Glass of the Sultans

THE METROPOLITAN MUSEUM OF ART

THE CORNING MUSEUM OF GLASS

Glass of the Sultans

Glass of the Sultans

Stefano Carboni and David Whitehouse

with contributions by Robert H. Brill and William Gudenrath

THE METROPOLITAN MUSEUM OF ART, NEW YORK

THE CORNING MUSEUM OF GLASS, CORNING

BENAKI MUSEUM, ATHENS

YALE UNIVERSITY PRESS, NEW HAVEN AND LONDON

This catalogue is published in conjunction with the exhibition "Glass of the Sultans," held at The Corning Museum of Glass, Corning, New York, from May 24 to September 3, 2001; The Metropolitan Museum of Art, New York, from October 2, 2001, to January 13, 2002; and the Benaki Museum, Athens, from February 20 to May 15, 2002.

The exhibition is made possible by The Hagop Kevorkian Fund and the National Endowment for the Arts.

The exhibition has been organized by The Metropolitan Museum of Art and The Corning Museum of Glass.

An indemnity has been granted by the Federal Council on the Arts and the Humanities.

The exhibition catalogue is made possible by The Andrew W. Mellon Foundation.

Published by The Metropolitan Museum of Art, New York

John P. O'Neill, Editor in Chief
Margaret Donovan, Editor
Tsang Seymour Design Inc., Designer
Peter Antony and Sally VanDevanter, Production
Robert Weisberg, Desktop Publishing Manager

New photography of Metropolitan Museum objects by Paul Lachenauer, the Photograph Studio, The Metropolitan Museum of Art

Color separations by Professional Graphics Inc., Rockford, Illinois
Printed and bound by CS Graphics PTE Ltd., Singapore

Jacket/cover illustration: front, Beaker, probably Syria, late 13th century (cat. no. 128); back, detail of beaker
Frontispiece: Ewer, Western Asia or Egypt, ca. 1000 (cat. no. 90)

Library of Congress Cataloging-in Publication Data
Carboni, Stefano.
Glass of the Sultans / Stefano Carboni and David Whitehouse, with contributions by Robert H. Brill and William Gudenrath.
p. cm.
Catalogue of an exhibition held at The Corning Museum of Glass, Corning, N.Y., May 24–Sept. 3, 2001, at The Metropolitan Museum of Art, New York, Oct. 2, 2001–Jan. 13, 2002, and at the Benaki Museum, Athens, Feb. 20–May 15, 2002.
Includes bibliographic references and index.
ISBN 0-87099-986-9 (hc.)—ISBN 0-87099-987-7 (pbk.)—ISBN 0-300-08851-5 (Yale Univ. Press)
1. Glassware, Islamic—Exhibitions. 2. Glassware—Islamic influences—Exhibitions. I. Whitehouse, David. II. Corning Museum of Glass. III. Metropolitan Museum of Art (New York, N.Y.). IV. Title.

NK5108.9.C37 2001
748'.0917'67107474783—dc21

00-069544

Contents

LENDERS TO THE EXHIBITION

AUSTRIA	
The Cathedral and Diocesan Museum, Vienna	124, 125
DENMARK	
The David Collection, Copenhagen	10, 21, 29, 39, 40, 57, 65, 89, 91, 96, 100, 107, 110
ENGLAND	
Trustees of The British Museum, London	59, 62, 99, 109, 111, 117, 118, 123, 151
Victoria and Albert Museum, London	1, 8, 15, 20, 28, 44, 76, 113, 115, 119, 130
GERMANY	
Kunstmuseum Düsseldorf	152
Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst	2, 6, 7, 48, 49, 61, 66, 70a–e, 78a,b, 82, 87, 98; figs. 4, 11, 12
ISRAEL	
The Eretz Israel Museum, Tel Aviv	35, 67; figs. 1, 2
The L. A. Mayer Museum for Islamic Art, Jerusalem	22, 23, 80, 88
ITALY	
Museo Civico Archaelogico, Padua	56
Procuratoria di San Marco, Venice	83, 84, 92
KUWAIT	
The al-Sabah Collection, Dar al-Āthār al-Islāmiyyah, Kuwait National Museum	4, 12, 13, 16, 17, 24, 26, 37, 41, 45, 50, 51, 52, 53, 54, 63, 72, 77, 81, 104, 139, 143, 144
LIECHTENSTEIN	
Furussiya Arts Foundation, Vaduz	121
PORTUGAL	
Calouste Gulbenkian Museum, Lisbon	127, 128
QATAR	
Museum of Islamic Art, Qatar	129
UNITED STATES OF AMERICA	
The Cleveland Museum of Art	135, 136, 138
The Corning Museum of Glass	3, 5, 9, 11, 19, 25, 38, 43, 47, 55, 64, 69, 73, 74, 75, 86, 90, 93, 94, 95, 101, 102, 103, 105, 106, 112, 122, 131, 134, 147, 148, 149, 150, 154, 155, 157
Los Angeles County Museum of Art	137, 140, 141
The Metropolitan Museum of Art, New York	14, 27, 31, 32, 46, 68, 71, 79, 97, 108, 114, 116, 120, 126, 145, 146, 153; fig. 5
The Toledo Museum of Art	18, 30, 33, 34, 36, 42, 58, 60, 85, 132, 133, 142, 156

Directors' Foreword

Thus far, in this age of international exhibitions, the masterpieces created by glassmakers in the Islamic world have seldom received the attention they deserve. "Glass of the Sultans" sets out to repair this omission by bringing together more than 150 glass objects that represent twelve centuries of Islamic glassmaking. The exhibition includes all the principal types of preindustrial glass from Egypt, the Middle East, and India and presents a comprehensive array of shapes, colors, and techniques.

At the time of the Arab conquest, in the seventh century A.D., glassmaking had flourished in Egypt and the Middle East for more than two millennia, and there is little reason to suppose that glassmakers' activities in those regions were curtailed by the momentous political, social, and religious changes that took place after the Prophet Muḥammad proclaimed the message of Islam. Indeed, as the earliest objects in the exhibition testify, Islamic glassmakers inherited many of the techniques of their forebears in the Byzantine and Sasanian Empires. Four of these simple techniques—glassblowing, the use of molds, the manipulation of molten glass with tools, and the application of molten glass to complete or decorate an object—were the basis of the glass industries of the Islamic world from the seventh century to the Industrial Revolution.

Two threads run through the history of glassmaking: an enduring set of basic techniques, tools, and recipes, and periods marked by sudden bursts of innovation. In the Islamic world, for instance, one of the most interesting technical innovations was the widespread use, in and after the eighth century, of metallic stain. The surface of the glass was painted with copper or silver oxide dissolved in acid, which imparted a transparent stain that varied in color from red to brown to yellow. Also, in tune with the development of a new artistic language after the ninth century, surface decoration, especially patterns created in a mold, became more varied and inventive, although always maintaining the taste for symmetry and harmony intrinsic to Islamic art.

From time to time, Islamic glassmakers revived or rediscovered ancient techniques that had fallen into disuse. Thus, the Jawsaq al-Khāqānī, the ninth-century palace of Caliph al-Muʿtaṣim at Samarra, Iraq, was decorated with mosaic-glass tiles reminiscent of examples from the Hellenistic and Roman periods. Similarly, in the ninth and tenth centuries, glassmakers revived the technique of decorating vessels with gold foil sandwiched between two fused layers of glass.

The exhibition explores with special emphasis two glorious episodes in the history of Islamic glassmaking: the ninth- and tenth-century production of cut and engraved glass and the thirteenth- and fourteenth-century production of gilded and enameled objects. Building on the tradition of glass cutting in the Sasanian Empire, Islamic craftsmen began to make exquisitely delicate cut glass in the ninth century. Glassmakers produced blanks of various kinds, including colorless

objects, which at their best had the clarity of rock crystal, and colorless pieces with a colored overlay, which were employed in making cameos; in the finishing shop, the blanks were cut, ground, and polished. The end products were some of the finest cut glass in the world, with bold motifs carved in relief and thin walls that made the objects almost as light as a feather.

Although earlier decorators had experimented with gilding and vitreous enamels, it was not until the thirteenth century that Islamic gilded and enameled glass came into its own. For approximately the next two hundred years, glassmakers in Syria and Egypt produced sumptuous objects for use and display. "Glass of the Sultans" includes twenty-three of these, ranging from bottles to beakers, vases to hanging lamps, and covering all facets of Ayyūbid and Mamluk decoration, especially calligraphy, complex vegetal patterns, and, in the thirteenth century, animals and human figures. From the beginning, such objects were highly regarded not only in the Islamic world but also in Europe and China: the exhibition includes vessels from Saint Stephen's Cathedral, Vienna, and the treasury of San Marco, Venice, that reached Europe no later than the fourteenth and fifteenth centuries, respectively.

The last sections of the exhibition focus on the glass of the Ottoman, Safavid, and Mughal Empires and on European glass made in imitation of Islamic prototypes. Although glass production under the empires did not match the great achievements of earlier times, it did enter the mainstream of artistic production, especially in Mughal India. In the second half of the nineteenth century, Islamic enameled and gilded glass was so admired that glassmakers in France, Venice, and Vienna challenged themselves to imitate these objects—sometimes with outstanding results.

"Glass of the Sultans," then, is an exhibition of ambitious scope. It was made possible by the willingness of numerous institutions in the United States, Europe, and the Middle East. We are indebted to the following lenders: the British Museum, London; the Cathedral and Diocesan Museum, Vienna; the Cleveland Museum of Art; the David Collection, Copenhagen; the Eretz Israel Museum, Tel Aviv; the Furussiya Arts Foundation, Vaduz; the Calouste Gulbenkian Museum, Lisbon; the Kunstmuseum Düsseldorf; the L. A. Mayer Museum for Islamic Art, Jerusalem; the Los Angeles County Museum of Art; the Museo Civico Archeologico, Padua; the Museum of Islamic Art, Qatar; the Procuratoria di San Marco, Venice; the al-Sabah Collection, Dār al-Āthār al-Islamiyyah, Kuwait National Museum; the Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst; the Toledo Museum of Art; and the Victoria and Albert Museum, London. To our friends and colleagues at all these institutions, we extend our heartfelt thanks. A special thanks goes to Stefano Carboni, Associate Curator of Islamic Art at the Metropolitan Museum and, along with David Whitehouse, curator of the exhibition. We are grateful as well to Anna Ballian and Mina Moraitou, curators of the Benaki Museum Islamic Collections.

In New York, the Metropolitan Museum extends its sincere thanks to The Hagop Kevorkian Fund for its generous support of the exhibition. We are also indebted to the National Endowment for the Arts for its important contribution to the project. In addition, we are grateful to The Andrew W. Mellon Foundation for its assistance toward the realization of this catalogue. The exhibition is supported by an indemnity granted by the Federal Council on the Arts and the Humanities.

Philippe de Montebello
Director
The Metropolitan Museum of Art

David Whitehouse
Executive Director
The Corning Museum of Glass

Angelos Delivorrias
Director
Benaki Museum

Acknowledgments

We would like to express our deepest appreciation to all those who made this publication and exhibition possible. We would first like to thank all the lenders, institutional and private, who supported our research and agreed to participate in this project. Of particular help were the following directors, curators, key administrative staff, collectors, and institutions: in Britain, Bashir Mohammed; at the British Museum, London, Robert Anderson, Sheila Canby, Rachel Ward, John Cherry, Neil M. Stratford, and Steve Drury-Thurgood; at the Cathedral and Diocesan Museum, Vienna, Gerda and Gerhard Ederndorfer and Bernard Bohler; at the Cleveland Museum of Art, Katherine Lee Reid, Stanislaw Czuma, Louise Mackie, Diane De Grazia, and Nancy Grossman; at the David Collection, Copenhagen, Kjeld von Folsach; at the Eretz Israel Museum, Tel Aviv, Ilan Cohen, Henrietta Eliezer-Brunner, and Etan Ayalon; the Furussiya Arts Foundation, Vaduz; at the Calouste Gulbenkian Museum, Lisbon, João Castel-Branco Pereira and Maria Queiroz Ribeiro; at the Kunstmuseum Düsseldorf, Helmut Ricke; at the L. A. Mayer Museum for Islamic Art, Jerusalem, Gabriel Moriah and Rachel Hasson; at the Los Angeles County Museum of Art, Andrea Rich, Stephen A. Markel, Shaula Coyl, and Laura Graziano; at the Museo Civico Archeologico, Padua, Girolamo Zampieri; at the Museum of Islamic Art, Qatar, Sheikh Saud bin Mohammed bin Ali al-Thani; at the Procuratoria di San Marco, Venice, the late Feliciano Benvenuti, Paolo Viti, Monsignor Antonio Meneguolo, Ettore Vio, Guiseppe Fioretti, and Paolo Gasparotto; and Giovanna Nepi Sciré of the Soprintendenza ai Beni Culturali e Ambientali, Venice; at the al-Sabah Collection, Dār al-Āthār al-Islamiyyah, Kuwait National Museum, Sheikh Nasser Sabah al-Ahmad al-Sabah, Sheikha Hussah Sabah al-Salim al-Sabah, Manuel Keene, Sue Kaoukji, Katie Marsh, and Aurora Luis; in Saudi Arabia, Rifaat Sheikh al-Ard; at the Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst, Volkmar Enderlein, Jens Kröger, and Almut von Gladiss; at the Toledo Museum of Art, Roger Berkowitz, Sandra Knudsen, Patricia Whitesides, and Lee Mooney; and at the Victoria and Albert Museum, London, Alan Borg, Oliver Watson, Reino Leifkes, and Rachel Lloyd.

In addition, other colleagues and friends generously offered their time, expertise, and advice. We would like to thank in particular Jiayao An, Julia Bailey, Sheila Blair, Melanie Gibson, Ernst Grube, Oren Gutfeld, Jessica Hallett, Gusta L. Jacobson, Linda Komaroff, Ursula Lienert, Nancy Lynn, Thomas F. Matthews, Laila al-Mossawi, William and Elsie Peck, and Maria Yakimov.

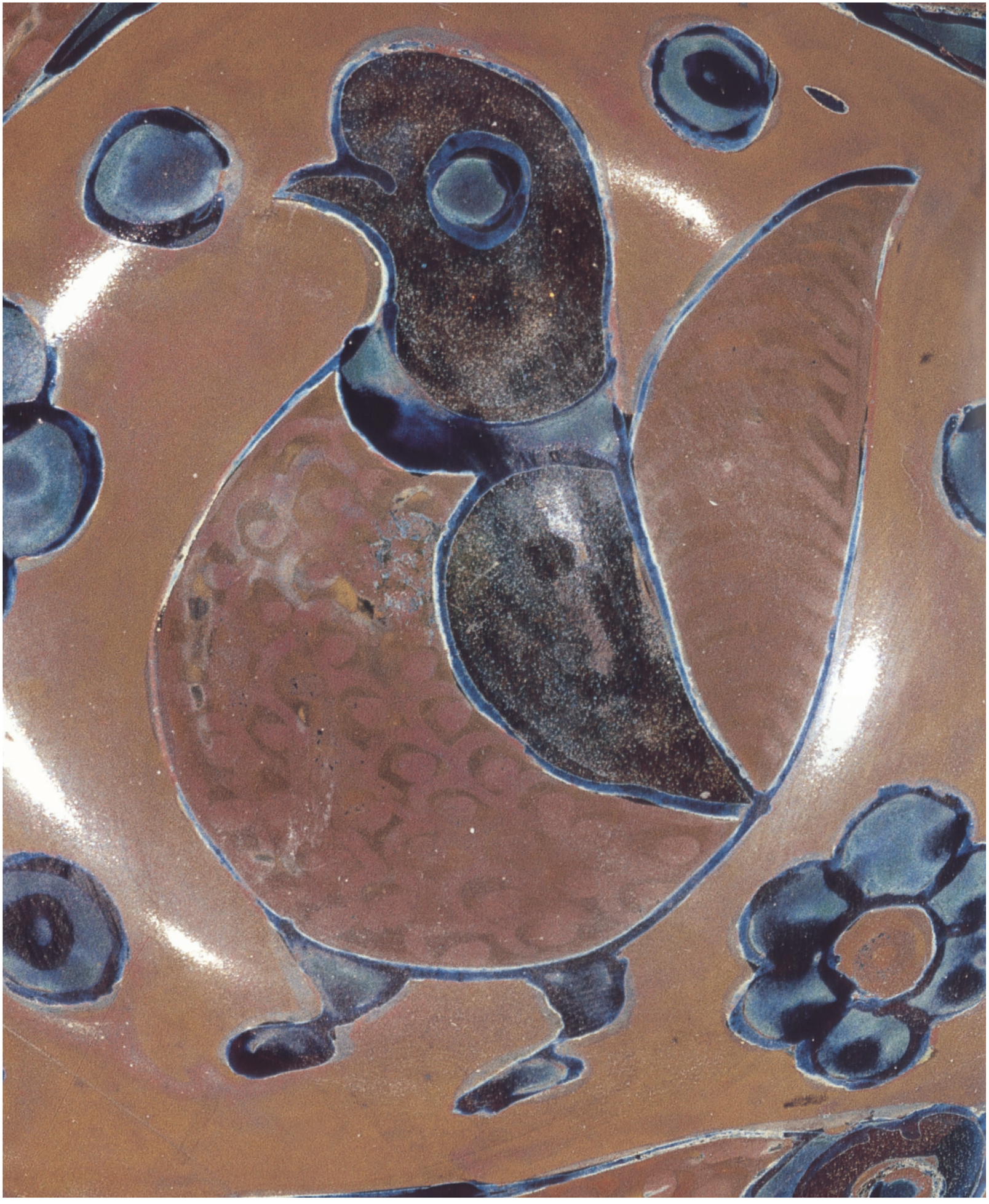
At The Metropolitan Museum of Art, Philippe de Montebello, Director, and Mahrukh Tarapor, Associate Director for Exhibitions, have been most supportive of this project since its outset. In the same institution, we are also grateful to Helen Evans, Shoki Goodarzi,

Marilyn Jenkins-Madina, Christopher Lightfoot, Donald J. LaRocca, Lisa Pilosi, and Daniel Walker, for their help and advice. Ladan Akbarnia, and then Qamar Adamjee, have been invaluable research assistants to Stefano Carboni. We are also grateful to everyone involved in producing this publication from the Editorial and Photographic Studio departments—John P. O'Neill, Gwen Roginsky, Margaret Donovan, Jayne Kuchna, Peter Antony, Sally VanDevanter, Robert Weisberg, and Paul Lachenauer—as well as to the staff of Tsang Seymour Design Inc. Mike Batista, Designer, Constance Norkin, Graphic Designer, Zack Zanolli, Lighting Designer, Stephen Bluto, Departmental Technician, Linda Sylling, Associate Manager for Special Exhibitions, and Herbert Moskowitz, Chief Registrar, were responsible for the exhibition at the Metropolitan Museum. At The Corning Museum of Glass, the energy and commitment of Robert Brill and William Gudenrath, who contributed two essays to this catalogue, Stephen Koob, Conservator, Jill Thomas-Clark and Brandy Harold, Registrars, Nicholas L. Williams, Photographer, and Tom Knotts, Administrative Assistant to David Whitehouse, were instrumental in successfully implementing this exciting first partnership between the Metropolitan and Corning. Robert Cassetti, Creative Director, Ingalill Walhroos, Architect, and the Museum's gallery staff, led by Joseph Maio, were responsible for creating the exhibition at Corning.

Our thanks also go to the staff of the Benaki Museum, Athens, the final venue of "Glass of the Sultans," for bringing the exhibition closer to European and Middle Eastern audiences. We are especially grateful to Angelos Delivorrias, Director, Irini Yeroulanou, Deputy Director, Anna Ballian and Mina Moraitou, Curators, and Electra Georgoula, Registrar and Administrative Assistant.

Stefano Carboni and David Whitehouse

Glass of the Sultans



Glass Production in the Islamic World: A Historical Overview

STEFANO CARBONI

In the seventh century A.D. momentous historical events took place in the eastern Mediterranean provinces of the Byzantine Empire. These events had as their catalyst the teachings and revelations of Muḥammad, who was born in Mecca, on the Arabian Peninsula, in about 570. Messenger of God (Allāh), prophet of the Islamic faith, and political activist, Muḥammad moved to the city of Medina (the *hijra,* or migration) in 622 and died in 632. After a brief period of conquests under the rule of the so-called four Rightly Guided Caliphs (632–61), the first Islamic dynasty, that of the Umayyads (661–750), came into being.

Taking full advantage of the weakness of both the Byzantine and the Sasanian empires, the Umayyads created a vast caliphate that extended from Spain in the west to Iran in the east. Their first caliph, Muʿāwiya ibn Abī Sufyān (r. 661–80), selected the Roman city of Damascus as his capital, thus making the Greater Syria area (modern Syria, Jordan, Lebanon, Israel, and Palestine) the true center of the dynasty. Aside from their significant political effect in the region, these new Islamic rulers had a strong impact on architecture, both religious and secular. For architectural decoration and portable objects, however, they relied on the existing decorative language established under the Romans and Sasanians. Consequently, pottery, metalwork, and glass continued to be made in conformance with preexisting models and to evolve along predictable artistic lines rather than being influenced by dynastic taste and requirements.

Hardly affected by these cataclysmic political changes, glassmakers in the region went about their business as usual. In fact, it is especially difficult to distinguish between glass objects made immediately before the advent of Islam and those produced in the ensuing century and a half, since—at least judging from extant material—the Umayyad rulers were clearly not interested in patronizing high-quality glass. During the previous two centuries, blown glass (both plain and decorated)—the common, inexpensive everyday ware developed in Greater Syria in the first century B.C.—had declined in inventiveness and had lost patronage. The traditional Jewish glassmakers as well as newly converted Muslim artisans were therefore in a weak position to invite Umayyad patronage; they continued to create objects that attracted the average buyer in the local suqs, thus largely neglecting the artistic potential of glassmaking. Given the difficulty in attributing works

Opposite: detail, cat. no. 105

made in the period, this type of "transitional" glass, which employed established techniques, shapes, and colors, has been defined as proto-Islamic (Carboni 2001, pp. 15–17, and nos. 1–9).

Although there are notable exceptions, high-quality Islamic glass has not generally enjoyed royal and courtly patronage throughout its history but has instead usually developed independently. Those familiar with Islamic art history can, for example, confidently identify Fatimid rock crystal, Ilkhanid ceramic tilework, or Timurid book illustration, since the dynasties named were directly involved in the development of those arts. It is not possible, however, to assign similar labels to glass made in the Islamic world. Naturally, glass was widely produced during the periods in which vast areas were dominated by such long-lived dynasties as the ʿAbbāsid (Greater Iraq, 749–1258), the Fatimid (Egypt and Syria, 969–1171), and the Seljuq (Iran and Anatolia, 1040–1194). Yet, to our knowledge, not one member of these powerful dynasties regarded the medium as important enough to have his or her name prominently carved or molded on a glass vessel. In general, therefore, attributions to a specific dynasty should be read as references to a historical period and geographical area rather than to the dynasty itself. (Accordingly, the present catalogue seldom includes such limiting attributions.)

The ʿAbbāsid dynasty founded a new capital named Madīnat al-Salām (City of Peace), later to be known as Baghdad. Its caliphs also built a second capital, the royal city of Samarra, about 125 kilometers (78 miles) north of Baghdad on the Tigris River, which flourished for a brief period of fifty-odd years before being abandoned by the court. Although the glass industry had been active in the area since at least the late Sasanian period (late sixth to early seventh century), the ʿAbbāsids' newly founded cities required that craftsmen be relocated from neighboring localities or perhaps from the former Umayyad capital of Damascus. Once again, there is no record of any type of ʿAbbāsid patronage for glass vessels, but in the ninth century, shapes and decoration did begin to change in response to more general artistic trends. Literary sources indicate that the quarter of Qadisiyya in Baghdad was a center of glass production (Lamm 1929–30, p. 498). Excavations at Samarra have revealed large quantities of glass, probably locally made, that allow for a better understanding of how the shapes of objects from the proto-Islamic period developed (Lamm 1928). One of the most interesting observations derived from the study of the Samarran material is that these glassmakers attempted to imitate second- and third-century Roman glass, which suggests that the ʿAbbāsid court may have taken an interest in a certain type of production that suited its tastes. Millefiori mosaic glass, for example, was revived to create the floor tiles and perhaps also the dadoes of the walls at one of the royal palaces at Samarra (cat. no. 61).

The artistic language established in ʿAbbāsid Baghdad and Samarra branched out to influence the rest of the Islamic world, providing models that would be absorbed and reinterpreted in the various regions of the empire. From the ninth century onward, Islamic art developed its own independent style, one that broke with former traditions. Although glass may have been only marginal to the development of the new Islamic decorative language, it witnessed its own period of flowering, especially in the Iranian region, during which some of the most accomplished objects found today in museums around the world were

produced. The splendid era of relief-cut glass (the tenth and eleventh centuries), for example, fits entirely within the ʿAbbāsid period in the central and eastern Islamic lands and in the Fatimid period in Egypt and Syria, although, unfortunately, the exact place of manufacture of its masterpieces remains a matter of speculation (see cat. no. 90). Yet, if these objects were also produced in the Iranian world during the same period, ʿAbbāsid power was rapidly dwindling there under the pressure of Central Asian newcomers such as the Būyids (932–1062), the Ghaznavids (977–1186), and the Seljuqs, to mention but three of the most successful dynasties in Iran, Central Asia, and Anatolia. Once again, the lack of inscriptions with historical content on relief-cut glass and the impossibility of attributing it to a specific area underscore the general inappropriateness of linking glass production to particular dynasties.

The Ghaznavids, who ruled in present-day Afghanistan and Pakistan, are the first dynasty for which evidence clearly indicates royal patronage of glass objects. Some glass medallions in a group impressed with various figural patterns include the name of Tāj al-dawla Khusraw Malik ibn Khusraw Shāh, the last Ghaznavid king, who ruled from 1160 to 1186 (cat. no. 50). Like the mosaic glass tiles created at Samarra in the ninth century, these medallions represented elements of architectural decoration (for windows in this case), and it may be that royal patronage of glass during this period was limited to decorative elements rather than extended to vessels and other portable objects.

The appearance of the nomadic Mongols in Iran and Iraq, culminating in the conquest of Baghdad in 1258, brought devastation to the Islamic regions. Adopting a sedentary way of life, these Mongols, known as the Ilkhanids (1256–1353), established a new rule that absorbed the existing traditions. Such upheavals almost certainly dealt a serious blow to the glass industry in the region: although molded glass of the type created in the Seljuq period (cat. nos. 20, 21, 23–25) probably continued to be made during the Ilkhanid era, the only surviving archaeological material is that excavated at the palace of Takht-i Sulaimān (see pp. 23–24). By the time Timur (Tamerlane; d. 1405) invaded and conquered Iran, glassmaking had declined to such an extent that the new lord is thought to have transferred artists from Damascus in order to revive the industry in his capital, Samarqand (in modern Uzbekistan). Unfortunately, no tangible proof exists that glass was made in any significant quantity in Samarqand during the Timurid period (1370–1506), let alone glass directly sponsored by the rulers.

Glassmaking seems to have been relegated to insignificance in the eastern Islamic lands in the fourteenth and fifteenth centuries and was not revived there until the late sixteenth century under the influence of European glass. The exact opposite can be said, however, with regard to the industry in Syria and Egypt. As a matter of fact, it was there, during the late Ayyūbid period (ca. 1169–1260) and especially under the Mamluks (1250–1517), that enameled and gilded glass—without doubt one of the most significant contributions to the history of glassmaking worldwide—reached a status that may be termed "royal," being in great demand from sultans and emirs alike (cat. nos. 114–118). The origins of the technique in the twelfth century are obscure, but it is clear that enameled and gilded glass became prized almost immediately: records indicate that products from Syria were commissioned by, or donated as gifts to, the reigning Ayyūbid rulers as well as Jaziran atabegs and the

Seljuq sultans of Anatolia (see p. 204). This type of glass became so successful that it inspired Venetian artisans (cat. nos. 151, 152) and was exported to Europe, where it graced the houses of noble families as well as church treasuries (cat. nos. 124, 125).

Among objects of religious significance, the hanging lamps that adorned mausoleums, mosques, Qur'anic schools, and hospices—institutions endowed by sultans and wealthy emirs both as pious gestures and as status symbols—often had their patrons' names copied in enamel on their surfaces so that the names would shine forever once the lamps were hung and lit (cat. nos. 114–117). The only examples of royal patronage of Islamic glass that lasted more than one or two generations, mosque lamps were produced over a period spanning more than one hundred years, between the reigns of the sultans Nāṣir Muḥammad ibn Qalāūn (1293–1341, with brief interruptions) and Barqūq (1382–99, with a brief interruption) and, in reference to Mamluk emirs, even extending before and after these reigns (cat. nos. 114, 117).

The production of enameled glass eventually became standardized in Syria and Egypt following years of political and economic decline, including increased competition from European trade and industry, until it virtually died out in the course of the fifteenth century. The great new powers of the Islamic world—the Ottomans, dominating the entire region west of Iran (1281–1923), the Safavids in Iran and parts of Central Asia (1501–1732), and the Mughals on the Indian subcontinent (1526–1858)—all became great patrons of the arts but, once again, did not take a special interest in glass, regarding it as little more than a useful commodity.

It is not possible, for a long interval in the sixteenth and seventeenth centuries, to definitely attribute any extant vessels to local Islamic factories. The trade in glass, which had proceeded exclusively east to west in the medieval period, now reversed direction, as Venetian, Bohemian, and English products were made for export. However, under the influence of the European trade, glassmaking revived in the Islamic world to a certain degree. In Mughal India especially, painted and gilded glass entered the mainstream of artistic production, resulting in a valuable enduring legacy (cat. nos. 137–142). Glass was widely produced in seventeenth-century Iran under the Safavids, later replaced by the Zands (1751–94) and the Qajars (1779–1924), in centers such as Isfahan and Shīrāz, although its graceful molded shapes—decanters, long-necked bottles, and rosewater sprinklers—are rarely artistically decorated and were clearly meant for practical purposes (cat. nos. 145–147). With regard to Ottoman glass, literary sources indicate that factories existed at least in the capital of Istanbul, but no specific objects attributable to them have been identified thus far. Only at the beginning of the eighteenth century was a government-run factory founded, at Beykoz, on the shores of the Bosphorus, that produced fairly successful artistic glass inspired by Venetian models and capable of competing with imported works (cat. nos. 148–150).

The manufacture of artistic glass in the Islamic world over the course of more than thirteen centuries may seem to have been somewhat disconnected from historical events, dynastic pride, and courtly involvement. This is doubtless one of the reasons why the medium has never been given the same scholarly attention as other Islamic artistic achievements such as book illustration, calligraphy, pottery, and metalwork. Yet, in addition

to their everyday use by the general populace as plain wares (containers of all kinds, medicinal vessels, and so on), glass vessels were a prominent and ubiquitous part of life at court and in wealthy abodes. Direct patronage may have been scant, but glassmakers were nonetheless obviously stimulated to create accomplished, elaborate, and technically challenging objects that would be "fit for a king," or, rather, "for a sultan." The results are exemplified in the present catalogue, which the authors hope will help to accord glass production in the Islamic world its proper place in art history.

The Growth of Interest in Islamic Glass

DAVID WHITEHOUSE

Glass from the Islamic world, together with other objects such as pottery, metalwork, and textiles, began to arrive in Europe during the Middle Ages, usually as items of trade or diplomatic gifts (Shalem 1996; Rogers 1998). Some of these items, such as the turquoise blue glass bowl in the treasury of San Marco, Venice (cat. no. 83), which reportedly was presented by a Turkoman ruler, Uzun Ḥasan, to the Venetian Signoria, were treated as exotic rarities that conferred distinction on their owners. Others, such as the gilded and enameled Mamluk beaker known as the Luck of Edenhall (fig. 99), were treasured as family heirlooms. Still others were regarded as Christian relics: the two gilded and enameled vessels (cat. nos. 124, 125) in the Cathedral of Saint Stephen, Vienna, for example, were believed to contain earth stained with the blood of the Holy Innocents (Shalem 1998, p. 64). In addition to such objects, fragments discovered in archaeological excavations, usually in cities or at sites associated with elite families, also attest to the export of glass from the Islamic world to western Europe (Baumgartner and Krueger 1988, pp. 120–25).

In the sixteenth and seventeenth centuries, Ottoman, Safavid, and Mughal rulers in western Asia and India cultivated the arts of the book, collecting calligraphic manuscripts and compiling albums of miniature paintings by celebrated artists. This, however, represents the full extent of their interest in the artistic heritage of the Islamic world, and it was in Europe that the study of Islamic art and antiquities actually developed. Initially, as in Islamic Asia, the focus of attention was manuscripts, which were collected both for their beauty and as a means of recovering lost classical texts and learning about the history of science. Later, European scholars and collectors extended their interest to architecture, coins, and inscriptions. Thus, one of the first studies of medieval Islamic architecture, a survey of the monuments of Granada and Córdoba based on the drawings of Juan de Villanueva and Pedro Arnal, was published in 1780 (*Antigüedades árabes* 1780); Christian Martin Frähn published the first systematic study of the coins of the Islamic world, a catalogue of the imperial cabinet in Saint Petersburg (1821); and Joseph-Toussaint Reinaud published the first analytical account of Islamic epigraphy, based principally on the collection of the duc de Blacas (1828).

The quickening of interest in Islamic art and antiquities took place against the background of

Orientalism, a fascination with the Near East that inspired European artists in the nineteenth century (Bendiner 1996). Greater European involvement in Near Eastern politics and improved means of travel prompted artists to visit the region in greater numbers than before, and their more or less realistic depictions of exotic landscapes, buildings, and human activities became popular at home. Perhaps the most potent influence of all was the *Description de l'Égypte*, which the French government published in twenty-four volumes between 1809 and 1822. Initiated by Napoleon following his invasion of Egypt in 1798, this encyclopedic record of the geography, flora, fauna, and people of Egypt became the source of inspiration for Egyptian Revival architecture and decoration.

Although the British Museum owned a number of Islamic objects when it opened in 1759, Islamic art was not widely collected until the nineteenth century. The barons Edmond and Maurice de Rothschild included such pieces in their collections, and, apart from objects in cathedral treasuries, one of the first medieval Islamic glass objects to attract attention was a mosque lamp that in 1850 was kept in a vitrine in a boudoir of the Rothschilds' Château de Boulogne, Paris (Fillitz 1996, p. 485, no. 13.26). Another such object was the Cavour Vase (cat. no. 129), acquired in 1861 by Marchese Carlo Alfieri di Sostegno from the estate of Count Camillo Benso di Cavour, the first prime minister of Italy after reunification. Alfieri exhibited this spectacular object in Florence in 1868, on the occasion of the Fourth International Congress of Orientalists. He later bequeathed the vase to Queen Margherita of Italy; it remained in the private collection of the Italian royal family for more than a century (Newby and Sheppard 1991).

At about the time that the Cavour Vase came to light, Lord Ashburton acquired an imposing gilded and enameled lamp (cat. no. 117), which was exhibited at the South Kensington Museum (now the Victoria and Albert Museum) in 1862. This passed into the collection of Felix Slade, whose executors presented it to the British Museum (Franks and Nesbitt 1871, pp. 61–62, no. 333) along with a number of other Islamic glass vessels and a small group of glass "coin weights."

Interest in medieval glass from the Islamic world expanded greatly in the third quarter of the nineteenth century, reaching its peak in Paris. In 1863 Ismāʿīl Pasha ascended the Egyptian throne and began an ambitious program of urban renewal in Cairo. Soon a group of French residents in that city were competing against one another to acquire examples of its medieval heritage. Included among them were Comte Gaston de Saint-Maurice, the khedive's equerry, part of whose collection entered the South Kensington Museum in 1884, and Baron Alphonse Delort de Gléon, whose collection was bequeathed by his widow to the Louvre in 1912.

Exhibits of Near Eastern works at the great Paris expositions of 1867 and 1878 led to an even wider appreciation of the arts of Islam. According to Henri Lavoix (1885), collectors had been scarcely interested in Islamic art in the 1850s. He recalled how one of the survivors of the Egyptian campaign formed a large collection of Islamic material that failed to sell when it was put on the market in 1855. At the Exposition Universelle of 1867, however, not only did one of the pavilions have a display of six mosque lamps, but Philippe-Joseph Brocard also exhibited his gilded and enameled imitations of medieval glass objects. Similarly, at the exposition of 1878, a group of

Mamluk lamps was the highlight of a display in the oriental gallery at the Trocadéro. Apart from works lent by the khedive, all the objects at the exposition came from French collections (including those of the Rothschilds, Delort de Gléon, Édouard André, Poit, and Basilewski). Knowledge of the history of Islamic art, Lavoix concluded, had increased considerably in the last twenty years, and glass had emerged as an important component of it.

Paris was not the only European city to host exhibitions that contained gilded and enameled glass (Vernoit 1998). The glass displayed at the Weltsausstellung at Vienna in 1873 included two Mamluk objects from Saint Stephen's Cathedral (cat. nos. 124, 125), one of which was copied by Brocard in 1874 (Vernoit 1998, p. 114, n. 30). In London, the Burlington Fine Arts Club organized the "Exhibition of Persian and Arab Art" in 1885 (*Persian and Arab Art* 1885); back in Paris, the "Exposition d'art musulman" took place in 1893 (Marye 1893).

Beginning in the 1860s, the popularity of "Oriental" or "Moorish" interior decoration encouraged glassmakers to imitate medieval objects. The most prolific centers of production were Paris, where Brocard gilded and enameled lamps and other objects (see cat. nos. 153, 154) with a virtuosity that sometimes challenged the public to distinguish his efforts from the real thing; Nancy, in northeastern France, where Émile Gallé produced not only Art Nouveau glass but also objects decorated in the Islamic style, such as the lamp now at The Corning Museum of Glass (cat. no. 155), which is a technical tour de force; and Vienna, where the firm of J. & L. Lobmeyr made a wide variety of decorative glassware inspired by medieval originals.

As far as these originals are concerned, gilded and enameled objects continued to be virtually the sole focus of attention, and in 1898 and 1899 Gustav Schmoranz published the first corpus of nearly two hundred specimens in public and private collections. This corpus remained the single most important contribution to the study of gilded and enameled glass until it was joined in 1929 by Gaston Wiet's catalogue of the unrivaled collection of enameled lamps and bottles in the Arabic Museum, Cairo.

It should be noted in passing that in 1891 the first major collection of Islamic glass in the United States was presented to The Metropolitan Museum of Art by Edward Moore, the president of Tiffany and Company. Consisting of ninety-six objects, Moore's gift was the nucleus of the Metropolitan Museum's outstanding collection of glass from Islamic lands (Vernoit 1996).

In the first few decades of the twentieth century, scholars became increasingly interested in the full range of medieval Islamic glass. This broadening of interest was due largely to the Swedish scholar Carl Johan Lamm (1902–1981) (Gyllensvard 1982). Lamm studied archaeology at the University of Stockholm and, as a graduate student, began to catalogue the glass and hard-stone objects excavated by Ernst Herzfeld and Friedrich Sarre at Samarra. His consequent publication, *Das Glas von Samarra* (Lamm 1928), contained an illustrated catalogue of 377 fragments of glass, all of which were believed to date from the caliphal occupation of the site, between 836 and 892. Its impact was enormous. *Das Glas von Samarra* provided students of the history of glass with their first fixed point in the chronology of objects made in western Asia in the early Islamic period. While one may question the wisdom of assigning

all the finds from Samarra to the ninth century, the significance of Lamm's monograph cannot be doubted.

Lamm (and Sarre before him) believed that the technique of staining, or luster-painting, glass was a ninth-century discovery. This view was contested by Fredrik Robert Martin, who, after some thirty years of studying early luster-painted glass, concluded that the technique was invented at a much earlier date: if not in Egypt in the Eighteenth Dynasty, then in the Ptolemaic period (Martin 1929).

Shortly after the publication of *Das Glas von Samarra*, Lamm's doctoral dissertation, "Mittelalterliche Gläser und Steinschnittarbeiten aus dem Nahen Osten," which was approved with the highest distinction, was published in two volumes (Lamm 1929–30). This catalogue raisonné was the first (and so far, the only) comprehensive account of all the glass and hard-stone objects made in the central Islamic lands between the seventh and fifteenth centuries. Encyclopedic in scope, the work is divided into three parts devoted to (1) all types of glass other than gilded and enameled objects, (2) hard-stone objects, mainly of rock crystal, and (3) glass with gilded and enameled ornament. In the first part, Lamm classified the objects according to the techniques used in forming or decorating them: glass without decoration, followed by glass with mold-blown or tooled ribs, with other mold-blown patterns, with stamped or pincered decoration, with applied ornament (including objects decorated with marvered trails), with stained (luster-painted) decoration, and with cut or engraved ornament. In the third part of the survey, Lamm attributed the great majority of gilded and enameled glass to workshops in one of three cities—Raqqa, Aleppo, or Damascus—and also identified both a "Syro-Frankish" and a "Fusṭāṭ" group.

Readers of this catalogue will find that, even after seventy years, much of Lamm's classification on the basis of technique still stands; indeed, George T. Scanlon maintains that "on the question of glass before 1200 the researcher may use Lamm without compunction" (Scanlon 1998, p. 27). The classification of the gilded and enameled objects has proved to be less resilient. Scanlon makes a spirited case for assigning more examples to Egypt than Lamm allowed, the "Syro-Frankish" group is now believed to be Venetian (see pp. 302–3 of this catalogue), and Lamm's attribution of the majority of the objects to Raqqa, Aleppo, and Damascus is questionable (see p. 204).

Lamm went on to publish glass found in the French excavations at Susa, in southern Iran (1931), glass from Iran in the Nationalmuseum, Stockholm (1935), a short chapter on glass and hard-stone vessels in *A Survey of Persian Art*, a monumental history of Iranian art and architecture (1939), and an account of stained, gilded, and enameled glass from excavations in Sweden, accompanied by a study of the origins of staining (1941). Despite these later studies, "Mittelalterliche Gläser" is without doubt his most enduring monument.

Two major archaeological excavations that took place between World Wars I and II eventually resulted in major publications of Islamic glass. Between 1931 and 1938 a Danish team carried out extensive work at Hama, a large multiperiod site in Syria, and from 1935 to 1940 and in 1947 The Metropolitan Museum of Art excavated at Nishapur, which, until its destruction by the Mongols in 1221, was one of the most splendid cities of medieval Iran (for further information on these and other archaeological excavations, see the essay

by Stefano Carboni in this volume on pp. 14–24). The glass unearthed at Hama by the Danish team, led by Harald Ingholt, came from a medieval settlement and was published by P. J. Riis in 1957 (Riis and Poulsen 1957, pp. 30–116). The American expedition, directed by Walter Hauser, Joseph M. Upton, and Charles K. Wilkinson, recovered the first large sample of medieval glass from Iran, which was published by Jens Kröger in the mid-1990s (Kröger 1995).

Among the post–World War II milestones in the study and appreciation of Islamic glass are a number of excavations and other archaeological discoveries, a greater awareness of scientific analysis as a source of information, a variety of publications, and one major exhibition. The exhibition, "The Arts of Islam," was held in London in 1976 (Jones and Michell 1976). It contained more than six hundred objects, ranging in date from the seventh to the nineteenth century and including textiles, the arts of the book, and objects of hard stone, ivory, metal, earthenware, wood, and glass. Although the section devoted to glass was small (twenty-eight objects), it was well chosen and afforded the public an opportunity to see exceptional examples of cut, stained, and gilded and enameled glass.

The archaeological discoveries after World War II include major excavations at Fusṭāṭ (Old Cairo), Egypt, and at Sīrāf, on the Iranian coast of the Persian Gulf. At Fusṭāṭ, the American Research Center in Egypt conducted nine seasons of excavation between 1964 and 1980, under the direction of George T. Scanlon. At Sīrāf, the site of a Sasanian and medieval Islamic port that was central to the maritime trade in the Indian Ocean between about 800 and 1000, the British Institute of Persian Studies carried out seven seasons of excavation between 1966 and 1973. Since Sīrāf was a city of stone buildings with plaster floors, the stratigraphy was clear and the relative chronology of the artifacts may be treated with confidence. More recently, excavations at Raqqa, Syria, were begun by the late Michael Meinecke in 1982 on behalf of the German Archaeological Institute in Damascus and continue today as part of the Raqqa Ancient Industry Project, led by Julian Henderson. These have revealed the remains of an early-ninth-century glass workshop that has much to tell us about the process of medieval glassmaking in the Near East (Henderson 1999).

Two unusually well dated archaeological discoveries are also significant: that in 1973 at Serçe Limanı, excavated by the Institute of Nautical Archaeology under the direction of George F. Bass between 1977 and 1979 (Van Doorninck 1982; Bass 1984), and that in 1981 at the Famen Temple (Famensi) in Shaanxi Province, China (see pp. 21–22 and 31 in this volume).

Although Lamm published a few chemical analyses of the composition of glass found at Samarra (1928, pp. 129–30), scientific investigation was rarely employed as a tool for studying medieval Islamic glass until after World War II. In the late 1950s, in the United States, Edward V. Sayre of the Brookhaven National Laboratory began to work with the noted collector of ancient and Islamic glass Ray Winfield Smith on an extensive program of analyses that included Islamic samples (Sayre and Smith 1961; Sayre 1964; Smith 1964). The torch soon passed to Robert H. Brill, whose account of the scientific examination of Islamic glass appears in this catalogue (see pp. 25–45). Today, programs conducting compositional analyses of glass from Islamic lands are under way in a number of different countries.

Finally, a word about publications. Among the most valuable publications of the late twentieth century was Jens Kröger's 1984 catalogue of more than two hundred previously unpublished glass objects in the Museum für Islamische Kunst, Berlin. Two years later, one of the first popular surveys of the subject, Marilyn Jenkins's "Islamic Glass: A Brief History," appeared in the Fall 1986 issue of *The Metropolitan Museum of Art Bulletin*. This concise, accessible essay presented objects dating from the seventh to the nineteenth century and was illustrated almost entirely by works from the collection of the Metropolitan Museum. Other popular overviews followed, notably by Ralph Pinder-Wilson (1991). Axel von Saldern, the dean of early glass studies, drew attention to long-standing problems that still defy solution in his address to an international congress in 1995 (von Saldern 1996).

It is possible that the study of Islamic glass is entering a new period of growth. In the last decade, we have seen publications concerning the glass from the Famen Temple (for example, An 1991 and Koch 1995), Kröger's monograph on the glass from Nishapur (Kröger 1995), and Rachel Ward's volume of papers delivered at a conference held at the British Museum in 1995 (Ward 1998), as well as a handsome catalogue of the gilded and enameled Mamluk glass in the Calouste Gulbenkian Museum, Lisbon (Ribeiro and Hallett 1999; see cat. nos. 127, 128). In the same period, the checklist of publications on glass, printed in the *Journal of Glass Studies*, recorded that an average of twelve items on Islamic glass appeared annually. These publications should be joined in the near future by a volume on the glass from the Serçe Limanı shipwreck, a monograph on the glass from the excavations at Fusṭāṭ, and catalogues of the glass in the Nasser D. Khalili Collection of Islamic Art, London, and the al-Sabah Collection, Kuwait (Carboni 2001). The authors of the present volume hope that it, too, will make its own contribution to the renewed interest in the history of glass from the Islamic world.

Archaeological Excavations of Islamic Glass

STEFANO CARBONI

Archaeological excavations have long been an important tool for scholars researching Islamic culture, city planning, art, and architecture. Scientific excavations of a site known from literary sources as a cultural and artistic center are extremely useful, when the stratigraphy is clear, in establishing proper chronologies and understanding the material and artistic culture at various times during the life of the site. Aside from information regarding city planning and architecture, which are understandably the main focus of the archaeologist, every site is usually rich in fragmentary portable material—objects for everyday use that were disposed of or abandoned over time. Pottery, which is often decorated and shows a wide range of patterns and technical details, is by far the most common medium that comes to light; it has been given much attention in reports, both interim and final, that include numerous drawings recording variations in shapes and profiles. Other media, such as glass, metal (coins and jewelry as well as vessels), stone, ivory, and bone, are much less prevalent than pottery. However, in terms of quantity and variety of shapes, colors, and decoration, glass almost invariably comes second, although it has rarely enjoyed the prominence it deserves in archaeological reports. With few exceptions, glass fragments have been described as a group, rather than being individually catalogued, measured, and analyzed, and have been discussed in a brief and cursory manner.

Scholars depend on archaeological digs for information concerning Islamic glassmaking in the period from the seventh through the fourteenth century; evidence for later production comes from extant objects. The study of glass obtained from such digs presents a number of problems, all related to the nature of the medium. These difficulties, together with the scarce interest devoted to glass by scholars of Islamic art and the consequent paucity of specialized publications, explain the reluctance of archaeologists to engage in an exhaustive analysis of the subject. For the sake of brevity, the specific problems in dealing with excavated glass can be limited to three.

The first difficulty, as previously explained (see pp. 3–7), relates to the almost total lack of vital information that the objects themselves have to offer: only in exceptional cases do they bear inscriptions that include useful names or dates. Scholars and archaeologists alike must therefore rely principally on rather frustrating

comparative analyses, which are made more complicated by the widespread production of glass in the Islamic world.

