although it was certainly practised by glass-cutters in that area. A small number of glass vessels, of shapes similar to those of the facet-cut group but with a few additions such as amphorae, have decoration cut in high relief. Almond-shaped knobs, ivy leaves and berries, shells, masks and other stylised motifs are depicted, most of which are known from contemporary vessels of mould-blown glass or precious metal.

Diatreta, literally meaning 'cut vessels', are mentioned as a new type of glass by the Roman poet Martial, whose works were published between AD 84 and 102. Vessels to which he might have been referring are represented by two beakers with openwork decoration, one found in the cemetery of the Roman town of Ulpa Noviomagus (modern Nijmegen in the Netherlands) and the other at the trading post of Begram in Afghanistan. In shape they compare with the tall enamelled and faceted beakers already discussed, and the cutting technique has something in common with that used in the relief-decorated series. The burial date of AD 80–100 for the Nijmegen example (Nijmegen Museum) shows that they must be roughly contemporary,

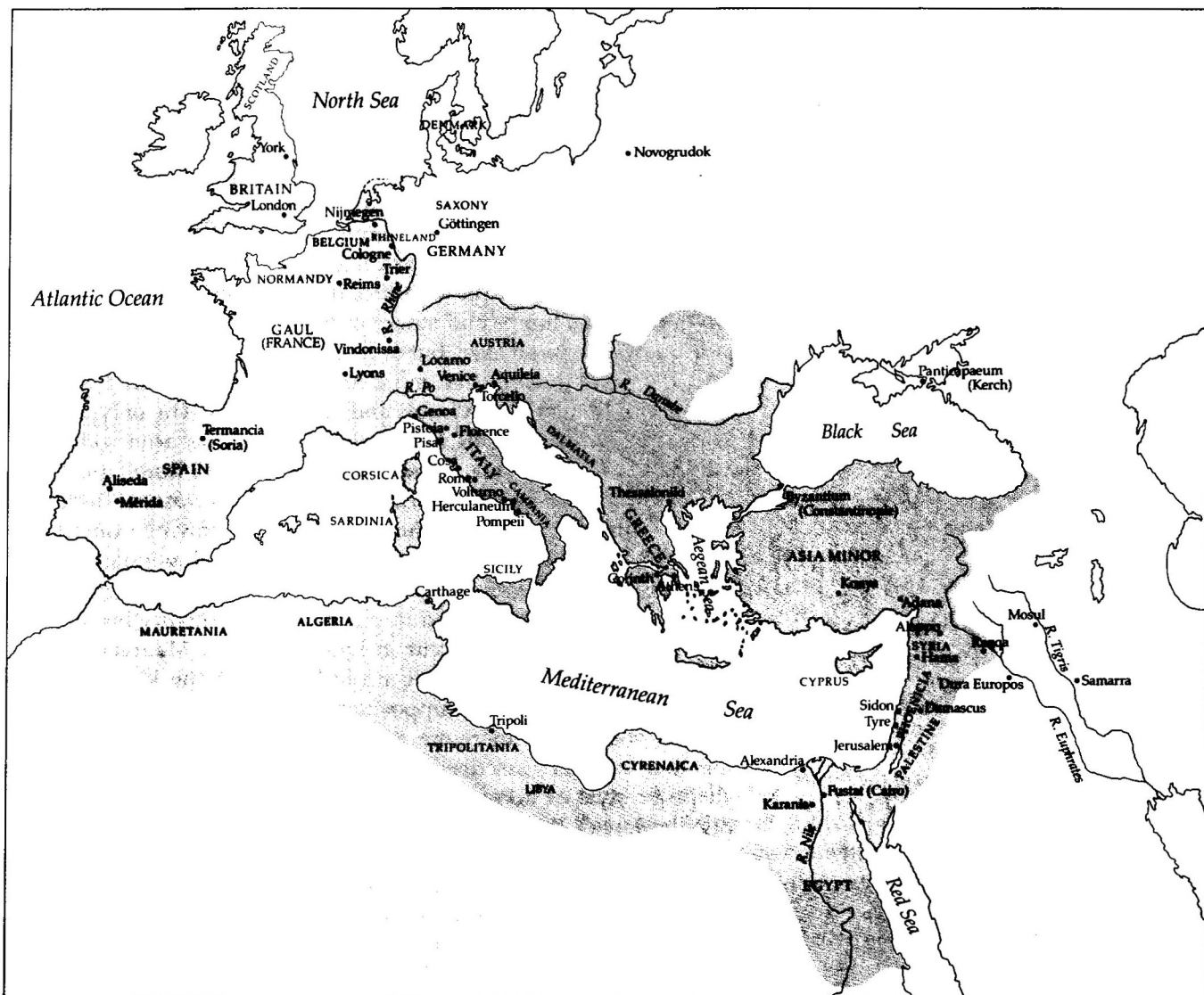
97 Jug of colourless blown glass decorated with hexagonal facets cut with a wheel. It was probably made in the Rhineland between about AD 70 and 117, alongside a larger class of beakers of similar glass with facet-cut decoration, although pottery jugs of this particular shape are usually dated AD 200–250. H. 12 cm.



dating from the later first or early second century AD. On the Nijmegen beaker twigs of an oak tree with leaves and acorns are carved in high relief and the decoration is shaped by grinding away the glass around and underneath the leaves, branches and acorns to form an openwork pattern. The surviving decoration on the beaker from Begram (Kabul Museum) shows three boats and a building consisting of a tower surmounted by statues, all partly cut away underneath. This scene has been identified as the famous lighthouse at Alexandria, one of the Seven Wonders of the World, and the neighbouring harbour filled with ships. However, as some recent excavations have shown, all Roman lighthouses were somewhat alike, and the distance of both Nijmegen and Begram from Alexandria (and from each other) make that city an unlikely source of these remarkable vessels, whose origin, even if the same, must remain a mystery for the moment.

Not a technique specific to glass working, cutting was nonetheless one of the most common decorative processes of the Roman era, as in earlier times. Glass-cutters must have been aware of the practices of other craftsmen, notably hardstone workers, and employed similar tools, no doubt including the bow-drill, known in Egypt from the middle of the third millennium BC. Wheels seem to have been used for certain linear and also facet-cut designs, as well as for some relief cutting, but these were no doubt always small and easily made, even of a hollowed stone supported on a stick and inserted into a hand-worked turning device. They would have been fed by damp grit such as sand, wood ash or other easily available abrasives. Some engraving was achieved freehand with a flint or similar tool. Simple files, narrow flattened implements of metal or even wood, sometimes bent at the end to reach, for example, under the bridges of cage cups, together with abrasives were used both for polishing and for some linear cutting. The easiest way to cut the decorative grooves around the circumference (often below the rim) of many glass vessels would have been with a file and abrasive, while the vessel itself was rotating slowly on a turning device like a potter's wheel.

Thus during the first century AD the Roman glass industry became fully established and prolific. This led to the rapid spread of glass-houses throughout the Empire, so that they were soon operating in all the major centres. Two pottery lamps of the second half of the first century AD, one from Dalmatia and the other from Italy, show glassblowers before their furnaces. The Roman Empire at this time extended from Britain in the west to parts of Iraq in the east. On the eastern side it embraced Asia Minor as far north as the northern shores of the Black Sea and inland to the frontiers of Armenia, running southwards to include most of modern Iraq, Syria, the Lebanon, Palestine, Israel and Arabia. In the north it was bordered by the Rhine and the Danube rivers, and in the south it encompassed the whole of the Mediterranean, North Africa and Egypt. Its influence, however, extended beyond its political boundaries. It is again the Elder Pliny who tells us that Spain and Gaul were making glass by the end of the first century AD, and this is borne out by the finds. The Latin name *Aramantus* (or *Aramanthus*) appears in the second half of the first century AD on glass vessels of different shapes, notably jugs with masks at the handle attachments, whose distribution suggests that they were made in south-eastern France, whence they were exported



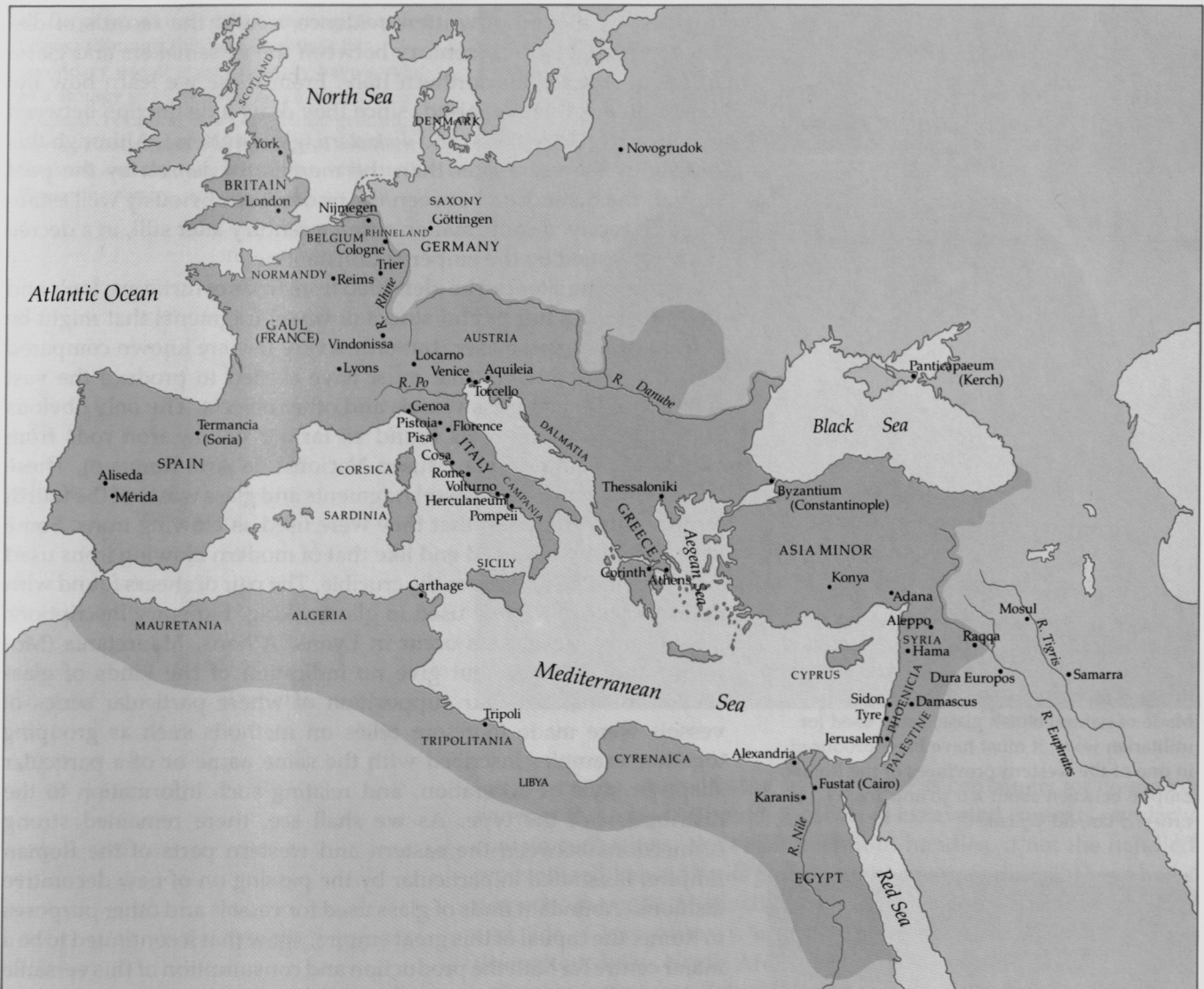
Map of Europe and North Africa, showing the extent of the Roman Empire in the 2nd century AD (in brown) and the main glassmaking centres and other sites mentioned in Chapters 2–4.

to Normandy and the Rhineland. The stamp AVG apparently identifies products of southern Spain and Portugal, since it occurs on unguent bottles of the later first and second centuries found principally in that region. Cologne is not mentioned by Pliny or other ancient authors, in spite of its obvious prolific production from soon after the mid-first century AD. Neither is Britain, but we now know that there were glasshouses in London from the AD 70s, and elsewhere in the second and third centuries AD.