The second problem arises from the established and widely acknowledged fact that Islamic glass was shipped for long distances as commercial cargo, either packed on camels in land caravans or aboard transoceanic ships, as part of the trans-Asia trade. As Roman and Sasanian glass had previously been sought after in eastern Asia, so too was Islamic glass of comparable quality circulated widely, not only in other Islamic countries but also as far as southeastern Asia, northern China, and Europe. Archaeological material of this type has thus surfaced in Malaysia, Korea, the Philippines, northeastern China, and many European sites (see, respectively, Lamb 1965; Lee 1993; Legeza 1988, p. 137; An 1991; and Lamm 1941). Naturally, most of the glass objects excavated at these sites are not of high artistic quality, since they were basically commodities for the general trade, containers used to hold perfumes, essences, oil, wine, and other liquids. In light of such widespread distribution, a glass bottle excavated in Central Asia may equally as well have been produced locally or left there after a thousand-mile journey on its way to China.

The third problem is in many ways related to the second. During its extensive travels, glass was shipped not only as a finished carrier of liquids or as an artistic product but also in large quantities as cullet, or broken glass suitable for remelting. It is known, for example, that Venice regularly imported cullet from Antioch in the second half of the thirteenth century (Carboni 1998, pp. 101–2 and n. 12). In 1973 the extraordinary discovery at Serçe Limanı, off the Turkish coast not far from Bodrum, of an eleventh-century ship carrying an enormous quantity of broken glass and glass lumps from the Syrian coast to the Black Sea proved that such commerce was firmly established in the Mediterranean in the medieval period. The same trade was also probably carried on along the coasts of the Indian Ocean, as witnessed by glass finds at the site of Mantai, Sri Lanka (Carboni forthcoming b). The reason for trading in cullet is simple. Finished glass already contains the right amounts of silica, lime, and ash necessary to make a fresh product. Melting it produces new glass and saves time and money because of simplified technology and lower costs for burning wood (modern-day recycling is based on the same principle). Once again, however, this aspect of the glass trade clearly complicates the task of archaeologists and art historians, since an object, or a fragment thereof, made from cullet may present a chemical composition associated with one place while its form and decoration suggest an entirely different attribution.

A concerted effort by archaeologists, art historians, and scholars of the technology and chemistry of glass is therefore needed if excavated material is to become a yardstick by which objects without a provenance can be measured and compared. Admittedly, the average site usually reveals a large quantity of fragments, a small number of fragmentary objects with shapes and decoration that can be reconstructed, and, only in fortuitous circumstances, very few complete vessels. Nevertheless, all the material that comes to light from scientifically valid excavations, fragmentary as it may be, has some potential and should be studied accordingly.

Glass, in varying quantities, has been discovered at almost every Islamic site thus far excavated and continues to be unearthed during new digs. Found from Spain and the Maghrib in the west to

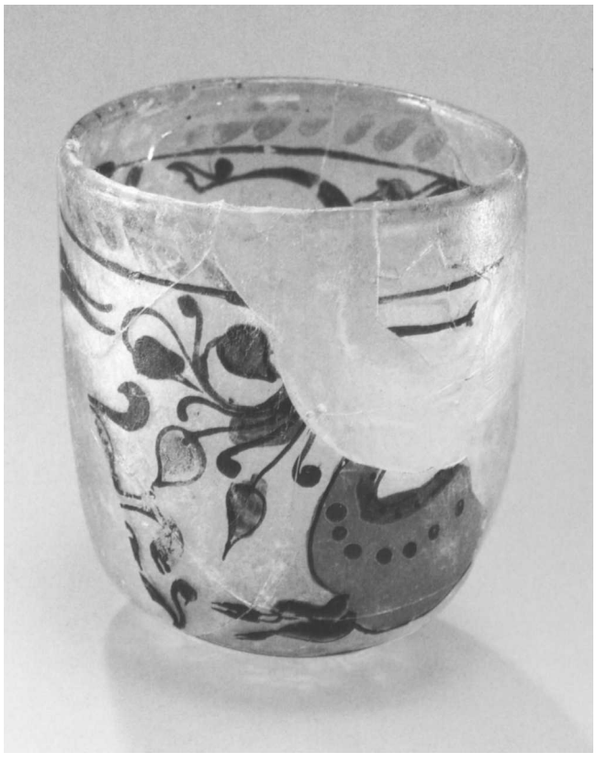


Fig. 1. Cup. Egypt or Syria, 8th–9th century. Greenish colorless glass; yellow and brown stains. Free blown and painted; tooled on the pontil. H. 9 cm (3½ in.), diam. 7.5 cm (3 in.). Lent to the Glass Pavilion, The Eretz Israel Museum, Tel Aviv, by the Israel Antiquities Authority 1991–2074

Central Asia in the east, amazingly large numbers of glass fragments and a few complete vessels are housed today in museums, universities, and cultural institutions sponsoring excavations in the Islamic world. Most of this material is, however, awaiting proper classification, study, and publication. Many of the interim and final reports of excavations, especially those related to sites linked to the early Islamic period, also contain brief presentations of the glass discovered. Among these, to mention but a few, are reports from the following sites that provide initial useful information to the student of Islamic glass: Murcia and Alicante in Spain, Qaṣr al-Ṣaghīr in Morocco and the Qal'a of the Banū Ḥammād in Tunisia, Caesarea in Israel, Qaṣr al-Ḥayr al-Sharqī and Raqqa in Syria, 'Anā and Ctesiphon in Iraq, Susa, Sīrāf, and Qaṣr Abū Nasr in Iran, and Afrāsiyāb and Samarqand in Uzbekistan (see, respectively, Jiménez 1991 and Azuar and Puche 1994; Redman 1986; Marçais and Poinssot 1952; Golvin 1965; Holum et al. 1988; Salam 1978; Henderson 1996a, 1996b, and 1999; Northedge et al. 1988; Kröger forthcoming; Lamm 1931; Whitehouse 1968 and 1970, as well as p. 12 in this catalogue; Whitcomb 1985; Sharakhimov 1973; Amindjanova 1962 and 1965 and *Terres secrètes* 1992).

Particularly active in recent years are Israeli archaeologists, who are digging many sites belonging to the first centuries of the Islamic era, such as Jerusalem and Ramla, and amassing a wealth of material that will provide important new information once published. Recent excavations at Hurbat Migdal, for instance, have uncovered an almost complete example of a rare class of painted Islamic glass—a stained cylindrical cup with a rounded bottom (fig. 1)—one of only three that have been found within an archaeological context (Jacobson 1990–93). In addition, a seldom seen type of undecorated opaque brownish red glass, often called *sang de boeuf,* has been discovered at several sites in Israel, including Jerusalem (see Engle 1984, pp. 29–32). Such glass, used mostly for small footed- or flat-bottomed bowls, had been previously found only as small fragments at a number of Islamic sites but had not been properly classified, having been dismissed as either modern or an intrusion from earlier Roman strata. It is now clear, thanks to these more recent excavations, that opaque reddish glass was made in the area of modern

Fig. 2. Bowl. Syro-Palestinian region, probably 8th–9th century. Opaque brownish red glass. Free blown and applied; tooled on the pontil. Diam. ca. 10 cm (3⅞ in.). Collection of the Glass Pavilion, The Eretz Israel Museum, Tel Aviv MHG1042.63

Israel with some continuity from the early to the medieval Islamic period (fig. 2).

Three archaeological sites are especially well known to students of Islamic art as important sources of glass material. Central to the study of city planning, architecture, and architectural decoration, Fusṭāṭ, Samarra, and Nishapur, respectively in present-day Egypt, Iraq, and Iran, are also valuable excavations for all kinds of portable objects, including glass. Fusṭāṭ (Miṣr al-Fusṭāṭ; Old Cairo), which became a suburb of Cairo after the establishment of the new city in the second half of the tenth century, remained the area's principal center of arts and crafts. It was active as a manufacturer of glass from the time of its foundation, when the conquering Muslim army invaded the region in the seventh century, until the late Mamluk period in the fifteenth. Although the site has been excavated for about a hundred years and has revealed a large number of important glass objects (see, for example, the stained goblet discussed under cat. no. 102), Fusṭāṭ unfortunately does not provide a clear-cut stratigraphy, owing to the complex nature and long duration of its occupation. Insightful and informative interim reports have been published (Scanlon 1966; Pinder-Wilson and Scanlon 1973 and 1987), and a final report by the same authors is awaited. A selection of objects from Fusṭāṭ, now in the collection of The Corning Museum of Glass, is illustrated here (fig. 3).

Unlike Fusṭāṭ, Samarra was occupied only for a relatively short period, when the ʿAbbāsid caliphs decided to found a new royal city north of Baghdad in 836. Although Samarra was not entirely abandoned after the court moved back to the former capital in 892 (an inhabited village still stands near the archaeological site), it may be safely postulated that most of the material found there can be attributed to the ninth century. Extensively excavated at the beginning of the twentieth century, the site is one of the few for which a series of publications has been issued, including a volume on the glass finds (Lamm 1928). The importance of Samarra lies mainly in that it does not present problems of chronology and, furthermore, fits

Fig. 3. Group of objects excavated at Fusṭāṭ, Egypt. H., tallest, 18.8 cm (7⅜ in.). The Corning Museum of Glass, Gift of the Fusṭāṭ Expedition 69.1.38, 69.1.45, 69.1.46, 67.1.32, 69.1.43, 69.1.39, 69.1.44, 69.1.41, 69.1.40, 69.1.42 (diagonally, left to right)

into a period of maturation for the Islamic artistic language, one that would influence decorative patterns for centuries to come. Consequently, most of the glass material excavated there (see cat. nos. 70a–e, 78a,b, 87, 98), whether locally produced or imported from workshops in Baghdad or elsewhere in Iraq, can be viewed as the product of a decisive moment in the development of the medium, when new shapes and decorative patterns were evolving.

Despite its innovative aspects, glass production in Samarra is also curiously related to a revival of Roman techniques that had been abandoned for at least five centuries. A case in point is the manufacture there of millefiori mosaic tiles for use in the royal palaces as a revetment for floors and, perhaps, as dadoes of walls (cat. no. 61)—a technique that had flourished in the eastern Mediterranean Roman provinces in the second and third centuries A.D. (cat. nos. 61–67). Samarran compositions in mixed

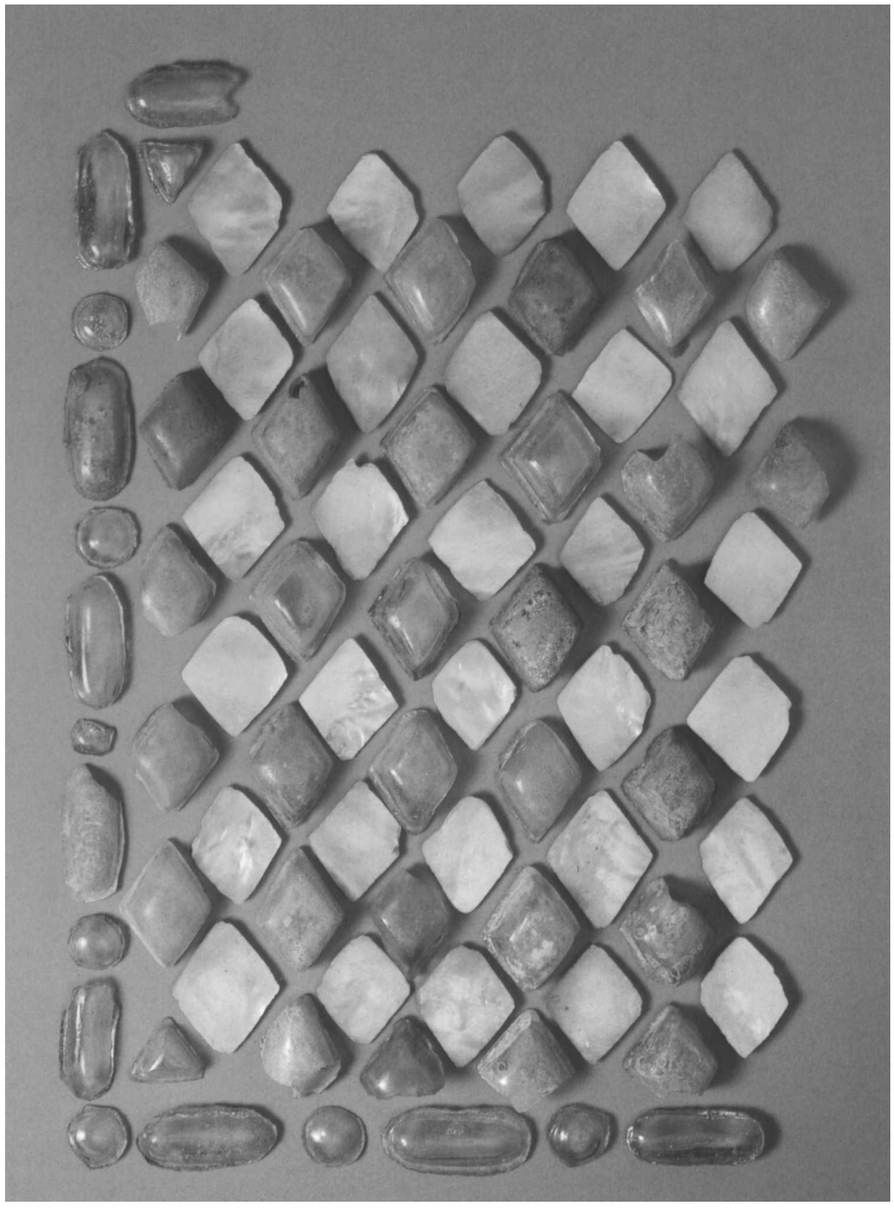


Fig. 4. Tile panel. Samarra, Iraq, 9th century. Colorless and multicolored glass and mother-of-pearl. Assembled. Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst Sam. 767

media, such as a decorative wall panel with alternating glass and mother-of-pearl elements (fig. 4), can also be understood as falling under the influence of Roman ornamental language. The glass from Samarra is thus doubly significant: that used for architectural decoration suggests indirect patronage by the court itself, in an effort to emulate splendors of the past, whereas that foreshadowing future developments attests to the inventiveness and creativity of Iraqi glassmakers.

Nishapur, located in northeastern Iran, was a thriving commercial center on the Silk Road that experienced its greatest activity between the ninth and eleventh centuries. Excavated under the

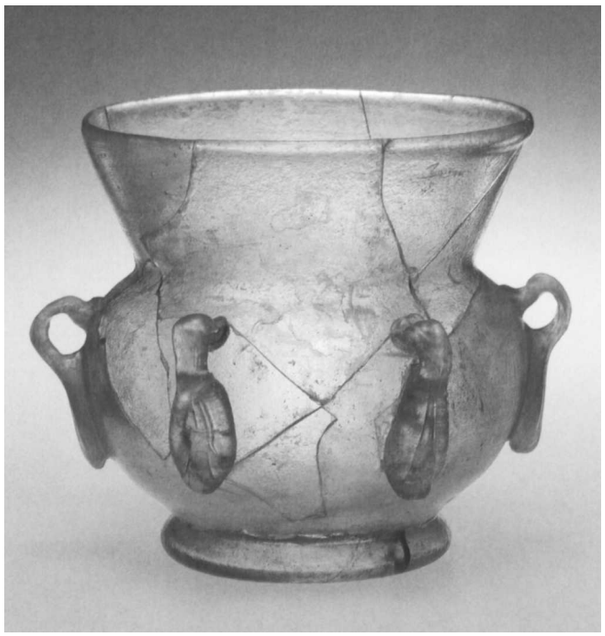
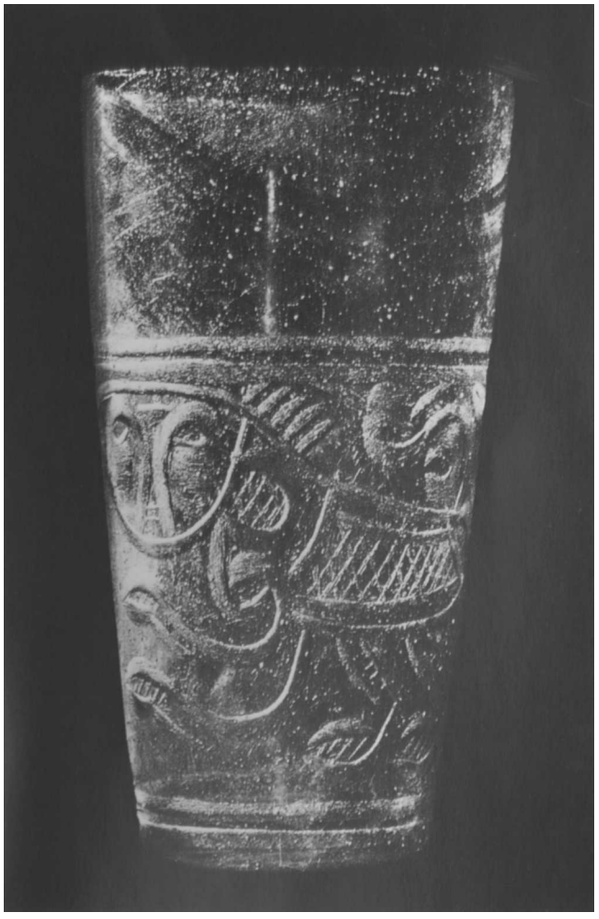


Fig. 5. Mosque lamp. Nishapur, Iran, 10th–11th century. Yellowish colorless glass. Free blown and applied; tooled on the pontil. H. ca. 11.4 cm (4½ in.). The Metropolitan Museum of Art, New York, Rogers Fund, 1948 48.101.59

leadership of a Metropolitan Museum team in the 1930s and 1940s, the site is the richest and most varied archaeological dig in the history of Islamic art. Thousands of objects and fragments were unearthed there, together with almost complete elements of architectural decoration in carved and/or painted plaster; these were equally divided between the Metropolitan and the Iran Bastan Museum, Tehran, where selections are now on permanent display. Nishapur's relatively brief period of affluence and the rather empirical method of its excavation (a clear understanding of stratigraphy was not the main concern for many pre–World War II archaeologists) do not allow precise chronological attributions. Yet the exact locations of most finds were painstakingly recorded, and these are extremely useful in understanding both Nishapur's urban and social structure and its trading activities in the early medieval period. In addition, the material excavated there, including glass, provides so many parallels with objects lacking a known provenance that it is constantly utilized for comparative research (see Kröger 1995).

That Nishapur was a center of arts and crafts as well as a commercial hub complicates the task of the scholar in looking for precise attributions. In many cases locally made glass (found in quantities so large as to suggest that the city was indeed a center of glass manufacture) cannot be securely distinguished from vessels that happened to be in transit and were used and discarded there. It is likely, for example, that a ninth-century fragmentary blue plate with finely incised decoration (cat. no. 68) was en route to eastern Asia after originating in either Syria or Iraq. Conversely, Nishapur's less elaborate, less expensive objects for everyday use and its vessels in almost colorless glass with shallow-cut decoration must have been made locally or in neighboring workshops. A hanging lamp and a jug (fig. 5; cat. no. 97), both part of the Metropolitan Museum's share of the Nishapur excavations, are among the best examples of the latter type of material.

In the past twenty years, the study of Islamic glass has benefited greatly from two unexpected archaeological finds, one from a type of excavation usually given little consideration in dealing with Islamic material and the other from a chance discovery. The first was the shipwreck at Serçe Limanı, previously mentioned in reference to cullet. Undisturbed on the seabed for centuries, the ship and her cargo were determined to have sunk



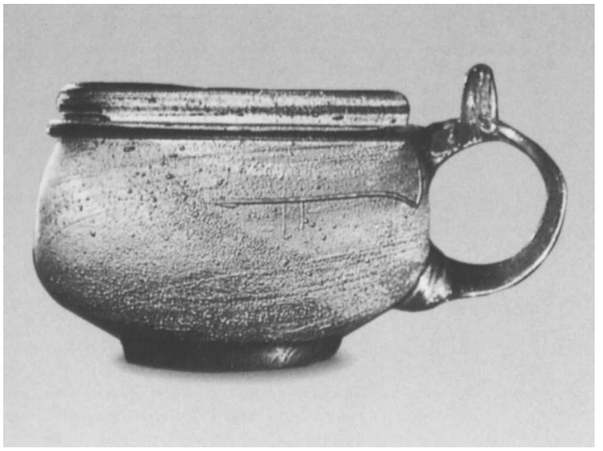


Fig. 6 (left). Beaker found in shipwreck at Serçe Limanı. From Jenkins 1986, p. 6

Fig. 7 (above). Cup found in shipwreck at Serçe Limanı. From Jenkins 1986, p. 9

shortly after A.D. 1025. It is reasonable to assume that the glass had been produced shortly before the ship sailed, even though where it was made is still a matter of speculation. Much of the fragmentary material has been reconstructed, giving an idea of the great variety of colors, shapes, and decoration in the glass aboard the ship, and is now on display at the Bodrum Museum of Underwater Archaeology (figs. 6, 7). This extraordinary find still awaits full publication (see interim reports in Bass 1984; Van Doorninck 1990; and Lledó 1997). Not only does it cast light on the commerce in cullet in the Mediterranean in the early Middle Ages, but it also fills a large gap in the understanding of glass typologies and decoration from the late tenth and early eleventh centuries.

The second valuable find was a lucky discovery not directly related to the archaeology of Islamic art. Nineteen intact pieces of Islamic glass were found in August 1981 in the crypt of a stupa in northeastern China, which was sealed in A.D. 874 (An 1991, pp. 123–34). The original site, known as the Famen Temple (Famensi), in Shaanxi Province, was built during the Eastern Han dynasty (A.D. 25–220); later, under the Tang dynasty (A.D. 618–907), a stupa was constructed to preserve the bones of the Sakyamuni Buddha. After the partial collapse of a structure subsequently built atop the stupa, the temple was excavated. Discovered inside was a treasury of Chinese gold, silver, porcelain, and silk objects, in addition to Islamic glass (*Chinese Archaeology* 1999, p. 484, no. 168). The find is of exceptional importance, in part because it proves that Islamic glass was highly esteemed in China. In addition, and more significantly for the scholar of Islamic glass, all the objects—including six blue plates with incised decoration (see fig. 8 and discussion at cat. no. 68), a stain-painted dish

Fig. 8. Plate found at the Famen Temple (Famensi), China. Western Asia, 9th century. Blue glass. Free blown and incised; tooled on the pontil. Diam. 15.8 cm (6¼ in.). Famen Buddhist Temple Museum, Shaanxi Province, China. Photograph courtesy of Jiayao An

Fig. 9. Plate found at the Famen Temple (Famensi), China. Iran, 9th century. Colorless glass. Free blown and stained; tooled on the pontil. Diam. 14 cm (5½ in.). Famen Buddhist Temple Museum, Shaanxi Province, China. Photograph courtesy of Jiayao An

Fig. 10. Bottle found at the Famen Temple (Famensi), China. Iran, 9th century. Yellowish colorless and dark purple glass. Free blown, applied, and impressed; tooled on the pontil. H. 21.3 cm (8⅜ in.), max. diam. 16 cm (6¼ in.). Famen Buddhist Temple Museum, Shaanxi Province, China. Photograph courtesy of Jiayao An

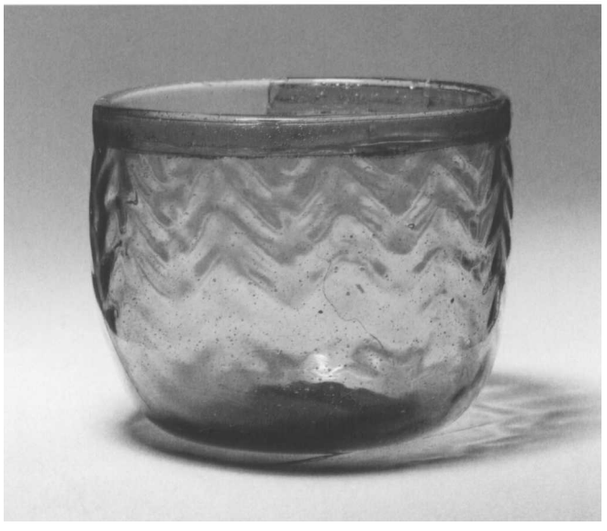


Fig. 11. Bowl. Takht-i Sulaimān, Iran, 13th century. Greenish colorless glass. Mold blown; tooled on the pontil. H. 3.8 cm (1½ in.), diam. 8.5 cm (3⅜ in.). Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst I.19/69

Fig. 12. Bowl. Takht-i Sulaimān, Iran, 13th century. Greenish colorless glass. Mold blown; tooled on the pontil. H. 7 cm (2¾ in.), diam. 8.9 cm (3½ in.). Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst I.19/69

(fig. 9), and a variety of other vessels (fig. 10)—are intact, in good condition, and clearly datable to the ninth century.

Islamic glass from later in the medieval period (from about the twelfth to the fourteenth century) has been found in archaeological excavations in smaller quantities than that from the early Middle Ages. Fusṭāṭ has yielded large numbers of fragmentary glass with marvered decoration as well as enameled and gilded vessels created in Egypt and Syria in the Ayyūbid and Mamluk periods (many of the latter have survived intact without a specific provenance; see cat. nos. 53–60, 113–135), although most of these were found on the surface. Two sites providing a better archaeological context for substantial amounts of such material are al-Quṣayr al-Qadīm, a trading post between Cairo and the Red Sea en route to the Indian Ocean (Meyer 1992), and Hama, one of the most important Syrian cities in the Middle Ages and probably a center of glass production (Riis and Poulsen 1957). Recent excavations at al-Ṭūr in the Sinai Peninsula have also revealed material with close connections to al-Quṣayr al-Qadīm as part of the same general trade.

Glass manufacturing enjoyed an artistic renaissance in Egypt and Syria during the late medieval period, whereas less is known and understood of contemporaneous creations in Iran under the Seljuqs and Ilkhanids. Gurgān, a prominent city near the southeastern Caspian shores, is often mentioned as the place where almost all the Persian glass of this period originated (Fukai 1977; Kordmahini 1988); however, since no compelling evidence of extensive glass production is available from excavations at the site, most of those attributions remain questionable (Kiani 1984). Perhaps the most interesting site that has produced glass in a significant quantity is the Ilkhanids' royal summer

palace of Takht-i Sulaimān, built in the 1270s in northwestern Iran. The most common finds there—green glass (mainly beakers and bowls) with a molded decoration of twisted ribs and chevron patterns—are peculiar to the site (figs. 11, 12). Given the remote location of the palace and the evidence of ceramic-tile production during its erection, it is probable that glass vessels were also produced on the site. Takht-i Sulaimān thus provides evidence of glass manufacture in Iran after the destruction brought about by the Mongols in the middle of the thirteenth century.

Such a brief survey of the most important archaeological sites associated with Islamic glassmaking from the seventh through the fourteenth century cannot be exhaustive; in fact, it omits a substantial number of excavations, especially in Central Asia and Iran, that have produced interesting finds or promise to do so in the near future. One of these is the medieval city of Merv (near present-day Mary, in Turkmenistan), an important center in the eastern Islamic world during the Seljuq period, which has been excavated in a scientific fashion only recently (see Herrmann 1999). The medieval city of Raqqa, in northeastern Syria, has already produced interesting results and will probably establish itself as one of the most important glassmaking centers in the Islamic world (Henderson 1996a, 1996b, and 1999; see also Robert H. Brill's essay in this volume, pp. 36–37). Progress is achieved every day in this field, while uncontrolled excavations, looting, and difficult political circumstances have not hindered the enthusiasm of archaeologists. Excavated glass may for the most part appear to be humble, uninformative, and puzzling. If properly studied and researched, however, it can provide much food for thought and lead to valuable theories and conclusions, both in the field of Islamic art and in the study of glass generally.

Some Thoughts on the Chemistry and Technology of Islamic Glass

ROBERT H. BRILL

This essay is not an attempt to make a definitive statement on the chemistry and technology of Islamic glass. Its aims are much more modest. They are, first, to present some useful factual information and, second, to suggest some ways in which this information can help to clarify the role Islamic glass played in the overall history of glass and glassmaking. In effect, that role comes down to its having evolved from Sasanian and Roman predecessors and to its having paved the way for certain developments in European glassmaking. Along the way, the essay will illustrate how chemical analysis in general can be used to learn something about the history of glass and glassmaking. "Islamic glass," a somewhat indefinite term, is used here to refer to glass made in regions under the control of followers of Islam from about the seventh through the fourteenth century.

One way of looking at this subject is to recall that, following the decline of Rome, glassmaking, along with many other chemical arts, was preserved—and, indeed, improved upon—in the world of Islam. It is as if the pendulum of glass history had moved westward toward Rome from its beginnings in western Asia and the Middle East, and then had swung back to the Islamic Middle East (it was destined ultimately to swing slowly westward again, to Venice and western Europe). Islamic glass, in its heyday, was also traded between East Asia and the West along the Silk Road. It is even known to have reached as far east as Sumatra, probably over long-distance maritime trade routes, starting some time between the seventh and the ninth century and lasting until the sixteenth century (McKinnon and Brill 1987). Meanwhile, similar trends were being played out in the Byzantine world as well, but Byzantine glass—even to the extent of deciding just what that term means—still remains something of a mystery. Analyses have shown that all these movements and changes can be tracked in the chemical compositions of the glasses involved.

By the time Islamic glassmaking flourished, many of the fundamental techniques of creating glass vessels by hand had long since been mastered. From among these techniques, Islamic glassmakers chose to concentrate on blown wares—free blown, mold blown, and pattern molded. The basic hand tools for working glass, such as the blowpipe and the punty, had been in existence for centuries and, for that matter, were probably not all that different from what they are today. In particular,

Islamic glassmakers excelled in applying decorations to their free-blown wares. Among the various decorating techniques, cutting, enameling, and the use of silver and/or copper stains were practiced expertly in Islamic times.

The momentous changes that were to make glass indispensable to modern life still lay well ahead in the future, but (with only a minor stretch of the imagination) many of those changes can be seen simply as extensions of early applications and early means of handling the material. Some of those subsequent advances were spurred on not so much by revolutionary discoveries about glass as by vastly improved technical control over how to make the material conform to practical needs and by mass production, made possible by machinery and automation.

ANCIENT GLASS AS A PYROTECHNOLOGICAL ART

All glassmaking is divided into two or three stages, and so it was in Islamic times. The first is the engineering stage, whereby glassmakers do the dirty work of transforming a mixture of earthy batch materials into a molten mass of clear, transparent glass. The second stage is the shaping of the molten glass into objects by craftsmen or artists, whom some prefer to call glassworkers. Sometimes—as it often was with Islamic glass—there is a third stage, involving the decoration of the glass artifacts by various techniques. Depending on the circumstances, the three stages may flow continuously from one into the other, or they may be sharply separated as to time and space, with different individuals carrying them out.

The engineering stage is hot, heavy work that requires the input of substantial quantities of heat energy. Ancient glassmaking furnaces had to have reached at least 1,150°C (about 2,100°F). That, in turn, required a substantial quantity of fuel—even for a small furnace—and fuel is often the most expensive ingredient of glassmaking. Glass melting can also be messy, because the batch materials (unless preheated or sintered) can froth up and occasionally will misbehave in unexpected ways.

Sometimes, as in modern mass production, for example, newly made molten glass is not allowed to cool, but is formed directly into objects. Batch materials are fed into one end of a huge tank, and molten glass is drawn off continuously from the other end to be formed directly into finished objects by automatic machines. If, instead, the glass is left to cool, it can be broken up into chunks of raw, unshaped glass called "cullet" (a term also used to describe scrap glass destined to be recycled). This cullet can be stored and later reheated to soften it back to a state where it can be blown or otherwise shaped into artifacts. While it is true that reheating necessitates the expenditure of additional fuel, the advantages of allowing the artisans to conduct their work at a time and place most convenient and most efficient for them may well offset the increased expenditure.

There are reasons to believe that both arrangements were used in ancient times. In 1977 two glassmakers in a small traditional factory in Herat, Afghanistan (see pp. 37–38), worked their glass without difficulty directly from the pots in which they had melted it from batch. There is no reason why that could not have been done in ancient times. In other situations, when cullet was resoftened, that could have been done right alongside the melting furnaces, or across the alley in another workshop, or across town, or hundreds of miles away. There must have been many instances in

which the glassmakers (those grimy engineering types) never in their lives saw the craftsmen who fashioned their cullet into delicate objects far across the sea or weeks of caravan travel away. Ample evidence exists for long-distance transport of cullet in ancient times. The cargo of the eleventh-century Serçe Limanı shipwreck (Bass 1984; Lledó 1997) contained more than a ton of large chunks of raw, unshaped cullet (as well as an enormous quantity of broken vessel glass, destined for recycling). Also, more than one hundred cast ingots of glass were recovered from the much earlier shipwreck, dated to about 1300 B.C., off Ulu Burun, on the Turkish coast (Bass 1987; Pulak 1998).

No matter how much one enjoys thinking of ancient glass as the product of artistic or crafting efforts, it was in fact also a product in the sense of being a commercial commodity. The glass world has always been a glass industry. Engineers, craftsmen, artists, merchants, middlemen, shop owners, and customers have always been involved, the only exception being when it was made in royal workshops.

CHEMICAL CLASSIFICATIONS

As one part of an ongoing long-term project (Brill 1999a), The Corning Museum of Glass has analyzed some four hundred samples of Islamic glass. Most of these are from fragments contributed by the excavators of twenty different archaeological sites, while others, which represent various decorative types, come from fragment collections in the museum. Unfortunately, most of the samples have not been well dated, since they were assembled largely on a catch-as-catch-can basis over a period of forty years. Hence, they are not a comprehensive representation of Islamic glass either geographically or chronologically. Nevertheless, the data do present a general picture of the chemical compositions of medieval Islamic glass and serve as a very useful basis for designing other, more systematic, analytical projects in the future.

Analyses of certain objects in this catalogue, and of some closely related works (table 1), summaries of the findings for several archaeological sites (table 2), and data regarding glasses with various types of decoration (table 3) appear at the end of this chapter. The chemical classification of glasses and the interpretation of chemical analyses are complicated subjects, difficult to discuss in uncomplicated terms. Therefore, in order to help nonspecialists in understanding the data presented, relevant remarks highlighting typical findings accompany each table, and every attempt has been made to be as straightforward as possible in the following discussion.

As was expected at the outset, almost all the Islamic glasses analyzed fall into one or the other of two well-defined chemical types (Brill 1988, pp. 264–69, and 1992). Both types are soda:lime:silica glasses (Na_2O:CaO:SiO_2), as, indeed, were the vast majority of glasses previously made in the Western world. Included among these are Egyptian, Mesopotamian, Hellenistic, Roman, and Sasanian glasses, but not certain European Iron Age and East Asian examples. In fact, these Islamic glasses illustrate very nicely the two fundamental traditions of ancient glassmaking, in which soda:lime:silica glasses were made either with natron (a naturally occurring form of soda from Egypt) or with soda obtained by burning certain varieties of littoral or desert plants.

Chemists distinguish between the two types by their respective levels of three impurities: potassium

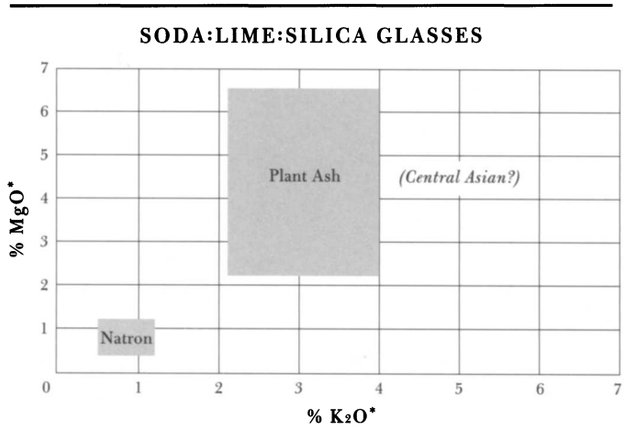


Fig. 13. Potassium oxide vs. magnesium oxide relationships for soda:lime:silica glasses based on natron and on plant-ash soda (approximate ranges)

oxide (K_2O), magnesium oxide (MgO), and (sometimes) aluminum oxide (Al_2O_3). Glasses made with natron generally have K_2O and MgO levels of about 1.5 percent or less; their alumina usually runs from 2.5 to 3.5 percent. Glasses made with plant-ash soda contain greater than approximately 2.5 percent K_2O, and anywhere from about 2.5 percent up to as great as 6–7 percent MgO; their alumina values are more variable. (For these differences, see fig. 13; for Islamic examples of each type of glass, see tables 1, 2, and 3.)

Interestingly, although all these glasses contain three basic components, in each case the chemical composition can be accounted for by assuming that the glass was made from only two main batch ingredients. In the case of the natron-based glasses, the necessary lime was introduced as an impurity in the beach sand that was used as a source of silica. In the case of the plant-ash-based glasses, the lime probably came in with the soda itself, the silica being introduced as quartzite pebbles, a relatively pure form of silica. It should be emphasized that we are not saying that all these glasses were necessarily made that way, only that they could have been.

As it turns out, Islamic glassmaking appears—chemically—to have simply carried on the two traditions that had already been firmly implanted in the Levant and eastward for centuries. The natron glasses seem to have been made more or less along the Levantine coast, presumably in factories from which the natron beds of the Wadi Natrun, in Egypt, would have been more accessible. Those factories lying farther inland appear to have clung to their own regional plant-ash-based tradition (Brill 1995), which can be traced back to the very beginnings of glassmaking in western Asia (Brill and Shirahata 1997; Brill 1999a, vol. 1, pp. 40–48, vol. 2, pp. 38–55).

Farther east, in Central Asia, soda:lime glasses of the Islamic period often have somewhat greater potassium levels (Brill 1989). If a soda:lime glass contains greater than approximately 4 percent K_2O, that is a sign that it might be of Central Asian origin. If the potassium level becomes higher still (at the expense of the soda), the glass may be considered a mixed-alkali glass (Na_2O, K_2O:CaO:SiO_2) (Brill 1992). Central Asian glasses of that family are known and were evidently made with the ashes of plants containing about equal levels of potassium and sodium.

There is another chemical type that occurs in certain emerald green Islamic glasses. Examples, which are relatively rare but distinctive in appearance, are usually associated with deep cutting (such as that found on molar bottles or other small vessels) or with the upper layers of elaborately cut cameo vessels. These green glasses are members of the lead:silica family (PbO:SiO_2) with remarkably high lead oxide contents, as much as 60 to 75 percent (Barnes et al. 1986, pp. 6–11; Brill 1999a, vol. 1, p. 93, vol. 2, p. 189). This feature makes the glass soft and easy to cut or grind, so it was probably tailor-made for producing cameo or deep-cut objects. At least one object in this exhibition, a green bowl (cat. no. 93), is a lead:silica

glass. The lead oxide content of the bowl (PbO = 73.9 percent) is the greatest of any ancient glass analyzed during the Corning study except for certain Chinese and Central Asian glasses (Brill et al. 1991).

Similar high-lead compositions have been found among Viking beads, as well as among glass rings, beads, and other small objects from Russia and parts of eastern Europe (Bezborodov 1975, table xxi, pp. 310–15). The earliest of these date from about the ninth century, and they continue up until about the thirteenth century. Recently, it has been reported that numerous lead:silica vessel glasses, dating from the twelfth century and later, are also being found throughout western Europe (Wedepohl et al. 1995). It is tempting to wonder if this unusual formulation might also have been connected somehow with the emergence of a relatively rare, but readily recognizable, type of dark green glass found in stained-glass windows in Germany and Austria (Brill 1972; Brill and Weintraub 1992; Brill 1997, pp. 123–25, figs. 10, 11, and 1999a, vol. 1, pp. 129–30, vol. 2, pp. 307–8). Most of the examples date from the twelfth to the early fifteenth century. These window glasses contain about 25–35 percent PbO, which appears to have been added to one of the ordinary high-lime potash:lime:silica glasses of the period.

Interesting questions arise as to the origin of the lead:silica composition. It is likely that the lead:silica family of glasses evolved from some closely related technology, such as ceramic glazing, glass or metal enameling, or the manufacture of imitation gems. Viking and eastern European connections with Turkey or northern Iran seem entirely reasonable, considering the existence of trade routes along the Danube and the Volga. One cannot help but wonder if this unusual composition might not have come across the Silk Road from China (perhaps more specifically, westernmost China), where examples of lead:silica glasses with very high lead contents can be traced back to the Tang dynasty—and perhaps even into the Han dynasties. These particular pieces are true $PbO:SiO_2$ glasses; they do not contain barium, as do many other early Chinese glasses. Included among them are objects clearly of Central Asian and Chinese origins, such as miniature Buddhist figurines and so-called ear spools, along with a few strands of melon beads (Fenn et al. 1991). The possibility of such a long-distance technological connection between East and West is truly intriguing.

Two other chemical additives, manganese and antimony oxides, are useful for the chemical classification of early glasses (Brill forthcoming). Islamic glasses generally do contain manganese, usually about 0.5–1.5 percent MnO. This amount indicates a deliberate addition, either as a decolorizer to offset the greenish tints produced by iron impurities or to prevent glasses from turning an amber color (Brill 1988, pp. 259, 269–78). However, Islamic glasses (and their Sasanian predecessors) rarely, if ever, contained antimony (Sb_2O_5), either as a decolorizer or as an opacifier. Although opaque glasses are relatively rare in the Islamic world, the few examples encountered during our study have been opacified with tin oxide (for white opaques) or lead-tin oxides (for yellow opaques).

CHEMICAL COMPOSITIONS AND GEOGRAPHY

All this leads to a fundamental question that touches on the primary reason why many laboratories analyze ancient materials at all: to what extent is it possible, starting with a chemical analysis, to trace the

origin of an ancient glass object; that is to say, identify its place of manufacture? Unfortunately, we have not yet reached the stage where we have a sufficient library of data to be able to do that. In fact, we do not even know if that will ever be possible. At present, the best we can do is to say which broad glassmaking tradition a particular glass falls under and what other glasses it either resembles or differs from. Nevertheless, that information in itself is often helpful to the archaeologist or curator—especially when combined (as it always should be, when circumstances permit) with archaeological evidence.

A comprehensive interpretation of the results of the four hundred analyses previously mentioned would go far beyond the scope of this essay, but the analyses are already published (Brill 1999a, vol. 1, pp. 85–101, vol. 2, pp. 161–205) and are now being interpreted with the goal of future publication. In the meantime, for readers who might like to gain a feeling for what the data are like, table 2 and figures 14–19 (pp. 32–33) summarize analytical data for Islamic glasses from a few archaeological sites. But two important reminders must be added. One cannot assume that just because a glass was found at a particular location, it necessarily was made there, or even made nearby. Furthermore, different glasses found at a site might well have been made in different factories.

DECORATION

Although the chemical technology of Islamic glass obviously descended from Sasanian and Roman forerunners, Islamic glassmakers and glass artisans should not be regarded as mere caretakers for a technology and for arts that were to be revived later in the West. Medieval Islamic glass artisans made significant strides of their own, and nowhere is this more evident than in the decorations they applied to their wares. Among the decorative methods they employed were cutting, scratch-engraving, luster-staining, enameling, and gilding. Chemical analyses and X-ray diffraction findings related to some of these types of decoration are reported in table 4, while analyses of some of the glasses themselves appear in table 3.

Cutting and scratch-engraving

Most of the various forms of Islamic glass cutting were continued at the same highly skilled levels evident in their Sasanian and Roman predecessors. That cameo cutting seems to have struck off in other directions is significant in that Islamic glassmakers might have been the first to utilize a glass composition tailor-made for a specific application. The previously mentioned high-lead glasses, with their 60–75 percent PbO contents, were significantly softer than the ordinary soda:lime glasses used for all the rest of their wares; the lead:silica glasses have a hardness of approximately 350 on the Knoop hardness scale as compared with about 460 for the soda limes (Brill 1995, p. 229). That difference would have given the cutters a marked advantage in their cameo cutting, since the technique required the removal of a great deal of glass but in a carefully controlled manner. It might be noted in this connection that several beautifully cut glass vessels purportedly of Islamic date have recently been analyzed (Brill 1999a, vol. 1, p. 97, vol. 2, p. 197) and that their compositions raise questions as to their authenticity.

The exact types of tools and abrasives used to cut ancient glasses are unknown. That topic might benefit from a field study in South Asia, East Asia,

or any other place where traditional techniques of cutting and carving hard materials still survive. In the case of the scratch-decorated glasses subsequently discussed, the styluses used to scratch the glass could have been pointed with chips of any number of minerals or hardstone gems. Diamond comes immediately to mind, but gemstones such as ruby, beryl, topaz, or garnet, or possibly even rock crystal, are all hard enough to have sufficed.

Chemical analyses of a number of scratch-decorated Islamic glasses have shown that these glasses apparently were made in more than one place (Brill and Fenn 1992; Brill 1999a, vol. 1, pp. 95–97, vol. 2, pp. 194–96). In one study, fifteen fragments were found to be natron-based glasses while nine others were made from soda derived from plant ashes. Unfortunately, most of the glasses analyzed came from a group of fragments in The Corning Museum of Glass that are without provenance. Two glasses, however—the wonderful fragmentary plate from The Metropolitan Museum of Art (cat. no. 68), along with a smaller colorless fragment—were excavated at Nishapur. Both were made from plant-ash soda, as are two somewhat smaller fragments of what must have been very similar dark blue plates in The Corning Museum of Glass (Brill and Fenn 1992, figs. 6, 7). We are inclined to believe that the natron-based glasses with scratch decoration were made in Egypt. The plant-ash-based glasses might have been produced at the same inland location where numerous other surface finds of glass from the environs of Nishapur were made (Brill 1995); at present, that location remains unidentified.

Scratch-decorated Islamic glass has taken on heightened interest with the discovery in 1981 of six blue plates in the Famen Temple (Famensi), located about 100 kilometers (62.5 miles) west of Xian in Shaanxi Province, China. The plates were part of a group of twenty glass objects found along with other treasures in the crypt, which had been sealed in 874 (Brill and Fenn 1992; Brill 1993). All six plates bear scratch decorations similar to those on the objects and fragments described in the preceding paragraph. The motifs included among the designs on the Famensi plates deserve careful study. Some are identical to motifs appearing on objects in this exhibition, such as the ropelike border on the large blue plate from Nishapur and the aqua-colored bottle (cat. nos. 68, 73). Others, however, may be without known parallels—in particular, the motif with five spiked leaves and what seems to be a tendril with a berry, which occurs on three of the Famensi plates. Conclusively identifying it as either a stylized or a realistic portrayal of some specific plant (various attributions have been suggested, including the Chinese maple and *Cannabis sativa*) might aid in interpreting the circumstances that led to the plates' being brought to Xian in the first place.

Chemical analyses of the Famensi glasses would be extremely helpful, assuming that the findings would place them into one or the other of the two chemical groupings now established for scratch-decorated glasses. One glass cup analyzed from the Famensi is a small yellowish vessel of an Islamic type (Fenn et al. 1991; Brill 1999a, vol. 1, p. 154, vol. 2, p. 355). It has a plant-ash soda composition typical of those we have already seen for many Islamic glasses.

Luster-staining

Chemically, Islamic stain-decorated glasses (more traditionally called "luster-decorated" glasses) occupy a significant place in the history of coloring glass. The story really starts with certain

REMARKS FOR FIGURES 14–19

All the glasses plotted here are soda:lime:silica glasses. The data are those used to calculate the means reported in table 2, although a few samples were omitted because the compositions were affected by colorants (Brill 1999a, vols. 1 and 2).

Figures 14, 16, and 18 show data for two sets of natron-based Islamic glasses, one excavated at Caesarea (in present-day Israel) and the other at Fusṭāṭ (on the outskirts of Cairo). The Caesarea glasses date from the sixth through eighth centuries, while the Fusṭāṭ glasses can be dated only between the ninth and thirteenth centuries.

Figures 15, 17, and 19 show similar plots for five sets of plant-ash-based Islamic glasses, excavated at the following sites: Caesarea (11th–12th century); Fusṭāṭ (9th–13th century); Nishapur (in northeastern Iran, 9th–10th century); Qaṣr al-Ṣaghīr (North Africa, dates uncertain); Afghanistan (4th[?]–13th century).

Figures 16 and 17 illustrate clearly the difference between the natron-based and plant-ash-based soda lime glasses from Caesarea and Fusṭāṭ. These glasses are further distinguishable from each other by their K_2O–MgO and Fe_2O_3–Al_2O_3 relationships.

Figure 15 illustrates that the Fusṭāṭ glasses are distinguishable from the other four groups on the basis of their soda content. The other four show considerable overlapping.

Figure 17 illustrates that the group from Afghanistan—an example of the provisional Central Asian type of soda lime glasses—is distinguishable from the other four groups because of its higher K_2O content. The others show some overlapping, but the Caesarea glasses differ somewhat from the Fusṭāṭ glasses.

Figure 19 illustrates that the Qaṣr al-Ṣaghīr glasses generally have higher alumina contents than the others, which might be an indication of regional manufacture. The glasses from the Levant are distinguishable from the others by their relatively low alumina contents.

It thus appears that the few plant-ash-based glasses analyzed from these particular sites can be distinguished from one another on the basis of their major and minor constituents, despite the overlapping that occurs. However, it must be emphasized that these remarks are only illustrative examples, and one must be very cautious about drawing generalizations based on these few data.

The twenty Nishapur glasses analyzed here are the same colored glasses used to calculate one of the mean compositions reported in table 2. Interested readers will note that if the colorless-cut glasses from Nishapur were plotted on similar graphs, their ellipses would not overlap the colored glasses significantly for the soda, magnesia, alumina, or iron contents. The low iron value, in particular, indicates that special batch ingredients must have been selected for melting the colorless glasses. That fact probably also explains the differences in the other oxides.