The Roman achievement

AD 100–400

The story of glass continued without any real interruption up to the end of the third and into the early years of the fourth century AD. The fairly frequent literary references show that, while becoming more common, it retained its fascination; but after the first century AD no information is given about where glass was actually being made. Although makers sometimes signed their glass vessels, none mentions his home town. Nor is any help as to the location of glasshouses



Map of Europe and North Africa, showing the extent of the Roman Empire in the 2nd century AD (in brown) and the main glassmaking centres and other sites mentioned in Chapters 2–4.

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98 Large urn with a lid, but plain rather than the more usual M-shaped handles. Like the jar in Pl. 99, it still contains cremated bones, but this was probably its secondary purpose. Made of natural bluish glass, often used for utilitarian ware, it must have been produced in one of the western provinces of the Roman Empire between about AD 50 and 200. H. of urn 31.7 cm, lid 5.7 cm.



provided by any other written evidence, except the records of disputes in the early third century between the glassmakers and glass-cutters of Aquileia in northern Italy. From these we learn how the glass industry was organised, since they draw a distinction between the *vitrearii* (glassmakers) and *diatretarii* (glass-cutters). Although this was about 100 years later than the mention of *diatreta* by the poet Martial, the distinction between the trades was obviously well established. It received confirmation about a century later still, in a decree of AD 337 issued by the emperor Constantine.

Glassmaking sites can be identified from finds of furnaces, tools and unworked glass lumps and stocks of vessel fragments that might be re-used by the glassmaker, but only a very few are known compared with the great number that must have existed to produce the vast quantity of Roman glass vessels and other objects. The only obvious Roman glassmaking tools found so far are hollow iron rods from Mérida in Spain (Mérida, Museo Nacional de Arte Romano). These were found with blown vessel fragments and glass waste of the fourth century AD, confirming that they were used as blowing irons. Some have a slightly thickened end like that of modern blowing irons used to gather molten glass from the crucible. The pair of shears found with them was also probably used in glassmaking. Funerary inscriptions mentioning glassmakers occur in Lyons, Athens, Mauretania (Morocco) and Dalmatia, but give no indication of the kinds of glass they were making. Our supposition of where particular series of vessels were made therefore relies on methods such as grouping together examples inscribed with the same name or of a particular shape or style of decoration, and relating such information to the distribution of the type. As we shall see, there remained strong connections between the eastern and western parts of the Roman Empire, illustrated in particular by the passing on of new decorative fashions. Abundant finds of glass used for vessels and other purposes in Rome, the capital of this great empire, show that it continued to be a major centre for both the production and consumption of this versatile and attractive material.

Until the fourth century, intentionally coloured glass became very rare for vessels. However, it continued to be used for some of the decorated mould-blown types, such as head-flasks of the variety introduced in the later first century and made in perhaps greater numbers in the second and third, and it seems to have become something of a speciality of the glassmakers at Cologne. They produced a number of mould-blown and other decorated glass vessels in quite deep shades of blue and green. Nonetheless, the finest or most luxurious pieces were now for the most part made of colourless material, while natural greenish and bluish-greenish glass was employed for some decorated vessels but in particular for utilitarian ware, which was produced in profusion. After the first century AD the proportion of decorated wares seems to have declined sharply in relation to glass tableware and storage vessels. Owning glass was no longer a novelty or a preserve of the rich.

A number of the distinctive forms introduced in the second half of the first century AD continued to be made in the second century. Among these were everyday wares like the tall mould-blown square bottles sometimes re-used as cinerary urns, as already discussed.

99 Large jar, or urn, still containing cremated bones, although this was doubtless its secondary use: it must originally have served as a storage jar. The deep green colour is unusual. Found at Box Lane burial ground, Hemel Hempstead, Hertfordshire, southern England, and made in one of the western Roman provinces, A D 50–200. H. 23.1 cm.



Large jars, too, served in the second place as containers for cremated bones at this time. Although those from excavated contexts regularly contain cremations, the version without handles, if not the handled types as well, must, like its pottery counterparts, originally have had a domestic purpose. Distinctive are examples with m-shaped handles and lids. Glass cinerary urns of this type were in common use throughout Italy, North Africa and the western provinces but were unknown in the east, Tripoli in modern Libya being the easternmost find-spot to date. Variations in detail suggest that they were made in many different western workshops.

The new types of mould-blown ware introduced in the second century were functional rather than decorative. Tall, square mould-blown bottles were still in circulation, but they were now joined by a smaller version. This type is again square in section and is known as a 'Mercury' flask because a figure of that Roman god appears, together with Latin initials or names such as Hylas or Hilarus, on the decorated base of many examples. They were made in western workshops in Gaul and the Rhineland, no doubt including Cologne, in the second and third centuries. Also of western, or perhaps specifically Rhineland production, of the third or fourth century, were flasks with three connected globular bodies and a single handle, not unlike some modern oil and vinegar bottles. These were free-blown and the vertical partitions made by drawing a wooden tool up and down the body. While it is quite easy to make a bipartite flask, a three-part vessel is no mean feat.

By the third century the production of tall square bottles had ceased. New types of containers in the north-western parts of the Empire

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included mould-blown barrel-shaped bottles with one or two handles, often called 'Frotinus bottles' because of the abbreviated name found on the base of many of them. Large numbers have been found in north-western France, where they were probably mostly made in the second, third and fourth centuries, the one-handled version having originated in the late first century AD. They are widespread in the Rhineland as well, and some have been found in Britain, including one with one handle inscribed on the base *FELIX FECIT*, meaning 'Felix made [me]'. A series of bottles popularly described as 'eau-de-Cologne bottles' was produced in Cologne from early in the third century into the fourth. They were blown into cylindrical moulds and sometimes decorated with cut lines. Their distinguishing feature is that the handles are shaped like dolphins. Similar handles are provided for a rarer type of flask shaped like a barrel and decorated with trails wound around the extremities. Among their eastern counterparts is a third-century group of cylindrical free-blown flasks with similar dolphin handles made in Egypt and decorated with cut lines and facets.

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It was in decorated wares that the glassmaker and his associates really excelled in the second and third centuries (and also the fourth, but more on that below). None of the decorative techniques was entirely new. Rather they illustrate the exploitation by the artists of tried and tested methods. The glassmaker himself might blow glass into decorated moulds which could determine the form of the actual vessel and also impart designs. He was also responsible for various types of applied decoration, including trails, blobs and mould-pressed medallions in the form of masks. Cut decoration, however, was



100 TOP From left: a mould-blown square bottle of a type commonly used to transport liquids, later 1st or 2nd century AD; a blown triple-bodied flask, probably 3rd–4th century AD; and a mould-blown barrel-shaped jug, 3rd century AD. All made in western workshops: the bottle and jug were found at Faversham, Kent, south-east England. H. of bottle 20 cm.

101 The base of the barrel jug in Pl. 100, showing the mould-blown inscription, *FELIX FECIT* or 'Felix made [me]'.
 FELIX
 FECIT

carried out by specialists in separate workshops. They, too, reached high standards of excellence.

Decorated mould-blown wares of the varieties first produced in the later years of the first century AD were still being made in the second. Among these were flasks in the form of dates or bunches of grapes, or with bodies in the shape of a human head, often facing two ways. By the third century new types of decorated mould-blown ware were being manufactured that were to remain popular for over a hundred years. Produced in great numbers were jars, jugs, bottles and sprinkler-flasks, which were first blown into decorated moulds which imparted intricate geometric patterns and then often further inflated. These are found all over the Roman world, but were particularly popular in the eastern Mediterranean. New and larger versions of older styles include grape- and head-flasks. While Syrian glasshouses were probably originally responsible for both these types, they came to be produced in the west as well, in the Rhineland (Cologne) and probably also in Gaul and Belgium, where one part of a two-piece mould for a grape-flask was found at Macquenoise. The western grape-flasks mostly have handles; some are unstable with pointed bottoms, but others have stemmed feet. Many different representations occur among the head-flasks, and occasional examples from eastern workshops carry Greek inscriptions. Besides Africans and others, usually with faces looking in both directions, there are representations of grotesques, probably modelled on the masks worn by comic actors. Instead of only a head, the body of the flask might be moulded in the shape of a figure of a deity or a monkey (itself perhaps a caricature of the god Mercury), or occasionally a fish.

As decoration on free-blown glass vessels, glassmakers continued to use trails and blobs but these were now applied in a somewhat different manner. In the Rhineland they used blobs and trails of different colours and so produced some attractive polychrome glass

102 RIGHT Inscribed head-flask, the body blown into a two-part mould. The head is that of a young man with curly hair; a Greek inscription above gives the name 'Eugen[es]', perhaps that of the glassmaker; another, around the base, reads 'May you prosper, Melanth[us]'. Probably made in the eastern Mediterranean in the 3rd century AD, and found in a tomb near Idalion, Cyprus. H. 19.7 cm.

103 BELOW Mould-blown bottle in the form of a fish, probably made in Gaul in the 3rd century AD. Perhaps from Arles, France. L. 27.8 cm.



vessels. Intricate vessels decorated with polychrome blobs were also made in Italian glasshouses.

A new type of trailed decoration is described as 'snake-thread' because of the serpentine appearance of the threads. The majority of glass vessels with this decoration were made in the third century, but the first examples date from the late second century and the style continued into the fourth. Its origin may be connected with a new mode of ornament created in the east at about the same time. This involved applying polychrome floral decoration, sometimes including birds and snakes, to vessels. It continued into the third century, when some of the floral elements on examples from Syria and Palestine have a chequered pattern that seems to indicate local production. Most examples of this group have been found in the east. A few reached Europe, but so far none are known from the Rhineland. A connection with the 'snake-thread' trailed glass vessels is suggested by the inclusion of similar floral elements on a number of these. The main characteristic of snake-thread vessels from the east is that they are of monochrome glass, usually greenish or colourless, and the trails are of the same colour as the body. Dropper-flasks were popular, and there is one in the shape of a helmet (Cologne, Römisch-Germanisches Museum). Other flasks have taller necks with normal openings. The chequer pattern of the floral elements on the Syro-Palestinian group is also found on some of the eastern snake-thread trails. Colourless glass vessels with colourless snake-thread trails bearing similar chequer imprints are also abundant in Italy and known from other western provinces such as Spain and Britain.

104 Another western group of snake-thread glass vessels, which appears to have been produced in Cologne, includes a series with thick colourless or polychrome trailings, usually milled, on colourless or, less often, coloured bodies. A second variety has much finer polychrome trailing and includes patterns such as floral elements, spirals, swastikas and volutes. Among the more remarkable of this second group are two further dropper-flasks in the shape of helmets – one decorated with polychrome and the other (Cologne, Römisch-Germanisches Museum) with opaque white trails, thus differing in colour from the eastern example which is completely green – and a pair of flasks shaped like sandals. Popular in the Rhineland in the third century were pairs of jugs and saucepan-like vessels decorated with fine polychrome trails.

127 Glass vessels decorated with quite large applied blobs are also generally colourful. Rhineland workshops again preferred the polychrome, as did glassmakers in Italy. This style of decoration also originated in the mid-third century, but became particularly popular in the fourth, continuing in the west until the early fifth century at the latest but enduring for another seventy-five years or more in the east. Patterns of dark blue blobs occur throughout the Roman Empire, bowls and cups being common in the eastern Mediterranean, at sites on the Black Sea and also in the west, but in Egypt such decoration is found almost exclusively on bowl-shaped and conical vessels which probably served as lamps in the fourth, fifth and perhaps also the sixth centuries. Similar lamps are found on late Roman and early Byzantine sites in the east as well. Decoration of large blobs of various colours, usually blues, greens and browns, on more sophisti-



104 Flask decorated with snake-thread trails, tooled flat and milled. Found in a grave at Koblenz, in the Rhineland where it was probably made, late 2nd or early 3rd century A.D. H. 19.5 cm.

105 OPPOSITE, TOP A handled dish and a jug, both with polychrome snake-thread trail decoration. Pairs of vessels like these were normally intended for hand-washing at mealtimes, but these glass versions are perhaps too small to have served this purpose. Found together in a coffin at Urdingen, near Düsseldorf, in the Rhineland where they were made in the 3rd century A.D. H. of jug, excluding handle, 12 cm.