Figure 19 was constructed from a total of sixty-four points. A straight line fitted to all the data has the equation $\%Fe_2O_3^* = 0.094 + 0.293\ (\%Al_2O_3^*)$. The positive correlation suggests, plausibly, that the iron and alumina were introduced with the same batch ingredient and that this ingredient could have been similar, as far as its Fe_2O_3/Al_2O_3 ratio was concerned, for the glasses from the different sources. The fact that the y-intercept is close to the origin indicates that the other ingredient, or ingredients, were relatively free of iron and alumina.

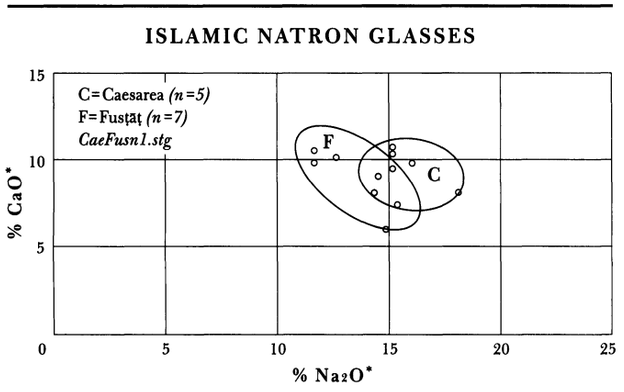


Fig. 14. Lime vs. soda relationships for Islamic natron-based glasses from Caesarea and Fusṭāṭ

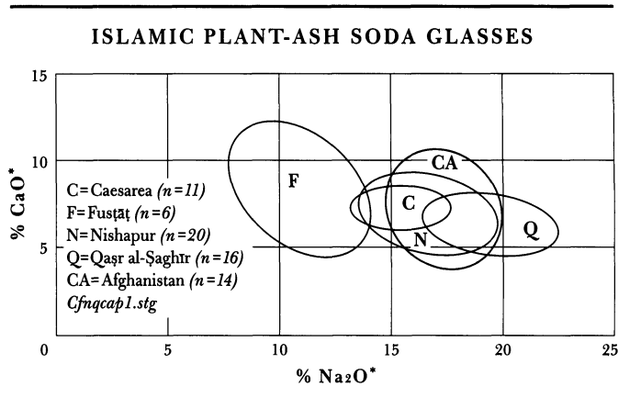


Fig. 15. Lime vs. soda relationships for Islamic plant-ash-based glasses from five Islamic sites

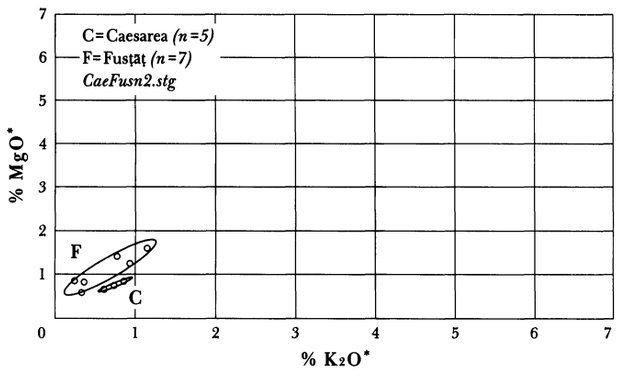


Fig. 16. Magnesia vs. potash relationships for Islamic natron-based glasses from Caesarea and Fusṭāṭ

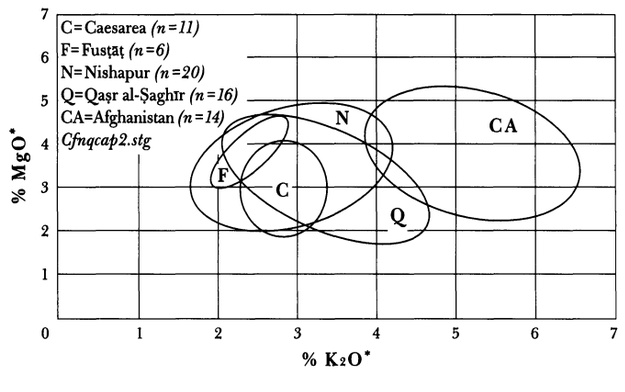


Fig. 17. Magnesia vs. potash relationships for Islamic plant-ash-based glasses from five Islamic sites

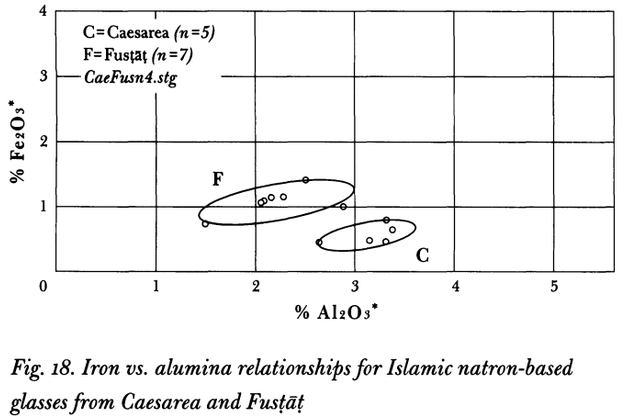


Fig. 18. Iron vs. alumina relationships for Islamic natron-based glasses from Caesarea and Fusṭāṭ

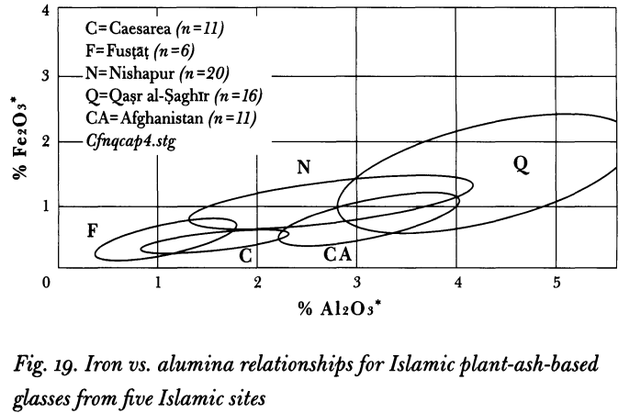


Fig. 19. Iron vs. alumina relationships for Islamic plant-ash-based glasses from five Islamic sites

Data for all graphs are taken from table 2 and from Brill 1999a, vols. 1 and 2.

Roman luxury glasses to which minute quantities of gold and silver were added as colorants. Very small concentrations of either metal—measured in parts per million—when struck as colloidal phases, can produce a range of beautiful colors. (The term "strike" means to reheat or cool an object in order to bring about an abrupt color change.) At its most spectacular, the glasses acquire a dichroic effect: they have a different color when viewed by transmitted light than they do under reflected light. We call this the "Lycurgus effect," because the color is so well exemplified by a famous piece of Roman glass known as the Lycurgus Cup (Brill 1965). The creators of that vessel (or their descendants or predecessors) are probably the same glassmakers and artists who made other dichroic cage cups or deep-cut luxury glasses. We have analyzed about a dozen examples of such glasses colored with either gold, silver, or a combination of both (Brill 1999a, vol. 1, pp. 78–80, vol. 2, pp. 144–46), and others are expected to come to light.

Islamic glass decorators made use of the same chemistry as the Romans, but in a different way. In their version, silver and copper were used to create decorative stains on glass vessels and lustrous decorations on glazed earthenware. Chemical analyses of a group of lusterware glass fragments in The Corning Museum of Glass showed that the stained regions contained silver and copper while the undecorated areas did not (Brill 1970; see also table 4 in this chapter). Similar analyses of some glazed Hispano-Moresque earthenware shards showed that their luster decorations contained copper but only minute traces of silver.

According to instructions recorded by ʿAbd Allāh ibn ʿAlī al-Kāshānī in a Persian document dated 1300–1301, luster decorations were produced on pottery by applying a paste to the surface and refiring the piece (Brill 1970). Afterward, the residue of the paste was buffed off, leaving lustrous surface designs. We assume a similar process was used to create the decorations on Islamic luster glasses. The paste used for the pottery consisted of a mixture of numerous substances—some necessary, and some perhaps not. We now believe, from our analyses, that the indispensable ingredients for staining the glasses were a silver compound, a copper compound, a reducing agent, and a vehicle with a thickening agent.

What we think happened in the case of glass is as follows. The paste was painted onto the surface of the object, which was then refired at a moderate temperature. During the refiring, the silver migrated through the surface into the body of the glass. Upon becoming reduced chemically to minute colloidal particles of metallic silver, it imparted a permanent stain just beneath the surface. (On the pieces we examined, the stain extended down into the glass only 0.02 mm. The colloidal metallic particles are too small to be seen by ordinary light microscopy.) The color of the resulting stain depended primarily on the amount of silver present and the extent to which the chemical reduction had proceeded. It could range from a lemon yellow to a strong amber. Evidently the presence of copper shifts the color further toward the amber shades. In experiments conducted by following out the old instructions, the yellow and amber colors were successfully reproduced, and part of the copper was sometimes deposited on the surface as a reflective coating.

Ceramic luster stains, although usually of a similar color to those on glass, also have a characteristic highly reflective coppery sheen. That reflectivity is now absent from surviving luster-stained glasses,

but one cannot know whether or not it might have been there when the objects were new. A few stray fragments in the Corning group do have mirrorlike surfaces, and laboratory experiments have shown that pieces of ancient glass with an amber transparent stain sometimes take on a lustrous surface sheen if reheated.

In a variation of the technique, some Islamic glasses have dense yellow opaque stained regions (Brill 1970), which are the result of a high concentration of copper in the form of minute crystallites of cuprous oxide (Cu_2O) in the stained portions. (The examples we analyzed contain a great deal of copper, but only traces of silver.) More rarely, parts of the pieces are a bright bloodred color. These also owe their color to cuprous oxide, but the crystallites in these red glasses are somewhat larger. Evidently, the color of cuprous oxide changes from yellow to orange to red as the crystallites grow in size (Brill and Cahill 1988). A blue pitcher bearing this sort of yellow opaque decoration is in this exhibition (cat. no. 106). A qualitative spectrographic analysis of a speck of blackish material trapped in a crevice on the pitcher showed that it contains mainly copper and iron, but only traces of silver. We believe that the black material was a residue of the paste used to produce the dense yellow stain.

A fine bowl having the same type of yellow-orange stained decoration was among the treasures uncovered at the Famensi. Illustrating the high regard in which glass was held at that time in that part of the world, the bowl was found inside an elaborate gilded silver vessel. Such glass must have been traded far and wide, for we have been told that another bowl resembling that from the Famensi was found in Thailand.

Silver staining next appears in western Europe on medieval stained-glass windows. The earliest known example, dated to 1313, is in the Norman church of Le Mesnil Villeman (Manche). By the 1320s silver stain was widely used (Michael Cothren, personal communication, June 2000), and the technique has been continuously employed since then. It survives today in modern stained-glass windows and art glass, in which yellow stains are still based on colloidal silver, sometimes accompanied by copper.

Enameling

There were Roman precursors of enameled glasses, although they may not be as numerous as sometimes believed, owing to the fact that painted decorations can easily be mistaken for enamels. While painted decorations are simply pigments suspended in a vehicle, enamels are pulverized glasses or minerals that are suspended in a vehicle, applied to a substrate, and then fired into place. Enamels differ chemically from contemporaneous glasses because a flux (usually lead oxide) had to be melted into them so that the glassy enamel phase would soften at a temperature lower than that required to soften the body of the object. This allowed the object to be reheated to the softening point of the enamel without distorting the object itself. Some Islamic enamels are lead:silica glasses with colorants added; others consist of regular colored glasses with large additions of lead oxide.

Table 4 shows the findings of a few X-ray fluorescence analyses of Islamic enamels and luster-stained decoration. It reveals that the enamels studied do not, in fact, all owe their color to pulverized glasses. Instead, some of the red enamels turn out to be iron oxide pigments suspended in glassy lead:silica matrices, while some dark blue enamels owe their color to pulverized lapis

lazuli. As shown in the table, the results of the X-ray fluorescence analyses were confirmed by X-ray diffraction and by separate emission spectrographic analyses.

Table 4 also includes information on an Islamic mold (cat. no. 11). A quantitative chemical analysis showed that the mold is made of brass that is rather high in zinc (Zn = 30.1 percent) and is lightly leaded (Pb = 1.3 percent). Lead-isotope ratios for the lead in the mold alloy were measured by Professor Hiroshi Shirahata of the Muroran Institute of Technology in Japan; his results are reported in the same table. These ratios are useful for learning more about the mining regions that may have been sources of lead (Brill 1976 and 1978; Barnes et al. 1986). The interpretation of lead-isotope data is too complex to go into here, but for readers familiar with the subject, we will note that the lead in the alloy falls within an isotopic range associated with Byzantine artifacts. However, there may be considerable overlapping of ores from many mining regions within this broad isotopic range. Those regions may include mines in Turkey and Iran, among others.

FACTORIES AND FURNACES

Some seven hundred years before the advent of Islamic glass, glassmaking underwent a major conversion in scale, being transformed from a small craftslike industry to an ancient version of a mass-production industry. This was brought about, in the first century B.C., by the invention of glassblowing, which suddenly made possible the rapid production of large numbers of inexpensive, thin-walled, lightweight vessels. Although glass artists continued to make luxury items, glass had become a commodity.

At some point during this enlargement of scale, it became more advantageous to separate the engineering stage from the crafting stage so that the glassmakers could get on with their melting while the artisans concentrated on fashioning their objects. It must have been something like this that led to the construction of large glassmaking tanks for carrying out the engineering stage, such as those whose remains were found at Bet Eli'ezer (Freestone and Gorin-Rosen 1999) and the huge slab of unused glass found at Bet She'arim in Upper Galilee (Brill and Wosinski 1965; Brill 1967). The Bet Eli'ezer tanks and furnaces date from the sixth to the seventh century. When the slab was excavated in the 1960s, it was thought to date from the fourth to the seventh century, but evidence accumulated over the years from nearby excavations suggests that it could be as late as the ninth century, or even later (Freestone and Gorin-Rosen 1999).

From the large quantities of Islamic glass that have been found, including the fragments that turn up routinely at excavations, one would suspect that the Islamic glass industry functioned on a similarly large scale, but to this author's knowledge, only one actual manufacturing site has so far been discovered, and that operated on a much more modest scale.

The Raqqa remains

In an important contribution, Julian Henderson has described the results of the excavation of the remains of an ʿAbbāsid glass factory at Raqqa, in northern Syria (Henderson 1999). Henderson reasoned that the operation had been active about 796–800, and perhaps a little earlier and later. The factory itself was relatively small, measuring only about 5 meters (ca. 16 ft.) square, but it contained

the partial remains of four furnaces. Although these were also small, Henderson saw a resemblance to the considerably larger beehive furnaces used in western Europe during the Middle Ages. The fact that soda:lime glasses based both on natron and on plant ash had been produced at the factory led Henderson to suggest that a changeover from the former to the latter occurred there as part of a general changeover that took place throughout Islamic glassmaking regions in the middle of the ninth century. Among several other important technical findings was physical evidence that fritting steps (partial melting of the batch) were employed prior to glass melting and that glass was cast in traylike molds. Henderson's contribution provides a great deal of tangible evidence, valuable chemical analytical data, and a feast of food for thought.

What was it like inside an Islamic glass factory?
It is possible, in an indirect way, to gain some insight into what a glass factory might have been like a thousand years ago by studying present-day factories where glass is still made by traditional methods. But one must be careful to distinguish between what is truly traditional and what is just old, but not all that old, as two anecdotes will explain.

While visiting a factory in Hebron one afternoon more than thirty years ago, I initially had a feeling of having stepped back into the past. But after a short while—and having become deeply absorbed in what was going on—I became aware of a hissing sound repeated over and over again. There, in a back corner of the darkened room, one of the glassworkers was operating an old pants-pressing machine, like the ones that used to be found in neighborhood tailor shops, using it as a source of steam. Every time he stepped on a pedal and pulled down a lever, a swoosh of steam was released for some glassmaking purpose that we never did quite figure out.

On another occasion, in 1962, I visited the glass factory in the old Khan al-Khalili Bazaar in Cairo and spent a day with the proprietor. A most unpleasant, although instructive incident occurred late in the afternoon, when a young woman, with a baby in tow, arrived with a heavy load of broken glass collected from the neighborhood—or possibly from more distant trash heaps. After a nasty display, the proprietor gave her the equivalent of thirty-two cents for the glass, and all but threw her out of the shop, shouting at her as she disappeared down the alley. I later learned that the cullet she had brought was supply enough for a full day's work. I finished asking my last question, which was where did he get his ideas for the shapes of the glasses he made. He told me that he did not bother to go to museums to see what earlier glasses were like since, he said with a sweeping gesture, he was a true artist. His designs were inspired by Picasso, and like Picasso, he made his glass for the benefit of all mankind.

Although keeping in mind the lessons learned from these incidents, I am nevertheless confident that observations made during four visits to a small glass factory in Herat, Afghanistan, really did provide a sense of what it might have been like in a glass factory a thousand years ago. In addition to that one-room factory with a mud-brick furnace (Brill 1979), a half dozen of the numerous small factories my colleagues and I visited in India over the past twenty years gave rise to similar insights (Brill 1999b).

The Herat factory had such a strong sense of connection with the past because the two

glassmakers were still melting their glass from the same batch materials that we believe had been used throughout the Near East (and eastward) for more than three millennia. Despite the stray modern artifact and occasional concessions to modern thinking, the sense of the past was all-pervasive. It was that way in 1977, but the two glassmakers and their family and neighbors were soon to suffer the same misfortunes that fell upon all Afghans in the 1980s and 1990s.

Today, in Herat, the factory still struggles to exist as the glassmakers' sons (and nephews), Nasrullah and Ghulam Saki and their families, continue to work. The glass they make eventually finds its way, through Peshawar, to shops in North America. The factory may yet survive, but the technological threads connecting the family and its glass to the past will soon grow tenuous, and inevitably will be broken. While sentiment sees this as a loss, it is not necessarily bad for the family, which, after all, also deserves to benefit from whatever it is that we believe is good about progress.

The situation was similar in India, but for a different reason. Although most of the factories in India were resoftening cullet instead of melting from batch, the products they made at their small furnaces were traditional glass bangles. Their methods appear to hark back to two different historical stages. One factory, I believe, without being able to defend it rigorously, demonstrated roughly the equivalent of an eighteenth-century industry. The glassmakers there drew long, spiraling canes in a technique that could have been learned long ago from English or European glassmakers (or could it have been the other way around?). In other factories, the methods and tools being used could well have resembled those employed a millennium ago. Gathering small wads of molten glass on the end of a pointed iron rod, the glassmakers twirled the rod to spin the glass out into a ring and then placed the ring on a terracotta cone, where it set up into a round bangle. The resulting bangles took on a slightly tapered profile corresponding to the shape of the cone—a characteristic also seen in some excavated Islamic bracelets from the ninth through thirteenth centuries. The pointed tool and the twirling step are reminiscent of descriptions by the German monk Theophilus, who wrote in the twelfth century (Theophilus 1963, pp. 73–74).

As far as our small team was able to determine, these particular small factories in and around Firozabad were owned by Muslim families who had lived in India for many generations. The factories had small, mud-plastered brick furnaces in cramped, smoky rooms. Heaps of tinder were often stacked up in racks above the furnaces to dry out. The workers (usually two to six at a time) squatted at ground level as they worked at glory holes on the sides of the furnaces. They annealed their bangles in areas adjacent to the melting chambers and regulated the furnace temperatures mainly by controlling the rate at which the wood fuel was stoked. Young boys and old men tended to minor ongoing tasks, and there were always hangers-on surrounding the working area and chatting or just watching. Few women were ever involved directly at the factories, but those who were worked outdoors sorting scrap and cullet by color. In smaller operations, removed from the immediate premises, young women sometimes finished bangles or made glass beads by flame-working, but we believe these factories were owned by Hindu families. Unhappily, the Indian bangle factories of this sort have now all but disappeared.

EPILOGUE

By the thirteenth and fourteenth centuries, just as the most beautiful Islamic enameled glass was being made, the pendulum of glass history had already begun to swing westward again. Cathedral windows were being constructed throughout western Europe; glass tesserae by the millions were being arranged into Byzantine mosaics (as, indeed, they had been for several centuries); and Venetian glass was soon to be on the rise. Middle Eastern glass had begun to fade away.

In Turkey during the seventeenth and eighteenth centuries, seemingly after a period of dormancy, factories made glass in traditional Islamic shapes, such as sprinklers and slender footed vases. This often overlooked Ottoman glass was typified by the objects made in factories at Beykoz, near Istanbul (Canav 1985). Today large producers in Turkey routinely manufacture wares that favor those same forms and traditional floral decorations. Similar continuations survived in Iran and in Mughal India, although now, in India at least, all glass design is completely international in character.

For years the Levant supplied Venice with both cullet and alkali (Jacoby 1993), and Spanish *barilla* was the alkali of choice for many English and Continental glassmakers from the sixteenth through the eighteenth century. The *barilla* industry, centered in Alicante but also operating as far west as Portugal, could have been a survival from earlier Islamic glassmaking times.

Also moving westward, along with the chemical arts and their underlying concepts, was the technology for the decorative techniques discussed above. And along with the technology went words. Many of the most commonly used words in chemistry today came into English from Arabic. In fact, the word "alkali," fundamental to every conversation about glass melting, has its roots in the Arabic *qaly*, which alludes to the very same kind of plant ashes we have been discussing here. The word "soda" is now thought to have originated in the Arabic term for a plant ash exported from North Africa to Sicily during the Middle Ages. Such small reminders of Islamic glassmaking are still with us, if we look carefully for them.

Sadly, however, the story of Islamic glass, as personified by descendants of the early glassmakers themselves, might soon come to an end with the demise of the small family factories in Herat and around Firozabad. But fortunately, in the objects exhibited here, and permanently in museums around the world, we still have with us vivid reminders of the magnificence of the Glass of the Sultans.

The author is extremely grateful to David Whitehouse for numerous very helpful discussions about Islamic glass and about related matters of all sorts. He also thanks Stephen Koob for his assistance in certain laboratory analyses, and Shana Plank for her help in plotting the graphs and preparing the tables. The chemical analyses of the glasses were carried out by Brandt A. Rising of Umpire and Control Services, Inc., and the lead-isotope analysis by Hiroshi Shirahata of the Muroran Institute of Technology. The analyses of the various decorative phases were conducted by Eileen Fanning, Bryan Wheaton, Philip Fenn, Timothy Cooper, and Nick Paliokastrites, all of Corning, Incorporated. Colleen Stapleton, of the University of Georgia, ran an electron microprobe analysis of the Hedwig Beaker sample and confirmed all the results, including the low MgO value. The author also thanks Margaret Donovan for her helpful editing.

REMARKS FOR TABLE 1

1009 This sample is from the Hedwig Beaker (12th–early 13th century) in The Corning Museum of Glass; the object (see fig. 96) is not included in the current exhibition. Although its MgO* value is somewhat low, it apparently is a plant-ash-type soda glass. The origin of the Hedwig glasses is still uncertain (see pp. 160–61).

3076 This sample is from a typical dark green transparent bottle with cut decoration, not included in the current exhibition. It has a low soda content, which is characteristic of deep-cut Islamic glasses. The strong green color is due to a combination of copper oxide (CuO) and an unusually high iron content (Fe_2O_3).

3099 This sample is from a large light blue opaque bottle (probably 11th century) with cut decoration. It is a rare example of an opaque Islamic glass. Its color is the result of a tin oxide opacifier (SnO_2) combined with the blue transparent color of copper oxide (CuO). The glass is somewhat unusual in that it contains a significant level of lead (PbO).

5603 This sample is a minute flake of glass (0.5 mm square) from the light blue opaque bowl in the San Marco treasury. The composition is that of a flake of white opacifier surrounded by blue glass. The opacifier contains tin oxide (SnO_2). The sample is very rich in lead (PbO) and is unusual in that it also contains arsenic (As_2O_5).

5197 This sample is from an emerald green bowl (10th–11th century). It is a member of the Islamic lead:silica glass family with an extraordinarily high lead content.

5199 This sample is from a molar flask from Heshbon (9th–11th century) not included in the current exhibition. It is also an emerald green Islamic glass belonging to the lead:silica family.

7700 This sample is a floating fragment of a dark blue ewer bearing a dense orangy yellow opaque stain; part of the fragment also has a red opaque color. The stains are a variety of luster decoration whose color is caused by colloidal cuprous oxide (Cu_2O). The glass itself is colored by copper (CuO) and cobalt (CoO) and has a typical Islamic plant-ash soda composition.

TABLE 1
CHEMICAL ANALYSES OF SOME ISLAMIC GLASSES

Catalogue number			75	83	93		106
Accession number	67.1.11	55.1.126	53.1.8	San Marco 140	55.1.136	Heshbon	79.1.33
Analytical number	*1009*	*3076*	*3099*	*5603*	*5197*	*5199*	*7700*
SiO_2	67.70	64.63	57.60	34.38	23.36	29.49	62.81
Na_2O	14.2	12.86	13.12	7.07	0.43	0.25	15.0
CaO	8.36	6.43	5.32	1.89	0.7	0.65	7.08
K_2O	3.26	3.28	2.45	1.41	0.26	0.59	2.7
MgO	1.70	5.7	4.73	1.59	0.24	0.08	4.68
Al_2O_3	1.24	1.79	1.07	0.75	0.34	1.55	2.21
Fe_2O_3	0.65	2.83	0.47	0.19	0.18	0.24	1.38
TiO_2	0.1	0.1	0.05	0.017	0.005	0.20	0.12
Sb_2O_5				0.007	0.086		
MnO	0.28	0.15	0.04	0.021	0.003	0.01	0.91
CuO	0.01	1.56	0.62	1.83	0.44	0.59	0.21
CoO							0.1
SnO_2		0.005	4.51	9.08	0.02	0.01	0.005
Ag_2O	0.01	0.001				0.001	0.005
PbO	0.04	0.05	8.7	42.65	73.9	66.30	2.1
BaO	0.04	0.02				0.01	0.05
SrO		0.2					0.08
Li_2O		0.015				0.001	0.003
B_2O_3	0.02	0.005					
V_2O_5		0.08				0.02	0.02
Cr_2O_3		0.005					
NiO		0.005					
ZnO	0.018	0.005	0.06	0.0024			0.005
ZrO_2		0.1					0.25
							0.01
P_2O_5	0.62	0.18	0.15	0.06	0.041	0.01	0.28
Cl	1.13		0.04	0.56			
As_2O_5				0.36			
SiO_2*a	69.71	66.27	67.96	38.23	23.49	29.74	64.12
Na_2O*	14.62	13.19	15.48	7.86	0.43	0.25	15.31
CaO*	8.61	6.59	6.28	2.10	0.70	0.66	7.23
K_2O*	3.36	3.36	2.89	1.57	0.26	0.60	2.76
MgO*	1.75	5.85	5.58	1.77	0.24	0.08	4.78
PbO*				47.43	74.34	66.87	2.14
Al_2O_3*	1.28	1.84	1.26	0.83	0.34	1.56	2.26
Fe_2O_3*	0.67	2.90	0.55	0.21	0.18	0.24	1.41

* The reduced composition is the composition expressed as seven or eight major and minor oxides normalized to 100.00%.

REMARKS FOR TABLE 2

For the sake of simplicity, minor and trace oxides—important as they are—have been omitted. Also, the compositions reported here are expressed as the reduced compositions, that is, the seven major and minor oxides have been normalized mathematically so they add up to 100 percent (Brill 1999a, vol. 2, p. 9).

Nishapur. The samples labeled "misc. colors" are undated surface finds from Nishapur, in eastern Iran, and are now in a fragment collection in The Corning Museum of Glass. The compositions are quite variable, as can be seen from the large relative deviations (Rel. Dev.) for the various oxides. This mean composition is typical of Islamic glasses of the soda:lime:silica variety made from soda derived from plant ashes—a derivation indicated by the high K_2O^* and MgO* values.

The samples labeled "colorless-cut" are from vessels with cut decoration also found at Nishapur. They are truly colorless—water white—lacking even faint traces of the natural aqua color associated with most ancient glasses. That aqua color is caused by iron impurities in the starting batch materials, and, as the table shows, these glasses have significantly lower iron contents than the other group from Nishapur. They must have been melted from specially selected raw materials that had lower iron contents or, conceivably, the raw materials could have been purified by some method that would have removed some of the iron. (In fact, a present-day glassmaker in Tehran recently told the author that in the 1940s glassmakers there used rock crystal instead of quartzite pebbles and a specially purified plant ash when they wished to prepare particularly fine and colorless glasses.) The aqua color was also affected, and offset, by the presence of manganese. Occasionally, ancient colorless glasses have acquired a pink or purplish tinge, either from partial overoxidation of the manganese added as a decolorizer or as a result of solarization caused by long exposure to the ultraviolet radiation in sunlight. Some of the other oxides in the colorless glasses also differ significantly from those in the colored glasses, as can be seen by comparing the means and 90 percent confidence limits in the table.

Fusṭāṭ. A comparison of the two mean compositions reported for glasses from Fusṭāṭ shows that both natron-type and plant-ash-type soda glasses occur on the site. Unfortunately, there is no dated stratigraphy in the area where the fragments were excavated. The differences in the two types of glasses are evident from the K_2O^*, MgO*, and $Al_2O_3^*$ contents. The samples were provided by Professor George Scanlon of the American University in Cairo.

Caesarea. The two groups of glasses from this site also represent natron-type and plant-ash-type soda glasses. In this case, however, the groups can also be separated by their dates. The natron-based glasses date from the eighth century or earlier; while the plant-ash-based soda glasses are mostly Fatimid, none dating earlier than the ninth century. This apparently reflects a changeover from one technology to the other in that region. The samples were provided by Rachel Pollak of the Recanati Center for Maritime Studies, Haifa.

Qaṣr al-Ṣaghīr. This group of samples, from a site in Morocco, are Islamic but of uncertain date. They differ from most other Islamic glasses in that they have rather high alumina ($Al_2O_3^*$) contents. Although it is possible that they were produced somewhere in North Africa, they were nevertheless made from plant-ash soda. The samples were provided by Charles Redman, then of the State University of New York.

Afghanistan. This group illustrates the relatively higher K_2O^* contents that may characterize certain glasses made in Central Asia. These fourteen fragments date from perhaps as early as the fourth century through the thirteenth. It should be noted that these are not mixed-alkali glasses, because the Na_2O is still much greater than the K_2O, probably because of the physiology of the plants used or the soil environment in which the particular plants grew. Most of the glasses were provided by Louis Dupree and Nancy Hatch Dupree, who excavated them during the 1950s and 1960s.

TABLE 2

MEAN CHEMICAL COMPOSITIONS OF ISLAMIC GLASSES FROM VARIOUS ARCHAEOLOGICAL SITES

Mean Compositions with 90 Percent Confidence Limits

(Expressed as Reduced Compositions)*

Nishapur, colorless-cut					*MNiscls.xls (n = 17)*
	90% C.L.	Mean	90% C.L.	Stand. Dev.	Rel. Dev. %
SiO_2*d	69.42	71.62	73.82	1.33	1.86
Na_2O*	11.09	12.78	14.47	1.02	8.00
CaO*	6.10	6.79	7.48	0.42	6.18
K_2O*	1.87	2.36	2.86	0.30	12.76
MgO*	4.11	5.12	6.13	0.61	11.98
Al_2O_3*	0.81	1.03	1.25	0.13	12.97
Fe_2O_3*	0.16	0.29	0.43	0.08	28.23

Nishapur, misc. colors					*MNis.xls (n = 20)*
	90% C.L.	Mean	90% C.L.	Stand. Dev.	Rel. Dev. %
SiO_2*d	61.96	66.27	70.58	2.61	3.94
Na_2O*	13.94	16.61	19.29	1.62	9.75
CaO*	5.04	7.01	8.98	1.19	17.00
K_2O*	1.87	2.91	3.96	0.63	21.68
MgO*	2.21	3.51	4.80	0.79	22.39
Al_2O_3*	1.26	2.52	3.79	0.77	30.47
Fe_2O_3*	0.39	1.16	1.93	0.47	40.15

Fusṭāṭ, natron					*MFusnat.xls (n = 7)*
	90% C.L.	Mean	90% C.L.	Stand. Dev.	Rel. Dev. %
SiO_2*d	70.17	72.19	74.22	1.23	1.70
Na_2O*	11.38	13.74	16.10	1.43	10.41
CaO*	6.42	8.98	11.54	1.55	17.28
K_2O*	0.19	0.67	1.16	0.29	43.63
MgO*	0.57	1.12	1.67	0.34	29.91
Al_2O_3*	1.57	2.22	2.86	0.39	17.65
Fe_2O_3*	0.82	1.08	1.34	0.16	14.54

Fusṭāṭ, plant ash					*MFusashA.xls (n = 6)*
	90% C.L.	Mean	90% C.L.	Stand. Dev.	Rel. Dev. %
SiO_2*d	69.87	71.93	73.99	1.25	1.74
Na_2O*	7.97	10.28	12.58	1.40	13.60
CaO*	9.14	9.61	10.09	0.29	2.99
K_2O*	2.00	2.43	2.85	0.26	10.56
MgO*	3.15	3.86	4.57	0.43	11.18
Al_2O_3*	0.91	1.34	1.77	0.26	19.46
Fe_2O_3*	0.27	0.55	0.84	0.17	31.46

Caesarea, natron					*MCaesarn.xls (n = 5)*
	90% C.L.	Mean	90% C.L.	Stand. Dev.	Rel. Dev. %
SiO_2*	67.07	70.13	73.18	1.85	2.64
Na_2O*	13.55	15.71	17.86	1.31	8.31
CaO*	7.44	9.12	10.81	1.02	11.18
K_2O*	0.59	0.72	0.84	0.08	10.73
MgO*	0.57	0.65	0.73	0.05	7.48
Al_2O_3*	2.73	3.13	3.53	0.24	7.80
Fe_2O_3*	0.36	0.54	0.72	0.11	20.32

Caesarea, plant ash					*MCaesarp.xls (n = 11)*
	90% C.L.	Mean	90% C.L.	Stand. Dev.	Rel. Dev. %
SiO_2*d	67.32	69.30	71.28	1.20	1.73
Na_2O*	14.07	15.68	17.29	0.98	6.24
CaO*	6.43	7.39	8.36	0.59	7.92
K_2O*	2.32	2.71	3.11	0.24	8.81
MgO*	2.04	2.96	3.88	0.56	18.79
Al_2O_3*	0.79	1.49	2.19	0.42	28.50
Fe_2O_3*	0.33	0.46	0.59	0.08	17.56

Qaṣr al-Ṣaghīr					*MQsrSghr.xls (n = 16)*
	90% C.L.	Mean	90% C.L.	Stand. Dev.	Rel. Dev. %
SiO_2*d	57.74	61.78	65.83	2.45	3.97
Na_2O*	16.75	19.26	21.77	1.52	7.89
CaO*	4.95	6.28	7.62	0.81	12.85
K_2O*	2.17	3.24	4.30	0.65	19.95
MgO*	2.18	3.33	4.49	0.70	21.00
Al_2O_3*	3.16	4.25	5.33	0.66	15.49
Fe_2O_3*	0.22	1.86	3.49	0.99	53.32

Afghanistan, Central Asian type					*MAAfg2.sta (n = 9)*
	90% C.L.	Mean	90% C.L.	Stand. Dev.	Rel. Dev. %
SiO_2*d	58.08	63.33	68.58	3.18	5.02
Na_2O*	15.13	17.47	19.81	1.42	8.13
CaO*	3.88	5.73	7.58	1.12	19.55
K_2O*	1.94	4.45	6.96	1.52	34.16
MgO*	1.73	3.97	6.21	1.36	34.26
Al_2O_3*	0.74	3.66	6.58	1.77	48.36
Fe_2O_3*	0.65	1.38	2.11	0.44	31.88

* The reduced composition is the composition expressed as seven major and minor oxides normalized to 100.00%.

TABLE 3

CHEMICAL ANALYSES OF VARIOUS TYPES OF ISLAMIC GLASSES

Mean Compositions with 90 Percent Confidence Limits

(Expressed as Reduced Compositions)*

Luster-decorated, natron					*MLustnat.xls (n = 8)*
	90% C.L.	Mean	90% C.L.	Stand. Dev.	Rel. Dev. %
SiO_2*d	69.34	71.30	73.26	1.19	1.67
Na_2O*	13.39	15.39	17.38	1.21	7.85
CaO*	6.68	8.77	10.87	1.27	14.48
K_2O*	0.31	0.57	0.83	0.16	27.45
MgO*	0.34	0.54	0.75	0.12	22.57
Al_2O_3*	1.68	2.46	3.24	0.47	19.28
Fe_2O_3*	0.41	0.96	1.52	0.34	34.98

Luster-decorated, plant ash					*MLustash.xls (n = 16)*
	90% C.L.	Mean	90% C.L.	Stand. Dev.	Rel. Dev. %
SiO_2*d	64.75	68.68	72.61	2.38	3.47
Na_2O*	11.04	13.87	16.71	1.72	12.38
CaO*	4.48	7.53	10.58	1.85	24.54
K_2O*	1.64	2.53	3.42	0.54	21.36
MgO*	1.99	3.35	4.72	0.83	24.71
Al_2O_3*	0.44	2.58	4.71	1.29	50.22
Fe_2O_3*	0.40	1.46	2.51	0.64	43.81

Scratch-decorated, natron					*MScrtnat.xls (n = 15)*
	90% C.L.	Mean	90% C.L.	Stand. Dev.	Rel. Dev. %
SiO_2*	68.36	69.64	70.93	0.78	1.12
Na_2O*	14.21	15.83	17.45	0.98	6.21
CaO*	8.87	9.72	10.56	0.51	5.29
K_2O*	0.36	0.51	0.65	0.09	17.60
MgO*	0.40	0.61	0.82	0.13	20.70
Al_2O_3*	1.92	2.38	2.83	0.28	11.66
Fe_2O_3*	0.65	1.32	1.99	0.40	30.67

Scratch-decorated, plant ash					*MScrtash.xls (n = 7)*
	90% C.L.	Mean	90% C.L.	Stand. Dev.	Rel. Dev. %
SiO_2*a	63.65	67.23	70.82	2.17	3.23
Na_2O*	12.78	15.54	18.31	1.67	10.77
CaO*	4.27	6.56	8.84	1.38	21.11
K_2O*	1.98	3.03	4.08	0.63	20.92
MgO*	2.97	4.17	5.36	0.72	17.39
Al_2O_3*	1.28	1.96	2.64	0.41	21.04
Fe_2O_3*	0.29	1.37	2.45	0.65	47.65

Emerald green					*(n = 3)*
	90% C.L.	Mean	90% C.L.	Stand. Dev.	Rel. Dev. %
SiO_2*d	24.30	31.10	37.90	4.14	13.00
Na_2O*	0.00	1.44	2.83	0.84	58.00
CaO*	0.26	1.70	3.14	0.87	51.00
PbO*	54.5	63.5	72.6	5.54	8.7
K_2O*	0.45	0.53	0.61	0.05	9.40
MgO*	0.00	0.54	1.22	0.41	76.00
Al_2O_3*	0.12	0.91	1.70	0.48	53.00
Fe_2O_3*	0.02	0.30	0.58	0.15	50.00

Enameled					*MIslmEnm.xls (n = 6)*
	90% C.L.	Mean	90% C.L.	Stand. Dev.	Rel. Dev. %
SiO_2*d	64.14	69.30	74.46	3.13	4.52
Na_2O*	11.54	13.88	16.22	1.42	10.22
CaO*	7.11	8.97	10.83	1.13	12.57
K_2O*	1.54	2.39	3.25	0.52	21.63
MgO*	2.45	3.69	4.93	0.75	20.43
Al_2O_3*	1.09	1.29	1.49	0.12	9.40
Fe_2O_3*	0.31	0.48	0.64	0.10	20.87

* The reduced composition is the composition expressed as seven or eight major and minor oxides normalized to 100.00%.

TABLE 4
COMPOSITIONS OF DECORATIVE MATERIALS AND AN ISLAMIC MOLD*

LUSTER STAINS

	XRF	*XRD*	*QSA (traces)*
Yellow-amber transparent stains (n = 11)	Ag (11) Cu (11)	Ag (1)	Sn, Pb, As, Bi, Au
	XRF (n = 9)	*XRD (n = 3)*	*QSA (traces) (n = 9)*
Yellow-red opaque stains (n = 9)	Cu Ag(< = Cu)	Cu_2O (3) Cu (3) Ag trace (3)	Sn, Pb, S, Au, Ni, Bi

ENAMELS

	*XRF***	*XRD*	*QSA***	
Dark blue (n = 4)	S no Co no Cu	lapis (4) quartz (2)	Fe, Pb (3) Cu, Mn (3) Au (3), Co (1) Sn (3) Ag (3)	0.3–1.0% 0.1–0.3% 0.03–0.1% 0.01–0.03% 0.003–0.01%
Red opaque (n = 2)	Fe (1) Pb (1) Mn (1) no Cu (1)	amorph. (2)	Pb (1), Fe (2) Mn (2) Au (1), Pb (1) Cu (2)	3–10% 0.3–1.0% 0.10% 0.03%
White opaque (n = 1)	Sn (1) Pb (1)	SnO_2 (1)	Pb (1) Sn (1)	10–30% 3–10%
Yellow opaque (n = 1)			Pb, Sn (1)	>10%

ISLAMIC MOLD†

Catalogue no. 11 *Accession no. 86.7.15* *Analytical no. 5997*	Copper Zinc Lead Tin Nickel Arsenic Antimony	68.2% 30.1 1.3 0.2 0.0X 0.0X 0.0X
Lead-isotope ratios	$^{208}Pb/^{206}Pb$ $^{207}Pb/^{206}Pb$ $^{204}Pb/^{206}Pb$	2.0852 0.84301 0.053784

n = number of samples; ( ) = number of samples to which results apply.

* Recent analyses by Eileen Fanning, Bryan Wheaton, Nick Paliokastrites, and Guy Filkins, all of Corning, Incorporated. These have been combined with the findings reported in Brill 1970.

** Elements of significance for color, or related to colorants in order of concentration. Substantial contamination of glass substrate.

† Chemical analysis by Brandt A. Rising of Umpire and Control Services, Inc., West Babylon, New York. Lead-isotope analysis by Hiroshi Shirahata of the Muroran Institute of Technology, Japan.

A Survey of Islamic Glassworking and Glass-Decorating Techniques

William Gudenrath

Glasshouse activities, Islamic and otherwise, may be divided into two types of manufacturing endeavor: glassmaking and glassworking. Glassmaking involves first acquiring and processing raw materials, then mixing them in more or less controlled quantities to form what is called "batch." Intense heating of batch in a furnace causes chemical reactions that result in the formation of glass. Often, recycled glass, called "cullet," is added to the batch during melting. Glassworking is the shaping of glass by various methods in order to create forms and decoration; two well-known and very different glassworking processes are those of glassblowing and glass-engraving.

Many glasshouses specialize to the degree that only one aspect of manufacturing takes place "under one roof." For example, glassblowing may be done independently of glassmaking by using only cullet or imported ingots as the source of glass. Similarly, blanks for engraving can be acquired by a decorator who has no capability of manufacturing them.

Important and telling aspects of Islamic glassmaking, both scientific and practical, are dealt with elsewhere in this catalogue (see the essay by Robert H. Brill). In this essay, which describes the techniques employed in making the objects in the present catalogue, an attempt will be made to respond to the most fundamental question about Islamic glassworking practices: once the glass had been either made or acquired from an outside supplier, how did the workers proceed in forming a particular object? The proposed solutions, some of which are also illustrated (see figs. 20–91), in fact, represent theories. While no degree of specificity is possible (for example, if catalogue number 1 was indeed made by glassblowing, of what length and diameter was the blowpipe used to make it?), close examination of "symptoms" of the manufacturing process coupled with experiments at the glass furnace can shed useful light on Islamic glassworking practices. Symptoms may take the form of varying shapes of bubbles trapped in the glass, for example: bubbles that are spherical in one area of an object, elongated in another, and lenticular in yet another constitute a precise record of the movement of the glass during its final moments of plasticity. Variations in the wall thickness of a vessel from top to bottom are another significant symptom.

The research procedure is straightforward. Data acquired from close study of the object are

used to arrive at a tentative reconstruction of the glassworker's actions. The results of experiments at the glass furnace reenacting these actions are compared with the original. When the symptoms observed in the two are overwhelmingly similar, we can say that this is indeed very possibly how the original may have been made.

There are two broad categories of glassworking processes: cold-working and hot-working. Most objects in this catalogue have been made and decorated by employing both. The specific processes can be further organized into categories and subcategories that reveal an impressively varied array of forming and decorating techniques. The catalogue numbers cited under the subheads below identify representative examples of the techniques discussed.

COLD-WORKING

Many of the techniques for shaping and decorating glass at room temperature will be familiar to the reader because they are also used, for example, in stone and wood sculpture. Among the techniques for decorating glass, scratching is used in many kinds of sculpture and in pottery making. Methods of decorating glass objects by applying metallic gold and colored paints are historically of two types: unfired and fired. Unfired decoration, often referred to as cold-painting, is impermanent. We see no evidence of unfired decoration on any object included in this catalogue. Fired gold and enamel decoration, if heated to a high enough temperature for a long enough period, will become permanent, although sustained abrasion will gradually wear away thin gold. Luster (stained) decoration also requires firing. Although in all three techniques intense heat is applied at the end of the process, the decorating itself is carried out when the object is at room temperature. For this reason, gilding, enameling, and staining are discussed here with other cold-working techniques.

Filing

Cat. no. 94

Cold-working by using a tool in the manner of a file to grind glass away is, after chipping, the most basic and probably the oldest of all glassworking processes. Identical in practice to some methods of working hard stone, this process predates man-made glass. Material is removed by abrasion from a chunk of glass or, in later periods, from a manufactured blank in order to create a form or decoration. The required equipment can be nothing more than a stick of wood or a piece of relatively soft metal wet with an abrasive slurry, which can consist of pulverized quartz, emery, corundum, or another hard stone mixed with a little water or oil acting as a liquid medium. As the tool is moved firmly back and forth against the glass, microscopic particles of glass are chipped away. In practice, the process is about the same as using a file to shape metal. Relatively coarse particles of grit promote fast cutting and leave the glass with a somewhat rough surface, which may be gradually smoothed with finer grit. Alternatively, grinding may be accomplished by wet natural soft stones used in a similar fashion for similar results; however, unlike in the tool and slurry approach, the stone slowly wears away and its shape gradually changes. Whichever the method, the surface is finally polished by rubbing a slurry of pumice or cerium oxide and water firmly against the glass with a soft tool (wood or leather is suitable).

Wheel-working

Cat. no. 95

The process of cutting and polishing glass with a wheel is, in principle, much like the procedure described above. Here, the tool is round and is turned more or less rapidly by some type of machine. The glass is pressed firmly against the working surface for removal of material. With the continuous action of a wheel, work can take place much more rapidly than with the reciprocating action of filing by hand. Wheels for grinding can be made of a soft metal such as copper (used with a slurry of grit) or of soft stone. Wood, leather, felt, or rubber wheels can be used with a slurry of pumice or cerium oxide for polishing. Large wheels of coarse grit or rough stone are used for cutting big areas of glass. Wheels of small diameter with sharp edges are used to engrave details with great precision. In addition to speed and ease, the wheel—with its curved working part—offers the advantage of enhanced control in small, flat areas, where filelike tools are useless for grinding and decorating.

Lathe-turning

Cat. no. 86

Holding a cutting tool against a chunk of rotating material in order to shape or decorate it is a process of great antiquity. Its use in ancient Egypt to produce the elements of monumental architecture is well known. The same process for cold-working glass objects was in common use, on a small scale, in Greek and Hellenistic workshops of the fourth and third centuries B.C., and the practice continued in the Roman era. Large surface areas of luxury objects and of some types of domestic ware were routinely ground and polished by turning while pressing the appropriate tool against the glass. Lathe-turning is identical in principle to the filing and wheel-working processes described above, except that the object is moved while the tool is held stationary.

Irrefutable evidence of the use of turning in Islamic glass workshops is not abundant. The process is mentioned here because it was used to make at least some parts of a few objects included in this catalogue. Although a highly skilled craftsman working at the wheel can approximate the visual effect of lathe-turning, the perfect symmetry characteristic of this process is the best evidence for its use in making glass objects. Compared with hand working by either filing or wheel-working, turning is a faster, easier, and more predictably successful way of creating the final exterior profiles of a number of structural and decorative features, including base rings, decorative rings, and the join of neck and body.

Scratching

Cat. no. 68

Decorating glass by scratching its surface with a sharp tool was widespread in the Roman glass industry. Empirical evidence suggests that the finest lines were achieved with the edge of a diamond. Coarser lines were probably made with a freshly chipped edge of quartz, corundum, or other hard stone.

Gilding and enameling

Cat. nos. 111, 116

The fired gold decoration represented in this catalogue is of two types, the metal having been either applied in the form of leaf or painted on while suspended in liquid form. Leaf (foil) is added in precut patterns, which are then stuck to the surface with an adhesive such as gum arabic and water. Alternatively, the entire surface is covered with leaf

and then portions of gold are scraped away with sharp tools to form patterns. For the second type of decoration, minute particles of the metal are suspended in a light oil or a mixture of water and gum arabic. The preparation, often referred to as liquid gold, is then applied to the surface of the glass with a brush or stylus. This technique was used to create the opulent decorations on later medieval gilded and enameled objects such as mosque lamps.