106 OPPOSITE Dropper-flask in the form of a helmet, decorated with blue snake-thread trails tooled flat and milled. The eyes are formed of coiled colourless trails with opaque white and blue pupils. On either side of the helmet is a bird made from colourless trails, standing on a coloured twig with red berries. Found at Cologne, where it was made in the 3rd century A.D. H. 10.1 cm.



cated shapes was a speciality of western glasshouses in the Rhineland and Italy.

Cypriot workshops of the second century seem to have been responsible for a group of colourless glass bowls with lids on which a scene is 'painted' to be seen through the glass. It has always been supposed that the designs were cold-painted, since they are drawn with very fine lines and there is no obvious evidence that the pigment was fired on. In addition, the decoration flakes away easily. (The same observations apply to the much earlier 'painted' glass inlays made in western Asia in the eighth century BC; see Chapter 1.) If, however, that were indeed the case, it is unlikely that any of the decoration would have survived at all, and it therefore seems most probable that these lids (and the earlier inlays) were enamelled. It was in the late second century that the technique of enamelling was revived on a larger scale, initially in the east, and this may be one of several modes of decoration taken westwards by immigrant craftsmen. The eastern group, after its start in the late second century, centres on the third and continues into the fourth. The western group dates from the later second century until no later than a decade or two after the mid-third. The best examples of this last group have been found outside the political boundaries of the Roman Empire, in Denmark and northern Germany, but they were made in the Rhineland. The majority are

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bowls of colourless glass on low bases, decorated in deep colours with wild beasts in the arena and, occasionally, gladiators in combat.

The enamelled scenes on glass vessels from eastern workshops, although not excluding animal motifs, are very different from those of the western group, indicating different tastes, whether of the craftsmen or the customers. Centres for their production were established in both Egypt and Syria. From Egypt come illustrations of human figures in both mythological and more mundane contexts, plant motifs and animals, and also more elaborate compositions – which are gilded as well – showing the worship of the Egyptian god Osiris together with inscriptions in Greek that read 'Drink and may you live'. Vessels with designs applied (no doubt by enamelling, since they have survived) on the inside to be seen through the glass were occasionally produced in Syrian glasshouses. These were probably also responsible for a number of remarkable enamelled glass vessels showing scenes from Greek mythology with the protagonists often named in Greek, though the inscriptions, in particular, are close to those of the Egyptian cut glassware. A close connection between enamelled glass workshops of west and east is illustrated by a bottle like those described below showing Italian landscapes, but whose decoration of a Greek mythological scene and a Greek inscription links it with our Syrian group. It may of course have been made in Cologne by a migrant Syrian glassmaker or for an eastern client, and an enamelled bottle of the same shape, but with a chariot scene and Latin inscription, has been found in the Rhineland (Bonn, Landesmuseum).

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Turning now to the work of the artists responsible for cut decoration, we have already seen that fine facet-cut glass vessels were being made into the second decade of the second century; bowls with facet-cut decoration were evidently being made in the west in the later second century. To the last quarter of the second and the early third century belongs a large group of fragments of colourless glass vessels from Karanis in the Faiyum (Egypt), some of which are decorated with

107 Bowl with painted – or, more probably, enamelled – lid. The design, outlined in black, is on the inside, so that it is seen through the glass. It shows a naked winged figure with a bunch of grapes and vine leaves in his left hand, and a hook (perhaps a sickle) in his right. Found in Cyprus, where it was made in the 2nd century A.D. H. of bowl 6.5 cm; D. of lid 7.4 cm.





108 ABOVE, LEFT Group of enamelled bowls found in Denmark, showing wild beasts which would have been used in staged fights in the Roman amphitheatre. Probably made in the Rhineland between about AD 150 and 260/70. H. of example showing bull 9.15 cm. Copenhagen, National Museum.

109 ABOVE, RIGHT Bottle with gilded enamelled polychrome decoration. The main zone depicts the contest between the god Apollo and the satyr Marsyas over which was the better musician. Here is shown Nike (Victory), winged and named in Greek, and Apollo with his lyre. The subject and the use of the Greek language link this vessel with a group made in Syria, but similarly shaped bottles show Italian landscapes. It was perhaps made in Cologne by a migrant Syrian glassmaker, or for an eastern client, 3rd to 4th century AD. H. 14.6 cm. Corning, New York, Corning Museum of Glass.

fine wheel-cut and engraved designs. None of these fragments is inscribed and most show animals, birds and foliage, but three figured fragments (Corning Museum of Glass) with human figures, from elsewhere in Egypt, have names inscribed on them in Greek, including that of the mythological hero Orestes. Fragments of similar vessels have been found at Dura Europos in Syria, one showing part of the story of Artemis and Actaeon, with the latter's name inscribed in Greek (Damascus, National Museum). For complete or nearly complete examples we must turn to the western provinces: a number come from Cologne, while others are known from Saxony (also in Germany, but outside the Roman Empire), near Reims (France) and Britain. The style of cutting, engraving and lettering of all these examples is very distinctive and implies a single centre of production. That this was in Egypt, which perhaps came into its own at this time, is suggested by the finds from there and from further east, by the choice of Greek mythological subjects, and not least by the Greek language of the inscriptions. In addition, the motifs on an uninscribed cut-glass beaker of the early third century are so Egyptian that they confirm that such techniques were being practised in Egypt at this time. The principal scene shows a sturdy man with a chisel and a mallet, carving the Greek numeral 7 (the letter *zeta*) on a Nilometer, an instrument – shown here as a round-topped column – on which the height of the year's flood of the Nile was recorded.

These Egyptian bowls with figured scenes were the prototypes from which numerous cutting styles were evolved during the third and fourth centuries, not only in Egypt and Syria but also in Italy and the

110 Bowl with cut decoration of facets and deep-cut circles with projecting central knobs. From a late 3rd-century grave at Leuna in Saxony, outside the borders of the Roman Empire, but probably made in the Rhineland between about A D 175 and 200. H. 8.7 cm.



Rhineland and perhaps other western centres as well. Another Egyptian group consists of tall footed beakers, mainly of the late third century, which carry abraded Greek inscriptions in which the lettering is formed of double parallel strokes separated by diagonal slashes and combined with other patterns such as wreaths, palm branches and cross-hatching. Similarly decorated, but in a cruder style and of the fourth century, mainly the first half, is another group consisting of flasks, dishes and a few small bowls, made or at least cut in Asia Minor. Other glass vessels of the earlier fourth century, mostly jugs and two-handled bottles, from workshops in Syria, Palestine and particularly Egypt, as well as in the Rhineland, are decorated with simple abraded geometric patterns. The recent discovery in Egypt of bottle fragments with abraded lines in contexts of the late first or early second century suggests that this mode of decoration had a long history in that area. The continuation into the earlier years of the fourth century of close connections between glasshouses throughout the Roman Empire, at least through trade, is illustrated by a pair of jugs decorated in this manner. They are so alike that they seem to have been made by the same man or at least in the same place, but one was found in Egypt and the other in Cologne (now in the Römisch-Germanisches Museum).

Several of the styles of decoration that we have been examining continued into the fourth century and some for even longer. New types of storage and tablewares were introduced at this time in the countries bordering the Mediterranean Sea, a number of which continued to be typical in the centuries to come. The colours changed too. Colourless glass continued, mainly for luxurious glassware, and deliberately coloured glass, notably blue, became more common. Unusual, but reminiscent of an earlier (western) type, is a juglet of green glass with a thin outer white layer through which the green glass shows. Of the natural colours, those with a greenish or bluish tinge were still used, particularly in North Africa, but more pronounced shades were generally preferred: most vessels were now

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111 Beaker with cut decoration. The principal scene depicts a man carving the Greek numeral 7 (the letter zeta) on a Nilometer, shown as a round-topped column. Made in Egypt in the early 3rd century A.D. H. 8.6 cm.



112 Large jug decorated with abraded and wheel-cut geometrical designs, found in a tomb at Oxyrhynchus, in Egypt where it was made in the first half of the 4th century A.D. A very similar jug was found at Cologne. H. 31.5 cm.





113 Large jug for which there are parallels in Late Roman silverware. From Syria, where it was made in the 4th century A.D. H. 45.6 cm.

made of blue-green, olive-green, green, pale yellow or brown glass in shades that may occur naturally. Overall the number of different shapes was reduced and the decoration became sparser, consisting mainly of simple trails or dark blue blobs. Beakers, both cylindrical and conical, were very common in these areas in the fourth and succeeding centuries. Late Roman glass beakers normally had rough rims, achieved, no doubt, by 'cracking off'. There was also an assortment of jars, bowls (mostly with bases), jugs and flasks. A number of the flasks and jugs had long necks and pronounced funnel-shaped or circular mouths.

The essential unity of the Roman glass industry seems to have been broken by the middle of the fourth century, probably following the transfer of the Imperial court from Rome to Constantinople (modern Istanbul), since these new styles of tableware and storage vessels are found on sites in the eastern Mediterranean, North Africa and Italy but do not occur further north in central and western Europe. These divisions are also illustrated by the distribution of a distinctive form of perfume bottle with a bulge in the centre of the body, usually described as 'pipette-shaped'. It was introduced in the later third century, which may explain why until the middle of the fourth century it occurs as frequently on sites in the western provinces as in Syria and Palestine (but is so far unknown in Egypt).

There was divergence, too, among the products of the eastern provinces. In Syria and Palestine the glassmakers experimented with trailing and produced an imaginative series of perfume bottles with basket handles and often double bodies. These are unknown in the west, unlike the pipette-shaped variety introduced earlier. A local Egyptian industry which flourished from the fourth century at least until the coming of the Arabs in the seventh was responsible for some elegant tableware including bowls, oval and circular plates and dishes, and jars with collars, as well as conical lamps with blue blobbed decoration.

While there was evidently a common style for everyday glassware within the Mediterranean basin, there were disparate styles of cutting and other modes of ornamentation throughout the Empire. Certain of the late Roman glasshouses were responsible for some of the most remarkable and technically excellent, if impractical, decorated glass vessels of antiquity.

In Syria cutting and engraving to a high standard lasted for some time, even into the sixth century, but in Egypt by the fourth century good cutting had for the most part given way to abrasion. In the west, too, facet-cutting became less common in the fourth century, most of the designs being executed by engraving and abrading. A closely-knit western group, belonging mainly to the third decade of the fourth century, consists of open vessels, mainly shallow bowls, decorated with hunting scenes, stories from Greek mythology or biblical subjects. The designs are engraved, apparently freehand, with a sharp pointed tool in a series of short jabs on the surface of the vessel. Particularly ambitious is a series of bottles made in the later third or fourth century and engraved with waterfront landscape scenes. They carry Latin inscriptions which on some identify the places as Baiae or Puteoli, in Italy, both favourite watering-places of wealthy Romans. The scenes are distinguishable also by differences in details in the

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114 Oval dish found in Egypt, where it was made in the 4th century AD, or possibly later. L. 23.7 cm.



115 Bowl with a scene of a hare-hunt and a Latin inscription engraved with a sharp-pointed tool. Found on Wint Hill, Banwell, Somerset, in south-west England, and made in one of the western Roman provinces between about AD 325 and 350. D. 19.2 cm. Oxford, Ashmolean Museum.



designs. Belonging to the years between about AD 330 and 370 is a group united by their crude workmanship. They show either pagan scenes such as a Bacchic dance or funerary banquet, or biblical stories. The drawing is competent but the designs are depicted by simply engraved, mostly straight, lines or shallow wheel-cutting with the hollows left unpolished. As they come from sites in Germany, France and Britain, they were probably made in the Rhineland, and perhaps in Gaul as well.