After the preparation has been applied, by either process, the object must be fired under particularly intense heating conditions to ensure a permanent bond. Recent investigation suggests that firing an object standing stationary in a kiln would never produce the tenacious adhesion achieved in thirteenth- and fourteenth-century Islamic examples. A much more laborious process was required. The decorated object must have been gradually reheated to a temperature near the softening point of the glass (probably about 1,300°F [704°C]). A pontil rod (punty) was then attached to the base atop the mark made by an earlier pontil during the glassblowing process (see figs. 40, 41). The vessel was then reintroduced to the glassworking furnace, and the glass was heated throughout until it became markedly softened and flexible. Moving the glass in this manner must have had the effect of "kneading" the gold into the surface, thereby making a much stronger bond than would have occurred if the object had been left undisturbed. After the glass had cooled sufficiently to become hard again (probably at a temperature of about 900°F [482°C]), the finished object was once again detached from the pontil and cooled gradually to room temperature in an annealing (slow-cooling) oven.

Objects of ancient Islamic glass offer ample evidence of this ticklish and labor-intensive firing process. Because most of the gold-decorated pieces represented in this catalogue also have enamel decoration, a full discussion of this evidence is given below, at the conclusion of the section on enameling.

Gold sandwich glass (cat. no. 111) was made in a somewhat more complicated sequence of procedures (see figs. 85–91, which demonstrate how catalogue number 111 may have been made). First the glassblower made two pieces of glass. One of them, the blank to be decorated, was shaped like a tube, closed and rounded at one end and open at the other. The second piece was a shallow cup, rounded at the base. When the pieces had cooled to room temperature, the lower portion of the tube's outer surface was decorated with gold and, in the case of catalogue number 111, with dots of enamel (figs. 85, 86). The tube was then reheated in a kiln to nearly its softening point. If made earlier, the shallow cup was also reheated, but it could have been made while the decorated tube was being refired and then placed upright near the tube in the kiln.

At this point, the hot glassworking was resumed for the final construction of the object. The decorated tube was reattached to a blowpipe (fig. 87). After the lower portion of the tube had been heated until it was soft and flexible, the tube was lowered into the cup and forcefully inflated (fig. 89); the two parts immediately fused together, trapping the gold between their surfaces. Finally, after the object was thoroughly reheated in the glass furnace, it was inflated and shaped into its final form (figs. 90, 91). Catalogue number 111 has no pontil mark, and the rim has been finished by cold-working. Presumably upon completion of the work on the blowpipe, the object was broken free of it and placed directly in the annealing oven for

slow cooling to room temperature. Alternatively, such a vessel could have been detached from the blowpipe, transferred to a pontil, and reheated for the final shaping of the rim (see fig. 53).

A casual survey of glass objects made during the sixteenth century and earlier strongly suggests that no material that has not been fused by intense heat to the surface of glass will remain attached to it indefinitely. Craftsmen must have suspected that this was so at a very early date, since some Egyptian and Roman glass objects have survived to our time with fired vitreous enamel decoration fully intact. The earliest evidence that a successful process for enameling glass had been achieved is a small Egyptian jug now in the British Museum, London. Made on a core affixed to a rod (an illustrated explanation of this early method of making hollow glass objects may be found in Gudenrath 1991, pp. 214–15, figs. 1–15), it probably came from the tomb of Tuthmosis III and is datable to about 1425 B.C. Careful examination reveals that the workers who made this object went to extreme efforts to ensure the permanence of its appearance.

Certain features of the botanical decoration and the inscription suggest that they were added in liquid form when the object was at room temperature. For example, suspended particles of colorant flowed down to the lowest area of the decoration before the liquid medium dried, and there is abundant evidence of pooling of liquid color at the beginning and ends of lines.

The painted decoration is vitreous in nature. That is to say, it consists of intensely colored, finely ground glass particles. (The enamel is nothing more than the same yellow glass as that used for the decorative bands which has been pulverized and ground to a fine powder.) Sometime after their application, during intense and prolonged heating, the particles fused to each other and—what is more important—to the surface of the vessel, thereby creating a permanent mechanical bond. This heating must have taken place after the application of the enamel decoration. We can be certain of this because the two yellow decorative bands and the handle clearly rest on the enamel decoration. They could have been added only when the vessel had been heated nearly to the softening point. Also, the vertical elements of the botanical decoration are twisted at the bottom, and the particles of colored glass appear somewhat dispersed by stretching. This distortion indicates that the softened vessel was turned as its base was pressed flat with a tool.

From this evidence, a clear—and perhaps surprising—sequence of events emerges. A blank was made by core-forming; it was undecorated and lacked a handle. The core and the rod were left in place while the blank was annealed—that is, slowly cooled to room temperature. Then the enamel decoration was painted on and allowed to dry. To fuse the enamel, the decorated blank was gradually reheated to a temperature well above its softening point. The yellow bands were trailed on (see fig. 82), and the handle was attached. Finally, the bottom was flattened. After the completed object had hardened sufficiently to retain its shape, it was again annealed. When cool, the rod and core were removed from the finished object. Today the process is much simpler, thanks to the development of low-fire enamels, probably during the eighteenth century. Enamel decoration is painted on a fully formed blank, complete with handles if required, after which the object is placed in a kiln. The entire firing process can take place with the vessel standing stationary because modern enamels

are designed to fuse at a temperature well below the softening point of the glass from which the blank has been made.

The decoration on medieval Islamic vessels was fired utilizing a pontil in an only slightly modified version of the much earlier Egyptian process (see the text above on gold decoration). However, the blanks for these objects, unlike that for the Tuthmosis III jug, were fully formed. In the case of mosque lamps, for example, the suspension loops were put on before the decorating process took place. Evidence suggests that these objects were fired utilizing a dynamic process (not fired resting stationary in a kiln).

All the gilded and enameled vessels in this catalogue were made by blowing. An informal survey of a randomly selected group of thirteenth- and fourteenth-century Islamic objects so decorated showed that most had a distinct double pontil mark. The first was made during the manufacture of the blank (see figs. 40–43). The second, often somewhat off-center and messier, typically left deposits of glass atop the first one. This second mark was a remnant of the firing process.

During firing, the glass must have softened for an extended period because there are subtle distortions in the walls of some of these objects, especially near the rim. On many, but not all, enameled objects irregularities occur on the interior walls behind areas of enameling on the exterior. The unevenness can sometimes be seen in bright light reflecting off such a surface, and it may be felt by rubbing the fingers back and forth on the glass. Two further features, both almost always associated with the dynamic enamel-firing process (as opposed to the later static kiln-firing process), appear on some enameled objects made by blowing. These are the stretching of enamels and the disintegration of gold, which unavoidably accompany the expanding of an object during the firing process.

Many fifteenth- and sixteenth-century Venetian gilded and enameled objects underwent dramatic changes of form during the firing process, causing very noticeable stretching of the enamel (on this type of distortion, see Gudenrath 1991, pp. 236–37, figs. 175–78). Similarly, the Aldrevandin Beaker (cat. no. 151), which is closer in age to the gilded and enameled objects in this catalogue, offers irrefutable evidence that the upper part of the body slightly expanded during the firing process. Yet medieval Islamic enameled vessels, which were certainly fired after having been reattached to a pontil, apparently were prevented from changing shape when fired. An ongoing informal survey of typical Mamluk objects in various collections has yet to reveal evidence of significant metamorphosis during the firing process.

If we examine the objects in this catalogue with these points of evidence in mind, it becomes apparent that the usual practice was to make a fully formed blank, decorate it when cold, and then fire it attached to a pontil. Apparently, though, no significant change of shape during firing was ever intended or allowed. Two objects, however, bear witness to no doubt unplanned and nearly catastrophic changes that did occur during firing. The Corning candlestick (cat. no. 134) is noticeably crooked. It is difficult to imagine that the effort and expense required to produce this opulent decoration would have been lavished on a flawed blank. More likely, the crookedness developed during the firing process. A large pontil mark inside the tubular part of the object suggests this was the site of attachment during firing; perhaps a spot inside the base would have provided more

stability. As this is a unique example in glass of a common medieval Islamic form, and as the craftsmanship shows clear signs of struggle, it is easy to suppose that a construction of this complexity was nearly beyond the worker's ability.

Apparently, the Cavour Vase (cat. no. 129) narrowly escaped ruin at the conclusion of the firing process. When a pontil is attached to the base of an object, either at the end of the glassblowing process (see figs. 40–43) or to permit the firing (see Gudenrath 1991, pp. 236–37, figs. 175–78), care is always taken to ensure that it can easily be broken away upon conclusion of the work. (Like the Romans before them and the Renaissance Venetians after them, the makers of Islamic blown-glass objects apparently tolerated the usually discreet scar left by the pontil.) If the pontil is too lightly attached, the vessel may accidentally break free and crash to the floor. If it is attached too firmly, and/or if the base is not sufficiently thick, a hole may be torn in the bottom when the vessel is separated from the pontil. This misfortune apparently occurred at the end of the firing of the Cavour Vase. Next to a depression in the center of the floor is a blob of blue glass somewhat crudely flattened with a tool. The blob is a remnant of a desperate and unsuccessful attempt to patch a hole from the inside; no other reason for its presence seems plausible. On the exterior of the bottom, a blob of glass was more accurately placed atop the hole and more expertly flattened. This is the patch that saved the Cavour Vase. Judging from the overall wall thickness of the object—an indication of how long it could have survived exposure to room temperature after the accident—the salvage operation probably took place in less than forty-five seconds of no doubt frenetic activity.

Staining (luster-painting)
Cat. no. 108

While staining is accomplished by processes similar to those used in gold and enamel decorating, the effective mechanism is fundamentally different. In glass-staining, a chemical reaction takes place during firing between the glass and chemical compounds that have been painted on a cooled blank. As a result, glass at and near the surface changes color, develops a metallic sheen, or exhibits some combination of both effects. Just as in the firing of ceramic glazes—both lusters and other kinds—careful control of the kiln atmosphere (either oxidizing or reducing) is crucial. In gilding—both leaf and liquid types—and enameling, no chemical reaction occurs during firing; the added materials are merely bonded to the surface of the object by fusion.

After extensive experiments at the furnace and close examination of twenty or so vessels and fragments, it seems safe to hypothesize that the firing process required to achieve staining effects probably took place with the objects at rest in a kiln. The temperature and duration of heating required for firing seem not to have been so great as to cause these objects to slump. A range of symptoms observed on the objects supports this hypothesis. Generally speaking, in this admittedly small sample group there are no double pontil marks, the surfaces appear perfectly smooth, and there are no signs of stretching. Catalogue number 105 is the only exception. This bowl has what is probably a double pontil mark, and the upper gold-colored band of stain has subtle but undeniable stretch marks, showing that the diameter of the upper portion increased somewhat during firing. By contrast, the lower gold band is perfectly solid, indicating that no change of shape or size took

place. Study of a much larger sample will be required before we can determine whether this bowl is a unique case or one of a group of objects similarly treated.

HOT-WORKING

The hot-working processes employed to form and decorate glass are, with the possible exceptions of casting and pressing, as foreign to our everyday experience as cold-working processes are, at least in principle, familiar. Cane-making, fusing, slumping, manipulating, and above all glassblowing exploit perfectly one characteristic physical property unique to glass: as it is heated to ever-higher temperatures, its viscosity (resistance to flow) gradually decreases. Whereas metals abruptly change their state from solid to liquid and vice versa depending upon whether the material is hotter or cooler than a specific temperature known as the melting point, glass has no precise melting point since it is, technically speaking, always a liquid.

Two other physical characteristics of glass make these hot-working processes possible. First, hot glass can be stretched nearly infinitely. This property is perfectly exploited in cane-pulling (figs. 20–23) and glassblowing (figs. 30–43). Second, two pieces of hot glass can be touched together to make a perfect, often undetectable, join. The fusing process (figs. 24–26) is entirely dependent on this property of hot glass.

Just as these peculiar physical properties of hot glass and their infinitely complex interactions are difficult to describe, so too do the highly complex and dynamic glassworking processes used to make the objects in this catalogue defy successful description through narrative. It is hoped that the many illustrations at the end of this essay will clarify these processes, which are undoubtedly unfamiliar to many readers.

Casting

Cat. no. 51

Casting and pressing are probably the most ancient of all the hot glassworking techniques and were undoubtedly adopted from processes invented to form less exotic materials such as clay and metal. They were often used together to make objects. There are two simple methods of casting: molten glass is poured or ladled into a mold and cooled until hard; or chunks of cold glass are placed in a mold, heated in a kiln until the glass melts and fills the void, and then cooled. The mold may be made of stone, plaster, clay, or any number of other heat-resistant materials. Molds may be of the open variety, resembling those used in cooking, or they may be of the closed type, resembling those traditionally used in certain metal-casting processes.

Pressing

Cat. no. 52

Pressing is often used in conjunction with casting to quickly fill a mold and nearly instantly transfer decorative details to the surface of the glass. For example, a dollop of molten glass can be put on a flat, heat-resistant surface and immediately pressed hard from above with an intaglio-cut embossing tool. Similarly, molten glass can be poured into an open mold and then immediately pressed hard from above with a tool that acts as a plunger to quickly fill the mold before the glass hardens. In practice, the difference between casting and pressing can best be expressed in terms of time and force, assuming that during the processes the glass

is at the same temperature. Casting processes usually require that the glass and the mold be exposed to heat for a considerable length of time in order to allow the relatively moderate force of gravity to do the work of filling the mold. By contrast, in pressing processes the much greater mechanical force available to move the plunger fills the mold with glass in a second or less.

Cane-making

Cat. no. 64

In cane-making (figs. 20–23), a relatively compact mass of molten glass is stretched until it becomes long and thin. This process is usually undertaken in order to create elements for use in subsequent hot-working processes such as fusing and slumping, which are discussed below. While the purpose of incorporating canes in an object is always to create decoration, the canes may also constitute the entire fabric of the vessel wall. This is invariably the case in objects made by fusing and slumping cane slices (cat. nos. 62, 63, 65).

Canes are of two types: those intended to be viewed from the side and those intended to be viewed from the end. Islamic workers and their patrons preferred the latter type. The method of preparing a cane with a bull's-eye pattern—visible from the end—is as follows. Glass of one color—say, black—is gathered thickly on the end of a metal rod. After the glass has been shaped into a solid cylinder and allowed to harden, it is dipped into a pot of molten glass of a different color—say, opaque white. This process can be continued to build up alternating layers of contrasting colors. After the glass has been thoroughly reheated, it is ready to be pulled to become a cane. A gradual pull over a short distance results in a stout cane; for thin canes, the length of a pull may exceed thirty feet. After cooling, stout canes (those more than half an inch in diameter) may require cutting by laborious sawing with a soft-metal blade and a slurry of grit. Thinner canes may be quickly sliced with a sharp chisel of hard stone or metal.

Fusing

Cat. no. 65

Nearly as ancient as casting and pressing, fusing is the process of joining with heat two or more pieces of glass while they rest on a flat heat-resistant (refractory) surface. Fusing may be accomplished over a relatively long period of time in a kiln that is just hot enough to give the glass a tacky surface, or it may be carried out much more quickly utilizing a high-temperature furnace. Figures 24 to 26 illustrate the fast process (the cane slices were fully fused in about five minutes).

If the finished product is intended to be flat, the object is removed from the refractory surface upon completion of the fusing process and placed in an annealing oven for gradual cooling. If it is to be given contour, the slumping process is immediately begun.

Slumping

Cat. no. 66

Slumping (figs. 27–29) is a method of transforming a flat piece of glass into a contoured one. Usually, the slumped product is a shallow bowl. Slumping is accomplished by the force of gravity. A piece of flat glass is placed atop a refractory form made of metal or perhaps ceramic. As the glass is softened with heat, it flows down over the form. After it has assumed its final shape, the glass is pried from the form and placed in an annealing oven.

To prevent the hot glass from sticking, a thin coating of kiln wash (fired clay) is applied to the surface of the form before use. Because much of the kiln wash sticks to the glass, cold-working is always required to grind clean and then polish the surface of the object that touched the slumping form.

Manipulating

Cat. no. 29

Manipulating is a general term for a variety of hand-working processes involving hot glass. At different periods Islamic workers apparently took pleasure in using various tools, often tweezerlike, to squeeze and reshape vessels. More commonly they added bits of hot glass to objects and then pulled, twisted, and cut them until they became part of the structure of an object or decoration. Unique among Islamic workers of the eighth and ninth centuries was the practice of resoftening a vessel immediately after completion and squeezing the wall at various points around the circumference with a two-jawed crimping tool (cat. no. 47). The pattern thus impressed on the glass vaguely resembles the effect of dip-molding (figs. 34–36).

Glassblowing

Cat. no. 1

In choosing photographs to illustrate the enormous variety of glassblowing and manipulating techniques used in Islamic glass workshops over a period of centuries, we have attempted to give as much technical information as possible through a parade of characteristic and interesting "types." Form-creating processes and ornament-creating processes are shown in a progression from the most basic (figs. 30–43) to the most complex (figs. 85–91). The remainder of this essay is intended to augment the figure captions; it is hoped that the reader will closely examine the illustrations, which are "synchronized" with the narrative.

Glassblowing is of three general types: free-blowing, dip-mold blowing, and blowing into a full-size mold. As the name suggests, free-blowing is accomplished without any accessory tool, mold, or form that would impede the expansion of the glass as it is inflated (figs. 47–49). After free-blowing, the glass may be reheated and reshaped by a variety of processes. Dip-molding is employed early in the blowing process, well before the glass bubble has reached its full size (see figs. 34–36, 44, 45). Some of its uses and techniques are discussed below. Like free-blown glass, dip-molded objects can be reheated and further reshaped by the worker. Blowing into a full-sized mold strictly limits the expansion of the glass bubble and fully defines both its size and its shape.

The basic glassblowing process is illustrated in figures 30 to 43. Shown in full is the making of a cup with dip-molded decoration similar to the one in catalogue number 16. The piece takes about three minutes to make. Dip molds, which were first used by workers of the Roman period, produce variations in the wall thickness of the bubble of glass. Because these variations in thickness have lenslike effects and in transparent glass produce optical variations, these tools are often referred to as optic molds. Islamic workshops employed molds with a great variety of patterns (cat. nos. 10, 11). Figures 34 to 36 show the use of a diamond-patterned mold. Figures 44 and 45 show a ribbed mold in use. The ribs can be left straight (fig. 44), or they may be twisted by holding the end of the bubble of glass stationary with a tool while rotating the blowpipe (fig. 45).

Islamic workers closely followed many Roman glassblowing practices. Figures 46 to 51 illustrate two characteristic Roman constructions. First, figures 46 to 49 show the formation of a vessel with a long tubular neck above a bulbous body. This tube can be easily and cleanly broken by the worker during the transfer to the pontil. The other common feature of Roman-period glass is the integral base ring; Islamic workers seem to have created this so-called Roman foot by a similar series of maneuvers (see figs. 50, 51).

The oddly shaped rim and characteristic long S-curved neck of sprinkler bottles (cat. no. 145) were made by holding the rim with tweezers and pulling outward while raising and lowering the hand to give the required curvature to the neck (figs. 53–55).

Like the tubular neck shown in figures 48 and 49, that formed by the double gather can also be cleanly broken (figs. 56, 58; see also cat. no. 24). After a tube of small diameter has been made and allowed to harden, glass is gathered on its end. When the newly added glass has resoftened the tube, the two are inflated together to form the vessel body. A detectable though sometimes subtle line always remains at the upper edge of the second gather of glass. This technique was first used by Roman workers of the late first century B.C. to make blanks for two-color cameo vessels; the tube was typically made of dark blue glass, and the second gather was taken from a crucible of molten opaque white glass (see Gudenrath 1991, pp. 227–28, figs. 99–108). This technique is still widely used in central European factories in mold-blowing processes.

A third method for producing a tubular neck above a vessel body is shown in figure 59. Here a bubble of glass is divided in half by a constriction. Pulling firmly outward while holding the constriction with a tool elongates the nearer half into a tube (cat. nos. 17, 18). "Boring" through the soft glass with sharp tweezers produces an ornamental hole. After the glass has been reheated, the hole is enlarged to the required diameter by using tweeezers as a reaming tool. (Although not represented in the present catalogue, this "doughnut-hole" construction was used by Islamic glassworkers and is shown as a technical curiosity; for an example, see Pinder-Wilson 1991, p. 129, fig. 161.)

An important structure-building process is shown in figures 61 to 67, in which a blown foot is under construction. Widely employed in Islamic glass workshops, this process would be more fully exploited by virtuoso Venetian Renaissance glassblowers, who would use it to make elaborate stems, decorative knobs, finials, and even hollow handles.

The very longest and thinnest vessel necks (cat. no. 146) were made not on the blowpipe but rather with the vessel attached to a pontil. Near the end of the work, the neck and shoulder were thoroughly resoftened, a flange was formed at the vessel's mouth, and then the neck was forcefully pulled outward. The flange could then either be broken off to leave a clean-edged opening or be left intact.

Typical manipulation, often called "bitwork," is shown in figures 68 and 69 (see also cat. nos. 1 and 29).

Unique to medieval Islamic glassworking is a construction called a doughnut-ring foot (see fig. 99 for an example). Through a series of frankly idiosyncratic maneuvers (figs. 70–78) a strong base is created. The purpose of this odd construction, unique in the history of glass, remains frustratingly elusive.

Islamic glassblowers made blanks that would later be decorated with cameo carving (cat. no. 90) utilizing the dip-overlay method. This differs from the Roman practice (see Gudenrath and Whitehouse 1990, pp. 112–13, figs. 71–74) only in that the entire first gather was immersed in a crucible containing glass of a contrasting color. Alternatively (see cat. no. 99), when only a small area of a vessel was to be cold-worked with cameo decoration, a dollop of hot colored glass was added and smoothed into the vessel wall (see figs. 79–81). In either case, after the blank was cooled the worker cut away part of the overlay to make the cameo decoration using a cold-working process, most probably wheel-cutting.

In the decorative technique known as threading and combing (cat. no. 53; figs. 82–84), small pieces of glass are attached lightly to the tip of an elongated bubble of glass while the latter is rotated on the end of a blowpipe, forming spiral threads that eventually cover the bubble. The threads are later combed into decorative patterns with a pointed tool (fig. 83). In Islamic glassmaking, threading and combing are usually associated with core-formed vessels (see Gudenrath 1991, pp. 214–15, figs. 6–8). The technique is considerably more difficult to carry out on a blown vessel, since the walls tend to collapse during combing. In what seems to have been an Islamic invention, threading atop dip-molded ribs followed by intense reheating while rapidly spinning the blowpipe results in a vessel covered with regularly spaced dots or dashes (cat. no. 56).

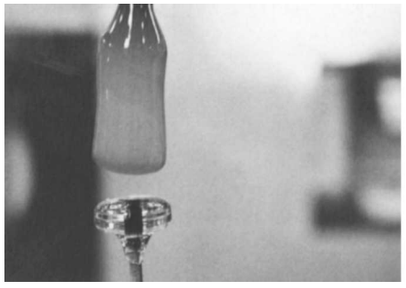
The most complex and risky process used to decorate the objects included in this catalogue was trapping enamel and/or gold decoration between two layers of glass (see cat. nos. 110–112; figs. 85–91). Reheating a decorated blank is inherently uncertain, as the glass may easily crack during the process; moreover, the feat of rapidly inserting a softened glass bubble into a close-fitting hot cup (figs. 87–89) is difficult and tricky. Considering the time and effort involved in making sandwich glass, not to mention the expense (the gold in these objects is rather thick foil, as opposed to thin leaf), Islamic artisans must always have begun work on one of these objects with some trepidation. It is not surprising that so few are in existence.

Annealing

At the conclusion of any hot-working process, the glass must slowly and carefully be cooled to room temperature. For relatively large, thick objects, this gradual decline in temperature, called annealing, may require several hours. Glass (like most other materials) shrinks as it cools, and a hot glass object must be made to lose heat nearly evenly in all of its parts, lest internal stress develop between, for example, the quickly cooling surface and the much more slowly cooling core. A more common annealing problem facing the Islamic workers who made the objects illustrated in this catalogue would have been uneven cooling in areas such as the join between a handle and a relatively thin vessel wall, as evidenced by catalogue numbers 1 and 90, for example. If they are of sufficient magnitude, the stresses that result will sooner or later cause an object to crack.

The author wishes to express his thanks to Steven Barall, whose photographs of Mr. Gudenrath demonstrating techniques accompany this essay. He would also like to acknowledge David Whitehouse, Executive Director of The Corning Museum of Glass, Amy Schwartz, Head of the Studio at the Museum, and the Studio staff, including Harry Seaman, Karen Vaughn, and Jen Zitkov.

Cane-making, Fusing, and Slumping (figs. 20–29)



Cane-Making *Fig. 20. Successive gathers of contrasting-colored glasses have been built up on the end of a metal rod. On another rod, a thick disk of colorless glass has been formed and allowed to cool and stiffen.*

Fig. 21. When the mass of colored glasses has fully softened after intense heating, it is pressed against the disk on the other rod.

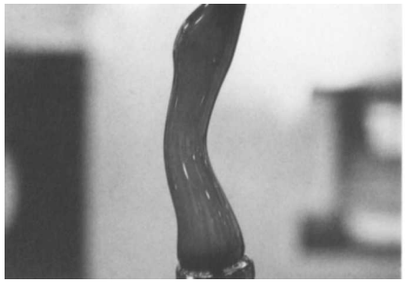


Fig. 22. The two rods are pulled in opposite directions, elongating the soft glass.

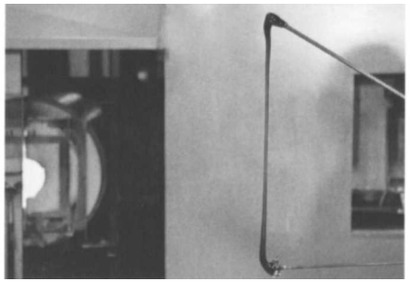


Fig. 23. Pulling continues at a rate that will produce a cane of the required length and diameter. The bull's-eye pattern of colors visible when the cane is cut up crosswise will remain intact no matter how attenuated the cane becomes.

Fusing *Fig. 24. After the cane has cooled, it is sliced into many pieces, each a few millimeters long. The pieces are upended and arranged close together in a circle on a refractory plate.*

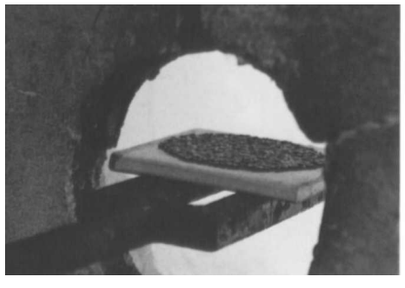


Fig. 25. The plate (in this case a piece of ceramic kiln shelf) is placed in a furnace or kiln.

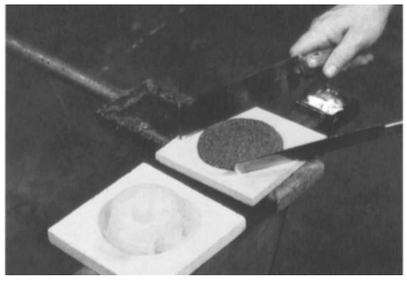
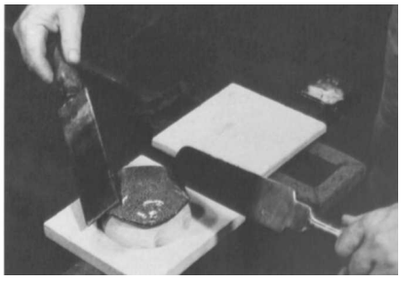


Fig. 26. After intense heating, the cane slices flow together, forming a disk. Tools are used to squeeze the disk at its edges to close any gaps and to make the object perfectly round.



Slumping *Fig. 27. The soft disk is transferred to a slumping form.*

Fig. 28. Reheating softens the glass so it will slump down and fully conform to the shape of the mold.

Fig. 29. When it has cooled enough to become hard, the glass object is pried free of the form and placed in an annealing oven for slow cooling to room temperature.

The Basic Glassblowing Steps, Used in Making a Dip-Molded Tumbler (figs. 30–43)

Marvering *Fig. 30. Hot glass is gathered from a furnace on one end of a long metal tube called a blowpipe. Inside the furnace, the glass is maintained at a temperature of roughly 2,000°F (1,093°C).*

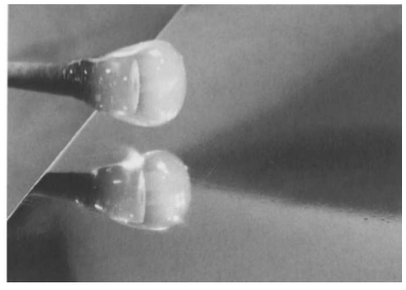


Fig. 31. The glass receives its initial shaping on a cool metal surface called a marver.

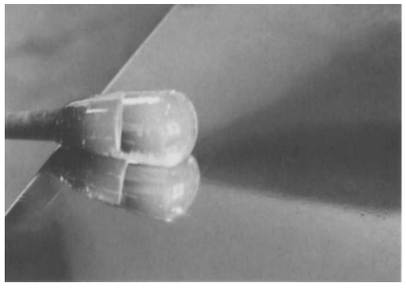


Fig. 32. Rolling the glass back and forth on the marver causes the gather to narrow and elongate.

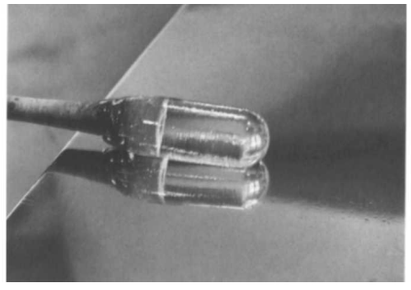
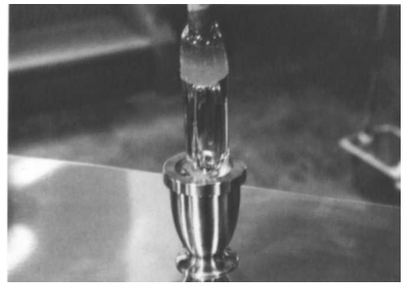


Fig. 33. Marvering is complete when the gather is perfectly cylindrical, concentric with the blowpipe, and somewhat cooled.



Dip-Molding with a Diamond-Patterned Mold *Fig. 34. After the glass has been inflated by blowing, it is lowered about three-quarters of the way into a dip mold (the upper part remains outside the mold).*

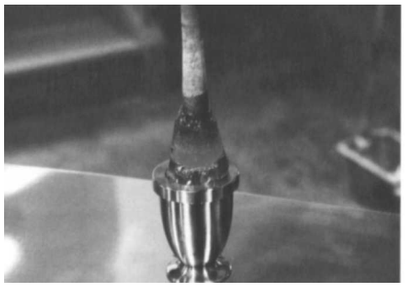


Fig. 35. The glass is suddenly and forcefully inflated inside the mold, and the pattern of the mold is transferred deeply into the glass.

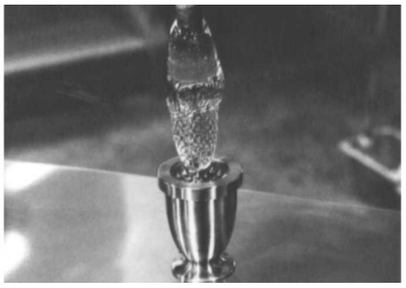
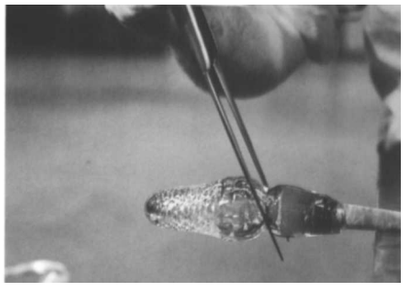
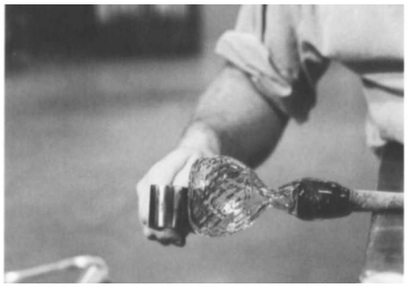


Fig. 36. When the glassworker deflates the bubble slightly by sucking a little air out of the blowpipe, the glass pulls free of the undercuts in the mold and can be removed.

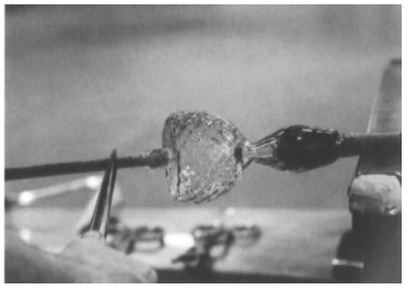


Making a Constricted Neck *Fig. 37. A constriction, usually called a neck, is formed between the still-inflated glass and the blowpipe by using a tool known as "the jacks." Later (fig. 41) this constriction will make it easy to separate the glass from the blowpipe.*

Fig. 38. After more inflation, the neck is made narrower.

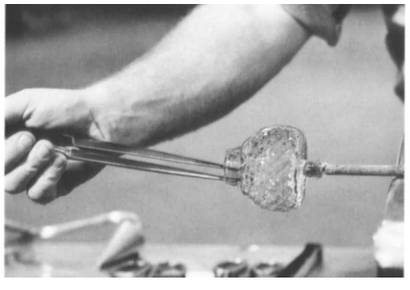


Flattening the Bottom *Fig. 39. Following reheating to soften the end of the bubble, the base of the object is formed.*



Transferring the Tumbler to the Pontil *Fig. 40. The pontil—a solid metal rod with a small amount of soft glass on one end—is attached to the center of the base.*

Fig. 41. The glassworker delivers a thermal shock to the neck by squeezing it with the cool pincers and at the same time taps forcefully on the blowpipe, causing the neck to break.



Creating a Rim *Fig. 42. After the object is reheated, the jacks are used to widen the hole left by the blowpipe.*

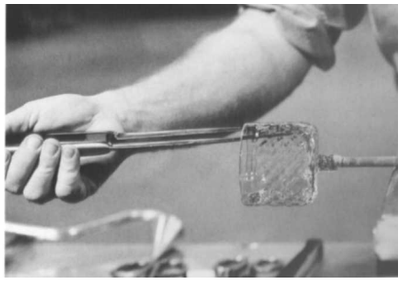


Fig. 43. More reheating follows, and the vessel is given its final shaping. When cool enough to hold its form, the finished object is broken off from the pontil and placed in the annealer for gradual cooling to room temperature.

Ribbed Dip-Molding (figs. 44, 45)

Fig. 44. Unlike the diamond-patterned mold shown in figures 34 to 36, a mold with vertical ribs has no undercutting that would require shrinking the bubble of glass to release it from the mold.

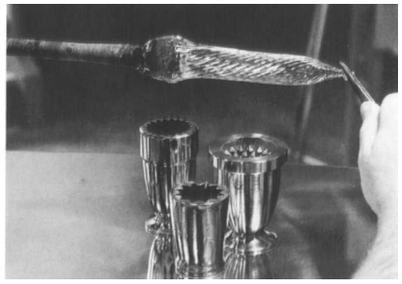
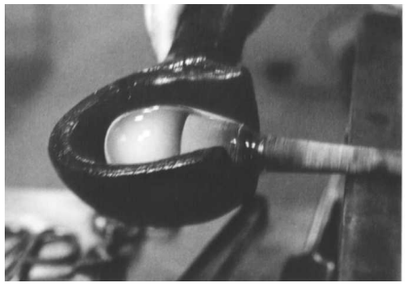
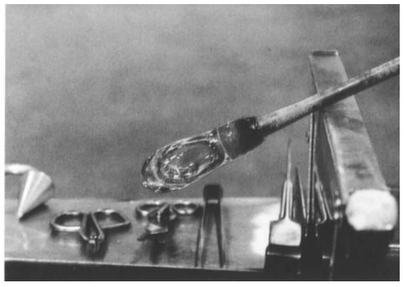


Fig. 45. The pattern of ribs may be left parallel as the vessel is blown to its full size. Or, to form a spiral pattern, the tip of the glass may be held stationary with a tool while the blowpipe is turned.

Making a Sprinkler Bottle (figs. 46–55)



Blocking *Fig. 46. A water-soaked wooden mold, known as a block, can be used instead of the marver (figs. 31–33) to give a gather of glass its initial shaping. The block is lifted firmly against the glass as the blowpipe is slowly turned.*



Making a Tubular (Roman) Neck *Fig. 47. The glass is rapidly inflated, leaving a thick mass at the tip of the bubble.*

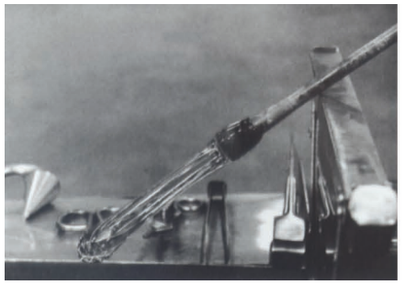


Fig. 48. After the blowpipe is spun end over end, it is held down to elongate the bubble.

Fig. 49. Because it is thin walled, the tube thus formed cools quickly. The thick glass at its tip stays soft and can be rapidly inflated.

Making a Roman Foot *Fig. 50. A constriction (neck) is formed near the bottom of the bulbous vessel body.*

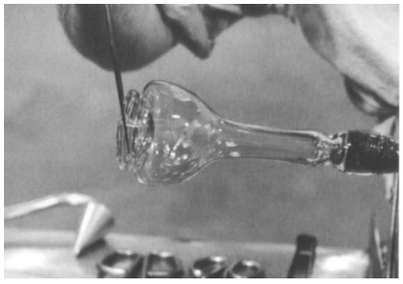
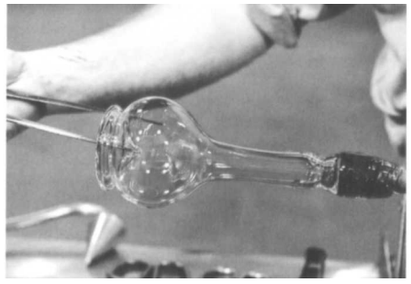
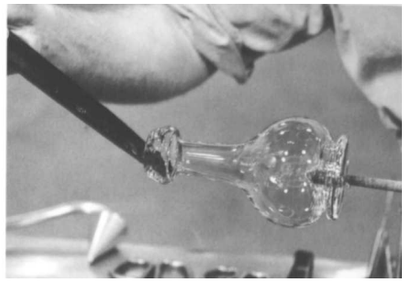


Fig. 51. A blade of the jacks is placed on either side of the constriction. The blades are squeezed together to fold and flatten the glass.



Making a Kick *Fig. 52. The tip of one blade of the jacks is pushed inward at the center of the base to form an internal depression, called the kick.*



Forming a Sprinkler-Bottle Neck and Opening *Fig. 53. After the object has been transferred to a pontil (figs. 40, 41), the open end is reheated and a bulge is formed near the rim. Here, the bulge is widened by a process called manipulating or tooling.*

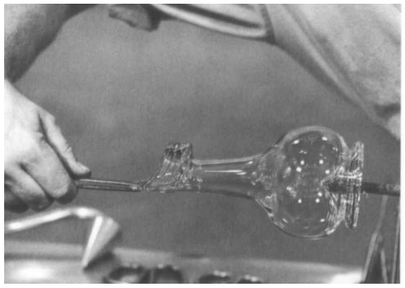


Fig. 54. After the entire neck has been fully reheated, the rim is grasped with tweezers and pulled outward.

Fig. 55. The neck and rim of the sprinkler bottle are given their final form by pulling the edges of the soft glass downward and then rapidly upward.

Making a Neck by the Post Technique (figs. 56–58)

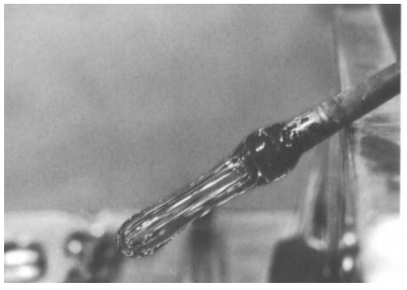


Fig. 56. Glass is gathered on the end of a blowpipe and then either marvered (figs. 31–33) or blocked (fig. 46). A bubble is blown and elongated to form a tube.

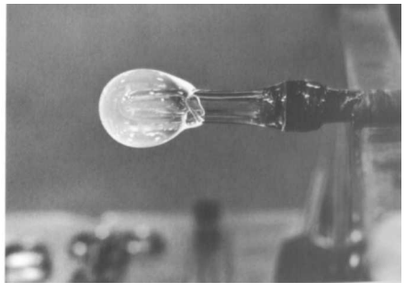


Fig. 57. After the tube has cooled enough to harden, more glass is gathered on its outer end.

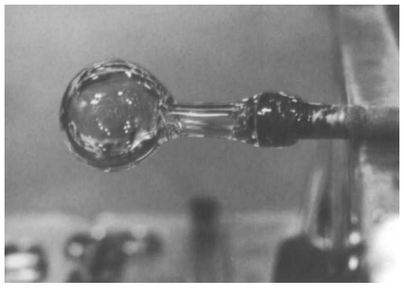
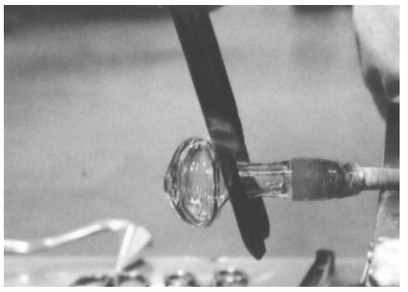


Fig. 58. When the heat from the newly gathered glass has softened the tube, glass and tube are inflated together, to form the vessel body. The tube, of relatively small diameter, can be easily and cleanly broken off during the transfer to the pontil.

Making a Blown Foot (figs. 59–67)



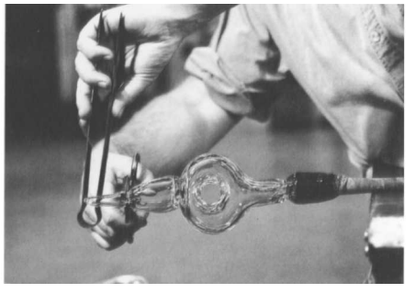
Forming a Neck by Pulling *Fig. 59. After gathering glass on the blowpipe, marvering (see figs. 31–33) or blocking (fig. 46), and blowing a bubble (fig. 47), the glassworker constricts the glass and, forcing the jacks outward, forms a tubular neck.*

Making a Doughnut-Bottle Hole *Fig. 60. After further inflation, the end is reheated and flattened. Pincers are driven through the center, creating a hole; after further heating and inflating, the inner surface is smoothed and dilated using the pincers.*

Blowing a Foot *Fig. 61. With the vessel resting upside down, a soft bubble of glass is brought into proper position for making a foot or base.*

Fig. 62. The bubble is forcefully pushed downward onto the bottom of the vessel, and the two parts are immediately fused together.

Fig. 63. After the blowpipe attached to the bubble has been lifted to create a tapering tube, the still-soft glass is cut free of the blowpipe.



Opening the Foot *Fig. 64. A narrow constriction is formed with the jacks and then held with shears to chill and weaken its surface.*

Fig. 65. The tip of the bubble is tapped sharply with the jacks, and it breaks away, leaving a hole in the outer end of the foot bubble.

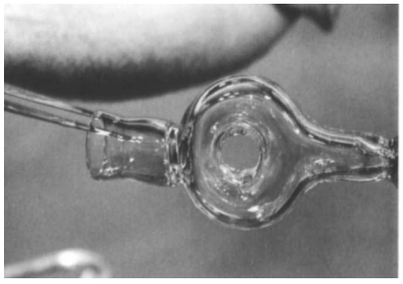


Fig. 66. After the foot has been reheated, the hole is enlarged and the edge flared.

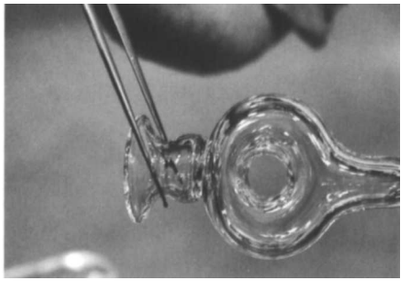


Fig. 67. The foot is given its final shape by manipulating it with the jacks.

Making Ornamental Bitwork (figs. 68, 69)

Fig. 68. A bit of glass freshly gathered from the furnace at the end of a metal rod is fused to the vessel's shoulder and then pulled away slightly to form a thick thread.

Fig. 69. The thick thread of glass is tooled and pressed against the shoulder to create the decorative pattern. Finally, the glass is cut free of the metal rod, and the finished object is broken from the pontil and placed into the annealing oven for slow cooling.

Creating a Doughnut-Ring Foot (figs. 70–78)

Fig. 70. A constriction (neck) has been formed near the blowpipe in a bubble of inflated glass (figs. 37, 38). Another constriction is begun using the jacks near the tip of the elongated bubble.

Fig. 71. The constriction is made narrow but not squeezed to the point where the passage between the two parts is closed off.

Fig. 72. The constriction is held tightly with shears to both weaken and chill it. Tweezers are brought into position to break away the outermost part of the glass.

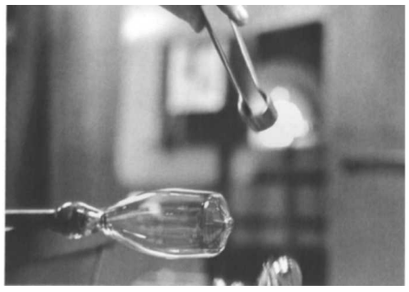


Fig. 73. A sharp tap on the end of the glass cleanly breaks the tip away, leaving a hole in the end of the bubble.

Fig. 74. Having been reheated to slightly soften the glass, the bottom is forcefully pushed flat.

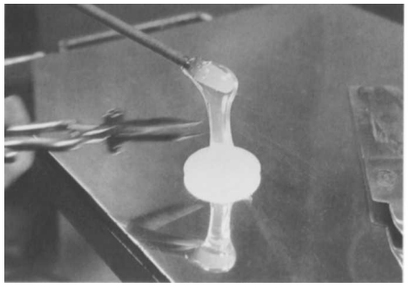


Fig. 75. A gob of glass is poured onto a flat surface.

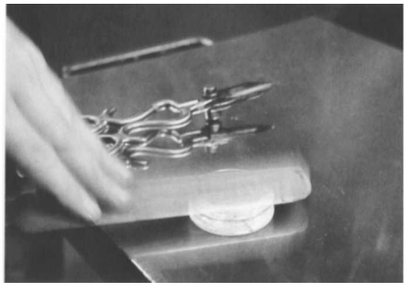


Fig. 76. The gob is flattened with a tool to form a disk.

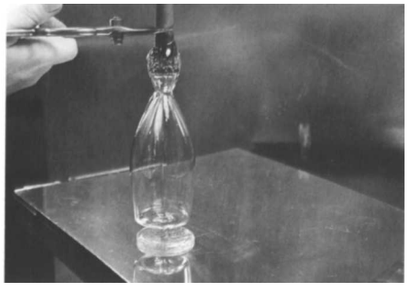


Fig. 77. The still-hot vessel is lowered onto the soft disk.

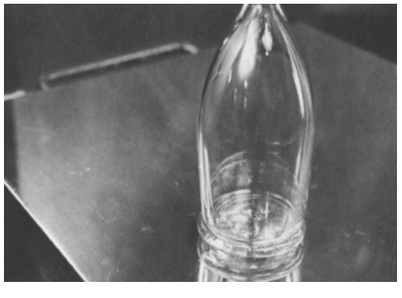


Fig. 78. Vessel and disk are firmly pressed together, creating a permanent bond. The glassblowing process is continued to complete the tumbler as in figures 40 to 43.

Adding a Pad of Colored Glass to the Surface of a Vessel (figs. 79–81)

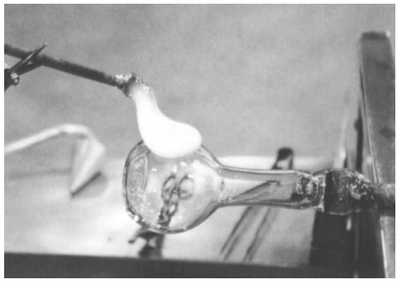


Fig. 79. A flattened mass of colored glass freshly gathered from the furnace is placed on the side of a partially completed vessel made of colorless glass.

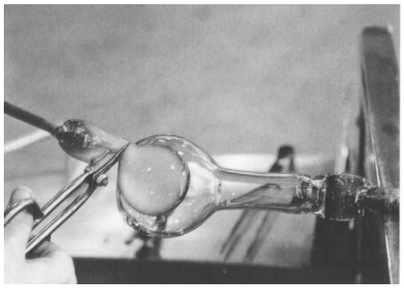


Fig. 80. The newly added glass is cut away from the metal rod, which had been used to gather and deliver it.

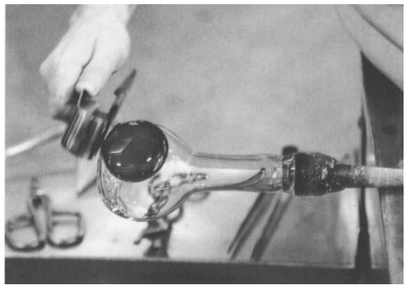


Fig. 81. The colored glass is pressed flat. The glassblowing process continues until the vessel is completed (see figs. 50–55, for example).

Threading and Combing (figs. 82–84)

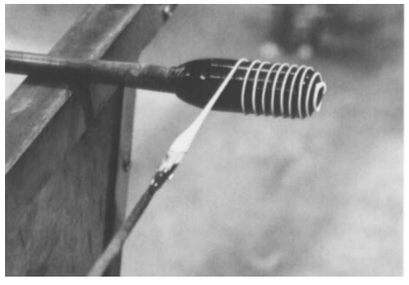


Fig. 82. A small piece of softened white glass has been touched to the tip of an elongated bubble of dark blue glass rotating on the end of a blowpipe, thus forming a spiral thread. The entire bubble is soon covered by the thread.

Fig. 83. After the bubble is reheated, combing begins. A pointed tool is dragged up the softened surface, pulling and distorting the spiral thread of white glass.

Fig. 84. The bubble is blown larger, and a broad constriction is formed in the glass near the blowpipe (figs. 37, 38) as the glassblowing process is continued.

Fusing Gold and Enamel Decoration between Two Layers of Glass (figs. 85–91)

Fig. 85. Strips of gold leaf on a paper backing are attached in patterns to the surface of a cooled tubular glass blank. A mixture of water and gum arabic is frequently used as an adhesive.

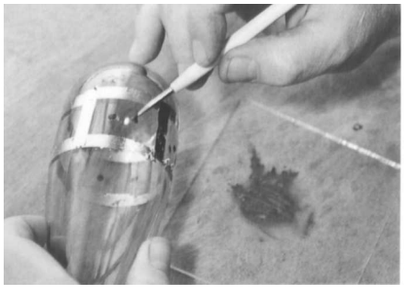


Fig. 86. Dots of intensely colored powdered glass mixed with water and gum arabic are also applied to the surface of the blank. These will fuse and form enamel decoration.

Fig. 87. After the decorated blank has been heated to a temperature near its softening point (about 1,300°F [704°C]), it is reattached to a blowpipe. A low glass cup with a rounded bottom has been blown and placed in the same hot kiln.

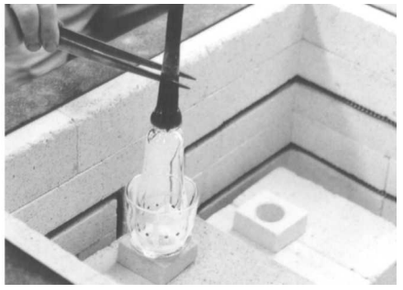


Fig. 88. After the lower half of the blank has been thoroughly softened, it is carefully lowered into the cup.

Fig. 89. Briskly inflated, it immediately fuses to the inner surface of the cup.

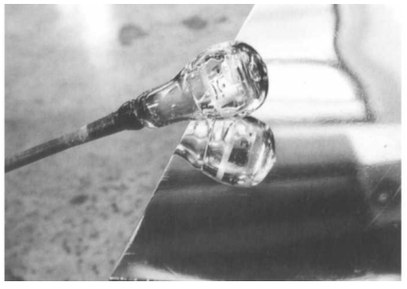


Fig. 90. After reheating, the upper edge of the cup is marvered inward to make complete contact with the blank.

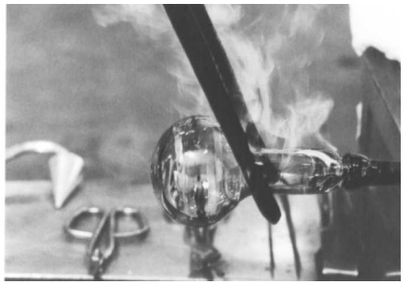


Fig. 91. The neck is pulled to its final length and diameter, the body is further inflated, and the bottom is flattened. When cooled almost to hardening, the object is broken from the blowpipe and placed in an annealing oven. The rim will be finished by cold-working.

Catalogue

Undecorated Blown Glass

DAVID WHITEHOUSE

The history of glassmaking before the Industrial Revolution may be divided into two stages. In the first, which began in the third millennium B.C. and ended in the period from 100 to 50 B.C., craftsmen discovered how to transform raw materials into glass and how to make vessels and other objects by using such techniques as casting in molds and forming molten glass around a removable core (Grose 1989; Stern and Schlick-Nolte 1994). Since these techniques were slow and labor-intensive, glass was made in relatively small quantities and was seldom widely available. In the second stage, which began in the first century B.C. in the Syro-Palestinian region, glassworkers found that molten glass could be gathered on the end of a blowpipe and then formed by inflation and manipulation with tools (Stern 1995). The invention of glass-blowing enabled craftsmen to make glass vessels quickly and in a very wide range of shapes, and glassware consequently became available to most sections of society.

Long before the expansion of Islam, blown glass was manufactured in many parts of the Mediterranean region and western Asia, flourishing, for example, in Egypt and Syria. There is no reason to suppose that the Arab conquests disrupted existing patterns of production, and it is impossible to distinguish between many of the objects made in the early and late seventh century. Indeed, a recent study of finds from excavations in Beirut showed that glass of the "Byzantine" type was being made in the vicinity in the second half of the seventh century (Foy forthcoming). These excavations, like others at Fusṭāṭ, Nishapur, Sīrāf, and many other sites, indicate that glass vessels were commonly used in the central Islamic lands (and probably elsewhere in the Islamic world) throughout the Middle Ages. Although various objects were formed by casting and pressing, in the medieval Islamic world the vast majority of glass vessels were inflated, either off hand (that is, without the use of molds) or inside a mold.

Opposite: detail, cat. no. 5

1

1. Cup
Egypt, 8th–10th century
H. 10.7 cm (4¼ in.), diam. at rim 10.4 cm (4⅛ in.)
Transparent pale yellowish brown
Free blown and applied
CONDITION: The object is intact and virtually without weathering. The glass contains numerous small bubbles.
Victoria and Albert Museum, London C165–1932

This cup has a cylindrical body, a handle, and four feet. The rim is plain, with a rounded lip. The wall descends almost vertically, but with a slightly convex profile, and curves in at the bottom. The base is plain and has a pontil mark. A small vertical handle was formed by applying a bit to the lower wall, drawing it out, up, and in, and reattaching it to the wall at the midpoint, immediately above the first attachment; the handle was subsequently pinched at the bottom, center, and top to form three flat semicircular projections. The small triangular feet were made by applying additional bits at the edge of the base. *DW*

LITERATURE: Watson 1997, pp. 29, 152, fig. 27

2. Saucepan
Egypt or western Asia, 10th–11th century (?)
H. 5.5 cm (2⅛ in.), diam. at rim 5.4 cm (2⅛ in.), l., body and handle, 12.2 cm (4¾ in.)
Almost colorless and translucent deep blue
Free blown and applied
CONDITION: The object is intact. The surface is dull, with some iridescence.
Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst Gans 402

This pan has a cylindrical body and a handle. The flange rim slopes down toward the rounded lip, the neck is very short, and the sloping shoulder has a rounded edge. The wall is straight, tapering slightly and curving in at the bottom. The base is plain and has a kick and a pontil mark. The handle, which is straplike in cross section, was applied to the top of the rim, then drawn out and slightly up; the end is tooled into a loop.

Glass saucepans of this general type were widely used in the Roman world, serving as ritual objects in religious ceremonies and in sets of drinking vessels (Whitehouse 1997, no. 346). This object differs from Roman examples in a number of respects, notably the form of the rim, the loop at the end of the handle, and the lack of a foot. *DW*

LITERATURE: *Islamische Kunst* 1954, supplement, no. 468; Brisch et al. 1971, no. 287; Brisch et al. 1979, no. 287; Kröger 1984, no. 131

2

3

3. **Sprinkler**
Egypt or western Asia, 12th–13th century (?)
H. 21.3 cm (8⅜ in.), max. w. 11 cm (4⅜ in.)
Almost colorless, with green tint
Free blown
CONDITION: The object is intact and bears the remains of iridescent weathering. The glass contains numerous small bubbles.
The Corning Museum of Glass, Gift of I. C. Elston, Jr. 54.1.73

This bottle has an oblate spheroid body, a long neck, and a narrow mouth. The rim is plain. The neck is wider near the bottom, where there is a constriction, than at the top. The base is plain and has a tall conical kick and a pontil mark. *DW*

LITERATURE: Unpublished

4. Bottle
Western Asia, probably Iran, 12th–early 13th century
H. 22 cm (8⅝ in.), max. diam. 14.5 cm (5¾ in.)
Transparent pale brown
Free blown and tooled
CONDITION: The object is intact. The surface is dull, with patches of whitish weathering and iridescence. The glass contains numerous very small bubbles.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 129 G

This bottle has a wide pear-shaped body and a flaring six-lobed mouth with a rounded lip. The neck has the form of a truncated cone, wider at the bottom than at the top, with a bulge just below the narrowest point; it merges with the wall, which flares to the greatest diameter and then curves down and in to the bottom. The base is plain and has a kick and a pontil mark. On the interior, immediately above the widest part of the body, there is a continuous horizontal rib made by tooling.

The flaring lobed mouth recalls those of certain Iranian ceramics from the twelfth and early thirteenth centuries (see, for example, Lane 1965, pl. 71C, and Sotheby's, London, sale, April 28, 1994, lot 45), including two Kāshān lusterware bottles (Watson 1985, no. 83, and Sotheby's, London, sale, October 10–11, 1990, lot 114). *DW*

PROVENANCE: Christie's, London, sale, June 11–12, 1984, lot 587
LITERATURE: Carboni 2001, no. 46a

5. Bottle
Egypt or western Asia, date uncertain
H. 29.5 cm (11⅝ in.), max. w. 21.4 cm (8⅜ in.)
Transparent bluish green
Free blown
CONDITION: The object is intact. The surface is dull and slightly pitted, with the remains of gray to brownish weathering on the interior. The glass contains numerous small bubbles.
The Corning Museum of Glass, Gift of I. C. Elston, Jr. 54.1.129

The wall of this object has been compressed, with the result that the body appears to be globular when seen broadside but is elliptical in horizontal cross section. The rim has a flat inturned flange of irregular width. The neck is cylindrical, slightly wider near the bottom than at the top, but with a slight constriction immediately above the shoulder. The shoulder slopes and has a rounded edge. On the broader sides, the wall descends vertically before curving in at the bottom; on the narrow sides, it curves down, out, and in. The object has prominent blowing spirals. The base is plain and has a low kick but no pontil mark. *DW*

LITERATURE: Unpublished

6. Lamp
Egypt, ca. 9th–11th century
H. 20.5 cm (8⅛ in.), diam. 15.5 cm (6⅛ in.)
Purplish
Free blown from two gathers and applied
CONDITION: The object is intact and without weathering. The glass contains streamers and dark inclusions.
Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst I.2337

This lamp has a bowl in the form of a truncated cone, a stem, a foot, and three small vertical handles. The tubular rim was made by folding out and down. The wall tapers and bulges slightly before it curves in at the bottom, where it expands to form a slightly irregular horizontal flange. The short stem, which was applied to the bowl, has two tooled constrictions. The foot is a disk with a rounded edge made by folding; its underside bears a pontil mark. The handles at the top were made by applying bits to the exterior of the upper wall, drawing them out, up, and in, and attaching them to the top of the rim.

Lamps of this general type have a long history. Except for the flange, the form of the bowl can be traced back to the fifth century, when it had a wide distribution in the Mediterranean region, especially in the east (von Saldern 1980a, pp. 46–49; Whitehouse 1997, no. 339). Examples excavated from Umayyad contexts in the Near East include fragments from Bet She'an, Israel (Hadad 1998, p. 64), and Jerash, Jordan (Meyer 1987, p. 212). Nevertheless, only one parallel has been found for the combination of a bowl of this form with a stem and foot. Discovered during excavations at Fusṭāṭ, in a context that also contained fragments of "Samarra-type" ruby-and-gold luster pottery, the comparable work has been attributed to the ninth century (Pinder-Wilson and Scanlon 1973, pp. 22–23, no. 14).

The presence of handles and a foot indicates that the lamp was designed both to be suspended from a hanger (similar to the one that accompanies cat. no. 7) and to stand on a flat surface.

DW

PROVENANCE: Acquired in Cairo in 1913
LITERATURE: Lamm 1929–30, p. 33, no. 17 (mentioned); *Islamische Kunst* 1954, no. 286; Kröger 1984, no. 13

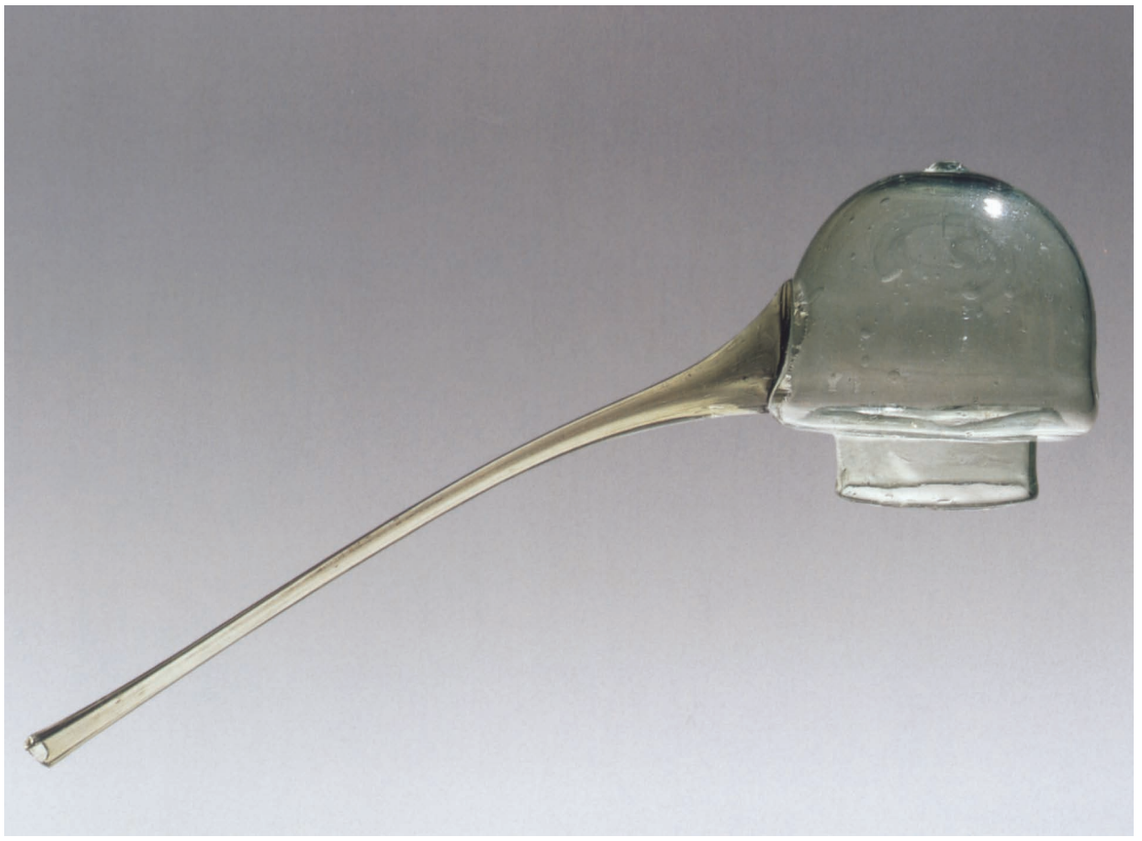
7. Hanging Lamp
Near East, ca. 10th–12th century
H. 8 cm (3⅛ in.), diam. 6.3 cm (2½ in.)
Colorless
Free blown and applied
CONDITION: The object is intact except for one handle, which is incomplete. The surface is pitted and extensively weathered.
Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst I.1/63

This lamp has a roughly globular body, a neck shaped like a funnel, and three small vertical handles. The rim is plain and rounded, and the neck has straight tapering sides. The shoulder is rounded, and the wall curves down and in below it. The base is plain and has a low kick and a pontil mark. At the center of the floor is a tubular wick holder. The handles were dropped onto the exterior of the upper wall, drawn out, up, and in, and attached to the edge of the shoulder.

Lamps of this type, with or without wick holders, were widely used in the Islamic world, as well as in parts of southern Europe (see, for instance, Lusuardi Siena and Zuech 2000, and Stiaffini 1999, pp. 119–20, for thirteenth- and fourteenth-century examples from Italy). Specimens from Islamic contexts include a small lamp with a wick holder from a deposit at Caesarea, in present-day Israel, dating to the late tenth or the early eleventh century (Pollak 2000, p. 241, no. 8) and somewhat larger objects with additional handles from Nishapur, Iran (Kröger 1995, no. 235), and from the shipwreck of an early-eleventh-century vessel at Serçe Limanı, off the southern coast of Turkey (Jenkins 1986, p. 8). Two other lamps that are larger than the present one but have the same general form are in the Kunstmuseum Düsseldorf (*JGS* 10 [1968], p. 184, no. 27) and The Metropolitan Museum of Art (Jenkins 1986, no. 40).

When it was acquired, the lamp in Berlin was accompanied by a hanger of copper alloy decorated with glass beads. While the hanger appears to be of some antiquity, there is no way to be certain that it was used to suspend this particular lamp, which was made sometime between the tenth and the twelfth century. *DW*

LITERATURE: *Erwerbungen islamischer Kunst* 1965, no. 77; Kröger 1984, no. 12



8. **Alembic**
Egypt, date uncertain
H., without spout, 8.6 cm (3⅜ in.), max. diam. 8.9 cm (3½ in.), diam. at rim 5.2 cm (2 in.), l., with spout, 26.9 cm (10⅝ in.)
Transparent light green and transparent light yellowish green
Free blown from two gathers
CONDITION: The object is intact and in pristine condition, except for rough patches on the rim, which may have resulted from its placement in the annealing oven rather than from abrasion during use. There are many large lens-shaped bubbles in the body of the vessel, as well as bubbles and specks of scale in the spout.
Victoria and Albert Museum, London
337–1900

This alembic has a roughly hemispherical body and a long curving spout. A plain rounded rim and a short cylindrical neck appear at the bottom. The shoulder is depressed and has a rounded edge. The top of the body bears a prominent pontil scar. The spout was made by dropping a gather onto the lower wall and drawing it out and down in a shallow curve; it widens slightly at the end, which was cracked off the iron.

Lamm tentatively attributed the present object to the period between the sixth and eighth centuries (Lamm 1929–30, pp. 28–29), but the form was made throughout the medieval and early modern periods.

An alembic (Arabic, *al-anbīq*) was employed as part of a distilling apparatus, which, in the medieval Islamic world, was used to make chemical and alchemical preparations, and perhaps to produce rose water and date wine (al-Hassan and Hill 1986, pp. 134–35). The basic apparatus consisted of three elements: the cucurbit, in which the liquid was heated; the alembic, a spouted vessel that fitted over the cucurbit and acted as a condenser for the vapor driven off the liquid; and the receiver for collecting the distillate (Holmyard 1956, pp. 735–38).

DW

PROVENANCE: Found in Egypt; acquired from W. J. Myers in 1900
LITERATURE: Lamm 1929–30, pl. 1:17

9. **Inkwell**
Possibly Egypt, date uncertain
H., total, 6.6 cm (2⅝ in.), h., at rim, 5.5–5.8 cm (2⅛–2¼ in.), w. 4 cm (1⅝ in.)
Transparent very pale yellowish green
Mold-blown and applied
CONDITION: The object is intact except for a small loss from one handle. The surface is dull, with faint weathering and iridescence.
The Corning Museum of Glass
50.1.38

This somewhat lopsided inkwell has a four-sided body made from two parts that were formed separately, then fused. The upper part, comprising the rim and the "well," was free blown before being inserted into the lower part. The rim consists of a horizontal flange that has a rounded edge and a diameter very similar to the maximum width of the wall; the well is a cylindrical tub, closed at the bottom. The lower part, which seems to have been blown in a dip mold, has a rounded shoulder, a straight slightly tapering wall, and a plain base that bears a circular pontil mark (diam. 1 cm [⅜ in.]). The interior, like the exterior, has four sides, and its walls are markedly thicker at the bottom than at the top. Four miniature handles were dropped onto the junctions of the sides of the wall, immediately below the shoulder; they were then drawn up and in, and attached to the edge of the rim.

Medieval Islamic glass inkwells, which may be cylindrical, square, or polygonal, are unusual but not rare. Another example with four sides comes from Iran (Lamm 1929–30, pl. 2:6). *DW*

PROVENANCE: Steuben Glass Inc. (AN 1620)
LITERATURE: Unpublished

Mold-Blown Glass

DAVID WHITEHOUSE

Most of the objects in this section were decorated, or formed and decorated, by inflating molten glass in a mold. In addition, however, the section also includes the only two undisputed medieval Islamic glassworkers' molds that are known to exist.

The discovery, in the first century B.C., that molten glass could be formed by inflation was soon followed by the discovery that it could be formed and decorated in a single operation by inflating it in a mold. After their introduction by the Romans in the early first century A.D., molds have been used continuously by glassworkers in western Asia, Egypt, and many other regions.

The first mold-blown glass was inflated in decorated molds that had two or more parts, which were probably hinged, and an opening at the top. When closed, the parts formed a hollow mold, into which molten glass on the end of a blowpipe was inserted through the aperture at the top. The glass was inflated until it filled the mold, which imparted a negative version of its ornament. After this, the mold was opened and the glass, still on the end of the blowpipe, was removed. The only additional steps required to complete the object were finishing the rim and perhaps applying one or more handles. Because the body of the object was inflated to its final size before it was removed, molds of this type are frequently known as "full-size" molds. Glass vessels that were blown in full-size molds usually have two or more faint vertical ribs that were formed at the junctions of the mold parts. Most medieval examples from the Islamic world have two diametrically opposed ribs, indicating that the molds had two vertical sections.

A second type of mold, also developed in the Roman world in the first century A.D., consisted of a cup-shaped object, decorated on the inside and with a wide opening at the top. The glassworker gathered molten glass on the end of a blowpipe, inserted the glass into the mold, and inflated it. Again, the mold imparted a negative impression of the ornament. The decorated glass was then withdrawn from the mold, reheated, and inflated further. Because it was no longer confined by the mold, the parison could be blown and tooled into a wide variety of forms, all of which retained the original decoration. The decoration might be faint or distorted—because the finished object was larger than the interior of the mold or had a radically different shape—but it survived, to a greater or lesser extent. The range of forms that could be decorated in molds of this type is well illustrated

Opposite: detail, cat. no. 21

by the dishes, cups, bowls, and bottles recovered from the eleventh-century underwater shipwreck at Serçe Limanı, Turkey, many of which have identical patterns (Lledó 1997). Because the molten glass was dipped into them, cup-shaped molds are sometimes known as "dip molds." Widely used in the Islamic world in the Middle Ages, they are a common feature of the glassblower's tool kit today, as are full-size molds (see p. 55 and figs. 34–36, 44).

No examples of full-size metal molds from the medieval Islamic period are known to exist. A number of small terracotta molds with two vertical sections have been identified as glassworkers' molds, first by Carl Johan Lamm (1929–30, pp. 58–59, pl. 13:1,2) and most recently by E. Marianne Stern (1995, p. 47); most of these are now in the Museum für Islamische Kunst, Berlin (30 660a,b), the Eretz Israel Museum, Tel Aviv (103958, 104058, and 104158), and The Corning Museum of Glass (80.7.3). Since no early Islamic glass vessels have been found with sizes, shapes, and motifs corresponding to the molds, it has been suggested that they were used for casting objects in some other medium, such as plaster (von Folsach and Whitehouse 1993, pp. 149–50). There are, however, two surviving metal dip molds, both of which are included in this catalogue. The object in Copenhagen (cat. no. 10) is a short cylindrical mold decorated with pairs of scrolling half-palmettes separated by pairs of vertical stripes. That in Corning (cat. no. 11), which has an overall pattern of lozenges, bears a scratched inscription giving the name and occupation of the owner: "Uthmān ibn Abū [*sic*] Naṣr, glassmaker."

Perhaps the earliest mold-blown object in this catalogue is a shallow cylindrical cup with vertical ribs that was evidently inflated in a dip mold (cat. no. 12). Cups of this type have a wide distribution in western and central Asia and are commonly believed to date from the seventh or eighth century, although similar (but not identical) vessels have been reported from an ʿAbbāsid context on Bijan Island, Iraq, that dates from the eighth or ninth century.

Next in chronological order are two small ewers blown in full-size molds (cat. nos. 13, 14), each of which bears a kufic inscription evidently naming the maker of the mold or the craftsman who used the mold to blow the vessel. The inscriptions are not without problems. Although the *nisba*, or name giving the family's place of origin, of Ṭayyib ibn Aḥmad appears to be Barmasī (that is, probably from Barmas in Iranian Azerbaijan), the reading Tirmisī (from Tirmis in the Najd region of Saudi Arabia) is not impossible. Similarly, in the first line, the word that probably recorded the name of the emir who commissioned the vessel—and which would establish its date—has not yet been read. In any case, however, good reasons exist for attributing these ewers, and other examples of the same type, to a workshop in Iraq in or about the ninth century.

The cup and bottle in Kuwait (cat. nos. 16, 17) were probably made in Iran in the tenth or eleventh century. The former, which was blown in a cylindrical dip mold, has parallels from archaeological excavations at Takht-i Sulaimān, Nishapur, and Tureng Tepe, all of which are in northern Iran. The form of the latter, a bottle with a tapering cylindrical body, a cylindrical neck, and an everted rim, is often paralleled in vessels with wheel-cut decoration (including cat. nos. 75, 96, 100), and fragments of similar but not identical mold-blown vessels have been found at Nishapur.

A selection of bottles made in the twelfth and thirteenth centuries (cat. nos. 18–24) displays a variety of ornament and techniques. While some of these vessels were inflated in full-size molds with two vertical sections (cat. nos. 18–20, 24), others seem to have been blown in dip molds (cat. nos. 22, 23). The latter also have bodies with two layers of glass assembled by the post technique (see p. 56 and figs. 56–58). One bottle is decorated with a frieze of birds (cat. no. 18), two others have kufic inscriptions (cat. nos. 19, 20), and four others have geometric or vegetal ornament (cat. nos. 21–24). Several of these objects also have applied trails at the base of the neck. Two pitchers with more or less cylindrical necks and bodies (cat. nos. 25, 26) are also believed to have been made in Iran in the twelfth or thirteenth century.

Both full-size and dip molds continued to be used in Iran in the eighteenth and nineteenth centuries (see cat. nos. 145–147).

10. **Mold**
Western Asia or Egypt, perhaps Syria or Iraq, 9th–10th century
H. 8 cm (3⅛ in.), diam. 11.1 cm (4⅜ in.)
Reddish brown copper alloy
Cast
CONDITION: The object is intact, with some corrosion products.
The David Collection, Copenhagen
20/1985

This mold in the form of a cup has a flat expanded rim, a straight, slightly tapering wall, and a flat base. Its interior is decorated in relief on the wall and the floor. The wall has eight equally spaced pairs of vertical stripes that extend from the rim to the floor; each pair of stripes is separated by a scrolling half-palmette. The floor is decorated with a circular boss at the center, eight small triangular elements with their apexes near the boss and their bases adjacent to the pairs of stripes, and eight larger triangular elements, also with their apexes near the boss and their bases adjacent to the scrolling half-palmettes.

The pattern on the mold resembles those in the "beveled," or "slant-cut," style found on wood and stucco objects—and on glass (see p. 159)—of the ninth and tenth centuries. This style, which is often associated with Samarra, probably originated in Iraq but spread quickly over an area that extended from Egypt to eastern Iran. Such a wide distribution makes it difficult to attribute the mold to any one region, although Iraq and Syria are perhaps more likely candidates than Iran. The ornament here may be compared with the alternating pairs of stripes and wavy lines on a pitcher that is also in the David Collection (30/1986). *DW*

PROVENANCE: Sotheby's, London, sale, October 15–16, 1985, lot 44
LITERATURE: von Folsach and Whitehouse 1993, pp. 150–52

11. Mold
Probably Western Asia, 11th–13th century
H. 11.4 cm (4½ in.), diam. 8.8 cm (3½ in.)
Brass
Cast; inscription incised
INSCRIPTION, in developed *nashkī* script, near top of exterior wall:

عثمان بن ابو [*sic*] نصر الزجّاج

(Uthmān ibn Abū [*sic*] Naṣr, glassmaker)

on middle of exterior wall: [illegible]
CONDITION: The object is intact, with patches of green corrosion product.
The Corning Museum of Glass
86.7.15

This mold in the form of a conical beaker has a narrow everted rim with a beveled top; the wall tapers before curving in at the bottom, and the base is slightly convex. The interior of the mold is decorated with lozenge-shaped bosses in prominent relief. On the wall, thirteen horizontal rows of bosses extend continuously from top to bottom, each row overlapping the next. On the floor, a concentric circle of seven bosses is surrounded by a ring of bosses.

A chemical analysis revealed that the metal in this mold is an alloy, of which the major components are copper and zinc, and a minor component is lead. The object, therefore, is made of brass (Brill 1999a, vol. 1, p. 226, vol. 2, p. 504 [sample 5997]).

This mold was used to produce vessels with an overall "honeycomb" pattern of lozenges on the sides and a seven-pointed star in the center of the base. The decoration was imparted to the parison before it had been blown to the intended size and shape. Indeed, the decorated parison could be worked into almost any form; open vessels with similar ornament include numerous bowls recovered from the Serçe Limanı ship, which foundered off the Turkish coast about 1025 (Bass 1984, figs. 5.d, e, k; Lledó 1997).

DW

PROVENANCE: Sotheby's, London, sale, April 16, 1986, lot 33
LITERATURE: von Folsach and Whitehouse 1993, pp. 152–53

12. **Cup**
Western Asia, 7th–8th century
H. 4 cm (1⅝ in.), diam. 9.4 cm (3¾ in.)
Translucent deep green
Blown in dip mold
CONDITION: The object is intact. The surface is extensively pitted, and many of the pits have light brown weathering. The glass contains many small bubbles, one large bubble, and dark streamers.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 127 G

This thick-walled cylindrical cup has a slightly everted rim and a rounded lip. The wall descends vertically, then curves in at the bottom. The base is plain and has a small kick and a pontil mark. The cup is decorated with seventeen vertical ribs, which begin about 1 centimeter (⅜ in.) below the lip and continue under the base.

Although cups such as this one are not uncommon, few appear to have been published and little has been written about them. Carl Johan Lamm (1935, p. 10) believed that they are Iranian, and examples have been found at Afrāsiyāb, in Uzbekistan (Abdurazakov 1972, fig. 1.4). Similar vessels (but with thinner walls) were discovered in an ʿAbbāsid context on Bijan Island, Iraq (Reiche 1996, p. 201, fig. 5.2, 3). *DW*

PROVENANCE: Sotheby's, London, sale, April 18, 1984, lot 336
LITERATURE: Qaddumi 1987, p. 104; Atıl 1990, no. 14

Cat. no. 12, underside

13. **Ewer Signed by Ṭayyib ibn Aḥmad Barmasī**
Probably Iraq, 9th century
H. 10.5 cm (4⅛ in.), max. diam. 6.4 cm (2½ in.)
Transparent very pale green
Body and base blown in mold with two vertical sections; handle applied
INSCRIPTION, in kufic script:

مما عمل للأمير ببعدا [؟]/ عمل طيب بن أحمد برمسي

(That which was made for the [emir in Baghda(d)?] / the work of Ṭayyib ibn Aḥmad Barmasī)
CONDITION: The object is complete except for the tip of the pouring lip, which has been restored. The surface is covered with light brown weathering and iridescence.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 44 KG

13

14. **Ewer Signed by Ṭayyib ibn Aḥmad Barmasī**
Probably Iraq, 9th century
H. at thumb rest 11.2 cm (4⅜ in.), h. at rim 10.7 cm (4¼ in.), max. diam. 6.2 cm (2½ in.)
Transparent pale yellowish green
Body blown in mold with two vertical sections; handle applied
INSCRIPTION, in kufic script:

مما عمل للأمير ببعدا [؟]/ عمل طيب بن أحمد برمسي

(That which was made for the [emir in Baghda(d)?] / the work of Ṭayyib ibn Aḥmad Barmasī)
CONDITION: The object is complete. Most of the surface is covered with glossy light yellowish brown weathering; it is extensively pitted, with iridescence in the pits.
The Metropolitan Museum of Art, New York, Museum Accession x.21.191

Both of these ewers have pear-shaped bodies. The one in Kuwait (cat. no. 13) has a slightly everted rim with a rounded edge and pinched pouring lip. That in New York (cat. no. 14) has an outsplayed rim with a folded tubular edge and a narrow pouring lip; its neck tapers. The base of each is plain: a low kick appears on the Kuwait ewer, while the New York object has a slightly concave base with a faint pontil mark. Their handles, which are circular in cross section, were dropped onto the wall, drawn up, and attached to the outside of the rim; the thumb rests were made by tooling.

The wall of the Kuwait ewer is decorated with a single panel that runs from one side of the handle to the other. The panel contains, in relief, a kufic inscription of two lines separated by a row of dots. Beneath the inscription is a second row of dots bordered by horizontal lines, also in relief. Vertical seams, made by the junctions of the two parts of the mold, are visible behind the handle and beneath the pouring lip. The wall of the New York ewer bears a relief decoration of two lines of kufic inscription, below which is a continuous horizontal rib between two rows of hemispherical bosses.

These objects belong to a group of some twenty small pear-shaped mold-blown ewers with kufic inscriptions. Nine of the vessels have the same inscription and probably were blown in the same mold. The example in Kuwait and a ewer in the Toledo Museum of Art (723.443; Rice 1958, pl. IVa,b) have the clearest inscriptions, but even so they are difficult to interpret. The final word in the first line has been interpreted as meaning "in Baghda[d]." However, it would be unusual for an emir not to be identified by name, and so an inscription that reads in part "for the emir in Baghdad" is disturbing—not least because the form *bi-Baghdad* is ungrammatical.

14

David Storm Rice (1958) has suggested that ewers of this type were made in at least two almost identical molds. Although this may be so, it is equally likely that they come from a single mold and that the small differences between them are the result of uneven inflation and of tooling after they had been removed from the mold.

A ewer with the same form, inscribed with the name ʿUmar ibn Ibrāhīm, was acquired in Baghdad (Lamm 1929–30, p. 59, pl. 13:6); another example, formerly in the collection of Ray Winfield Smith (1173) and now at The Corning Museum of Glass (72.1.20), was also acquired in Iraq and "possibly found there" (Smith 1957, p. 237, no. 469). These provenances strengthen the case for attributing the group to Iraq.

The form of these objects is similar to that of an almost colorless glass ewer preserved in the Shōsō-in repository of the Tōdaiji Temple at Nara, Japan (Harada et al. 1965, pp. iii, 12–14, colorpl. 2, pls. 26–30). The Shōsō-in was consecrated in 756, but it also contains objects transferred to it from a second shrine at the Tōdaiji Temple in 950.

DW

PROVENANCE: (cat. no. 13) A. Churchill, Ltd., London; Élie Bustros, Beirut; Ernst Kofler

LITERATURE: (cat. no. 13) Rice 1958, pl. VIa,b; Kunz 1981, no. 558; Carboni 2001, no. 48a; (cat. no. 14) Dimand 1944a, p. 230; Rice 1958, pl. Va; Jenkins 1986, no. 14

15. Cup or Bowl
Probably Egypt, 9th–10th century
H. 8 cm (3⅛ in.), diam. 11.9 cm (4¾ in.)
Transparent light yellowish green
Wall and base blown in dip mold
CONDITION: The object is intact. The surface has patches of brown weathering.
Victoria and Albert Museum, London
C27–1932

This cylindrical cup or bowl has a plain rim with a rounded lip. The wall is almost vertical, but with a slightly convex profile, and the base is flat. The vessel is decorated on the wall and the underside of the base. The wall has two horizontal rows of contiguous ring-and-dot motifs, the upper of which is faint and the lower more pronounced. The base has, at the center, a group of four bosses arranged in a square, and this motif is surrounded by two concentric circles.

DW

LITERATURE: Unpublished

16. Cup
Western Asia, probably Iran, 10th–11th century
H. 9 cm (3½ in.), diam. 9.5 cm (3¾ in.)
Transparent deep green
Wall and base blown in dip mold
CONDITION: The object is intact. The surface is pitted, with areas of whitish weathering. The glass contains many small bubbles and a few larger ones.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 50 G

This cylindrical cup has a slightly inturned rim and a rounded lip. The wall descends vertically, then curves in at the bottom. The base is plain and has a small kick. The wall is decorated in low relief with a continuous pattern of eight adjoining vertical rows of chevrons.

Mold-blown objects decorated with an overall pattern of chevrons are rare. Other examples, all from northeastern Iran, include a green beaker excavated at Takht-i Sulaimān (Naumann and Naumann 1976, p. 33, no. 66), a pale green bowl said to come from Nishapur (Kröger 1984, no. 77), and a cylindrical cup and a bowl excavated at Tureng Tepe (Boucharlat and Lecomte 1987, p. 180, pl. 102:4, 9, and pl. 160a). The vessels from Tureng Tepe were found in contexts of Period VII C, which, on the basis of associated pottery, was assigned to the ninth and tenth centuries (Boucharlat and Lecomte 1987, p. 153). The fact that these parallels were found in Iran supports the view that the present object was also made there.

DW

PROVENANCE: Sotheby's, London, sale, April 22, 1980, lot 314
LITERATURE: Carboni 2001, no. 54

17. Bottle
Probably Iran, 10th–11th century
H. 20.5 cm (8⅛ in.), max. diam. 10.5 cm (4⅛ in.), diam. at rim 7.6 cm (3 in.)
Translucent deep blue
Body (including shoulder) blown in mold with two vertical sections
CONDITION: The object is intact. The surface has patches of gray and brown weathering. The glass contains small bubbles and one dark streamer.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 8 G

This bottle has a truncated conical neck and a tapering body. The rim consists of a flange, which rises toward the edge and has a rounded lip. The neck is wider at the bottom than at the top. The shoulder is almost flat, with a rounded edge. The wall tapers, then curves in at the bottom. The base is plain and has a pontil mark. The decoration, in negative relief, consists of a continuous frieze framed at the top and bottom by horizontal lines. The frieze contains four pairs of confronted S-shaped motifs, separated by a small circle above a pointed oval.

Two fragmentary dark blue bottles similar in form and dimensions to the present object were excavated at Tepe Madraseh, Nishapur, in 1939 (see Kröger 1995, no. 133, for a conflated description of the two objects). They are, however, decorated with a more complex pattern of vegetal motifs (including stemmed palmettes), which is rendered in relief.

DW

LITERATURE: Jenkins et al. 1983, p. 58; Atıl 1990, no. 36; Carboni 2001, no. 55

18. **Bottle with Birds**
Iran, 12th–13th century
H. 24.4 cm (9⅝ in.), max. diam. 9.2 cm (3⅝ in.), diam. at rim 2.1 cm (⅞ in.)
Translucent deep blue
Body blown in mold with two vertical sections; trail applied
CONDITION: The object is intact.
The Toledo Museum of Art, Museum Purchase 1962.27

This globular bottle has a plain, somewhat irregular rim, with a rounded lip, and a tall cylindrical neck. The low hollow foot is plain and has a pontil mark. The wall is decorated with a continuous frieze framed by decorative borders. The frieze consists of four circular medallions, each containing a bird, alternating with geometric motifs. A single trail is wound two and a half times around the lower neck.

Medallions containing birds have a long history in Iran and adjoining regions. They occur, for example, on Sasanian stucco, metalwork, and textiles (see *Splendeur des Sassanides* 1993, no. 13 [for stucco]; nos. 46–47, 69–70, 91 [for metalwork]; and no. 129 [for textiles]).

When the Toledo Museum acquired this object in 1962, the vendor reported that it came from Shāhī (now called Ghaem Shahr), a small town in Māzandarān Province, 160 kilometers (100 miles) northeast of Tehran. *DW*

PROVENANCE: Reportedly from Shāhī (Ghaem Shahr), Iran
LITERATURE: Riefstahl 1967, p. 435, fig. 17; Toledo Museum 1969, fig. p. 37 bottom

19. **Bottle with Inscription**
Probably Iran, ca. 12th century
H. 25.8 cm (10⅛ in.), max. diam. 11.9 cm (4¾ in.), diam. at rim 3 cm (1⅛ in.)
Translucent deep green
Body blown in mold with two vertical sections; trail applied
INSCRIPTION:

ولصاحبه يمن وبركة وسعادة

(And to the owner happiness, and blessing, and joy.)
CONDITION: The object was broken, with small losses from the trail, and has been repaired. The surface is dull, with traces of weathering and accretion, especially around the trail. The glass contains numerous bubbles.
The Corning Museum of Glass 55.1.6

This bottle has a tall slender neck and a roughly globular body. The rim is an irregular horizontal flange with a rounded edge. The neck is slightly wider at the bottom than at the top. The foot is hollow, with a flat base and a rough pontil mark.

The shoulder and wall are decorated in low relief with four continuous friezes separated by single horizontal ribs. From top to bottom, the decoration consists of twelve downward-pointing tongue-shaped elements, a continuous scroll with elaborate leaves or flowers, an inscription, and a continuous vegetal scroll. Near the bottom of the neck, a single trail has been wound both spirally and in an openwork zigzag. *DW*

LITERATURE: Whitehouse 1985a, p. 68; Welander-Berggren 1990, p. 46; Whitehouse 1991, p. 44; Frantz et al. 1992, p. 34, no. 22

20. **Bottle with Inscription**
Western Asia, probably Iran, 11th–13th century
H. 21.5 cm (8½ in.), max. diam. 8.2 cm (3¼ in.), diam. at rim 1.1 cm (½ in.)
Transparent green
Body blown in mold with two vertical sections; trail applied
INSCRIPTION, in kufic script:

بركة ويمن وسرور وسلامة له

(Blessing and happiness and joy and success to him.)
CONDITION: The object is intact. The surface is almost pristine except for patches of pitting and slightly brownish weathering. The glass contains many bubbles and a little scale.
Victoria and Albert Museum, London C7–1974

This bottle has a small globular body and a plain rim with a rounded lip. The neck is tall, cylindrical, and slightly wider at the bottom than at the top. The hollow foot has a vertical side and a low kick, with a circular pontil mark (diam. 1.6 cm [⅝ in.]).

The bottle is decorated on the neck and the wall. A trail was wound four and a half times around the circumference of the lower neck and then was tooled to produce a series of vertical depressions. On the wall, the mold-blown ornament consists of friezes framed by continuous horizontal lines: the top and bottom friezes contain rows of adjoining circles or lappet-shaped motifs, the central frieze an inscription conveying good wishes, presumably to the owner of the object.

For a similar object, see Lamm 1929–30, pp. 57–58, pl. 12:20.

DW

LITERATURE: Watson 1997, p. 28, fig. 26

21. Bottle
Western Asia, probably Iran, 12th–13th century
H. 20.7 cm (8⅛ in.), max. diam. 10.5 cm (4⅛ in.)
Transparent very pale purplish brown
Body first blown using post technique, then blown in dip mold; trail applied
CONDITION: The object is intact except for a chip on the trail. The surface is virtually without weathering.
The David Collection, Copenhagen
9/1987

This bottle, which is somewhat lopsided, has a roughly globular body and an everted rim with a plain rounded lip. The neck is cylindrical and narrower at the top than at the bottom, with a bulge immediately below the rim. The shoulder slopes and has a rounded edge. The wall curves down and in; the base is plain and has a pontil mark. The wall and shoulder are decorated in relief with two continuous horizontal scrolls: those in the upper, larger band spiral in a clockwise direction, while those in the lower band run counterclockwise. Near the base of the neck is a sinuous horizontal trail.

The body of this bottle was formed from two layers of glass by employing the post technique (for a description, see p. 56). The top of the outer layer is clearly visible immediately above the molded decoration.

DW

LITERATURE: Unpublished

22. Bottle
Western Asia, probably Iran, 11th–13th century
H. 13.5 cm (5⅜ in.), max. diam. 8.8 cm (3½ in.), diam. at rim 3.5 cm (1⅜ in.)
Transparent green
Body first blown using post technique, then blown in dip mold
CONDITION: The object is intact.
The L. A. Mayer Museum for Islamic Art, Jerusalem G44–69

This bottle has a globular body and a slightly everted rim with a plain, rounded lip. The neck is of medium length, cylindrical, and wider at the top than at the bottom; it has a bulge below the midpoint. The base is plain. The body is decorated in relief with four vertical panels separated by groups of three vertical lines. Each panel contains two sinuous lines that are mirror images of each other; touching at their midpoints and curving in at the top and bottom, they make a figure that resembles an hourglass. The upper and lower parts of the figure contain scrolls, as do the spaces between the figure and the groups of vertical lines.

The body was formed from two layers of glass by employing the post technique (for a description, see p. 56). The decoration here is not unlike that of the mold in the David Collection (cat. no. 10), the wall of which is decorated with eight vertical panels of scrolling half-palmettes separated by pairs of vertical lines. The present object is attributed to the period between the eleventh and thirteenth century and not to the ninth or tenth century (the presumed date of the mold) on account of the bulge in the neck. Pronounced bulges do not appear to be a feature of glass produced in the Islamic world during the ninth and tenth centuries; they are present neither among the ninth-century glass from Samarra published by Lamm (1928) nor among the ninth- to tenth-century material from Nishapur published by Kröger (1995). On the other hand, personal observation confirms their presence among the glass from the Serçe Limanı shipwreck of the early eleventh century, and they are a common feature of objects attributed to later centuries.

DW

LITERATURE: Hasson 1979, pp. 18 and 36, no. 34

23. **Bottle**
Western Asia, probably Iran, 12th–13th century
H. 20 cm (7⅞ in.), max. diam. 10 cm (4 in.), diam. at rim 3.4 cm (1⅜ in.)
Transparent yellowish green
Body first blown using post technique, then blown in dip mold
CONDITION: The object is intact and virtually unweathered.
The L. A. Mayer Museum for Islamic Art, Jerusalem G105–84

This bottle has a roughly cylindrical body and a slightly everted rim, with a plain rounded lip. The neck, which is cylindrical and wider at the top than at the bottom, has three bulges: one immediately below the rim and two near the bottom. The shoulder slopes and has a rounded edge. The wall has a convex profile and splays slightly before curving in at the bottom. The base is plain. The body and part of the shoulder are decorated in relief with a continuous frieze containing three large star-shaped panels, each of which has a vegetal motif inside two concentric circles.

Like the two previously described bottles (cat. nos. 21, 22), this object has a body formed from two layers of glass by using the post technique (for a description, see p. 56). The top of the outer layer is clearly visible on the shoulder, immediately above the molded decoration. *DW*

LITERATURE: Unpublished

24

24. Bottle
Western Asia, probably Iran, 12th–13th century
H. 27 cm (10⅝ in.), max. diam. 13 cm (5⅛ in.)
Transparent very pale brown
Body blown in dip mold; trail applied
CONDITION: The object is intact except for the rim, which was broken, with small losses, and has been restored. The surface is lightly weathered, especially on the interior. One small chunk of glass has been fused to the surface, almost certainly by accident. The glass contains many small bubbles and some inclusions.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 104 G

This bottle has a globular body and an everted rim with a plain rounded lip. The neck is tall, cylindrical, and slightly wider at the bottom than at the top, and it has a bulge at the top. The foot is plain and has a kick. The body of the bottle is decorated with an overall pattern of eight continuous rows of hexagons, arranged in a quincunx. A single undulating trail was applied to the bottom of the neck. *DW*

LITERATURE: Carboni 2001, no. 66

25. Pitcher
Iran, 12th–14th century
H. at thumb rest 16.2 cm (6⅜ in.), h. at rim 15.5 cm (6⅛ in.), max. diam. 11.2 cm (4⅜ in.)
Transparent yellowish brown
Body blown in dip mold, then withdrawn and inflated further; neck tooled; handle applied and pinched
CONDITION: The object is intact, with patches of light tan to pale gray weathering.
The Corning Museum of Glass 66.1.5

This pitcher has a roughly cylindrical body. The vertical rim has a rounded lip with six lobes. The cylindrical neck was folded near the bottom to form a narrow "collar" of triple thickness. The shoulder slopes and has a rounded edge with a slight overhang. The base is plain and has a low kick and a pontil mark. The handle was dropped onto the edge of the shoulder, drawn up and in, and attached to the rim, where there is a folded thumb rest. It was also flattened and decorated by pinching with a tool that produced three pyramidal bosses; there are two groups of bosses on the upright part of handle and one incomplete group on the thumb rest.

A continuous pattern of molded decoration covers the bottom of the neck, the shoulder, the wall, and the underside of the base. On the neck, shoulder, and wall, there are eight horizontal rows of hexagons, which are smallest and most prominent at the top and elongated and somewhat faint at the bottom. The underside of the base has a circular boss at the center and a concentric ring of contiguous kite-shaped motifs.

Colored mold-blown glass of this general type is frequently attributed to the Gurgān region of northeastern Iran. *DW*

LITERATURE: Higashi 1991, no. 50

25

26

26. Pitcher
Western Asia, probably Iran, ca. 12th century
H. 14 cm (5½ in.), max. diam. 9 cm (3½ in.), diam. at rim 7.8 cm (3⅛ in.)
Translucent deep blue
Lower neck and body blown in mold with two vertical sections; trails and handle applied
CONDITION: The pitcher is intact. The surface retains patches of light brown weathering, especially in the region of the trailed ornament. The glass contains small bubbles as well as some inclusions and streamers.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 100 G

This pitcher has a cylindrical body and a slightly everted rim with a rounded lip. The neck is cylindrical but somewhat constricted at the bottom. The wall tapers slightly, then curves in at the bottom. The base is plain and has a kick and a pontil mark. A narrow trail was applied just below the rim and wound three times around the upper neck. A handle, circular in cross section, was dropped onto the edge of the shoulder, drawn out, up, and in, and attached to the outside of the rim; the small inclined thumb rest was made by tooling.