Not more than a generation or two before AD 300 the first of the principal series of cage cups, or *diatrete*, were made (their predecessors, made about 200 years earlier, have already been described). Most belong to the fourth century or the second half of the third, and represent the apogee of glass-cutting in antiquity. The majority are deep bowls (or 'cups'). A thick blank was blown, and then cut away to create an openwork design connected to the background wall by a

minimum number of 'bridges' strategically hidden behind the decoration. Many, like those found in and around Cologne, where they were probably made, are decorated with a network of cages, usually of different colours contrasting with a colourless wall and often with an inscription in Greek or Latin at the rim. Others, more brilliantly conceived, show figured scenes. The most remarkable is a cup which illustrates the story of Lycurgus, the ill-fated king of the Thracian Edoni, who was strangled by vines after taunting the god Dionysos. The colour of the glass is very unusual in that in reflected light it is pea-green, changing to magenta in transmitted light. A similar colour change (pea-green to amber) occurs on a fragmentary cage cup from Termancia in Spain with network rather than figured decoration (Madrid, Museo Arqueológico Nacional), and on two more network fragments, one from Thessaloniki in northern Greece and the other without provenance but now in the British Museum. A few other glass fragments with cut decoration have similar properties. The change in colour might have happened by chance from the use of two gathers of glass on the blow-pipe and from the firing temperature. Alternatively it could have been achieved by the addition of minute particles of gold

116 Cage cup depicting the story of Lycurgus, the ill-fated Thracian king strangled by vines after taunting the god Dionysos. In reflected light it is pea-green in colour. The silver-gilt rim-mount, calyx, stem and foot have been added, probably in the late 17th or 18th century. Perhaps made in the Rhineland, 4th century A.D. Max. H. 16.5 cm.

117 OPPOSITE The Lycurgus cage cup in transmitted light, when it appears a deep red, often described as magenta, and amethystine purple on the torso of Lycurgus.







118 Replica made by George Scott of Edinburgh, Scotland, of a completely colourless cup decorated with a network of cages and used as a hanging lamp. The original, now in the Corning Museum of Glass, New York, was made around AD 300 and is said to have been found in Syria. H. 10 cm.

and silver to the glass batch, though exactly how this was done is not known. This latter technique seems to have produced the opaque tannish-pink colour of the occasional piece of early Roman cast glass tableware and in late Roman times the opaque flesh tones of figures in some *opus sectile* panels.

The best-known cage cups are those found in the west, where they were evidently made. However, particularly in more recent years, examples have come to light from further east. One of these, a bowl without figured decoration, now in the Corning Museum of Glass, said to come from the area on the modern border between northern Syria and southern Turkey, is of an unusual shape for this class, being broader than it is high, and is completely colourless with no coloured embellishments. Another recently discovered completely colourless example (also at Corning) of this hemispherical network type, but smaller, has metal fittings indicating that at the time of burial it was meant to be suspended. This suggests that the hemispherical cage cups, and perhaps also some others, served as hanging lamps rather than as drinking vessels – though a fragment of a rather shallower yet still hemispherical example (Trier, Rheinisches Museum) bears a drinking slogan.

The striking similarity in the technique of manufacture and the details of the design of all known examples with networks of cages has given rise to the suggestion that all were decorated by one family or even a single craftsman within a time-span of no more than fifty years. Other scholars maintain that a number of workshops, not only in the Rhineland, were responsible for these masterpieces, including the figured group. Late Roman metalworkers were also making openwork vessels with glass liners blown into the casings in the manner of the examples made perhaps some 200 years earlier when Pliny described the technique. Probably to the fourth century belongs an example from a hoard found in Scotland (now Edinburgh, National Museums of Scotland), whose silver casing forms a network of cages in apparent imitation of the completely glass series.

The delight of western glasshouses in colourful vessels is well illustrated by those decorated with applied blobs (or prunts) of coloured glass, which were being made in increasing numbers in the fourth century. Applied blue blobs remained popular (as in the eastern and Mediterranean glass workshops), particularly on simple shapes such as bowls and beakers that were still being circulated in Scandinavia in the fifth century. Some jugs, with distinctive ribbed handles folded over before being attached below the rim, are decorated with opaque white marvered trails forming festoon patterns, foreshadowing a Frankish style of decoration (see Chapter 3). Perhaps a corollary of these is an even more elaborate series of drinking vessels and bowls of colourless or greenish-colourless glass with applied decoration. This may take the form of self-coloured trails in an openwork design, just like the network patterns of the *diatrete* but the work of the glass-makers themselves. On one example the openwork trails are milled or plaited or decorated with moulded shells; on another the trails provide some protection for gilded decoration (both Cologne, Römisch-Germanisches Museum). Two large beakers with the usual rough rims are decorated with rows of lions' masks of the same green colour as the actual vessels. One was found in France and the other in Holland