The lower neck and the wall are decorated in relief. The former has a continuous horizontal band of seven circular motifs, while the latter is filled with a frieze of seven tall narrow octagons, each containing a ring-and-dot motif.

The form of the present object may be compared with that of a pitcher in Corning (cat. no. 25), which has an overall honeycomb pattern on the wall and a scalloped rim. *DW*

LITERATURE: Kunz 1981, no. 554; Carboni 2001, no. 62

Hot-Worked Glass

STEFANO CARBONI

The objects in this chapter vary greatly in shape, color, and decoration. And, indeed, they range in time from the early Islamic period (and perhaps even before; see cat. no. 27) to the thirteenth century, and in place of origin from Egypt in the west to Central Asia in the east. The group therefore provides evidence of how continuous and widespread the production of hot-worked glass was in the Islamic world. By definition, this type of glass is manipulated and decorated while the blown vessel is still hot, that is, in a malleable state, its final form being achieved just outside the kiln's glory hole. Such vessels are decorated either by the application and subsequent manipulation of trails along the molten surface (cat. nos. 27–42) or by impressions on the surface, achieved by means of tongs or dies (cat. nos. 43–52). Clearly, the decorative possibilities are endless and leave much room for the glass artist's inspiration and imagination.

The hot-worked objects presented here have been subdivided into three major groups. One group includes works with impressed patterns, either vessels whose walls were directly stamped (cat. nos. 43–49) or individual medallions, which were utilized for architectural decoration (cat. nos. 50–52). Another group consists of vessels with applied decorative trails, whether of the same color or a contrasting one, that have in some cases been further manipulated to create "spectacle" patterns (cat. no. 27), wavy motifs (cat. no. 33), pinched designs in relief (cat. nos. 34, 39), and combinations thereof. The last group (cat. nos. 53–60) falls within the category of applied decoration, but its treatment is more specialized. In these, the trails are pushed in with a rolling action against a slab with a smooth hard surface (called the marver) while the vessel is still attached to the pontil; they thus become hardly perceptible in relief. Although vessels with this type of decoration are generally referred to as "marvered glass," a more precise term would be "glass with applied and marvered trails."

The objects with impressed patterns were decorated with the aid of tools that differ from the one- or two-part molds discussed in the previous chapter. Here the tools were metal tongs (probably of iron) with circular or square ends that bore, on one or both sides, the carved motif that was to be impressed in relief on the glass walls. Whenever tongs are used for decoration, it is naturally assumed that the ends of the tool will be pressed against both the interior and the exterior wall of an object. Thus the great majority of tong-decorated

Opposite: detail, cat. no. 58

Fig. 92. Bottle. Syria, 9th–10th century. Greenish colorless and dark blue glass. Free blown and impressed with tongs; tooled on the pontil. H. 19.1 cm (7½ in.). The Metropolitan Museum of Art, New York, Rogers Fund, 1908 08.138.2

vessels—bowls, beakers, and sometimes pitchers—have an open profile, although bottles formed from two separate sections that were impressed before being joined are not uncommon. In the best examples, the upper and lower sections are colored differently (see, for example, fig. 92, in The Metropolitan Museum of Art [Jenkins 1986, no. 19], and von Folsach 1990, no. 223, in the David Collection).

Most of the objects decorated with the aid of tongs are small bowls that can be attributed with some degree of confidence to Egyptian workshops of the ninth and tenth centuries (cat. nos. 43, 45). The most common feature of these works is the repetition of the same pattern at irregular intervals around the walls, the pattern itself often overlapping as it is repeated. In addition, the pressure exerted by the tongs frequently altered the profile of the vessel, and the finished product became lopsided, although this could sometimes make for a more captivating appearance. The motifs impressed on these small vessels are limited to basic geometric figures (rectangles and circles, either concentric or not, with or without a central boss; see cat. no. 43); pseudovegetal motifs, such as rosettes with a central button and a varying number of petals (cat. no. 44); and animals, either stylized quadrupeds (cat. no. 45) or birds (fig. 93; see also Lamm 1941, pl. 2:2).

Vessels of a larger size than these small bowls rank among the best products decorated with tongs in the ninth through the eleventh century. Their impressed patterns are neatly and evenly spaced, with no overlapping, and their shapes are not distorted (cat. nos. 46–49). While the repertoire of patterns is as limited as on the smaller vessels, two or more different tongs were often applied on the same object to create composite geometric motifs (cat. nos. 47, 48). Teardrop and curled designs, clusters of circles and rhombuses arranged in regular patterns, curved and diagonal lines, and circles could be combined into irregular designs that made these vessels both more abstract and more appealing (cat. no. 47; Carboni 2001, no. 71). Vertically set inscriptions are also found on tong-decorated objects. Two of these, "Drink with enjoyment!" (Carboni 2001, no. 72) and "Blessing

Fig. 93. Bowl. Egyptian, 9th–10th century. Greenish colorless glass. Free blown and impressed; tooled on the pontil. From Kozloff 1981, no. 43

upon its owner" (cat. no. 46), are centered within rectangular framing devices on their respective vessels. Their makers were careful to position the tongs at even intervals along the top and bottom and on contiguous sides around the walls so that the decorated surface was divided into similar rectangular sections, each including the desired inscription in the center.

Probably of Egyptian origin, these larger, more refined tong-decorated vessels have also been found during excavations in Syria and Iraq and, reportedly, in the Caucasus and Iran as well (see, for Egypt, Salam 1978; for Syria, Henderson 1996a, 1996b, and 1999; for Iraq, Northedge et al. 1988 and Kröger forthcoming; for the Caucasus, Dzhanpoladian and Kalantarian 1988; for Iran, Lamm 1931, Whitehouse 1968 and 1970, and Whitcomb 1985). If they were indeed created in Egypt, they must have represented an important category of trade goods.

Impressed glass was also produced in the twelfth century in the easternmost Islamic lands. A number of medallions, ranging in diameter from about 5 to 10 centimeters (2 to 4 in.), have survived that may be securely attributed to the areas and periods of rule of the Ghaznavid (977–1186) and Ghūrid (early eleventh century–1215) dynasties in present-day Afghanistan (cat. nos. 50–52). Their patterns, impressed on one side (the other is flat and plain), vary greatly in subject matter and refinement of detail, although most are figural, depicting falconers, musicians, elephant riders, and all kinds of animals. Their inscriptions, while infrequent, afford scholars of Islamic glass the rare luxury of establishing both patronage and a fairly accurate dating. The medallions were patterned by pressing a mold, probably composed of two connecting metal blocks, against a cake of molten glass resting on a flat surface (the result is similar to that achieved on glass weights stamped with an iron die; see Morton 1985, esp. p. 31).

The earliest description of the medallions, which have appeared regularly on the art market in the past decade, is found in the excavation report

of a Ghaznavid palace at Old Termez, near the Afghan-Uzbek border (Field and Prostov 1942). By establishing that the objects had been inserted into alabaster gratings, the authors identified them as elements of architectural decoration. This particular use of glass has not yet been definitively studied, but the medium was obviously exploited continually in medieval Islamic architecture both for its transparency and for its vibrant colors. There were richly textured and colored glass floors at Samarra and Raqqa (see pp. 18–19), and lively stained windows set in plaster were a common sight in Egypt and western Asia. These medallions seem to be unique, however, in that they bear refined impressed patterns that become evident only through the transmission of light.

Another type of impressed decoration is found on vessels that have small roundels stamped, with the aid of cylindrical dies, into lumps of glass attached to their surface (cat. no. 34). Originating in the pre-Islamic period, this technique was probably developed by Sasanian-influenced craftsmen, who were also conversant with Late Antique Roman models. Symbolic of this dual influence are certain disks that include the almost identical image of a winged horse and an inscription in either Pahlavi or Arabic (see Herrmann 1989, fig. 34, for an example in the British Museum [119564]; see also Carboni 2001, no. 3.50d,e, for examples in the al-Sabah Collection, Kuwait). Despite their origins, most vessels with applied disks belong to the early Islamic period in Syria. These depict birds with long tails (cat. no. 34) and carry kufic inscriptions either mentioning historical figures of the Umayyad and early ʿAbbāsid periods (seventh to ninth century) or indicating the capacity of the pharmaceutical object to which they were attached (see Jenkins 1986, no. 6).

The applied and stamped roundels appear on small globular bottles having either a narrow neck or a relatively large mouth. Other objects, of similar profile and dimensions and evidently created in the same, or neighboring, workshops, were decorated more plastically with patches of glass. In addition to undecorated roundels, their ornament might include ovals, prunts, and irregular geometrical shapes such as triangles, six-pointed stars, and composite figures (cat. no. 33). Although generally uniform, these objects are more varied than those with stamped disks: there is a greater range of shapes (for example, elongated flasks and small ewers), and contrasting patches of color give them a livelier appearance (An 1991, fig. 2; Carboni 2001, nos. 6, 1.4a, 1.8a,b).

The second group of hot-worked vessels—those with delicate trails applied in a spiraling motion—demonstrates well the continuity of decorative models between the Late Antique and early Islamic periods in the Syrian region. Particularly meaningful in emphasizing the smooth transition in glass production between the two empires is the fact that these trails continued to be manipulated to create the so-called spectacle and festooned patterns (cat. nos. 27, 28). An effective decorative motif and a technically simple one, the application of trails in a spiraling pattern would be used for centuries throughout the Islamic glassmaking world. In this technique, the hot trail, which has roughly the consistency of molasses, is "poured" over the vessel with one hand while the other hand slowly rotates the object attached to the pontil (see fig. 82). Varying the thickness and color of the trails allowed for infinite decorative combinations; sometimes it even helped to determine the shape of an object, as in the so-called cage flasks (cat. nos. 29–31). There, the trails—built one upon the

other to form an openwork structure that encases the actual vessel—become the most prominent feature of the object, which acquires a marked three-dimensional aspect.

While cage flasks owe much to preexisting glassmaking traditions, applied glass continued to be used to craft major decorative details when vessel shapes became fully identifiable as Islamic. This particular aspect is exemplified in the present catalogue by two pitchers (cat. nos. 37, 38). In the former, the handle, which is usually only a functional component, has an open trailed structure and becomes the most decorative feature of the container. In the latter, the thumb rest, a regular constituent of Islamic pitchers and commonly a nondescript flattened protrusion created out of the handle itself, is in the shape of an animal (surprisingly, a monkey), a feature that highlights the powerful influence of the nomadic Central Asian cultures that entered the Islamic world from the eleventh century onward.

The general principles of Islamic art production almost invariably limit three-dimensional sculptural figures to a decorative function. In a few remarkable exceptions, an object itself was turned into a zoomorphic, or even an anthropomorphic, container (cat. nos. 36, 35). Such examples are so rare in glass, however—especially when compared with twelfth- and thirteenth-century glazed ceramic figurines from the Seljuq period in Iran (see, for example, Grube 1976, nos. 119, 120, 181)—that an accurate attribution is problematic. Perhaps inspired by Sogdian earthenware goddesses (cat. no. 35), or by cast-bronze examples from the ninth or tenth century (Lukonin and Ivanov 1996, no. 91), or by the Seljuq ceramic figurines (ultimately of Central Asian or Chinese origin), or even by medieval European aquamaniles (cat. no. 36), these objects remain extremely difficult to place properly within the production of Islamic glass.

In the early medieval period, the shapes as well as the applied patterns devised by Iranian glassmakers (cat. nos. 37–39) were more varied and imaginative than those produced in the Syrian region, which preserved traditional patterns such as zigzags and spiraling threads and seldom embarked on new ornamental motifs. Stamped roundels, no longer used to decorate vessels, were slowly replaced during the late Fatimid and Ayyūbid periods (eleventh and twelfth centuries) by smaller, more closely spaced prunts. Cylindrical beakers represent the most distinctive productions of Syrian, and perhaps Egyptian, glass craftsmen in this period; three of these (cat. nos. 40–42) well illustrate the range of decorative applied patterns in vogue at the time. While the most traditionally decorated (cat. no. 40) bears simple trails arranged to form a network of lozenges reminiscent of earlier times, it is also innovative in its inclusion of an opaque pale blue prunt inside each lozenge, a feature and color that became hallmarks of Syrian production. A beaker of similar shape (cat. no. 41) displays a lively combination of zigzag trails and emerald green prunts in addition to a green trail around the rim that enhances the subtle chromatic contrast. Presenting the elongated shape common to enameled and gilded objects (see cat. nos. 128 and fig. 99), the third beaker (cat. no. 42) is an excellent example of the taste for bold color combinations typical of this area of glass production; although the concept behind its decoration is rather simple (applied dark green vertical trails), the result is highly accomplished and refined.

Glass with applied and marvered decoration best demonstrates the use of bold contrasting

colors that clearly distinguishes Egyptian and, in particular, Syrian glassmakers from their colleagues in the rest of the Islamic world. This type of glass can be immediately identified by its patterned decoration and colors, which in the great majority of cases include trails marvered into a dark-colored matrix. Although the trails are almost invariably white, there are some memorable examples in pale blue, gray, red, and yellow (see cat. nos. 53, 56, 58). Appearing almost black in reflected light, the matrix glass is revealed in transmitted light to be translucent purple or sometimes blue, green, or brown. The marvered trails, initially applied in the traditional spiral pattern, may be left that way or, more often, are tooled (or "combed") with a toothed implement into wavy, arched, festooned, or foliated patterns, so described according to the upward or downward direction of the tooling stroke (see fig. 83).

Although glass with marvered trails attained its artistic peak and most prolific production during the Ayyūbid and early Mamluk periods (twelfth to fourteenth century; see cat. nos. 55–60), there is no question that it was produced continuously from very early in the Islamic period, having been inspired in its turn by Late Roman models. An aquamarine blue cup with irregular wavy white decoration (cat. no. 54) reflects this particular transition well: its early Islamic shape is balanced by the Late Antique taste for pale matrix glass and spontaneous patterns (see, for example, von Saldern et al. 1974, nos. 386, 387). Similarly, the dark purple matrix of a colorful bottle (cat. no. 53) foreshadows those of most later creations, yet the combination of three trails of different colors, almost entirely concealing the background, seems to be in tune with the taste for polychrome combinations inspired by Roman models, such as the ninth-century production of millefiori glass (see cat. nos. 61, 62). The early phase of Islamic marvered glass is also suggested by the irregular pattern, which is wavy and zigzag and often overlaps, resulting in a spectacular motif far removed from the controlled designs of the later period.

Small cosmetic flasks (for kohl or unguents) are the most common vessels in glass with marvered decoration. Consistently recovered from excavations, they attest to a continuity of production between the early Islamic and the medieval period. One example (cat. no. 55), a so-called spear flask with a regular pattern over a dark blue body, fits into the medieval phase of production. Many others, of similar dimensions and functions although sometimes with irregular tapered profiles or cylindrical bodies, present a much less controlled pattern (fig. 94 [Carboni 2001, no. 80a,b]; see also von Saldern 1968, no. 69; Manzari et al. 1976, p. 30, no. 8; Oliver 1980, no. 241; Carboni 2001, no. 3.63). These vessels can be attributed to an earlier phase, although they will ultimately develop into flasks similar to one in The Corning Museum of Glass (cat. no. 55) and the numerous examples from the Ayyūbid and Mamluk eras.

It is not surprising that kohl flasks, designed for a specific use and easily transportable, are perhaps the most consistently encountered glass containers in the Islamic world and also correspondingly well represented in glass with marvered decoration. Equally long-lived may be a peculiar group of small toylike birds often having a small ring for suspension attached to their backs and sometimes containing glass rods that rattle when shaken. The bodies of these birds are usually purple, with regularly marvered trails, while their eyes, beaks, wings, and feet are applied in different colors (fig. 95 [Carboni 2001, no. 79]).

Fig. 94. Two flasks. Egyptian or Syrian region, 12th–13th century. Translucent dark purple and opaque white glass. Free blown, with marvered trails; tooled on the pontil. H. 11.5 cm (4½ in.), 10.4 cm (4⅛ in.). The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 107 KG *(left),* LNS 118 G *(right)*

Although archaeological evidence and their combed patterns and colors suggest that most of these were produced during the medieval period, bird and animal figurines themselves are characteristic of the early Islamic era, and an earlier attribution also seems appropriate.

Two bowls, a small perfume sprinkler (*qumqum*), a bottle, and a beaker (cat. nos. 56–60) produced in the Ayyūbid and early Mamluk periods represent the final and most spectacular phase of glass with marvered decoration. Larger overall than their predecessors, these objects have shapes

Fig. 95. Bird. Egyptian or Syrian region, 9th–12th century. Translucent dark purple and opaque white and red glass. Free blown, with marvered trails, and applied; tooled on the pontil. L. 7.5 cm (3 in.). The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 103 KG

similar to those of contemporaneous glass vessels decorated with different techniques; the beaker (cat. no. 60) is the most telling example, since objects with exactly the same shape appear with applied and enameled decoration (see, for example, cat. no. 42). These larger vessels, which have marvered decoration with a consistent and regular overall "combed" pattern, can be securely attributed to the twelfth and thirteenth centuries, supporting the argument that their mode of decoration belongs to the later phase of this type of glass. Marvered objects with molded vertical ribs, such as the bowl from Padua and the beaker from Toledo (cat. nos. 56, 60), also fit exclusively into this phase. Their textured wavy surfaces, created by the molded relief, require that the marvered white trails not be elaborately tooled but left as simple spiral patterns. The *qumqum* and the bottle (cat. nos. 58, 59), which are not molded, were decorated instead with a combed pattern. The largest known works with marvered trails are certain bowls that have a flat base and a curved tapered profile originally topped by a knobbed lid; two fragmentary and incomplete examples, originally measuring about 16 centimeters (6¼ in.) in diameter, are in the National Museum, Damascus, and the Metropolitan Museum (see Jenkins 1986, no. 50, for the latter, the lid of which is almost complete).

These later vessels are almost exclusively translucent dark purple with white opaque trails, although opaque pale blue or grayish blue trails are sometimes added (see cat. nos. 56, 58), often raising a merely accomplished object to the level of a truly refined creation; the use of a similar color has been previously discussed in relation to the small prunts applied to the surface of works belonging to the same area and period (see p. 105 and also cat. no. 40). In rare instances, stained or

gilded pseudovegetal motifs are drawn against the dark purple background left between the white patterns (see Carboni 2001, no. 84). Only one surviving intact vessel (sold at Sotheby's, London, October 12, 1988; present location unknown), some incomplete objects, and some fragments attest to the dramatic impression that this last type of decoration must have made (see Allan 1995, pp. 20–21). The mixture of techniques found in such works strengthens their association with painted glass objects, whether stained, gilded, or enameled. The proximity and reciprocal influence of Islamic glassmakers are thus emphasized: these artisans may have specialized in specific techniques, but they were also well aware of contemporaneous trends in other aspects of their craft.

27. Bottle
Egypt or Syria, 7th–early 8th century
H. 20.1 cm (7⅞ in.), max. diam. 8.2 cm (3¼ in.)
Bluish colorless and blue
Free blown and applied; tooled on the blowpipe
CONDITION: The object is intact. The surface is lightly weathered, resulting in a whitish film and some brown pitting. The glass contains numerous bubbles, one of which is particularly large.
The Metropolitan Museum of Art, New York, Museum Accession x.21.210

This bottle has a globular body with a flattened, slightly kicked base and a long narrow neck. It is decorated with darker blue trails applied around the neck and the body. On the neck the trail spirals from the rim to the base; additional trails appear at the rim, in the center, and at the base. One of the rare intact examples having a hot-worked trailed decoration in the so-called spectacle pattern, the object was created with the aid of a pincer. The trails, arranged horizontally, were dragged toward the center at regular intervals, thus forming a sequence of oval figures around the body.

The application of trails in a darker shade than that of the vessel itself, their arrangement in a spiraling stroke, and their manipulation while still hot into different decorative patterns are all characteristics that reflect the smooth, almost unnoticeable transition from the glass production in the Roman provinces of late antiquity to that of the early Islamic period. As a rule, Late Roman glass did not have a pontil mark, and neither does this bottle, which was tooled and decorated while still attached to the blowpipe. Since most examples of Islamic glass do have such a feature, the bottle probably originated in the pre-Islamic or very early Islamic period in a glass center that opposed the recently introduced use of the pontil.

The spectacle pattern was common in the fifth and sixth centuries (Smith 1957, no. 425; Auth 1976, no. 193; Higashi 1991, no. 48) and survived in the Egyptian region probably until the eighth century (Soucek 1978, no. 34). Fragments from a conical beaker with such a pattern were unearthed at Fusṭāṭ (Old Cairo) in an eighth-century context, and glass of this type was exported to—or perhaps imitated in—eastern Iran, reaching as far as Nishapur (see, respectively, Scanlon 1968, fig. p. 192 bottom left, and Kröger 1995, no. 151). *SC*

LITERATURE: Jenkins 1986, no. 8; *Arte islámico* 1994, pp. 170–71

28. Jug
Egypt or Syria, 8th–9th century
H. 15.1 cm (6 in.), max. diam. 10.1 cm (4 in.)
Greenish colorless
Free blown and applied; tooled on the pontil
CONDITION: The object is intact and in good condition, except for a slight milky film on the surface. The glass contains numerous small bubbles and a large elongated one near the opening.
Victoria and Albert Museum, London C164–1932

This jug has a nearly conical body with a slightly curved shoulder, a flat base, and a sharply flared neck with a narrow base. A long curved handle is attached to one side. It is decorated with a thick trail applied horizontally near the base, then dragged downward with a pointed tool four times at regular intervals, thus creating a festooned pattern.

The typical Islamic shape of this object indicates that decoration by means of applied and dragged trails (see discussion under cat. no. 27) was not merely an echo of a Late Antique technique but continued to be employed well into the early Islamic period. Here, instead of a spectacled pattern, a festooned effect is produced by dragging the trail downward (a bottle in the Metropolitan Museum provides a good example of multiple dragged trails; see Jenkins 1986, no. 9).

This jug and a bottle of the same color and decoration, having a flat base, a dome-shaped body, and a flaring neck (also in the collection of the Victoria and Albert Museum [C172–1932]), form a unique pair of vessels almost certainly made in the same workshop. The decorative festoon near the base of the jug and one about halfway down on the bottle protrude into the interior walls of the vessels, with a result similar to that on a ewer in the David Collection, Copenhagen (cat. no. 39). *SC*

LITERATURE: Unpublished

29

30

29. "Cage" Animal Flask
Syria, 7th–8th century
H. 10 cm (4 in.), max. l. 10 cm (4 in.), max. w. ca. 7 cm (2¾ in.)
Almost colorless, pale green, and dark bluish green
Free blown and applied; tooled on the pontil
CONDITION: The object is intact and in good condition.
The David Collection, Copenhagen 49/1979

30. "Cage" Animal Flask
Syria, 7th–8th century
H. 10 cm (4 in.), max. l. 7.7 cm (3 in.), max. w. 5.5 cm (2⅛ in.)
Green and purple
Free blown and applied; tooled on the pontil
CONDITION: The object is intact and in good condition.
The Toledo Museum of Art, Gift of Edward Drummond Libbey 1923.2048

31. "Cage" Animal Flask
Syria, 7th–8th century
H. 11.1 cm (4⅜ in.), max. l. 8.3 cm (3¼ in.), max. w. 4.7 cm (1⅞ in.)
Yellowish colorless
Free blown and applied; tooled on the pontil
CONDITION: The object is intact except for the probable omission of the original tail. The surface is entirely weathered, resulting in heavy iridescence and some corrosion.
The Metropolitan Museum of Art, New York, Gift of Mrs. Charles S. Payson, 1969 69.153

32. Animal Flask
Syria, 7th–8th century
H. 8.6 cm (3⅜ in.), max. l. 8.8 cm (3½ in.), max. w. 6.4 cm (2½ in.)
Yellowish, pinkish, and grayish colorless
Free blown and applied; tooled on the pontil
CONDITION: The object is intact except for parts of the flask, which have been repaired. The surface is heavily weathered, resulting in iridescence, a white coating, and corrosion.
The Metropolitan Museum of Art, New York, Purchase, Friends of Islamic Art Gifts, 1999 1999.145

The first of these four objects (cat. no. 29) is made up of a globular flask enclosed in a trailed openwork cage that rests on a four-legged platform. The flask is of almost colorless pale green glass, and a bluish green trail is applied around its rim; the short neck is cylindrical. The cage is composed of two tiers of trails—the upper dark bluish green, and the lower pale green—both tooled in a wavy pattern. The forepart of a pale green stylized horse or donkey with long bluish green ears protrudes from the platform. On the opposite side, an applied curved bluish green tail completes the figure.

Unlike the first object, the second (cat. no. 30) is elongated and has a dark trail around the neck; its cage is composed of two purple trails surrounding another of green. The cage of the third object (cat. no. 31) is more elaborately constructed than that of other vessels, being composed of four tiers of trails topped by four protruding stylized animal heads. The forepart of its quadruped is two-headed, and its elongated short-necked flask has a

31 (right), 32 (left)

trail applied in a spiral pattern around the body. The last flask (cat. no. 32) is surrounded not by an openwork structure, as are the three previous objects, but by a piece of solid glass tooled with vertical ribs. The object is cylindrical and has a splayed opening; its quadruped, although stylized, can be identified as a camel.

These four charming trinketlike figurines had both functional and decorative uses. Although tubular *balsamaria* (multipurpose containers for kohl, perfumes, or essences) mounted on zoomorphic figures were made in the Syrian region in Roman times, these more elaborate objects belong to the early Islamic period. When used as vessels for kohl, they were provided with a spatula of bone, metal, or glass. Here, the protruding necks, the dimensions, and the shapes suggest that their contents were meant to be poured; a stopper would seal the precious perfume or balsam securely inside the flask.

Such vessels have been described in the past by several different names, including horse *balsamaria*, animal "dromedary" flasks, and animalistic vases. "Cage" flasks, the name deriving from the openwork structure that surrounds and protects the bottle, is perhaps the most successful. Yet the object in the shape of a camel with a solid burden (cat. no. 32), which clearly belongs in the same class, attests that the group is not completely homogeneous. In fact, the ultimate inspiration for such objects may well be the celebrated third- and fourth-century cut-glass *vasa diatreta*, or "cage cups," the most famous of which are the so-called Trivulzio Bowl, the Lycurgus Cup, and the Situla Pagana (Harden et al. 1987, nos. 134–39). These Roman vessels were later imitated in Alexandria, Egypt, where hot-worked trails were used to build the openwork cage around the cup. Usually known as *pseudodiatreta*, the Egyptian objects provide a more direct source of inspiration for the cage flasks (Bussagli and Chiappori 1991,

fig. p. 65). The idea of supporting such small flasks with a four-legged animal form probably evolved from the everyday production of glass toys and figurines.

More than twenty intact cage flasks may be found in museums around the world (in addition to the literature cited above, see, for example, von Saldern 1968, no. 64; Merrill 1989, fig. 13; Pinder-Wilson 1991, p. 122, no. 153). Among the most lively and distinctive glass objects made in the early Islamic period, they are all one of a kind, spontaneous creations, as a comparison of the present four flasks makes clear. For example, the quadrupeds may be paired and have multiple heads; one, two, or three differently colored glass batches may form the object; or a solid section may replace the ubiquitous cage. Combining a high degree of artistic sophistication with an almost naive appearance, these popular objects were produced in great numbers and were probably affordable to a broad segment of society.

Stylized glass quadrupeds bearing burdens may also have been appealing as symbols of the trade and exchange of goods on the caravan routes, where glass containers filled with all kinds of valuable liquids (from perfumes to oils, from wine to rose water) traveled packed inside wicker baskets insulated with generous amounts of straw.

SC

LITERATURE: (cat. no. 29) von Folsach 1990, no. 224; (cat. no. 30) Riefstahl 1967, fig. 9 left; Toledo Museum 1969, fig. p. 36 left; (cat. no. 31) Jenkins 1986, no. 1; *The Islamic World* 1987, pl. 4; (cat. no. 32) *JGS* 42 (2000), p. 177, no. 7

33

33. Bottle
Syria, 7th–8th century
H. 12.2 cm (4¾ in.), max. diam. 10.8 cm (4¼ in.)
Colorless
Free blown and applied; tooled on the pontil
CONDITION: The object is intact except for a burst bubble on the base. The surface is entirely weathered, resulting in a whitish coating.
The Toledo Museum of Art, Gift of Edward Drummond Libbey 1923.2033

This globular bottle rests on a low circular foot and has a short narrow cylindrical neck ending in a thickened and flattened rim. Its top line of decoration consists of a row of twelve coiled rings applied at regular intervals around the shoulder. The main band is formed by a row of six contiguous four-pointed figures joining the vertices of a series of six triangles below, thus forming a festooned pattern. A smaller triangle is placed in each space above and between the four-pointed figures.

The same Syrian workshops that made the previously discussed cage flasks (cat. nos. 29–32) also produced other popular types of glass containers for perfume and perfumed water, which were essentially larger versions of the flasks carried by the quadrupeds inside the openwork cages. Rarely exceeding a height of 10 centimeters (4 in.), these globular bottles, vases, and elongated flasks are decorated with whimsical geometric figures quickly applied at regular intervals in the same color as the vessel itself or sometimes in a contrasting color.

The object shown here, representative of this large group, is decorated with three- and four-pointed figures and coiled circles; the ornamental repertoire also included six-pointed, or roughly H-shaped, figures (sometimes compared to animal hides; see Jenkins 1986, p. 11) and small disks. The shoulder is often decorated with a zigzag or pinched trail (cat. no. 34). The globular bottles and vases have either a narrow neck or a large mouth, depending on whether they functioned as sprinklers or pouring vessels, while the elongated flasks always have a narrow neck and opening. Many examples of both types are

34

found today in museums and private collections (see, for example, Lamm 1929–30, pl. 20:14–23, 25, pl. 23:8–12, and Carboni 2001, nos. 5, 6, 1.4–1.8).

Only one bottle of this type, now in the National Museum, Damascus, has a secure archaeological context, namely, the site of Jabal al-Durūz in southern Syria (al-ʿUsh 1964, fig. 48). Datable to the seventh century, the object has a shape similar to that of a vase in Toledo (23.2028) and is decorated with H-shaped figures. These larger glass containers have been attributed to periods ranging from the pre-Islamic era (fifth–sixth century; Lamm 1931, p. 361) to the ninth century (Kunz 1981, nos. 513–17). A dating to the seventh or eighth century, similar to that of the cage flasks, seems most likely: although these vessels do not have an immediate parallel in Late Roman objects, they were clearly produced before the changes in shapes and decoration that occurred in the ninth century. *SC*

PROVENANCE: Edward Drummond Libbey
LITERATURE: Unpublished

34. Vase
Syria, 7th–8th century
H. 8.9 cm (3½ in.), max. diam. 7.8 cm (3⅛ in.)
Yellowish colorless
Free blown, applied and impressed; tooled on a blowpipe used as a pontil
CONDITION: The object is intact except for a chip at the rim. The surface is partially weathered, resulting in a whitish film. The glass contains numerous small bubbles.
The Toledo Museum of Art, Gift of Edward Drummond Libbey 1923.2015

This small globular bottle with a short flared neck rests on a low applied circular foot. The decoration around the

shoulder consists of a pinched trail. The main band is formed by a row of five large disks, each enclosing the stamped image of a bird, applied at regular intervals.

Sharing the globular shape and flared neck of a vase in Toledo (23.2028), the present work can be included in the same group of objects (see discussion under cat. no. 33). The pinched trail around its shoulder is also one of the decorative patterns often found on this type of glass (see, for example, Carboni 2001, no. 5a,b). Here, however, the applied disks are not plain but bear the elaborate figure of a bird. This plump animal has a long tail with one straight and four curly feathers, small legs that touch the edge of the disk, and a crest, which may be the prolongation of a branch with a cluster of three berries that it holds in its beak. The texture of the feathers on the bird's body and wings is also indicated. Although the five medallions present the same impression, only two show the bird in a nearly upright position. Unlike patterns stamped with a tong (see discussions under cat. nos. 43–49), those here must have been achieved with an iron die after a lump of glass was applied to the wall, since the interior wall behind each of the medallions is deeply bulged. This particular method of stamping—which also explains why the disks have irregular outlines—is corroborated by the large number of extant individual medallions that still have part of the bulged wall attached to them.

Impressed disks appear less frequently than geometric figures on seventh- and eighth-century vessels, but their repertoire of animal figures, such as birds and horses, and Arabic inscriptions in kufic script make the group more informative. Outstanding examples with winged horses and/or birds (the latter identical to those on the present vase) include a large vase in The Metropolitan Museum of Art and three bowls in the Abegg-Stiftung, Riggisberg, the Museum für Islamische Kunst, Berlin, and the Toledo Museum of Art, respectively, all of which are attributed to dates in the eighth or ninth century (for the vase, see Jenkins 1986, no. 7; for the bowls, see Kröger 1998, figs. 179–83). The bird and winged-horse motifs originated in pre-Islamic Mesopotamia and Syria, where they commonly appeared on architectural decoration, and soon entered the repertoire of Umayyad art in the Islamic period (Kröger 1998, p. 314).

The inscriptions found on medallions attached to the walls of vessels for oil, wine, medicine, or other commodities often refer only to the capacity of such containers (see, for example, Miles 1948, pp. 18–22, and Jenkins 1986, p. 13, no. 6 ["a qist, full measure"]). Those vessels with stamps giving the names of emirs and governors of the Umayyad and early ʿAbbāsid periods thus provide better clues toward an attribution of the entire group (see Balog 1974 and 1976 and Morton 1985, pp. 31–39). *SC*

PROVENANCE: Edward Drummond Libbey; Thomas E. H. Curtis
LITERATURE: Lamm 1929–30, pl. 15:4; Erdmann 1952, col. 123, pl. 6; Toledo Museum 1969, fig. p. 37 above; Balog 1974, p. 132, fig. D

35. **Anthropomorphic Rhyton**
Central Asia, 7th–8th century
H. 19 cm (7½ in.), max. diam. 8 cm (3⅛ in.)
Yellowish green
Free blown and applied; tooled on the pontil
CONDITION: The object is intact except for the missing left arm and fragments of the applied decoration. The surface is slightly weathered, resulting in a whitish film and corrosion. The glass contains numerous small bubbles.
Collection of the Glass Pavilion, The Eretz Israel Museum, Tel Aviv
MHG1.93

This pouring vessel is an anthropomorphic figurine with a blown body and applied features. The body, a cylindrical bottle having a short neck and slightly compressed in the middle, has one opening at the top of the neck and a second, funnel-shaped one at the lower front. The face is a flat oval medallion that was applied around the neck and tooled to shape the nose, eyes, and mouth; it is surmounted by a headdress terminating in an oval point, with two flaps on either side extending above the opening. The figure stands on two feet, and the extended forearm holds a snake. Several long wavy braids of hair run from under the headdress along the back to reach the waist. The figure wears a full-length robe with a collar, a belt, and a frilled ruffle on the back. Two small roundels suggest the presence of breasts. The pontil mark is visible under the base.

Although unique, this object finds some parallels in Central Asian pottery. An anthropomorphic rhyton in the shape of a naked male figure, made of unglazed earthenware and about 16 centimeters (6¼ in.) high, is said to have been found at Afrāsiyāb, Uzbekistan, in a seventh- or eighth-century context (*Terres secrètes* 1992, no. 1).

Although the match with the present object is not perfect, the earthenware rhyton has similar dimensions as well as openings placed above its head and on its lower front. The spout there represents the phallus of the naked male figure, whereas here, in a statuette that otherwise seems female, it gives the impression that the body is that of a hermaphrodite. The creation of rhytons and terracotta statuettes—seldom in combination—goes back in time to an area that in antiquity comprised Margiana, Bactria, Sogdiana, and Transoxiana, corresponding to present-day Iran, Afghanistan, Uzbekistan, Turkmenistan, and Tajikistan (see, for example, Gardin 1957 and Rowland 1966 and 1971).

Some fragments of glass rhytons survive from the late Sasanian period, and a few more from the early Islamic era. These are usually from drinking horns (*bālogh* in Persian), such as the complete examples from the early Islamic period in colorless cut glass from the Victoria and Albert Museum (C75–1969) and in stained glass from the Corning Museum (cat. no. 103). Another category of rhytons includes zoomorphic objects (*takūk* in Persian), that is, those in the shape of animals (see cat. no. 36). Both categories have been studied by various scholars (see, for example, Melikian-Chirvani 1982, pp. 263–92; for the drinking horns, see also Masson and Pugachenkova 1982, pp. 74–84).

Anthropomorphic terracotta statuettes with applied features have a long history in the Central Asian regions, dating back to the second millennium B.C. The best known belong to the so-called group of Margiana goddesses, which have been found in areas corresponding to ancient Margiana and Bactria and date from the second century B.C. to about the third century A.D. (Pugachenkova 1959, pp. 119–40; Grenet 1982). Represented as female figures, usually fully dressed in tunics with folds that betray a Hellenistic influence, these goddesses are thought to represent votive figures worshiped by cults.

A characteristic feature is the large headdress, a tall protruding hood that envelops the sides of the head; in one case, the headdress includes a pair of snakes (Pugachenkova 1959, fig. 10.2). The present glass rhyton may be a remnant of this Central Asian figurative tradition. Notwithstanding its unsophisticated execution and unusual medium, it has a classical quality that links it to ancient iconography and may perhaps be identified as an apotropaic goddess holding a snake.

Snake-holding goddesses are not unfamiliar in Central Asia, especially in Sogdiana. A fragmentary eighth-century terracotta figurine excavated at Panjikent, Tajikistan, has long plaits strongly reminiscent of the applied and tooled trails on the present object. In addition, fragments of glass with applied decoration found in the area of Panjikent may well come from objects similar to this rhyton (Valentina Raspopova and Boris Marshak, State Hermitage Museum, Saint Petersburg, personal communication). There is also a comparable unpublished glass rhyton that seems to have been discovered during excavations in Akhshket, Ferghana, Uzbekistan (Gulsara Babajanova, Hamza Institute, Tashkent, personal communication). The evidence therefore suggests that this highly unusual glass rhyton was an object of apotropaic significance, capable of being held in one hand comfortably and intended to be used in some kind of talismanic ritual. *SC*

LITERATURE: *JGS* 37 (1995), p. 99, fig. 2; Carboni forthcoming a

36. **Zoomorphic Rhyton**
Possibly Iran, 7th–8th century (?)
H. 14.4 cm (5⅝ in.), l. 18 cm (7⅛ in.), w. 7 cm (2¾ in.)
Colorless
Free blown, applied, and tooled
CONDITION: The object is intact except for a broken spout and chips at the lip around the opening. The surface is entirely weathered, resulting in a brown coating that obscures the original color.
The Toledo Museum of Art, Gift of Edward Drummond Libbey 1923.2055

This pouring vessel in the shape of a stylized horse has an elongated gourd-like body to which all the other parts are attached. Four conical legs and a spout on the chest were blown after they were attached to the body as solid blobs of hot glass, which melted locally and allowed for further inflation (a technique similar to that used for the so-called claw beakers). The neck and head were blown and applied one above the other; small ears and circular protruding eyes were applied to the head, and a muzzle, mane, and reins were extended back from it. A short tail in solid glass was tooled and twisted. Trails representing reins and bridles, including a harness that loops under the tail and another that encircles the belly, appear on the body. A small roundel is attached between the forelegs. In the center of the back is a hole, surrounded by a lip, for pouring the liquid.

Like anthropomorphic rhytons in pottery (see discussion under cat. no. 35), zoomorphic rhytons in the same material have been unearthed in archaeological contexts. Usually bulls or lions, they have also been found

as other animals, including horses and rams. Fragments of a zoomorphic rhyton in glass, which was probably bull shaped, were excavated at Afrāsiyāb, Uzbekistan, in a context datable to the eighth or ninth century (Pugachenkova and Rempel 1965, pp. 209–10, pl. 213). Judging from our analysis of the anthropomorphic rhyton, the present object may be assigned by default to the same period and origin. In fact, these two pouring vessels—the only glass objects of their type to have survived intact, or nearly intact—have a number of features in common. Apart from the function of the objects themselves, these include a similar color and gourd-shaped body, the same technique employed to form the funneled spout, and the use of a large number of applied and tooled trails. Yet, because the two vessels depict entirely different subjects, it is difficult to study them as a pair.

The present vessel, which has been known since the first decades of the last century, has long been regarded as a Syrian product from the twelfth or thirteenth century, an attribution supported by the only previous in-depth study of this object (Soucek et al. 1981, p. 34). Priscilla Soucek's attribution is primarily based on comparisons with cage flasks (see cat. nos. 29–32), unglazed ceramic vessels excavated in Syria, and twelfth- or thirteenth-century glazed zoomorphic vessels. It is important to note, however, that a great number of extant ceramic zoomorphic vessels, both unglazed and glazed, have been attributed consistently to Iran in the pre-Islamic and Islamic periods. Among these are animal-shaped rhytons from Amlash datable to the ninth and eighth centuries B.C. that display similarly organic animal shapes (see, for example, the humped-ox and horse rhytons in Ghirshman 1964, p. 32, figs. 34, 35); zoomorphic vessels from the Achaemenid, Parthian, and Sasanian periods in Iran (see *Persian Pottery* 1980, figs. 160–64; Kawami 1992, p. 32, fig. 36, and no. 54, the latter a vessel in the Arthur M. Sackler Museum, Harvard University); and a vessel in the shape of a horse from the late Sasanian or early Islamic period, now in the

Iran Bastan Museum, Tehran (Harper et al. 1978, no. 86). An example in metalwork is also provided by the figure of a horse cast in brass, now in the Hermitage, datable to tenth-century Iran by its kufic Arabic inscription (Lukonin and Ivanov 1996, no. 92).

The continuity in the production of such zoomorphic rhytons in Iran—from the second millennium B.C. through the thirteenth century A.D.—also argues for an eastern provenance for this object. The wide chronological span makes its dating rather difficult, however. Since the anthropomorphic rhyton (cat. no. 35) now provides the best match for the present vessel, the latter can be tentatively assigned to the seventh or eighth century until new evidence for a more precise attribution is found.

SC

PROVENANCE: Edward Drummond Libbey; Thomas E. H. Curtis
LITERATURE: Soucek et al. 1981, no. 12

37. Pitcher
Iran, late 10th–11th century
H. 18.5 cm (7¼ in.), max. diam. 11.2 cm (4⅜ in.)
Grayish colorless
Free blown and applied; tooled
CONDITION: The object was broken and restored before acquisition and also after the invasion of Kuwait in 1990. About 10 percent of the vessel is missing at present. The surface is lightly weathered, resulting in a golden iridescence. The glass is of good quality.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 43 G

This pitcher has a nearly globular body, a large flared neck, and an applied splayed foot. An angular handle formed of trailed openwork is topped by a pointed thumb rest. The decoration on the body consists of a row of applied looping trails enclosed between two parallel horizontal trails. Two rows of small irregular disks, also enclosed between horizontal trails, appear around the neck.

Although this elegant pitcher is one of a kind and has no known exact parallels, details of its shape and decoration help to attribute it to the Iranian area in the late tenth or the eleventh century. The closest parallel, a jug found in the tomb of Princess Chenguo in Inner Mongolia and now in the Inner Mongolia Museum, Hohhot, shares its globular body, splayed foot, angular openwork handle, and irregular decorative disks (An 1991, fig. 13; *Treasures on Grassland* 2000, p. 227). The neck of the jug is more slender,

however, and the thumb rest and looping trails are absent. Princess Chenguo of the Liao dynasty died in A.D. 1018 (Taniichi 1988, p. 98; An 1991, p. 130), and the jug, which was not produced locally but imported from one of the Islamic lands, must be attributed to shortly before her death. It also provides an approximate dating for the present pitcher.

The most distinctive feature of this object is the openwork handle, formed directly on the side of the vessel by superimposing and tooling glass trails. A jug in the Corning Museum (cat. no. 38) has the same type of handle and a similar large neck, but the shape of its body is quite different. Two spouted pitchers, each with a globular body and a long tapered neck ending in a heart-shaped opening, now in the Iran Bastan Museum, Tehran, are the only other surviving pieces with a handle that is trailed in an openwork pattern and has a thumb rest (Kordmahini 1988, p. 60; Kröger 1995, no. 160); one of the two was excavated at Nishapur and was probably manufactured locally. Fragmentary openwork handles have sometimes been unearthed during excavations or reported from specific sites. Among these, two are from Iran (one from Rayy), one from Caesarea, in Israel, and the last from Fusṭāṭ, in Egypt (see, respectively, Pope 1931, p. 11, fig. 4; Lamm 1935, p. 14, pls. 8a, 40d; Auth 1976, no. 533; Lamm 1929–30, pl. 26:1). Consequently, it is possible that this type of decorative handle, which also has counterparts in relief-cut glass and rock crystal, became popular over a vast area. However, considering its shape, color, and overall decoration, the present pitcher can be attributed confidently to the Iranian area. *SC*

LITERATURE: Jenkins et al. 1983, p. 31; Carboni 2001, no. 40

38. **Pitcher**
Probably Iran, 12th century
Max. h. 17.8 cm (7 in.), max. diam. 11.6 cm (4⅝ in.)
Greenish colorless and pale blue
Free blown and applied; tooled on the pontil
CONDITION: The object was broken and repaired but is almost complete. The surface is heavily weathered, resulting in a silvery brown coating, iridescence, and a few small holes. The glass contains numerous small bubbles and a few larger ones.
The Corning Museum of Glass 59.1.515

This pitcher has a flaring, almost conical body with an applied circular foot ring, a sharp angular shoulder, and a long cylindrical neck. An angular handle formed by trailed openwork is topped by a thumb rest in the shape of a stylized blue monkey. On the opposite side of the neck, two small blue rings, one above the other, hang from two applied loops. A thin blue trail was applied in a spiral pattern below the rim.

A rare touch of exotic taste in glassmaking is provided by the small tooled figurine that functions here as a thumb rest. The animal is stylized, but

its profile, its face, and especially its long looping tail identify it as a monkey—an animal not native to the areas that produced Islamic glass during the medieval period. Exotic animals were, however, often presented as gifts to Muslim royal courts, so it is not surprising to encounter them in other areas of Islamic artistic production. In the popular tales from the *Kalīla wa Dimna*, the text of which originated in India, for example, monkeys are among the most commonly portrayed characters—in stories such as "The Monkey and the Carpenter" and "The Monkey Riding on the Tortoise's Back" (Grube 1991, figs. 15–17, 87–90). Although rarely portrayed in glass, monkeys appear with other animals on two bottles with intricate multicolored applied decoration (Corning Museum 64.1.21; location unknown [Paris 1961–62, no. 893, colorpl.]).

The openwork inverted L-shaped handle topped by a crouching animal has been compared with those on eleventh-century Fatimid rock-crystal ewers (Smith 1957, pp. 229, 244), but it also occurs on contemporaneous glass objects (cat. no. 37). Although the rock-crystal parallel is questionable on art-historical grounds, it does narrow the chronology for glass objects with elaborate trails, animal figures, and dangling rings to the eleventh to the thirteenth century.

The unusual shape of this pitcher may have Iranian bronze prototypes, and indeed the object may be of similar origin. Yet all the applied details—especially the loose rings, which made a pleasing sound when the vessel was in use—were also common to the Syrian region (see, for example, a thirteenth-century beaker similar to cat. no. 42 in the Corning Museum [79.1.41]; Atıl 1981, no. 64).

SC

PROVENANCE: Ray Winfield Smith
LITERATURE: Smith 1957, pl. 9, no. 487

39

39. **Ewer**
Iran, late 11th–12th century
H. 23 cm (9 in.), max. diam. ca. 10.5 cm (4⅛ in.)
Green
Free blown and applied; tooled on the pontil
CONDITION: The object is intact. The surface is heavily weathered, resulting in white pitting, iridescence, and corrosion. The glass contains numerous small bubbles.
The David Collection, Copenhagen
51/1981

This pear-shaped ewer has an applied low foot, a funneled neck with a heart-shaped opening, and a curved handle with a flattened thumb rest. The neck is lopsided, probably as the result of an accident. A trail was applied in a spiral below the neck and then pinched. Two decorative horizontal lines were created with a pointed tool on the lower body while the glass was still hot.

Its pyriform shape and relatively large size help to attribute the ewer to the late eleventh or the twelfth century

in Iran. Vessels with the same distinctive shape—some undecorated, some with abstract applied motifs or spiraling trails—may be found in various collections (see, for example, Fukai 1977, nos. 64, 76, and *Treasures of the Orient* 1979, fig. 235).

In addition to the pinched trail, one of the most common decorative motifs employed by Islamic glassmakers, there is a curious horizontal double line adorning the lower part of the vessel, just above the largest expansion of the glass bubble. Ray Winfield Smith, referring to a large conical beaker now in the Corning Museum and correctly attributed to an eastern Mediterranean workshop in the fourth or fifth century, states that such lines were created "by impressing a sharp point into the molten metal and drawing the tool around the vessel's circumference to the point of departure. This manipulation sets up a collar which is inwardly protruding, and the transmitted light through this greater thickness of glass produces the illusion of a band of darker color" (Smith 1957, p. 213, no. 423).

Only recently has it become clear that this peculiar technical practice was revived in the Iranian region in the medieval period. A bottle, a jug, and a sprinkler with this type of ornament, now in the al-Sabah Collection, Kuwait, can also be attributed to the same area and period on the basis of their shapes and additional decoration (Carboni 2001, no. 46a–c). Furthermore, a pear-shaped bottle apparently found at Ābādān Tepe (near the Gunbad-i Qābūs) in northern Iran confirms such attribution (Kröger 1984, no. 22). Although the group of objects decorated with inward-protruding lines contains vessels of various shapes, the technique is so distinctive that it seems logical to attribute them to neighboring workshops. Most of these objects are pale brown, and the remainder green, as here, probably because the contrast created by the thicker glass line is more evident and pleasing than in a colorless vessel. *SC*

40

LITERATURE: von Folsach 1990, no. 238

40. **Beaker**
Syria, 12th–13th century
H. 12.5 cm (4⅞ in.)
Translucent colorless and opaque pale blue
Free blown and applied; tooled on the pontil
CONDITION: The object is intact. The surface is entirely weathered, resulting in a brown coating and gray pitting.
The David Collection, Copenhagen
46/1974

This beaker, resting on an applied foot ring, has a flared profile that is more pronounced near the opening. Its decoration consists of a central horizontal band bordered by two thin trails and bearing a network of trails that form lozenges marked with pale blue dots.

The flared shape of this beaker is characteristic of Syrian glass production during the Ayyūbid period (ca. 1169–1260). It was at this time that

beaker shapes were adjusted to obtain the definitive forms that became the rule later in the period and during the early Mamluk era, when enameling on glass was mass-produced. Ayyūbid glass was made mainly in the Syrian centers of Damascus, Aleppo, Hama, and Raqqa.

The applied decoration usually chosen for this type of vessel consisted of tiny or medium-sized glass droplets, or prunts, laid on the surface to create an ornamented band framed by horizontal trails (see, for example, excavated beakers from Hama; Riis and Poulsen 1957, figs. 159–61). The prunts were sometimes in the same color as the glass, but more often opaque pale blue glass was chosen, probably to set up a pleasant chromatic contrast with the colorless surface of the beaker itself. A similar use of pale blue also marks the decoration on gilded sandwich-glass objects (see cat. nos. 110, 111).

The decoration here is elaborate and accomplished: the central band shows a trailed pattern that forms a stylized honeycomb motif, each section containing one large prunt. The pattern was quickly produced by applying trails and pinching them with a technique recalling that of the Late Antique and early Islamic "spectacle" and "festooned" motifs (cat. nos. 27, 28). A further tribute to earlier times is the honeycomb pattern itself, which was extremely popular before the tenth century, especially on glass with wheel-cut decoration (cat. no. 74).

SC

LITERATURE: Unpublished

41. **Beaker**
Syria, 12th–13th century
H. 11.5 cm (4½ in.), max. diam. 8.3 cm (3¼ in.)
Translucent yellowish colorless and dark green
Free blown and applied; tooled on the pontil
CONDITION: The object is intact except for the restoration of half the rim and a small section of the wall. The surface is heavily weathered, resulting in a golden iridescence and some corrosion. The glass contains numerous small bubbles.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 91 KG

This beaker has a nearly cylindrical profile that ends in a slightly flaring opening. A foot ring is attached around the base. The decoration consists of a green trail, which forms the lip, and a series of trails of the same color as the vessel, which create a horizontal band around the central section of the body. Within the trails are three vertical zigzag patterns spaced at regular intervals and alternated with three small green disks.

Like the beaker from the David Collection (cat. no. 40), this object has one of the shapes (here, nearly cylindrical and somewhat squat) that became codified in Syria during the twelfth or thirteenth century.

Excavations at Hama, in central Syria, have yielded several beakers of cylindrical shape decorated with applied threads of the same or a contrasting color, one of which shows a zigzag decoration in addition to droplets (Riis and Poulsen 1957, fig. 162). The best match, however, is another beaker, formerly in the Krug collection,

that is nearly identical in its shape, dimensions, use of dark green and colorless glass on a colorless vessel, and foot ring, although its decorative pattern is slightly different (Sotheby's, New York, sale, December 7, 1981, lot 239).

These Syrian beakers were widely exported throughout the Islamic world and were reportedly also found in Iran, Turkey, and the Crimea (see, respectively, Strauss 1955, no. 64; Öney 1990, pl. 1a; and Lamm 1929–30, pp. 89–90, pl. 27:15). Their shape also inspired the production of the earliest enameled beakers created in Venice in the late thirteenth century (see cat. no. 151). *SC*

PROVENANCE: Ernst Kofler
LITERATURE: Carboni 2001, no. 47

42. **Beaker**
Syria, 12th–13th century
H. 12.7 cm (5 in.), max. diam. 5.5 cm (2⅛ in.)
Greenish colorless and dark green
Free blown and applied; tooled on the pontil
CONDITION: The object is intact. The surface is partially weathered, resulting in pale brown pitting and some iridescence. The glass contains numerous small bubbles.
The Toledo Museum of Art, Gift of Edward Drummond Libbey
1923.2127

This beaker is cylindrical with a flared opening and has a green foot ring attached around the base. The applied decoration consists of vertical ribs of dark green and greenish colorless trails, which were alternately applied and partially marvered while reinflating the vessel. The upper part of the beaker was then twisted, and the lip was formed by a green trail.

A third variation in profile among beakers attributed to the Ayyūbid period (see cat. nos. 40, 41) is a slender cylindrical vessel that flares and then curves inward shortly below the opening. This type of beaker was also commonly decorated with enamels and gilding in the same period (see, for example, Lamm 1929–30, pls. 163–67).

The striking dark and emerald-like translucent green glass employed for the prunts on the beaker from Kuwait (cat. no. 41) is here fully exploited as a decorative color. The concept is rather simple: the entire vessel is treated as if it were an ornamented band, with the decoration consisting of vertical trails of alternating colorless and colored glass and of horizontal trails encircling the rim and foot. The artistic "twist"—quite literally—that makes the object particularly appealing is

the skewing of the vertical trails on the flared upper section.

Another beaker of identical color, profile, and decoration, although with an additional horizontal trail below the rim, is in the Metropolitan Museum (it is slightly less high, 11.1 cm [4⅜ in.], but greater in diameter, 7.3 cm [2⅞ in.]; see Jenkins 1986, no. 43). Obviously created in the same Syrian workshop, the two objects may not have belonged to the same set, but their slightly different dimensions do argue for the existence of sets that included nesting beakers of different dimensions similar to those in enameled and gilded glass (see Carboni 2001, nos. 86, 87).

SC

PROVENANCE: Edward Drummond Libbey

LITERATURE: Toledo Museum 1969, p. 39 above; Atıl 1981, no. 65

43. **Bowl**
Egypt, 9th–10th century
H. 3.5 cm (1⅜ in.), max. diam. 5.9 cm (2⅜ in.)
Pale yellowish green
Free blown and impressed; tooled on the pontil
CONDITION: The object is intact. The surface is heavily weathered, resulting in iridescence and a milky white film.
The Corning Museum of Glass
59.1.512

This small bowl with a flat base has slightly lopsided walls. The decoration consists of two registers of seven repeated rectangular motifs, which were impressed with a tonglike tool at irregular intervals and which often overlap. Each motif is about 1.3 centimeters (½ in.) high and 1.8 centimeters (¾ in.) wide and has a protruding prunt in the center.

Many bowls such as this—small, even miniature, in size, of pale yellow or green glass with impressed decoration—survive in numerous public and private collections. Their most prominent characteristic is a quasi-sculpted appearance that results in walls with a lively irregular surface. Such vessels were created while the glass was still hot, employing metal tongs that had the pattern carved on one end and the other end flat. Their small size and the large number of impressions around the walls often caused the motifs to overlap and to stand in various levels of relief, making for uneven and misshapen surfaces that altered the profiles of the vessels. Although the resulting objects may seem somewhat carelessly executed, the lopsided effect was clearly intended and became fashionable for some time.

Among the limited number of motifs utilized for these vessels are rosettes with various numbers of petals, circular "omphalos" patterns, quadrupeds, and inscriptions (cat. nos. 44–46). The pattern on the present bowl—a rectangle with a protruding boss in the center—can be regarded as an infrequent variation of the circular omphalos (for another example, see Lamm 1929–30, pl. 15:12).

These small open vessels with impressed decoration are generally attributed to the Egyptian area between the eighth and the tenth century. Most of them with a reputed provenance are said to have been acquired in Egypt (see Lamm 1929–30, pp. 64–65; Clairmont 1977, pl. 14:225–28; and

Kröger 1984, nos. 96–99). A bowl in the Museum für Islamische Kunst, Berlin, and a fragmentary bowl in the Benaki Museum, Athens, seem to support this attribution: both bear impressed medallions enclosing a distorted stamped inscription that can probably be read as *ʿamal bi-miṣr*, or "made in Egypt" (Kröger 1984, no. 69, and Clairmont 1977, no. 235, respectively).

The present bowl was once in the collection of Louis Comfort Tiffany, together with a small number of similar examples of Islamic glass. It was probably its iridescence, along with the combination of a miniature size with a sculpted appearance, that enticed the American master. Tiffany often found inspiration for his Favrile glass creations in ancient glass that had acquired a particular patina during burial. *SC*

PROVENANCE: Louis Comfort Tiffany; Ray Winfield Smith
LITERATURE: Smith 1957, no. 508; Ferber 1975, no. G2

44. **Bowl**
Egypt, 9th–10th century
H. 3.2 cm (1¼ in.), max. diam. 10.2 cm (4 in.)
Pale purple
Free blown and impressed; tooled on the pontil
CONDITION: The object is intact. The surface is in good condition. The glass contains streaks of darker color, numerous small bubbles, and some larger ones.
Victoria and Albert Museum, London
C157–1936

This shallow, slightly lopsided bowl rests on a low foot and has flared walls. The decoration consists of a row of seven impressed oval medallions, each of which includes a six-petaled rosette with a central boss of the same size as the petals. The impressions were made at irregular intervals.

The rosette is probably the most common motif found on vessels with stamped decoration made in Egypt during the ninth and tenth centuries. There are usually six or eight petals, less frequently five, seven, or nine; the central boss is generally of the same size as the petals but may sometimes be larger and in higher relief.

After the impressions are made with a tonglike tool, manipulation and further tooling of the object contribute to the final relief and shape. Unlike the small bowl in the Corning Museum (cat. no. 43), in which there was little manipulation after stamping, the present bowl was blown again after the impressions were made, and its open shape was achieved by spinning the object while applying the jacks around the rim in order to attain a perfect circle. The final pattern is therefore in low relief, and the medallions below the rim, which were originally circular, have become elongated ovals; these features make for a subtle decoration that greatly contributes to the appeal of the object without dictating its shape.

The rosette is one of the most ancient as well as common decorative patterns, especially in the Egyptian region; besides conveying the notions of renewal and rejuvenation, it is also imbued with solar and cosmic symbolism. It was not only incorporated into Islamic architectural decoration, following the Late Antique tradition, but was also adopted by calligraphers and illuminators to mark the separation between verses in the Qur'an. Not surprisingly, therefore, it became one of the favorite motifs in the repertoire of glassmakers. *SC*

LITERATURE: Barrucand 1998, no. 155; Contadini 1998, pl. 42

45. Bowl
Egypt or Syria, 9th–10th century
H. 3.2 cm (1¼ in.), diam. 4.7 cm (1⅞ in.)
Green
Free blown and impressed; tooled on the pontil
CONDITION: The object is intact. The surface is partially weathered, resulting in milky white and pale brown coatings. The glass is of good quality.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 66 KG

This slightly lopsided bowl has straight walls and a curved base. The decoration consists of five medallions impressed at regular intervals. Each medallion bears a quadruped, possibly a feline with large ears, viewed in profile and having a raised and curved tail.

Only two figural motifs appear on objects having tong-impressed decoration: a stylized quadruped and a bird viewed in right profile (for the latter, see, for example, Kozloff 1981, no. 43, pl. XXI). The quadruped portrayed on this miniature bowl—with its long legs and body, curved tail, open mouth, and large ears—is almost identical to those on most extant objects. A decorative leaf, or semipalmette, is sometimes attached to the tip of the tail on other examples. The animal is so stylized that it can be identified either as a canine or a feline, the latter interpretation being more likely, since that motif occurs more frequently in the figural tradition of Islamic art.

It seems that the tong was applied in a more careful manner on bowls with quadrupeds than on objects having other types of impressed medallions, such as those with rosettes (cat. no. 44) or omphalos patterns: the motifs are more evenly spaced and the bowls more highly finished. The same animal is also found on different types of vessels, for example, on a bottle in the Metropolitan Museum formed by two sections of different colors (Jenkins 1986, no. 19). The colorless lower part—a tall bowl stamped with quadrupeds—was attached to the blue upper section by employing the so-called *incalmo* technique, a difficult operation in which the glassmaker joins the rims of two vessels of equal diameter. Two-colored bottles have been attributed to an area ranging from Egypt to Iran (see, for example, fig. 92 and Kröger 1995, no. 141). However, the presence of this particular animal, a motif characteristic of Egypt and Syria, on one such bottle suggests that their place of origin should be restricted to those two regions. *SC*

LITERATURE: Carboni 2001, no. 70b

46. **Cup**
Egypt, Syria, or Iraq, 9th–10th century
H. 8.3 cm (3¼ in.), w. 9.5 cm (3¾ in.)
Yellowish colorless
Free blown and impressed; tooled on the pontil
INSCRIPTION, in kufic script:

بركة لصاحبه

(Blessing upon its owner)
CONDITION: The object was broken and repaired; it is intact except for a small piece. The surface is lightly weathered, resulting in a yellowish film, a faint iridescence, and some pitting. The glass contains numerous small bubbles and a dark inclusion.
The Metropolitan Museum of Art, New York, Purchase, Joseph V. McMullan Gift, 1974 1974.15

This cylindrical cup has slightly curved walls and a flat base. The decoration consists of an inscription impressed vertically eight times around the walls. Since each end of the tong was rectangular, the inscription is framed above and below by a row of short lines that create a decorative effect, as if the surface were divided into panels spaced at regular intervals. The inscription is sunken, suggesting that the pattern was in relief on the tong itself.

Glass impressed with large rectangular tong ends belongs to the same category as that stamped with circular ends bearing the motif of the rosette or quadruped (cat. nos. 44, 45). Many large beakers and bowls, and fragments thereof, have survived with rectangular indented marks in addition to the required pattern. Glassmakers were usually careful in making the sides of such tongs overlap, so that these marks would become part of the decoration, subdividing the surface into rectangular panels.

The inscription *baraka li-ṣāḥibihi* (Blessing upon its owner) is the most common on large cups of square proportions, such as the present one. A fragmentary beaker in Stockholm, found at Sāveh, Iran (Lamm 1935, pl. 29c), has the same inscription as this cup, which is among the most complete extant examples. A pitcher in Kuwait has a repeated vertical inscription, in the same type of kufic script, that exhorts "Drink with enjoyment!" (*ishrab haniyyan*), thus defining the object as a container for a potable liquid, probably wine (Carboni 2001, no. 72). Pitchers and cups with similar impressed inscriptions may have belonged to matching sets, not unlike those in use today.

A precise attribution for this cup is more difficult than for the small vessels previously discussed (cat. nos. 43–45), for which an Egyptian or Syrian origin seems likely. Since the fragment with the same inscription found in Iran may represent an accidental import, an Iranian origin is not certain. In fact, the square proportions of this cup find better parallels in the Syrian and Mesopotamian regions from the eighth century onward (see, for example, Negro Ponzi 1970–71, fig. 57, no. 51). Consequently, a definitive attribution of this type of vessel is not possible until new finds contribute to a better understanding of its origins.

SC

LITERATURE: Jenkins 1986, no. 17

47. Cup
Egypt, Syria, or Iraq, 9th–10th century
H. 8.3 cm (3¼ in.), max. diam. 9.9 cm (3⅜ in.)
Olive green
Free blown and impressed; tooled on the pontil
CONDITION: The object is intact. The surface is in good condition, except for a light milky white film and some abrasion near the base. The glass contains some small bubbles and a few very large ones as well as occasional darker streaks.
The Corning Museum of Glass
55.1.17

This cylindrical cup has a flat base and square proportions. The decoration was impressed with three different tongs, one bearing a triangular motif, the second a circle, and the third a stylized heart-shaped pattern enclosing a vertical line and two semicircles. The uppermost row of decoration consists of eleven upside-down triangles; the making of these caused the circle of the rim to become irregular. The central row comprises thirteen circles; the third motif, near the base, is repeated eight times at various intervals and heights. The three patterns do not line up consistently.

Cups of square proportions were often impressed with combinations of simple geometric figures, such as triangles, circles, and rhombuses. These are linked to cups with kufic inscriptions (cat. no. 46) by an extant object decorated with both types of motif (*Persisches Glas* 1963, no. 65). There is little doubt, therefore, that these two sorts of tong-decorated objects originated in neighboring workshops, although the location of the shops is still a matter of speculation. Fragments bearing one of the most common combinations of geometric motifs—a cluster of three circles and a rhombus—were excavated in Egypt (Ehnasya), Syria (Hama), and Iraq (Samarra) (see, for Ehnasya, Rackham 1925–26, fig. 3; for Hama, Riis and Poulsen 1957, figs. 132, 133; for Samarra, Lamm 1928, p. 48, no. 165, fig. 32, and 1929–30, p. 66, pl. 16:1). In addition, two nearly complete cups with the same combination of motifs are said to have been found in the Caucasus (Kobanj) and in Iran (Māzandarān region) (Lamm 1935, p. 12). Most likely, this type of glass was traded extensively in the Islamic world during the ninth and tenth centuries.

As in the seemingly untidy and random application of the tongs on small bowls with impressed rectangles, rosettes, and quadrupeds (cat. nos. 43, 44, and 45, respectively), the individual elements here are orderly only in a general way. Although

arranged in three horizontal registers, they are impressed at irregular intervals and do not combine into a unified regular pattern; only the uppermost row of stamped triangles forms a consistent sawtooth motif. Perhaps the makers of these vessels were looking for ways to achieve some freedom of expression within the canons of repetition dictated by Islamic art—a freedom that could be achieved only by decoration with tongs, not by patterns impressed in a mold. *SC*

LITERATURE: Higashi 1991, p. 76, no. 49; Tomobe 1992, pl. 149

48. **Bowl**
Egypt, 9th–10th century
H. 6.5 cm (2½ in.), max. diam. 13.3 cm (5¼ in.)
Bluish green
Free blown and impressed; tooled on the pontil
CONDITION: The object is intact and the surface is in good condition. The glass contains numerous small bubbles.
Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst I.1538

This low cylindrical bowl has a flat base. The decoration was impressed with three different tongs, one bearing a circle, the second a stylized palmette motif composed of confronted S-shapes above a teardrop, and the third a double vertical line joined alternately at the top or bottom by a curved line. The uppermost row of decoration consists of fifteen circles: the central register alternates the two remaining motifs. The elements of each pattern were closely stamped at fairly regular intervals, although they do not always line up consistently and sometimes overlap slightly.

The present bowl is proportionally wider and lower than the two cups previously discussed (cat. nos. 46, 47), which have almost identical dimensions. An Egyptian origin is substantiated for this object both by its place of acquisition and by two fragments with similar decoration found in Fusṭāṭ (Old Cairo) and now in the Museum of Islamic Art, Cairo (Lamm 1929–30, pls. 16:7, 17:9). In particular, the second cited fragment presents the same three decorative motifs, but the row with circles and that with the alternating palmettes and vertical lines are reversed.

While the circle was widely used as a decorative pattern for tong-impressed

glass (cat. no. 47), the palmette and the vertical lines joined at one end are not as common; these features, along with the wider shape of the bowl, strongly suggest an Egyptian attribution. The two motifs originated as architectural patterns on stucco-decorated walls in the mid-ninth-century ʿAbbāsid capital of Samarra, in Mesopotamia, where impressed glass was also found (Herzfeld 1923, esp. pls. 49, 50, 52, 54, nos. 131, 132, 140, 141; Lamm 1928, pp. 45–48). It is well known, however, that the new artistic language developed in Iraq significantly influenced the art of the Tulunids in Egypt in the late ninth and early tenth centuries. Consequently, an Egyptian attribution remains the most likely. *SC*

PROVENANCE: Acquired in Cairo; B. Moritz

LITERATURE: Lamm 1928, p. 46; Lamm 1929–30, p. 66; Kröger 1984, no. 106

49. Handled Cup
Egypt, Syria, or Iraq, 9th–10th century
H. 6.5 cm (2½ in.), max. diam. 8.5 cm (3⅜ in.)
Green
Free blown, impressed, and applied; tooled on the pontil
CONDITION: The object is intact. The surface is weathered, resulting in a brown coating. The glass contains numerous small bubbles.
Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst 1.2134

This cylindrical cup has a flat base and a rounded rim. The decoration consists of a row of concentric teardrops impressed at irregular intervals and often overlapping. Three trails of the same color as the cup were applied vertically at even intervals around the vessel before being dragged downward to reach the base and then upward to return to the rim; the outer surface of each of these trails was tooled into a wavy pattern. A curved handle with two thumb rests made by tooling was attached between two of the vertical trails, at the base and slightly below the rim.

The combination of the concentric teardrop motif and the applied wavy trails makes this object unique, although it clearly fits into the group of glass with tong-stamped decoration previously discussed (cat. nos. 43–48). While the present work is almost certainly a drinking vessel, handled cups were also used as portable lamps; in such cases, a tubular part was attached at the bottom to hold the wick (see Lamm 1929–30, pl. 4:39, for an example in the National Museum, Damascus). A cup similar to this one and erroneously catalogued as fifth to sixth century is in the Museo Civico d'Arte Antica, Turin (Invernizzi 1966, no. 400). Another cup of like proportions, in Berlin, bears a row of multipetaled rosettes impressed with a tong having jagged sides (as in cat. no. 44), three vertical wavy trails that also form small feet, and a round handle with one thumb rest (Lamm 1929–30, pl. 19:2; Kühnel 1963, fig. 175). An interesting parallel in the Benaki

Museum, Athens, is a vessel that includes an identical handle with two thumb rests and six wavy trails (Clairmont 1977, pl. 13:215). With molded rather than impressed decoration, it provides an ideal link between the two techniques, which were evidently employed in the same workshop.

SC

PROVENANCE: Acquired in Cairo
LITERATURE: Lamm 1928, pp. 45–46; Lamm 1929–30, p. 70; Kröger 1984, no. 109

50. **Medallion**
Central Asia, ca. 1160–87
Max. diam. 6.7 cm (2⅝ in.)
Dark green
Impressed
INSCRIPTION, in *naskhī* script:
خسرو ملك (Khusraw Malik)
CONDITION: The object is intact. The surface is heavily weathered, resulting in a whitish film and silvery iridescence. The glass contains numerous small bubbles and several large ones.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 365 G

51. **Medallion**
Central Asia, late 12th century
Max. diam. 9.5 cm (3¾ in.)
Yellowish green
Impressed
INSCRIPTION, in *naskhī* script:

عماد الدولة والدين ملـ [ـك الامراء جهان پهلـ] وان
عمر بن الحسين نصرة

(The Pillar of State and Religion, the Em[ir in Chief, Champion of the] World, ʿUmar ibn al-Ḥusayn Nuṣra [The Help of the Commander of the Believers])
CONDITION: The object was broken and chipped; approximately 20 percent of it is missing. The surface is entirely weathered, resulting in pale brown and whitish coatings, iridescence, and abrasion. The glass contains scattered small bubbles.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 378 G

52. **Medallion**
Central Asia, late 12th century
Max. diam. 6.4 cm (2½ in.)
Dark bluish green
Impressed
CONDITION: The object was broken into two parts and has been repaired; it has a large chip at the border but is otherwise complete. The surface is entirely weathered, resulting in a whitish coating, heavy iridescence, and abrasion.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 323 G

All these circular medallions have an impressed pattern in relief on one side and are plain on the reverse. The decoration of the first (cat. no. 50) consists of a frontal view of a bird of prey with stretched legs, open wings, and extended tail. The animal's head has two protrusions at the top, and its body is textured with feathers. A circular depression in the center of the medallion partially obscures a human figure depicted within the bird's body (only the head, arms, and legs are visible). Two leaves stem symmetrically from the border, on either side of the bird's head. A minute inscription is visible on the upper parts of the bird's wings.

The second medallion (cat. no. 51) presents a frontal view of a lute player seated cross-legged. He wears a long tunic on which the folds are indicated. His round face has well-defined eyebrows that join with the line of the nose, and he seems to be bareheaded. The lute has a small multilobed body and a long neck that bends at a sharp angle. An inscription is impressed inside a band around the periphery of the medallion.

The decoration of the third medallion (cat. no. 52) shows a walking elephant with a massive body, short legs (one foreleg is bent), a long trunk that bends back to touch one leg, and a long tail; its right ear corresponds to a circular depression in the center of the medallion. A figure, perhaps a woman, stands inside a howdah atop the elephant. The mahout, who wears a winged crown that appears to be Sasanian, sits on the animal's neck and pecks at its head with a hooked tool called an *ankus*. A third figure sitting behind the howdah wears a complex headdress and holds an object in his right hand.

These three medallions are representative of a fairly large group of objects that have appeared consistently on the art market in the past decade. An archaeological context is provided for them by the excavations, completed in the late 1930s, of the ruins of a twelfth- or thirteenth-century Ghaznavid palace at Old Termez (Tirmidh), Uzbekistan, near the border with Afghanistan (Field and Prostov 1942). About twenty such medallions, depicting various subjects, were found at Termez. The excavations also supplied a clue as to the function of the medallions: since they were found together with alabaster gratings, they are thought to have been window decorations. Another five similar medallions, reputedly from Ghazna, Afghanistan, were acquired by the Museum für Islamische Kunst, Berlin, in the 1960s (Kröger 1984, nos. 115–19). Private and public collections now have more than seventy complete or fragmentary medallions, the majority of which are in Kuwait, in the al-Sabah Collection and the Tareq Rajab Museum.

The diameters of these medallions vary from less than 5 to about 10 centimeters (2 to 4 in.). Their edges are often irregular, and they are seldom exactly circular. They range widely in color—from dark and vivid blue, green, turquoise, and purple to pale yellow, pale green, and amber. Most of the approximately twenty different identifiable subjects are figural, including falconers, horse and elephant riders, musicians, predatory birds, felines, elephants, ducks, hares, antelopes, sphinxes, and griffins. Among the nonfigural subjects are kufic inscriptions, six-pointed stars, and rosettes.

Historical inscriptions in cursive calligraphy, which are a great help in attributing the group more accurately to the late twelfth century, sometimes appear around the edge of the medallions (cat. no. 51); elsewhere, they are almost concealed inside a figure, as the name of Khusraw Malik is on an eagle's wings (cat. no. 50). This name, that of the last Ghaznavid ruler, Tāj al-dawla Khusraw Malik ibn Khusraw Shāh (r. 1160–86), occurs on a few other extant medallions, all of which were probably destined to adorn the windows of palaces in Ghazna, the capital, or in other important cities ruled by Ghaznavids, such as Maymana, Kundūz, Lahore, and Peshawar. Appearing more prominently on the medallion with the lute player (cat. no. 51) is the name of a Ghūrid atabeg, Jahān Pahlavān ʿUmar ibn al-Ḥusayn Nuṣra (Carboni 2001, no. 73), which is also found on other medallions in the same collection and in the Tareq Rajab Museum.

To varying degrees, the subjects illustrated on these three medallions give evidence that the Ghaznavids and Ghūrids were greatly interested in Sasanian iconography. This is not surprising in light of the fact that the Ghaznavid sultan Maḥmūd (r. 997–1030) was the patron of the Persian poet Firdausī (ca. 940–1020), the author of the celebrated masterpiece of Persian literature, the *Shāhnāma* (Book of Kings), in which the Sasanian dynasty plays a prominent part. The figure inside the howdah atop the elephant (cat. no. 52) can perhaps be identified as Sapınūd, the Indian bride of Bahrām Gūr, a character from the *Shāhnāma*. A similar scene is also illustrated on a ceramic bowl made for a Seljuq amir in the late twelfth or the early thirteenth century (Freer Gallery of Art, Washington, D.C., 27.3; Atıl 1973, no. 39).

The eagle carrying a human figure (cat. no. 50) has origins in the Greek myth of Zeus and Ganymede, which relates how Zeus, in the guise of an eagle, kidnapped the youth Ganymede, the cupbearer of the gods. Later, Greco-Buddhist models influenced the development of the theme in both Sasanian and Islamic iconography (Azarpay 1995, p. 105). In the Iranian area, the image was transformed into an eagle holding in its talons a human figure, often a female, who appears frontally in the middle of the bird's body; a silver plate in the Hermitage attributed to the late Sasanian period exemplifies this interpretation (Trever and Lukonin 1987, no. 22, pls. 57, 58). That the same image spread to the western Islamic world is indicated by a painting on the ceiling of the Cappella Palatina, Palermo (Ettinghausen 1962b, pl. p. 46). In the Iranian and Central Asian regions, the theme was

Opposite (counterclockwise from top left): 50, 51, 52

depicted in other media, such as pottery and metalwork (*SPA* 1938–77, vol. 5 [1938], pl. 585a; Melikian-Chirvani 1982, no. 9). Although the subject probably developed from an amalgamation of different myths that eventually blended in medieval Iran, its origins are clearly associated with pre-Islamic Iran.

The figure of the lute player associated with the atabeg Pahlavān (cat. no. 51) seems at first to be a straightforward image of royal entertainment, but a relationship to Sasanian Iran can also be postulated here. A similar image—an enthroned king on the obverse and a lute player on the reverse—is found on a gold medallion dated A.D. 976 in the Archaeological Museum, Istanbul. Both sides of the medallion carry a kufic inscription citing the name of the Būyid ruler ʿIzz al-dawla Bakhtiyār, who reigned from 967 to 978 (Bahrami 1952, fig. 3; Ettinghausen and Grabar 1987, fig. 253). The Ghūrid patron of the glass medallion may have borrowed this image in an effort to emulate the well-documented ambition of the Būyids to continue the great Sasanian tradition and establish themselves as the champions of Islam.

Two of these medallions have a perplexing circular hollow in the center. A comparison with circular bronze mirrors having a knob in the center of the molded face seems appropriate (the subjects depicted are also often similar), although there is no evidence that identical molds were used for both types of objects. The depression obviously interferes with the viewer's ability to make out the subject; the human figure held by the eagle, for example, is almost indecipherable. Perhaps the depression was made as a setting for a decorative stone or glass gem, or perhaps a small pontil was used to lift the medallion up when the glass was still hot, in order to set it in a plaster grid, thus leaving a sort of pontil mark.

SC

PROVENANCE: (cat. no. 50) Said to have been found at Ghazna, Afghanistan; (cat. no. 51) Christie's, London, sale, October 15, 1996, lot 285; (cat. no. 52) Christie's, London, sale, April 25, 1995, lot 253
LITERATURE: (cat. no. 50) Carboni 2001, no. 73b; (cat. no. 51) Carboni 2001, no. 73c; (cat. no. 52) Carboni 2001, no. 73f

53. **Bottle**
Egypt or Syria, 8th–9th century
H. 12.5 cm (4⅞ in.), max. diam. 6 cm (2⅜ in.)
Translucent dark purple and opaque brownish red, blue, and yellow
Free blown, applied, and marvered; tooled on the pontil
CONDITION: The object was broken and has been repaired but is almost complete; small sections are filled in and painted over. The surface is partially weathered, resulting in a milky white film. The glass contains scattered bubbles.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 71 KG

This cylindrical bottle has a flat base, an angular shoulder, a short neck, and a splayed irregular opening. Trails of opaque glass in three colors, often overlapping and creating additional colors, have been applied and marvered in an irregular wavy pattern that spirals around the body.

This exceptional bottle, having no exact parallels, stands apart from all other extant Islamic vessels with marvered decoration. The purple color of the object itself, almost entirely concealed by the three-colored trails, is treated as a fourth decorative color rather than simply as the background; additional hues produced by the overlapping include pale green, from the mixture of blue and yellow. The whimsical effect of the colors is further enhanced by the nature of the pattern. Attributable to the early Islamic period, the cylindrical shape finds particular analogies in the eighth and early ninth centuries.

A small fragment from the neck of a bottle, now in the Corning Museum (74.1.48), provides the closest parallel. There, against a dark purple background, the decoration is tooled into an irregular fish-scale motif in red, yellow, and pale blue. A flask in the same collection in Kuwait, undoubtedly from the early Islamic period, shows a similar combination of colors and supports the proposed attribution for this bottle (Carboni 2001, no. 75b). Ultimately, however, the artistic impetus behind the creation of the present object must be sought in a contemporaneous revival of core-formed Egyptian vessels with similar decoration, as well as in Roman objects inspired by the appearance of semiprecious stones, such as onyx and agate (see, for example, cat. nos. 62, 63, and Tatton-Brown and Andrews 1991, pp. 25–33, nos. 20–32, p. 51, no. 58). A second-millennium-B.C. core-formed blue goblet at Corning and a Late Roman bottle in Boston made of dark blue glass and red, ocher, and yellow threads offer good chromatic parallels (Smith 1957, no. 4, and Eisen and Kouchakji 1927, pl. 156 bottom, respectively). Both demonstrate the venerable tradition of decorative patterns and colors in the eastern Mediterranean area, which persisted into the early Islamic period. *SC*

PROVENANCE: Ernst Kofler
LITERATURE: Kunz 1981, no. 495; Carboni 2001, no. 75a

54. **Cup**
Egypt or Syria, 8th–9th century
H. 6.2 cm (2½ in.), diam. 6.2 cm (2½ in.)
Translucent pale blue and opaque white
Free blown, applied, and marvered; tooled on the pontil
CONDITION: The object is cracked but complete. The surface is lightly weathered, resulting in brownish pitting on the interior. The glass contains scattered small bubbles and one inclusion.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 52 KG

This cylindrical cup, of equal height and diameter, has a flat base and walls that taper slightly near the rim. A trail of white opaque glass forms a band below the rim. White glass is also partially marvered around the body, creating an irregular wavy pattern.

The present cup is among the most peculiar and appealing objects found in the Kuwait collection—and, in fact, among all the known productions of Islamic glass with marvered decoration (see also cat. no. 53). The straight-walled profile, equal height and diameter, the colors, and the quality of the decoration all argue for an attribution to the early Islamic period. The wavy irregular pattern, formed by the partial marvering of the opaque white trails, vaguely recalls sea foam, a parallel emphasized by the pale blue color, which, in its turn, finds analogies in glass with stained decoration (see cat. nos. 102–109). Such a transparent quasi-colorless surface—rare in Islamic marvered glass, which is usually made of a dark purple, green, or blue matrix—points to pre-Islamic models (cat. nos. 53, 55–60).

Parallels for the present object can be found in two cups of similar shape and decoration, though in worse condition, in the National Museum, Damascus, and the Newark Museum, as well as in three uncatalogued fragments at Corning (RWS5914); only the object in Newark is published (Auth 1976, no. 234). The Damascus cup, excavated in Syria, represents the best match for the present object. Although its condition makes a satisfactory understanding of its color difficult, the vessel is probably amber yellow with white trails. The Newark cup has a more regular festooned pattern, and its base glass is purple, a color that links it to the majority of Islamic glass vessels with marvered decoration and thus supports its attribution. The three Corning fragments are of a slightly darker blue than the present cup and seem to belong to the same vessel. A reconstruction based on their shapes proves to be an excellent parallel: not only does it match the cylindrical form of this cup, but it also includes an applied white trail below the rim. *SC*

PROVENANCE: Ernst Kofler
LITERATURE: Kunz 1981, no. 494; Carboni 2001, no. 76

55. **Flask**
Probably Egypt, 11th–12th century
H. 14.6 cm (5¾ in.), max. diam. 3.7 cm (1½ in.)
Translucent dark blue and opaque white
Free blown, applied, and marvered; tooled on the pontil
CONDITION: The object is chipped at the base but otherwise intact. The surface is in excellent condition. The glass contains small bubbles.
The Corning Museum of Glass
50.1.32

This flask has a small uneven square base showing a pontil mark, a slender flaring profile with a curved shoulder, and a cylindrical neck with a rounded rim. A white marvered trail was tooled into a regular festooned pattern that covers the entire surface.

The present object is one of the best of a class that includes many similar containers, and its shape is probably the most common seen in Islamic vessels with marvered decoration during the medieval period. Sometimes referred to as "spearlike" flasks for their slender flared profile and small base, such vessels usually have necks that bulge in the center and flare at the opening, although the neck here is a simple cylinder. The shape of such vessels suggests that they were stored horizontally or at a slight angle or that a support was used to keep them upright. Ranging consistently between 10 and 15 centimeters (4 to 6 in.) in height, they have traditionally been viewed as kohl containers. That this was indeed their main function has recently been proved by the excavation of a small flask at al-Ṭūr, on the Sinai Peninsula, that still retained some kohl and was found alongside a copper rod used to apply the compound to the eyelids (Shindo 1993, pp. 302–4, figs. 7–9; Satoh et al. 1994, with a chemical analysis of the compound).

The trailed and marvered decoration applied to the spearlike flasks is almost invariably opaque white against a dark base glass and is tooled into a regular foliated or festooned pattern, whereas flasks of similar dimensions but of a cylindrical profile may present different colors and less regular tooling (see Carboni 2001, nos. 76, 3.63a). For this reason, cylindrical flasks can be attributed to either the early Islamic or early medieval period, but spearlike flasks only to the medieval. The numerous flasks excavated at al-Ṭūr, which were supposedly exported from Cairo, are predominantly dark blue and green; to a lesser extent, dark purple, pale green, and colorless examples are found. The same distribution of colors occurs in the material unearthed at Fusṭāṭ and, in part, at al-Quṣayr al-Qadīm, Egypt (Meyer 1992, pl. 19, nos. 551–53; Shindo 1993, fig. 3, nos. 17–23; Allan 1995, fig. 12). Dark purple, the most common color for glass with marvered decoration, predominates in Syria (cat. nos. 56–60; see Carboni 2001, no. 80). Blue must have been a popular color for export on the Indian Ocean route and may indicate an Egyptian origin for the present flask. A comparable blue flask is in the Victoria and Albert Museum (C4–1950); another was formerly in the Durighiello collection (Lamm 1929–30, pl. 29:7).

SC

LITERATURE: Perrot 1970, no. 51; Ferber 1975, no. G13

56. **Bowl**
Egypt or Syria, 13th century
H. 8 cm (3⅛ in.), max. diam. 20 cm (7⅞ in.)
Translucent dark purple and opaque white and pale blue
Mold blown, applied, and marvered; tooled on the pontil
CONDITION: The object was broken and has been repaired; approximately 80 percent is original. The surface is in good condition.
Museo Civico Archeologico, Padua
XXII.229

Cat. no. 56, underside

57. **Footed Bowl**
Egypt or Syria, 13th century
H. 4 cm (1⅝ in.), max. diam. 9 cm (3½ in.)
Translucent dark purple and opaque white and pale blue
Free blown, applied, and marvered; tooled on the pontil
CONDITION: The object is intact and in good condition, except for a dull white film covering its surface.
The David Collection, Copenhagen
22/1987

The bowl in Padua (cat. no. 56) has a curved profile with a convex shape and rests on a flat base. It was blown in a mold with vertical ribs. The decoration consists of two trails of white glass applied and marvered around and just below the opening, as well as on the lower half of the body, and ending in a curl around the pontil mark underneath the base. On the area not covered by the white trails, the ribs in relief are decorated with rows of short horizontal lines in pale blue glass.

The bowl in Copenhagen (cat. no. 57) has a tapered, slightly curved profile rising from a rather flat base; it stands on an applied low foot with a circular base and a very short stem. Its decoration consists of a white trail applied and marvered in a spiraling pattern around the body. A pale blue trail decorates the rim and the area immediately below it. The foot also bears a white applied and marvered trail.

Bowls with applied and marvered trails seem to have been made almost invariably of dark purple glass and—at least judging from the numerous locations where they were unearthed—must have been popular and prized export items. Among the sites at which they were found were Hama and other locations in Syria and Iraq; Jerusalem; Fusṭāṭ in Egypt; al-Ṭūr in the Sinai Peninsula; Sarai al-Jadid in the lands of the Golden Horde; England; and Italy (see, respectively, Riis and Poulsen 1957, figs. 186, 189, 190, 192, 195, 196, 207; ʿAbd al-Khaliq

1976, fig. 24b; Engle 1984, p. 67, no. 36; Shindo 1992 and 1993, fig. 4; Kramarovsky 1998, p. 97, fig. 22.6; Harden et al. 1968, pp. 155–56; and the present bowl from Padua).

The most common type of bowl with marvered decoration has molded vertical ribs and white marvered trails applied in a spiral pattern that is usually left "uncombed," the required wavy effect being achieved by the uneven ribbed surface (see, for example, Carboni 2001, no. 82b). Variations do exist, however, as the two examples discussed here demonstrate: both also include pale blue trails, while the bowl in Copenhagen is not molded and stands on a low applied foot.

The vessel in Padua, excavated there in the nineteenth century, has an almost exact parallel in the Ashmolean Museum, Oxford, although the latter piece does not present the peculiar pale blue decoration in the empty space on the upper half (Pinder-Wilson and Ezzy 1976, no. 144). The decorative technique of the Padua bowl is rather complex, for both the white trail on the lower half and the blue lines must have been marvered while the bowl was reblown in the mold rather than by rolling on the marver. The result is a spectacularly accomplished object.

Although more straightforward, the footed bowl in Copenhagen is equally striking. Its blue and white trails were applied in a spiraling movement and quickly marvered with a rotating action before the foot was applied at the bottom. The uncombed pattern, the flat surface, and the addition of the foot combine to make this one of the few surviving objects with marvered decoration that have an austere, almost classical quality.

SC

PROVENANCE: (cat. no. 56) Excavated in Via Zattere, Padua, 1855
LITERATURE: (cat. no. 56) Zampieri 1997, no. 6; (cat. no. 57) von Folsach 1990, no. 246

58. **Perfume Sprinkler (*Qumqum*)**
Syria, 13th century
H. 10.2 cm (4 in.), max. diam. 6.2 cm (2½ in.)
Translucent dark purple and opaque white and sage green
Free blown, applied, and marvered; tooled on the pontil
CONDITION: The object is intact. The surface is lightly weathered, resulting in iridescence and brown pitting.
The Toledo Museum of Art, Gift of Edward Drummond Libbey
1923.2359

This *qumqum* has a globular body flattened at two sides, a small kicked base, and a tapered neck with a narrow opening. Two purple handles were applied at opposite sides of the base of the neck and tooled into a snakelike pattern. Two marvered trails, one white and one sage green, were tooled into an arcaded pattern along the entire surface.

Perfume or rosewater sprinklers having flattened sides and a narrow neck with a tiny opening became popular in the Syrian region in the thirteenth century. Apparently called *qumqum* (plural *qamāqim*) in Arabic during the medieval period, this type of container has often been referred to as *omom* in the related literature, after its pronunciation in the Egyptian dialect. *Qamāqim,* and particularly the length of their necks, may vary in size; they can be undecorated, molded into a vertical ribbed pattern, enameled and gilded (cat. no. 122), or decorated with marvered trails, as here. The neck is often flanked by two small handles, tooled into a snakelike pattern, that probably reflect the original function of the prototypes of such vessels, namely, small

59. **The Durighiello Bottle**
Syria, 13th century
H. 20 cm (7⅞ in.), max. diam. 11 cm (4⅜ in.)
Translucent dark purple and opaque white
Free blown, applied, and marvered; tooled on the pontil
CONDITION: The object is intact. The surface is weathered, resulting in heavy iridescence and some corrosion, especially on the body.
Trustees of The British Museum, London 1913.5-22.39

This bottle has a flattened globular body, a low circular tooled foot, and a long tapered neck that ends in a splayed opening. Two purple handles were applied at opposite sides of the base of the neck and tooled into a snakelike pattern. The decoration consists of a white applied and marvered trail tooled into a festooned pattern along the entire surface.

Among the best-known glass objects with applied and marvered trails is this bottle, named after its former owner, Joseph-Ange Durighiello. Its fine state of preservation, harmonious proportions, and skillfully balanced marvered pattern (divided into six regular sections on the body) contribute to its fame.

The shapes of the body, foot, and neck clearly point to the Syrian region as the place of origin; glass having a comparable profile has been excavated at Hama in particular (Riis and Poulsen 1957, fig. 178). A dark blue object of identical profile and proportions but with a thick wavy trail in place of the two snakelike trails, formerly in the Antikensammlung, Berlin, was described by Carl Johan

personal objects of metal or leather tied at the belt with cords or straps.

Like most other objects with marvered trails, these sprinklers are dark purple with white threads in the great majority of cases (see, for example, Lamm 1929–30, pl. 29:16, and Carboni 2001, no. 83a); a few dark blue and brown examples have survived (Smith 1957, no. 513; Ohm 1973, no. 101). This *qumqum* of elegant proportions is singular for its dichromatic decoration in which sage green blends appealingly with the predominant white. Opaque pale blue or bluish green trails were often used to highlight the white marvered trails (cat. nos. 56, 57), but they were rarely employed as components of vessels (see Carboni 2001, no. 94a,b).

SC

PROVENANCE: Thomas E. H. Curtis; Edward Drummond Libbey
LITERATURE: Lamm 1929–30, pl. 32:8

Lamm as being gilded but not enameled (1929–30, p. 265, pl. 89). A similar, although undecorated, bottle in dark blue glass is in the al-Sabah Collection, Kuwait (Carboni 2001, no. 44a). A gilded and enameled bottle with a higher foot but the same profile, now in the National Museum, Damascus, was found in Aleppo (al-'Ush 1976, fig. 156).

This bottle was reportedly discovered in Adana, a town near the south Anatolian coast that is not far from the Syrian border and the town of Aleppo, which is one of its possible places of origin. Whether or not this hearsay provenance can be trusted, it would not be surprising, since Adana, a border town sandwiched between the Islamic and Byzantine worlds, was an active commercial center where Hellenistic, Roman, and Islamic glass has been found (see *The Encyclopaedia of Islam* 1954–, vol. 1 [1960], pp. 182–84, and Stern 1989, esp. figs. 13, 14).

SC

PROVENANCE: Said to have been found at Adana, Turkey; Joseph-Ange Durighiello

LITERATURE: Lamm 1929–30, pl. 29:15; Pinder-Wilson and Ezzy 1976, no. 134; Pinder-Wilson and Ezzy 1991, p. 129, no. 162

60. **Beaker**
Syria, 13th century
H. 15.9 cm (6¼ in.), max. diam. 6.5 cm (2½ in.)
Translucent dark purple and opaque white
Mold blown, applied, and marvered; tooled on the pontil
CONDITION: The object is intact and in good condition. The surface is lightly weathered, resulting in only slight iridescence.

The Toledo Museum of Art, Purchased with funds from the Libbey Endowment, Gift of Edward Drummond Libbey 1969.365

This tall narrow cylindrical beaker flares into a funnel shape about 2 centimeters (¾ in.) below the rim; a thin foot ring is applied at the base. The object is marked by narrow and evenly spaced vertical ribs. The decoration consists of an applied and marvered trail running in a spiral along the cylindrical section of the body and of a second trail applied around and below the rim, leaving an undecorated band in between.

The shape of the present object, which is similar to that of a beaker with applied emerald green trails in the same collection (cat. no. 42), confirms its attribution to the Ayyūbid or early Mamluk period. This type of beaker was produced in large quantities and usually decorated with enamels and gilding; applied and marvered trails seem to have been a less common decorative solution. The present beaker is the best preserved and the largest of a small group bearing such trails, which includes a few other beakers and especially fragments excavated in Syria (Riis and Poulsen 1957, fig. 205). Its molded ribbed pattern and uncombed trails suggest a comparison with bowls of the type found in Padua (cat. no. 56), which were probably produced in neighboring Syrian ateliers in the same period. Here, the stark contrast between white and dark purple, emphasized by the undecorated band near the opening, combines with the elongated shape to make for a vessel that is austere and elegant, yet also charming. *SC*

LITERATURE: *JGS* 13 (1971), p. 140, no. 133; Atıl 1981, no. 54

Mosaic Glass

DAVID WHITEHOUSE

Mosaic glass, also known as millefiori (Italian, "thousand flowers"), has been made intermittently for 3,500 years, from the Bronze Age to the present. The earliest examples consist either of slices of monochrome canes (thin rods drawn from a mass of molten glass) or chips of various colors arranged in patterns on a core (for the former, see Stern and Schlick-Nolte 1994, p. 46, fig. 39; for the latter, see Grose 1989, p. 51, fig. 25). In both cases, the components were heated until they fused.

Beginning in the Hellenistic period, most mosaic glass was made by fusing slices of canes having patterned cross sections. If the desired form was an open vessel, the slices were probably fused in a disk, which was then slumped over a mold (see figs. 24–29). If it was a closed form or a solid object, the slices were picked up on a gather of molten glass or fused in a mold. Unlike the great majority of Hellenistic and Roman mosaic-glass canes, most Islamic specimens have a bull's-eye pattern: a circular spot at the center, a concentric ring of another color, and one or more outer rings, either monochrome or having dots in a matrix of another color or short radial stripes of alternating colors.