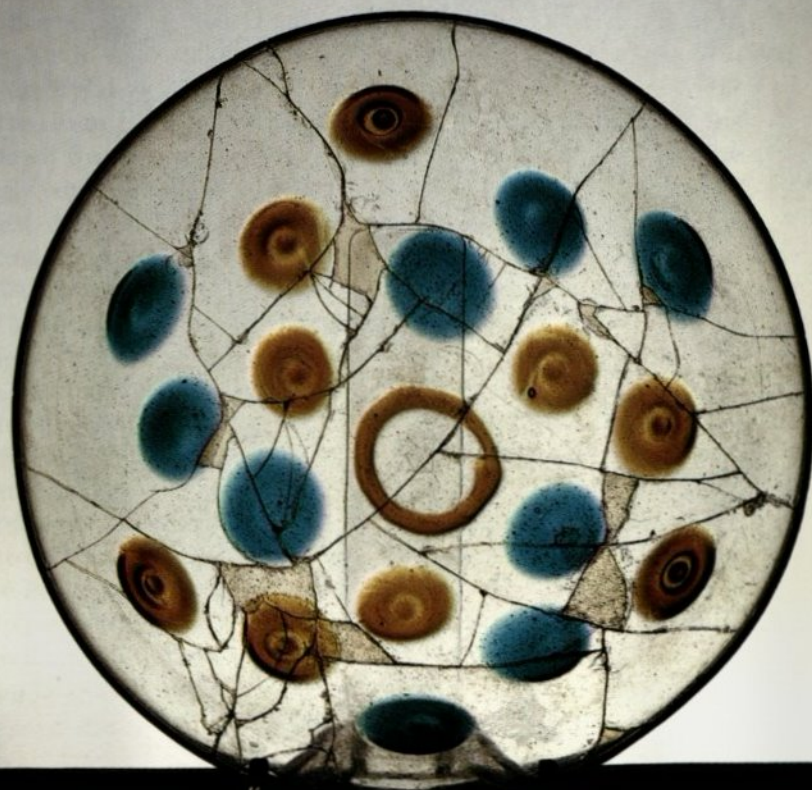
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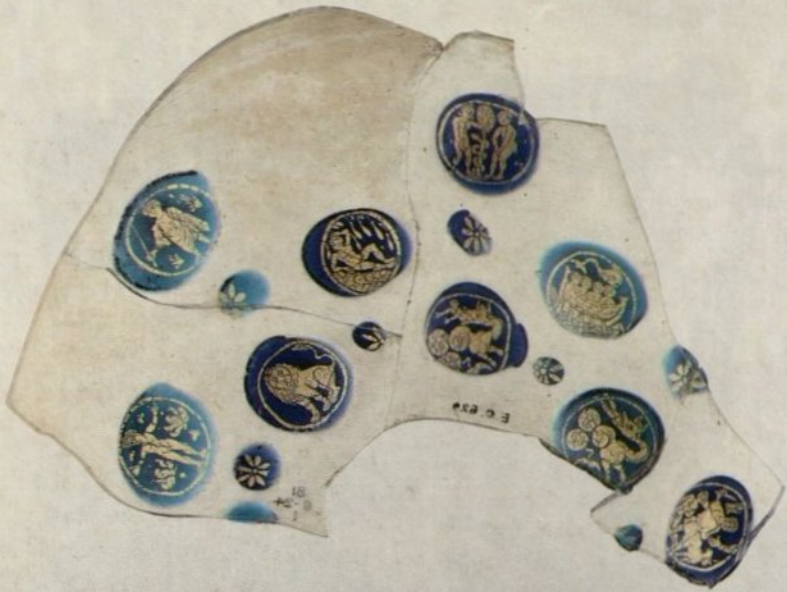
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119 Two small jugs: that on the left is decorated with white trails combed into festoons, in apparent anticipation of a Frankish style of decoration; the other is of two colours, the clear green showing through the outer opaque white layer, particularly in a vertical streak on the body. This is reminiscent of a much earlier western group of undecorated two-coloured glass bowls made alongside the better-known cameo-glass vessels. Both jugs were made in the 4th century A D; the undecorated example is said to come from Cyzicus on the Bosphorus. H. of undecorated jug 11.8 cm.



120 Plate of colourless glass decorated with green and yellowish-brown blobs or prunts. A yellowish-brown trail forms a small foot-ring. From Cologne in the Rhineland, where it was made in the first half of the 4th century A D. D. 22.8 cm. Cologne, Römisch-Germanisches Museum.



121 One of two surviving portions of a bowl of colourless glass decorated with applied blobs, under which are biblical scenes depicted in gold leaf. Found at Cologne in the Rhineland, where it was probably made in the second half of the 4th century A.D. Max. W. 16.8 cm.



122 Large beaker decorated with rows of lion masks. To make the masks blobs of glass were applied in the required places on the body of the vessel and then mould-pressed *in situ*. Made in Gaul in the 4th century A.D., and said to be from Reims, France. H. 22.9 cm.



123 Two gold-glass roundels originally at the bottom of bowls. The designs are rendered in gold leaf with added painted (probably enamelled) details sandwiched between two fused layers of colourless glass. The first shows a husband and wife with a small figure of Hercules between them, encircled by a Latin inscription; there are other inscriptions in the field. The design on the second roundel is divided in two: above are three figures between columns linked by a curtain-like garland, and below are three figures identified by the accompanying Latin inscriptions as Christ, in the centre, with the saints Hippolytus and Timothy. Both roundels were made in Rome in the 4th century A.D. of top example 10.4 cm.

(Leiden, National Museum of Antiquities), while a smaller example (Copenhagen, National Museum) comes from a tomb in Denmark, indicating that they were made in a western, perhaps Gaulish, glass-house.

The technique of applying gold leaf to the surface of glass, which provides a protective covering when the gold is on the underside, or sandwiching it between two layers seems to have persisted from at least the Hellenistic until the Late Roman period, but it was in Rome in the fourth century that glassmakers exploited it to the full with a series of roundels to be set at the bottom of bowls and normally known by the term 'gold-glass'. Portraits of couples, families or individuals, pagan deities, various legends, genre scenes, animals and Jewish and, above all, Christian motifs were depicted meticulously in gold leaf with added painted (or enamelled) details before being sandwiched between two layers of colourless glass. The roundels with Christian scenes have been found mainly in catacombs outside the walls of Rome. They had been purposely broken away from the vessels and were discovered mortared into the walls of the niches of the catacombs, perhaps to mark individual burials.

Possibly related to these bowl-roundels are a number made as medallions in their own right. These show portraits, in one case a family group, stylistically similar to mummy portraits from Roman Egypt. Another Egyptian connection is provided by inscriptions on two examples (one of which is the family group just mentioned) in the Alexandrian dialect of Greek (Brescia, Museo Cristiano, and New York, Metropolitan Museum of Art). However, these may reflect the nationality either of the craftsman or perhaps his client, and therefore provide no real proof that Late Roman gold-glass was originally an Alexandrian technique. It is, of course, also possible that the medallions were made by an Alexandrian craftsman living in Rome.

Another group of vessels uses small medallions showing biblical subjects set in blue and green blob-like roundels, connecting it with the series of glass vessels decorated with coloured blobs. A fairly well-preserved example comes from Cologne, but since similar medallions are known from the catacombs at Rome, it is difficult to determine precisely which glasshouses were responsible for this group. Not all gold-leaf decoration from Late Roman glasshouses in Rome was protected by an outer layer of glass, nor is it true to say that the entire Rhineland production of this time consisted of unprotected gilding. There are nonetheless some fine examples from the Rhineland, including a deep blue bowl (Cologne, Römisch-Germanisches Museum), in which the gold leaf is applied to the surface of the glass with no outer layer, although in the case of one vessel dating from the end of the third century the gilt decoration is partly protected by a network pattern of trails.

The story of Roman glass comes to an end around the beginning of the fifth century, which was to witness the final collapse of the Roman Empire in the west. Nonetheless, as we shall see, Roman traditions were to persist in the east for several hundred years, and in the west the products of Roman workshops in Italy, the Rhineland, Gaul and Belgium laid the foundations for glassmaking for centuries to come.

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