The discovery of fragments of mosaic-glass vessels and tiles (including cat. no. 61) in the ruins of the Jawsaq al-Khāqānī, the palace built by Caliph al-Mu'taṣim in 836–42 at Samarra, suggests that at least some Islamic mosaic glass was made in the ninth century (Lamm 1928, pp. 106–7 and 108–10, nos. 302–12). Unfortunately, this is the only apparently fixed point in the chronology of such glass, and it is not known when manufacture began or ended. However, with the possible exception of beads, we are not aware of any Sasanian mosaic glass or of Roman mosaic glass that is demonstrably later than the fourth century. (The latest datable Roman mosaic glass occurs in the late-fourth-century opus sectile panels from Kenchreai, Greece, and in related fragments; for the latter, see Brill and Whitehouse 1988, pp. 35–37, and Auth 1990.) Thus, there is no evidence for continuity of production between late antiquity and the ninth century.

Mosaic glass seems to have been among the least common varieties of Islamic glass, but it achieved a wide distribution, from Egypt to Iran. For example, a mosaic-glass molar flask was acquired by Ray Winfield Smith in Cairo (Corning 59.1.430; Smith 1957, no. 485); in Iran a few pieces of mosaic glass were excavated at Susa (Lamm 1931, pp. 366–67, pl. 79.10) and Nishapur (Kröger 1995, no. 162).

Opposite: detail, cat. no. 61

61. Tile Fragment
Iraq, 9th century
L. 11 cm (4⅜ in.), w. 7.5 cm (3 in.), thickness .85 cm (⅜ in.)
Opaque white, reddish orange, yellow, green, light blue, and very deep purple
Slices of mosaic-glass canes placed side by side on flat surface and fused
CONDITION: The fragment comprises three smaller fragments. The upper surface is slightly pitted but otherwise in good condition.
Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst Sam. 309

This fragment—part of a tile—preserves one straight edge. It was constructed from cane slices having seven different patterns: (1) a green dot surrounded by a yellow ring, a ring of alternating white and purple dots, and an outermost ring of alternating white and red stripes; (2) an orange dot surrounded by a yellow ring, a ring of alternating yellow and purple dots, a ring of alternating orange and yellow dots, and an outermost ring of white and purple dots; (3) a checkerboard of white, orange, yellow, and green squares; (4) an orange dot surrounded by a ring of white and a purple square; (5) a red-and-green dot surrounded by a ring of alternating white and purple stripes, a ring of blue, and an outermost ring of yellow; (6) a checkerboard of white, orange, yellow, and purple squares; and (7) a green dot surrounded by a yellow ring, a red ring, and an outermost ring of alternating yellow and purple stripes.

Enough of this tile survives to permit a reconstruction of the size and design of the complete object. Granted the assumption that the design was symmetrical, the tile was square, with sides of 16 centimeters (6¼ in.). At its center was a square comprising nine slices of pattern 1 arranged in three rows. This was enclosed by one continuous row of slices of pattern 2, with five slices in each side; one row of pattern 3, with seven or eight slices per side; one row of pattern 4, with about eight slices per side; one row of pattern 5, with twelve or thirteen slices per side; one row of pattern 6, with fourteen or fifteen slices per side; one row of pattern 2 or something closely similar; and, at the edge, one row of pattern 7.

The tile was found, together with smaller fragments of tiles of the same type, during the excavation of the Jawsaq al-Khāqānī, the palace built by Caliph al-Muʿtaṣim between 836 and 842 at Samarra (Lamm 1928, pp. 109–10, nos. 304–12). Presumably they formed part of the decoration of the palace, perhaps arranged in panels on a wall. Two fragments of similar tiles are now in The Metropolitan Museum of Art (23.75.15a,b; Jenkins 1986, no. 75). *DW*

PROVENANCE: Jawsaq al-Khāqānī, Samarra, Iraq
LITERATURE: Lamm 1928, p. 109, no. 309; Hasson 1979, p. 34, no. 64

62. **Bowl**
Western Asia, perhaps Iraq, 9th century
H. 2.6 cm (1 in.), diam. 7.4 cm (2⅞ in.)
Opaque white, light yellow, light green, red, dark bluish gray, and black
Slices of mosaic-glass canes fused in disk, slumped, and probably ground and polished
CONDITION: The object is intact. The exterior is shiny, probably as a result of recent polishing. The top of the rim and the interior are matte and pitted. The colors are vivid on the exterior but various shades of brown on the interior.
Trustees of The British Museum, London OA1973.6–23.1

This shallow bowl has a plain rim, with a flat top made by grinding. The wall curves down and in, and merges with the rounded base. The bowl was constructed from cane slices having four different patterns: (1) a red dot surrounded by a white ring and an outermost ring of alternating red and black stripes; (2) a red dot surrounded by a yellow ring and an outermost ring of alternating green and yellow stripes; (3) a yellow dot surrounded by a red ring and an outermost ring of alternating white and gray stripes; and (4) a green dot surrounded by a red ring, a black ring, and an outermost ring of alternating red and white stripes.

The slices are arranged in the following pattern of somewhat irregular concentric circles: at the center of the bowl is a single slice of pattern 1; this is surrounded by a circle of seven slices, also of pattern 1; the succeeding circles consist of at least seventeen slices of pattern 2, nineteen slices of pattern 3, at least twenty-three slices of pattern 4, thirty-two slices of pattern 2, and, at the rim, thirty-two slices of pattern 1. Although probably originally arranged symmetrically for fusion as a disk, the slices became distorted as the disk was manipulated in order to eliminate gaps and to facilitate the process of sagging or slumping.

The variety and complexity of the slices distinguish this object—as well as the tiles from Samarra (see cat. no. 61) and a bowl in Kuwait (cat. no. 63)—from vessels with more repetitious designs (cat. nos. 64–67). The differences may indicate that the first three were produced in Iraq in the ninth century, while the others were made in a different region or regions, or at a different date. *DW*

PROVENANCE: Thomas Barlow Walker; Gawain McKinley Ltd., London
LITERATURE: Gawain McKinley n.d., inside back cover; Pinder-Wilson 1991, pp. 122 and 124, no. 156

63

63. **Bowl**
Western Asia, perhaps Iraq, 9th century
H. 1.2 cm (½ in.), diam. 4.1 cm (1⅝ in.)
Opaque white, yellow, green, red, and black
Slices of mosaic-glass canes fused in disk, slumped, and probably ground and polished
CONDITION: The object is intact. The interior is partly covered with whitish weathering, and the exterior is slightly pitted.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 63 G

This somewhat lopsided bowl has a plain rim. The wall curves down and in and merges with the rounded base. The object was constructed from cane slices having a black dot surrounded by white and red rings, with an outermost ring of alternating green and yellow stripes.

Other very small bowls of the type include examples in the David Collection, Copenhagen (von Folsach 1990, no. 241), and The Corning Museum of Glass (76.1.9; *JGS* 19 [1977], p. 170, no. 11). *DW*

LITERATURE: Atıl 1990, no. 13; Carboni 2001, no. 7b

64. **Bowl**
Western Asia, 9th–10th century
H. 5 cm (2 in.), diam. 20.2 cm (8 in.)
Opaque yellow, white, and black
Slices of mosaic-glass canes fused in disk, slumped, and probably ground and polished
CONDITION: The object is incomplete. It has been broken into many pieces, with small losses from the rim and wall and the complete loss of the floor and foot. The vessel has been restored with a narrow foot. The surface is dull and pitted, with traces of grayish weathering.
The Corning Museum of Glass 79.1.2

This shallow conical bowl has a plain rim with a rounded edge. The wall is almost straight but curves in toward the bottom. The object was made of

64

cane slices having an opaque yellow circle at the center, surrounded by an opaque white ring and a ring of small white spots in an opaque "black" matrix. All the cane slices are closely similar, and four of them occupy about 1 square centimeter (.16 sq. in.). When complete, the wall and floor of the vessel would have contained some thirteen hundred slices.

The form of this bowl may be compared with that of certain medieval Islamic ceramics, such as some of the slip-painted dishes and bowls usually associated with Nishapur (see, for example, Wilkinson 1973, nos. 5, 19, 25). *DW*

LITERATURE: *JGS* 22 (1980), p. 89, no. 9; Whitehouse 1991, fig. p. 42

65

65. **Bowl**
Western Asia, 9th–10th century
H. 4 cm (1⅝ in.), diam. 13.8 cm (5⅜ in.)
Opaque white and very dark blue
Slices of mosaic-glass canes fused in disk, slumped, and probably ground and polished
CONDITION: The object was broken and has been repaired. It is almost complete. The surface is lightly weathered, resulting in a whitish film.
The David Collection, Copenhagen
33/1978

This shallow bowl has a plain rim with a rounded lip. The wall is generally

straight but curves in at the bottom. The base consists of an applied foot ring. The object is made of cane slices having a black dot at the center surrounded by a ring of white and an outermost ring of short, alternating white and dark blue stripes. *DW*

LITERATURE: Unpublished

66. **Dish**
Western Asia, perhaps Iran, 9th–10th century
H. 4.5 cm (1¾ in.), l. 12.1 cm (4¾ in.), w. 5.2 cm (2 in.)
Transparent light green, transparent deep green, and opaque yellow
Slices of mosaic-glass canes fused, then slumped, and probably ground and polished
CONDITION: The object is intact. The surface is dull and weathered.
Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst I.3/73

This oval dish with pointed ends has a rounded rim. The wall curves down and in, and the base is flat. The object was made of cane slices having at least two patterns: (1) a green dot surrounded by a ring of alternating broad yellow and narrow green stripes, and (2) a yellow dot surrounded by a narrow green band and a wider band of alternating broad yellow and narrow green stripes.

The "marbled" appearance of the surface here, so different from that of the other mosaic-glass objects previously described, is the result of most of the cane slices having their sides exposed. Nevertheless, as can be seen here and there, the cross sections do have the characteristic bull's-eye pattern of canes made in the Islamic world. *DW*

LITERATURE: Brisch 1975, p. 422; Brisch et al. 1979, no. 651; Kröger 1984, no. 141

67. Molar Flask
Western Asia, 9th–10th century
H. ca. 6 cm (2⅜ in.)
Opaque white, red, orange, and bluish black
Formed by fusing slices of mosaic-glass canes in a mold; finished by cutting and polishing
CONDITION: The object is broken at the rim but otherwise complete.
Collection of the Glass Pavilion, The Eretz Israel Museum, Tel Aviv
MHG892.58

This bottle has a cylindrical neck, a four-sided body with vertical walls, and four tapering feet, one at each corner of the body. It was constructed from slices of mosaic-glass canes, all of which have a red dot surrounded by a white ring, a black ring, and an outermost orange ring. The upper and lower parts of the body are separated by a continuous horizontal groove. The upper part is decorated with four identical pairs of raised triangles at the junctions of the four sides. A larger triangle extends from the shoulder to the groove, while a smaller triangle, about half its height, is superimposed upon it. Below the triangles, the lower part of the body and the feet are decorated with four identical groups of two horizontal cuts above a single vertical cut.

The object belongs to a large group of bottles known as molar flasks because their feet resemble the roots of a molar tooth. The form was widely used in the central Islamic lands as containers for perfumes and scented oils. The great majority of molar flasks, almost all of which are small, are monochrome (usually colorless). Most were cast as a solid block, after which the interior was fashioned by drilling and the exterior was decorated by cutting and polishing. The decoration on molar flasks ranges from simple linear motifs to more elaborate relief-cut ornament consisting of geometric elements such as triangles, "shields," and bosses. Making a molar flask from slices of mosaic glass was a more complex process, and it is not surprising that such examples are rare; a specimen in The Corning Museum of Glass (59.1.430) was acquired by its former owner in Cairo, Egypt. Even more precious, however, were relief-cut molar flasks made of rock crystal (Lamm 1929–30, pp. 213–21, pls. 76, 78).

Carl Johan Lamm (1929–30, pp. 143–44) evidently believed that all molar flasks were made in Egypt, but their abundance and wide distribution suggest that they were also produced in other regions. The earliest specimens probably date from the seventh or eighth century, and the type seems to have remained in use until at least the tenth or eleventh century. *DW*

LITERATURE: Unpublished

Cut and Engraved Glass

DAVID WHITEHOUSE

By the reign of Augustus (27 B.C.–A.D. 14) glassworkers in the Roman Empire were experienced in finishing some of their products by cutting, grinding, and polishing them on the wheel after they had been annealed, just as lapidaries finished objects made of precious and semiprecious stone. Very little is known about the tools used for this purpose, although information about the working of semiprecious stones (preserved, for example, in Book 36 of Pliny's *Natural History*) probably applies equally to the process in glass, known as cold-working; indeed, it is not unlikely that from time to time the same craftsmen worked in both materials. By the late second or the early third century Roman finishing shops were also producing glass that had cut and polished decoration and details scratched in the surface with a pointed tool (Whitehouse 1997, p. 222 and nos. 401–17). In the fourth century some glass was decorated by scratch-engraving alone (Harden et al. 1987, pp. 184–85 and nos. 126–28).

Wheel-cutting, which was practiced extensively by both the Romans and their contemporaries, the Sasanians of Iran and Iraq, declined in the Mediterranean region after the fourth or fifth century, and scratch-engraving disappeared. Cutting continued, however, in western Asia, although it is not yet clear how much cut glass was made in the late Sasanian and very early Islamic periods. Nevertheless, by the eighth and ninth centuries, both cutting and scratch-engraving were once again prominent parts of the repertoire of glassworkers in the Islamic world.

The cut and engraved objects in this catalogue range in date between the eighth and the eleventh century. They are divided into seven categories, which are defined in terms of decorative technique and, as far as possible, presented in chronological order. However, since several techniques may have been in use in any given period, the order in which the seven categories appear should not be regarded as a strictly linear chronological sequence. The categories are as follows: scratch-engraved ornament (cat. nos. 68–73); faceted ornament (cat. nos. 74, 75); decoration with disks and related motifs (cat. nos. 76, 77); decoration with raised outlines, both on monochrome, usually colorless, glass (cat. nos. 78–86) and on cameo glass (cat. nos. 87–90); slant-cut decoration (cat. nos. 91–97); linear decoration (cat.

Opposite: detail, cat. no. 68

nos. 98–100); and decoration by molding and cutting (cat. no. 101).

SCRATCH-ENGRAVED ORNAMENT

The simplest kind of engraving on glass consists of scratching the surface with a pointed tool. In recent centuries, glass engravers have tended to use tools mounted with diamond chips (Matcham and Dreiser 1997, p. 120), but other minerals, such as corundum and topaz, with a hardness in excess of 7 on Mohs's scale serve equally well. Frequently, the entire surface is covered with decoration, which may be divided, on open forms, into concentric bands or radial panels. Sometimes the background is hatched, and sometimes the ornament itself. The quality of the engraving ranges from the skillful execution of a complex design laid out with care (cat. no. 68) to the perfunctory completion of a simple pattern (cat. no. 69).

Although inscriptions occur (cat. no. 70), so far none of them has provided an indication of the date of an object. Knowledge concerning the chronology of the group is thus dependent on archaeological discoveries. Fragments of Islamic scratch-engraved glass have been found in eighth-century deposits at two sites. At Susa, in southwestern Iran, a fragment was excavated from Stratum 3, which is believed to belong to the period 700–750 (Hardy-Guilbert 1984, pp. 143–44, fig. 32.1, and pl. 6.7); at Bet She'an, Israel, two fragments were recovered from deposits attributed to the Umayyad period, which ended in 750 (Hadad 2000, p. 63 and fig. 1.1–2). This type of glass is represented more frequently in ninth-century contexts, such as Samarra (cat. no. 70; Lamm 1928, pp. 79–82, nos. 251–59), Fusṭāṭ (Old Cairo; Scanlon 1974, pp. 84–85, pl. 32, fig. 5b), and Bet She'an (Hadad 2000, p. 65, with a list of additional find-places). The most closely dated ninth-century finds, however, are six deep blue plates from the crypt of the Famen Temple (Famensi) in Shaanxi Province, China, which was sealed in 874 (An 1991, pp. 123–24, figs. 3–8; compare Michaelson 1999, pp. 158–59, no. 115). It is interesting to note that two of the objects from the temple have traces of gilding in the incised lines. Although fragments of scratch-engraved glass have been reported from later periods at a number of sites, it seems probable that most vessels of this type were made in the eighth and ninth centuries.

FACETED ORNAMENT

Some of the best-known glass made in the Sasanian Empire consisted of thick-walled vessels decorated with patterns of facets made by cutting, grinding, and polishing. The ornament varied from overall "honeycomb" patterns of shallow facets to friezes of facets combined with linear motifs. Although the chronology of Sasanian cut glass is not yet fully understood, it is thought that faceted objects were made throughout the period from the third through the seventh centuries (*Splendeur des Sassanides* 1993, pp. 110–11 and nos. 105–7, 109–13). For at least the earlier part of this period, facet-cut glass was also produced in the Roman Empire. Many of the Roman examples were decorated with rows of unconnected "rice-grain" facets, and the occurrence of fragments with such patterns at Dura-Europos, Syria, shows that facet-cut glass was current in Rome's eastern provinces by the time the Sasanians destroyed the site in 256.

It is reasonable to suppose that the tradition of making facet-cut glass continued without a break in Iran and Iraq after the Muslim conquest, although at present this cannot be proved. In Syria, on the other hand, there is as yet no evidence that continuity took place, even though much more is known about Syrian glass in late antiquity.

Of the two early Islamic facet-cut objects presented in this catalogue, one is a bottle with an overall pattern of facets on the wall (cat. no. 74), whereas the other has a limited amount of faceting combined with linear decoration (cat. no. 75).

DECORATION WITH DISKS AND RELATED MOTIFS

Among the most common designs found on early Islamic cut glass are those based on raised or countersunk disks with bosses at the center (cat. no. 76). The excavations at Nishapur, in northeastern Iran, yielded ten fragmentary vessels with raised disks having bosses at the center (Kröger 1995, nos. 174–83), and similar fragments were excavated at Samarra (Lamm 1928, p. 75, nos. 228, 230).

Ornament of this type, which originated in Sasanian Iraq or Iran, is believed to have been made in parts of western Asia and perhaps Egypt from the ninth century (or earlier) to the eleventh century. Sasanian hemispherical cups decorated with prominent relief-cut bosses appear on the market from time to time, and their origin is usually said to be Iran (see, for example, Fukai 1977, pp. 43–45 and figs. 36, 37 [from Gīlān]; *Splendeur des Sassanides* 1993, no. 114). A dating for such bosses was established by the excavation of a fragmentary example at a site from the late Tumulus period (sixth–seventh century) on the island of Okinoshima in the Genkai Sea, east of Kyūshū, Japan (Fukai 1977, pp. 44–45, figs. 40, 41). A similar boss could be produced by cutting away a circular border to create a raised effect, although the surface of the boss remained flush with the surface of the wall (Fukai 1977, pp. 46–48).

A bottle in Kuwait (cat. no. 77), with two rows of tear-shaped bosses occupying the wall, presents a related type of decoration.

DECORATION WITH RAISED OUTLINES

This large and disparate group, usually known as "relief-cut" glass, is united by a single feature: both the background and most of the interior of the principal motifs have been removed by cutting and grinding, leaving the outlines and a few internal features in relief. The group may be subdivided in a number of ways, most obviously on the basis of color. The great majority of the objects are monochrome (usually colorless, in imitation of rock crystal), while a small minority consist of cameo glasses (usually with colorless base glass and a colored overlay).

In the ninth and tenth centuries decoration with raised outlines had a wide distribution in the central Islamic lands. Thus, the excavations at Samarra produced both colorless and cameo-glass fragments (cat. nos. 78, 87). Among the former are fragments of a bowl decorated with a frieze of hares (see discussion under cat. no. 83), which were found in the ruins of the Jawsaq al-Khāqānī, a palace built by Caliph al-Muʿtaṣim between 836 and 842 and supposedly abandoned when the caliphs returned to Baghdad in 892. Thirteen hundred kilometers (ca. 800 miles) to the northeast of Samarra, colorless relief-cut glass came to light

during excavations at Nishapur (Kröger 1995, nos. 192, 193). Numerous glasses with raised outlines that found their way onto the antiquities market in Tehran are attributed to Nishapur, and although many of the attributions may be apocryphal, there is no reason to suppose that these vessels were not found somewhere in Iran. Two thousand kilometers (ca. 1,240 miles) to the southwest of Samarra, excavations at Fusṭāṭ have yielded colorless glasses with raised outlines, including a ewer with a relief-cut inscription and a bowl decorated with a frieze of medallions containing birds (Pinder-Wilson and Scanlon 1973, pp. 25–26, nos. 19, 20). Despite the very wide pattern of distribution of these objects—from Egypt to Khorāsān—they display strong similarities, including the embellishment of the raised outlines with numerous parallel notches and the use of drilled circular depressions to add texture to the bodies of birds and animals.

The stylistic similarities of objects found over a very wide area are reflected, at least in part, by similarities between the chemical compositions of colorless glasses found at Nishapur and certain colorless glasses excavated at Fusṭāṭ. In the words of Robert H. Brill, "The analyses match so well that one is tempted to speculate that these particular Fusṭāṭ glasses were made in the same place as the Nishapur colorless glasses; and if that is so, it invites some tantalizing questions. Were they all made at (or near) Nishapur? Were they all made at (or near) Fusṭāṭ? Or were they made somewhere else and exported to both those places?" (Brill 1995, p. 214).

The examples of relief-cut glass in this catalogue include beakers decorated with palmettes and other vegetal motifs (cat. nos. 79, 80); bowls decorated with a fantastic animal (cat. no. 81), horses (cat. no. 82), hares (cat. no. 83), and lions (cat. no. 84); a perfume bottle decorated with birds (cat. no. 85); and a bottle decorated with ibexes (cat. no. 86).

Cameo glass is a logical extension of monochrome relief-cut vessels. A layer of glass of one color is applied to all or part of an object of a different color. Subsequently, most of the outer layer is removed by grinding and carving or by cutting, leaving the decoration in relief. Cameo glass was made by the Romans, first in the period from approximately 25 B.C. to A.D. 50/60 and later in the fourth century (Whitehouse 1997, pp. 41–65), but there is no reason to suppose that production was continuous or that it persisted into the Islamic period. Indeed, it is much more likely that the practice was rediscovered in western Asia or Egypt in the ninth century.

Unlike the majority of Roman cameo-glass objects, which have opaque white decoration on a translucent dark blue background, Islamic examples usually have translucent colored decoration on a colorless background. In terms of technique, Islamic cameo glass falls into two groups. In the first group, the surface of the object was completely or almost completely covered with a thin overlay, either by gathering colored glass over the colorless parison or by inflating a colorless gather inside a "cup" of colored glass. In the second group, blobs of molten glass were applied to the parison and marvered to create small areas of one or more different colors. In either case, after reheating and forming the object and annealing it, the undecorated "blank" was sent to the cutting shop, where much of the overlay was removed by grinding, cutting, and drilling. Examples of Islamic cameo glass made in this manner include a cylindrical cup in the L. A. Mayer Museum for

Islamic Art, Jerusalem (cat. no. 88), a bottle in the David Collection (cat. no. 89), and a ewer in The Corning Museum of Glass (cat. no. 90).

In recent years, a number of similar, elaborately relief cut glasses have appeared on the market (see, for example, Piotrovsky and Vrieze 1999, pp. 204–6, nos. 171–74). Although the objects themselves are tours de force of glass cutting, the chemical composition of the glass from which some of them were formed may raise questions about where and when they were made (see pp. 29–30).

SLANT-CUT DECORATION

A large number of early Islamic wheel-cut glass objects are decorated in a style resembling the "beveled" style that was widely used to carve stucco, stone, and wood at Samarra in the ninth century and which survived in modified forms until the fourteenth century (Ettinghausen 1952). A characteristic feature of this style is the beveling of the surface toward the design: that is, the surface is cut and ground with a cross section shaped like a checkmark, so that the ornament appears to be raised. In his monograph on the glass from Nishapur, Jens Kröger (1995, p. 161) suggested that, when applied to glass, this distinctive style of cutting should be termed "slant-cut," and his suggestion has been adopted here. Fragments of slant-cut glass, presumably dating to the ninth century, were excavated at Samarra, and Kröger published twenty examples from Nishapur, which he attributed to the tenth century (Kröger 1995, nos. 219–28). The specimens in this catalogue include a cylindrical box with a lid (cat. no. 91), part of a lobed dish from the treasury of San Marco, Venice (cat. no. 92), a lobed bowl decorated with birds and vegetal ornament (cat. no. 93), a small egg-shaped perfume bottle (cat. no. 94), a globular bottle (cat. no. 95), a cylindrical bottle with a complex design of animals, birds, and vegetal motifs (cat. no. 96), and a ewer from the excavations at Nishapur (cat. no. 97).

LINEAR DECORATION

Linear decoration was made by cutting into the surface of the glass with a rotating wheel fed with an abrasive slurry. The lines produced, of varying width and depth, form both the outlines and the details of the ornament; they have either a U- or a V-shaped cross section, and their bottom and sides may be matte or polished. Glass with linear decoration occurs throughout the central Islamic lands, from Egypt to Iran, and ranges in date from the eighth or ninth century to the eleventh century. Among the earliest finds are fragments from Fusṭāṭ, which include a bowl excavated from a context that also contained a glass "coin weight" of the ʿAbbasīd caliph al-Mahdī (r. 775–85; Pinder-Wilson and Scanlon 1973, p. 24, no. 17), as well as a small bottle from an eighth- or ninth-century deposit (Pinder-Wilson and Scanlon 1987, p. 66, no. 12). Examples that date from the ninth and tenth centuries include excavated fragments from Samarra (Lamm 1928, pp. 66–68, nos. 176–85), Susa (Kervran 1984, pp. 218–19, nos. 22, 24), and Nishapur (Kröger 1995, nos. 198–201). Finally, a large number of linear-cut objects were recovered from the underwater remains of a ship that sank shortly after 1025 at Serçe Limanı, a natural harbor on the southern coast of Turkey, opposite Rhodes (Bass 1984, figs. 2, 5a).

Linear-cut vessels were exported over very long distances. Examples have been found, for instance, in southern Europe (see Newby 1991, pp. 38–39, fig. 5b, for fragments from archaeological excavations at Farfa, Italy) and the Far East (An 1991, p. 121, fig. 12, illustrates a bottle from the tomb of Princess Chenguo at Naiman Qi, Inner Mongolia; Lamb 1965, p. 36, fig. 7, shows fragments collected at Pengkalan Bujang, Malaysia).

Although most of the objects with linear-cut ornament are monochrome, a few cameo glasses do occur. The latter were made by applying blobs or trails of colored glass to the parison and marvering them until they were almost flush with the surface; after the vessel had been annealed, the overlays were cut on the wheel. This "padding" or "marquetry" technique was used to produce colorless objects decorated in one or more colors, with isolated motifs enlivened with linear cutting. Examples include a globular bottle decorated with two green animals, in the British Museum (cat. no. 99), and a larger, cylindrical bottle decorated with three animals and a bird, in green and brown, in the David Collection (cat. no. 100). Other specimens include a cylindrical cup at the Chrysler Museum of Art, Norfolk, Virginia (Merrill 1989, p. 22, no. 14); a beaker, formerly in the Cohn collection and now at the Los Angeles County Museum of Art (von Saldern 1980b, p. 156, no. 149); and a beaker with two green and two yellowish brown animals (Christie's, London, sale, October 10, 2000, lot 329). That the ornament of these objects was indeed cut from marvered blobs or trails is shown by a colorless blank with a band of translucent blue overlay, allegedly from Nishapur and now at Corning, which for some reason never reached the cutting shop (Goldstein et al. 1982, p. 128, no. 148; *JGS* 24 [1982], p. 90, no. 11).

DECORATION BY MOLDING AND CUTTING

Two objects presented here (cat. nos. 93, 101) seem to have been decorated first by sagging a disk of semimolten glass over a decorated mold and then, after annealing, by cutting it on the wheel. The shape of the bubbles in the glass indicates that the vessels were not inflated, and the irregularities in the outer surfaces resemble the tool marks that sometimes occur when a glassworker manipulates semimolten glass over a form. The style of the cutting, which left the figures in relief of uniform thickness, without raised borders, is unusual in relief-cut Islamic glass; other examples include a fragment, decorated with an animal that may be a horse, from a very large dish or plate at Corning (59.1.463; Harper 1961, p. 25, fig. 29) and a fragment reported to have been on the New York market in the 1950s (Harper 1961, p. 25, n. 54).

One type of cut glass that readers might expect to find in these pages, but which has been omitted, consists of the so-called Hedwig glasses (fig. 96). These are puzzling vessels insofar as they form a tightly coherent group but are unlike any other medieval objects of glass or rock crystal, whether from the Islamic world, Byzantium, or western Christendom. Beakers with a tapering wall and a disklike base, Hedwig glasses range in height from 8.3 to 14.6 centimeters (3¼ to 5¾ in.). All are colorless or nearly colorless and decorated in slant-cut relief. The repertoire of motifs is varied: lions, eagles, griffins, and the tree of life are recurrent elements; also found are a chalice, a crescent moon and stars, palmettes, and abstract or geometric motifs. The name of the group derives from the tradition that three of the beakers were associated with Saint Hedwig of Silesia, who died in 1243

Fig. 96. Hedwig Beaker. Transparent smoky topaz glass. Probably cast, cut, and polished. H. 8.3 cm (3¼ in.). The Corning Museum of Glass 67.1.11

and was canonized in 1267 (Allen 1987; Baumgartner and Krueger 1988, pp. 86–102).

Despite the puzzling aspects of the Hedwig beakers, two things are known about them: where they were found or first recorded, and approximately when they were made. Eleven Hedwig beakers (two of which disappeared in World War II) are or once were in church treasuries in Europe; fragments of six others have been found in archaeological excavations, all in Europe. Two of the beakers that have survived above ground, in the treasury of Saint Nicolas d'Oignies aux Soeurs de Notre-Dame, in Namur, Belgium, are recorded as gifts of Jacques de Vitry, bishop of Acre from 1216 to 1226 (Baumgartner and Krueger 1988, nos. 41, 42). One of the excavated fragments, from Novogrudok, Belarus, is reported to have come from a twelfth-century context (Gurevich 1981, p. 79), and another, from Pistoia, Italy, is from a deposit datable to the decades around 1300 (Vannini 1987, pp. 633–34, no. 3563). Thus, all the known findplaces of Hedwig beakers are in Europe, and the earliest datable examples belong to the twelfth or the early thirteenth century.

Scholars have explained the Hedwig beakers in several mutually exclusive ways: that they are medieval and were made in central Europe (Lierke 1999, pp. 140–45); that they were made in Europe and most of them are modern (Sčapova 1978); or that they were made in the Middle Ages and are Islamic (von Saldern 1996, pp. 239–42), or Byzantine (Philippe 1970, pp. 125–31), or from southern Italy (Pinder-Wilson 1991, p. 128). While the first and second of these explanations fail to convince, the Islamic, Byzantine, and southern Italian conjectures all have merit. In the absence of decisive evidence in favor of one or another of these possibilities, it has been decided not to include a Hedwig glass in the catalogue.

68. **Fragmentary Plate**
Western Asia, 9th century
H. 1.5 cm (⅝ in.), diam. 28 cm (11 in.)
Transparent deep blue
Blown, trailed, and scratch-engraved
CONDITION: The object was broken, with numerous losses, and has been repaired; about 60 percent survives. The surface is lightly weathered. The glass contains small bubbles and specks of scale.
The Metropolitan Museum of Art, New York, Rogers Fund, 1940
40.170.131

This shallow plate has a plain rim with a rounded edge. The wall curves down and in, with a depression (diam. 4 cm [1⅝ in.]) at the center of the floor. Most of the floor is missing; similar plates have either a plain base or three applied feet (see, for example, Smith 1957, no. 605). The exterior has one continuous horizontal trail at the junction of the wall and the floor.

The interior is almost completely covered with engraved decoration arranged in four concentric bands with a roundel at the center. The outermost band is narrow and consists of a groundline supporting small, roughly semicircular scalelike elements, in which scales filled with transverse hatching alternate with scales that are empty except for a short transverse dash. The second, wider band, which has inner and outer borders, contains two ribbons twisted into a cable on a hatched background. The third band, the widest of all and with inner and outer borders, is divided into six equal compartments by radiating rows of bordered contiguous circles, which are alternately hatched and empty except for a single short dash.

Inside the compartments, two designs alternate. The first consists of crowded sprays of leaves with transverse hatching and berries that appear to be of multiple or aggregate form. The second design is divided into three triangles by double borders. The triangle at the center, with apex pointing toward the rim, contains a palmate leaf with five branches on a coiled stem. The other triangles have allover patterns of rhomboids that alternately are hatched or contain one short dash. The innermost band, which is narrow and framed by borders, contains a chain of contiguous circles with either transverse hatching or short

dashes. Apart from the border, nothing of the central roundel survives.

Chemical analysis has revealed that the material here is a soda:lime:silica glass made with plant ash (Brill 1999a, vol. 1, p. 96, vol. 2, p. 196 [sample 6365]). Robert H. Brill compared this object with two fragments at Corning (55.1.110 and 55.1.111), both of which come from deep blue plates or bowls decorated on the inside with a central roundel and concentric bands of ornament. In both those cases, the glass was made with plant ash (Brill 1999a, vol. 1, p. 96, vol. 2, p. 196 [samples 6349, 6350]).

It has been suggested that the palmate leaf is that of the hemp plant, *Cannabis sativa* (Brill 1993, p. 63, n. 14), or the Chinese maple. Perhaps the other leaves and the berries are those of the white mulberry tree, *Morus alba*, the preferred food of silkworms. Palmate leaves with five branches occur on at least four other scratch-engraved vessels that are similar to this object. All four are among the treasures concealed in the crypt of the Famen Temple (Famensi), in northeastern China, in 874; one has four such leaves on coiled stems (An 1991, pp. 126–29, figs. 3, 5, 7, 8; Koch 1995, p. 500, fig. 41.2 and pl. 138.2).

DW

PROVENANCE: Excavated at Tepe Madraseh, Nishapur, 1939

LITERATURE: Hauser and Wilkinson 1942, pp. 105–6, fig. 33; Charleston 1989, p. 302 and pl. 14; An 1990, p. 1119; An 1991, pp. 123–24; Kröger 1995, no. 164

69. **Cup**
Syro-Palestinian region or Egypt, 8th–9th century
H. 9.5–10.8 cm (3¾–4¼ in.), diam. 12.7 cm (5 in.)
Transparent blue
Blown and scratch-engraved
CONDITION: The object has a vertical crack in the wall. It is complete except for a circular hole in the base, which was made by the previous owner in order to obtain a sample for chemical analysis. The surface has patches of light brown weathering and some iridescence. The glass contains a few small bubbles and inclusions.
The Corning Museum of Glass
55.1.112

This cylindrical cup has a plain rounded rim and a slightly convex wall. The base is plain and has a pontil mark at the center.

The wall is decorated with a continuous horizontal band of ornament that has multiple carelessly scratched borders at the top and bottom and is divided into three large and one small compartment by vertical bands of crosshatching. Each of the three large compartments contains two vertical pairs of crosshatched triangles, their apexes almost touching but separated by V-shaped motifs. The spaces between the triangles themselves and between the triangles and the upper and lower borders are filled with hatched circles. The narrow compartment has a single pair of crosshatched triangles.

Chemical analysis has revealed that the material here is a soda:lime:silica glass made with natron (Brill 1999a, vol. 1, p. 96, vol. 2, p. 194 [sample 6348]). This suggests that the glass was made either in Egypt, the most likely source of the natron, or in the Syro-Palestinian region (see pp. 27–28). *DW*

PROVENANCE: Ray Winfield Smith (900), who reported that he acquired it in Cairo

LITERATURE: *Verres antiques* 1954, p. 50, no. 303; Smith 1957, no. 606

70a–e. **Fragments of Cup or Bowl**
Probably Iraq, 9th century
Max. diam. 6.5 cm (2½ in.)
Translucent reddish purple
Free blown and scratch-engraved
CONDITION: The object consists of five fragments, some of which join, from the rim and wall of a vessel.
Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst Sam. 608

The fragments were part of a cylindrical cup or bowl that had a plain rim with a rounded edge and a vertical wall. The wall was decorated with at least three continuous horizontal bands of ornament (from the top): (1) a row of narrow isosceles triangles, the bases of which are contiguous and form a continuous groundline, filled with transverse hatching; (2) between upper and lower borders, a row of contiguous lozenges filled with vertical hatching; and (3) a broader band divided into two or more horizontal rows of contiguous double-bordered squares, each of which contains a lozenge enclosing a quatrefoil with transverse hatching, which also appears on the triangles between the sides of the squares and the lozenges.

The fragments were found in the domed chamber of the harem of the Jawsaq al-Khāqānī, the palace built by Caliph al-Muʿtaṣim in 836–42 at Samarra. It is not known, however, whether they were discarded during the construction of the palace or at some later date. *DW*

LITERATURE: Lamm 1928, p. 82, no. 259

71. **Goblet**
Western Asia or Egypt, 9th century
H. 11.9 cm (4¾ in.), diam. 9.2 cm (3⅝ in.)
Transparent pale greenish blue
Blown from two gathers and scratch-engraved
INSCRIPTION, in kufic script:

بركة من الله لصاحب الكأس إشرب

(Blessings from Allāh to the owner of the goblet. Drink!)
CONDITION: The object was broken, with minor losses, and has been restored. The surface is virtually without weathering, apart from cloudy patches on the foot. The glass contains seeds and a few larger bubbles.
The Metropolitan Museum of Art, New York, Purchase, Joseph Pulitzer Bequest, 1965 65.173.1

This goblet has a bell-shaped bowl with a rounded lip. The wall curves down, in, and down in an elongated S-shaped curve. The floor is narrow. The stem, which was formed from a separate bit of glass, is solid and has five tooled constrictions. The foot is in the form of a disk with a rounded edge. There is a small pontil mark.

The bowl is decorated with four continuous horizontal bands of rather careless scratch-engraving. The uppermost band has a groundline that supports thirty-two isosceles triangles filled with transverse hatching. The second band, which has erratic upper and lower borders, contains an Arabic inscription in kufic script, with double outlines and transverse hatching. The third band is framed by borders, each consisting of two parallel lines filled with hatching. The interior

is divided into seven rectangular compartments by vertical hatched borders; each compartment contains a horizontal row of four (or in one case three) hatched circles. The lowest band, also framed by borders, contains thirty-one contiguous rhomboids, each enclosing one small hatched circle; the triangles between the rhomboids and the borders are also hatched.

This bowl is similar in shape to a bowl or goblet with stained decoration excavated at Fusṭāṭ that has an inscription reportedly referring to ʿAbd al-Ṣamad ibn ʿAlī, a great-uncle of Caliph Hārūn al-Rashīd, who governed Egypt for one month in 773 and died in 801, and which therefore may have been made in the second half of the eighth century (Pinder-Wilson and Scanlon 1973, pp. 28–29, no. 23). Another goblet having a stem similar to the one shown here but with no decoration on the bowl was excavated at Sīrāf, in southwestern Iran, in 1966 (Whitehouse 1968, pl. VIIa).

DW

LITERATURE: Clairmont 1972, pp. 145–46; Jenkins 1986, no. 16

72. Fragmentary Bottle
Western Asia, 9th century
H., surviving, 32.3 cm (12¾ in.), max. diam. 13.5 cm (5⅜ in.)
Translucent deep blue
Blown and scratch-engraved
CONDITION: The object is incomplete and has undergone extensive restoration. The surface has patches of milky white weathering and iridescence.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 375 G

The rim and neck of this large pear-shaped bottle are missing. The wall splays to its greatest diameter below the midpoint, then curves down and in to the low splayed foot ring, which was made by folding. The underside of the base has a pontil mark.

The wall of this vessel is completely covered with scratch-engraved ornament, contained in seven continuous horizontal bands. The first band from the top (h. 1 cm [⅜ in.]) has a groundline that supports numerous small isosceles triangles filled with transverse hatching. Band 2 (h. 1.7 cm [⅝ in.]) is framed by borders and contains two ribbons twisted into a continuous cable on a hatched background. Band 3 (h. 2.7 cm [1⅛ in.]), also bordered, is divided into a series of alternating upright and inverted triangles, each of which contains a pointed leaf or flower on a hatched background. Band 4 (h. 1.5 cm [⅝ in.]) resembles band 2. Band 5 (h. 6.5 cm [2½ in.]), again framed by borders, contains eight horizontal oval motifs outlined by interlacing bands that are joined by loops to the borders. Each oval encloses a branch with pairs of circular leaves or fruit, the spaces between the ovals and the borders are filled with pairs of leaves or flowers, and the backgrounds in the ovals and the spaces between the ovals are hatched. Band 6 (h. 2 cm [¾ in.]) resembles bands 2 and 4. Band 7, of the same height as band 6, is found at the bottom of the wall and consists of a groundline supporting a contiguous row of vertical scales with rounded ends.

Although the rim, neck, and large parts of the wall are missing, the shape of the body has been restored with confidence. *DW*

PROVENANCE: Christie's, London, sale, April 26 and 28, 1994, lot 317
LITERATURE: Carboni 2001, no. 17a

73. **Bottle**
Syro-Palestinian region or Egypt, 9th century
H. 20.7 cm (8⅛ in.), max. diam. 12.5 cm (4⅞ in.), diam. at rim 3.8 cm (1½ in.)
Transparent pale bluish green
Blown and scratch-engraved
CONDITION: The object was broken, with extensive losses, and has been restored. The surface has little or no weathering.
The Corning Museum of Glass 68.1.1

This bottle has a tall neck and a globular body. The rim is everted and has a rounded lip. The narrow cylindrical neck tapers slightly toward the bottom. The wall curves out, down, and in, and the plain base has a pontil mark.

The body of the bottle is decorated with four continuous horizontal bands of scratch-engraved ornament. The uppermost narrow band has a groundline that supports about thirty-two isosceles triangles filled with transverse hatching. The second, somewhat wider band is framed by borders and contains two ribbons twisted into a continuous cable on a hatched background. The broad third band contains six tall oval panels alternating with six rhomboidal panels; all the panels are enclosed by interwoven bands with hatched backgrounds. Each oval panel contains a leaflike motif with eleven or twelve lobes, enlivened with a hatched oval surrounded by small hatched circles; the background is hatched. The rhomboidal panels contain allover patterns of rhomboids that are alternately hatched or filled with one or two short dashes. The fourth band of ornament consists of a groundline supporting a continuous row of overlapping scales, enlivened with dots and roughly scratched circles.

Chemical analysis has revealed that the material here is a soda:lime:silica glass made with natron (Brill 1999a, vol. 1, p. 95, vol. 2, p. 194 [sample 6340]). This suggests that the glass was made either in Egypt, the most likely source of the natron, or in the Syro-Palestinian region (see pp. 27–28).

DW

LITERATURE: *JGS* 11 (1969), p. 112, no. 20; Whitehouse 1991, p. 41

74. Bottle
Iran, 9th–10th century
H. 21.4 cm (8⅜ in.), max. diam. 10.6 cm (4⅛ in.), diam. at rim 2.2 cm (⅞ in.)
Almost colorless, with green tint
Blown, cut, ground, and polished
CONDITION: The bottle is intact except for chips on the rim. The surface is somewhat dull and has small patches of weathering. The glass contains numerous bubbles, the largest measuring 2 centimeters (⅞ in.) in length.
The Corning Museum of Glass
55.1.129

This bottle with a globular body has a rim that has been ground flat except for a narrow chamfer at the outer edge. The neck is cylindrical and wider at the bottom than at the top. The base is narrow and slightly concave. There is no pontil mark.

The neck and wall have facet-cut decoration arranged in horizontal bands. Those on the neck contain (from top to bottom): (1) five contiguous rectangular facets, the junctions of which have been cut away to make five very narrow triangular facets; (2) thirteen transverse oval facets; (3) six rhombus-shaped facets arranged to form three contiguous chevrons, with a single oval facet in each of the triangular spaces above and below the chevrons; (4) sixteen short rectangular facets arranged to form eight contiguous chevrons; and (5) two rows of seven roughly triangular or semicircular facets. The five bands of facets are separated by shallow grooves that are .5 to .6 centimeters (approximately ¼ in.) wide.

The bands of ornament on the wall contain (from top to bottom): (1) twenty-three transverse oval facets; (2) three rows of adjacent and occasionally overlapping circular facets arranged in a quincunx, with fourteen facets in each row; and (3) twenty-six short rectangular facets arranged to form thirteen contiguous chevrons. The three bands of facets are framed at the top by a shallow groove that is .5 to .6 centimeters (ca. ¼ in.) wide. In every case, the facets are polished, but the bands are not. Cutting the facets exposed a number of large bubbles, some of which were removed by grinding and polishing.

Other extant bottles have the same form and similar combinations of rectangular and rhomboid facets on the neck and circular facets on the wall (see, for example, Pinder-Wilson and Ezzy 1976, no. 122, and von Saldern 1980b, p. 160, no. 153). *DW*

PROVENANCE: Ray Winfield Smith, who reported that he acquired it in Tehran
LITERATURE: Unpublished

75. **Bottle**
Probably Iran, 11th century
H. 27.3 cm (10¾ in.), max. diam. 15.5 cm (6⅛ in.), diam. at rim 7.8 cm (3⅛ in.)
Opaque turquoise blue
Blown and cut
CONDITION: The object was broken, with small losses, and has been restored. The surface is matte and pitted, with patches of light brown weathering, especially in the cuts.
The Corning Museum of Glass 53.1.8

This bottle has a flange rim with a rounded edge, a truncated conical neck, and a shallow sloping shoulder, which also has a rounded edge. The wall is straight and tapers toward the bottom. The base is plain.

The neck, shoulder, and wall are all decorated with wheel-cut ornament. The decoration on the neck consists of five continuous horizontal bands separated by grooves. The bands contain the following motifs (from top to bottom): (1) six square facets; (2) eight four-pointed stars, which are linked by eight short horizontal cuts; (3) four shallow V-shaped elements alternating with four inverted Vs; (4) the same ornament as band 2; and (5) the same as 1, but with ten square facets. The decoration on the shoulder consists of a group of three continuous horizontal grooves near the base of the neck, as well as, at the junction with the wall, a continuous band of oval facets placed between a single horizontal groove near the edge of the shoulder and an identical groove near the top of the wall. The wall itself has a pair of continuous horizontal grooves above the midpoint and, at the junction with the base, a continuous band of oval facets below a groove.

A bottle of almost colorless glass, with the same form and similar decoration as the present object, was discovered during restoration of the stupa of the Dule Temple (Dulesi) in Ji Xian, Tianjin, China, in 1983. The bottle was one of 169 objects concealed in the stupa, apparently in 1058 (An 1991, p. 134).

Vessels made from opaque turquoise-colored glass are unusual. Other examples include a bowl in the treasury of San Marco, Venice (cat. no. 83); a perfume bottle in The Metropolitan Museum of Art (10.130.2649; Jenkins 1986, no. 21); two pitchers, one in the Gemeentemuseum, The Hague (OG01–1930),

and the other in the British Museum (OA1945.10–17.260; Pinder-Wilson 1991, p. 128, no. 160); and two bowls in The Corning Museum of Glass (69.1.32 and 71.1.23). Opaque turquoise blue glass was also used in the manufacture of Egyptian "coin weights" between 975 and 1229 (Kolbas 1983, p. 96). *DW*

PROVENANCE: Said to come from Gurgān, in northeastern Iran
LITERATURE: Brill et al. 1974, p. 26, no. 27

76. Box with Lid
Western Asia, 10th century
Box: h. 3 cm (1⅛ in.), diam. 6.4 cm (2½ in.); lid: h. 2.4 cm (1 in.), diam. 7 cm (2¾ in.)
Colorless
Blown and cut
CONDITION: The object is complete except for chips on the rim of the box. The surfaces are dull and pitted, with the remains of yellowish weathering and slight iridescence.
Victoria and Albert Museum, London C196–1939

The box is shallow and cylindrical. The narrow vertical rim has an inner edge that is flush with the inside of the wall and an outer edge that is cut back to make a narrow ledge to support the lid. The wall is vertical. The base is plain and has no pontil mark. The wall has been cut in seven contiguous vertical facets, each of which contains one roughly circular raised disk (diam. ca. 2 cm [¾ in.]) with a countersunk knob at the center. The underside of the base has, at the center, a countersunk disk-shaped boss.

The lid has a roughly segmental profile. The rim is narrow, with the outer edge flush with the outside of the wall and the inner edge cut back to receive the rim of the box. The wall curves up and in and is flat at the center. It is decorated with five raised disks, each having a countersunk knob at the center.

Disk-shaped facets with bosses at their centers are a common feature of Islamic cut glass from the ninth and tenth centuries (see, for example, Lamm 1929–30, p. 154, pl. 57:10 [found at Rayy, Iran]; Fukai 1977, pl. 83 [acquired in Iran]; Kröger 1984, no. 167 [acquired in Cairo and said to be from Fusṭāṭ]; Kröger 1995, nos. 180–83 [excavated at Nishapur]; and Pinder-Wilson 1996, pp. 108–9, no. 49). *DW*

LITERATURE: *Persian Art* 1931

77. Bottle
Western Asia, late 9th–10th century
H. 11.9 cm (4¾ in.), max. diam. 7.8 cm (3⅛ in.), diam. at rim 2.9 cm (1⅛ in.)
Transparent light bluish green
Blown and cut
CONDITION: The object is intact. The outside, which has been cleaned, is dull and pitted, with brown and white weathering in the pits; the interior retains a layer of weathering. The glass contains numerous small bubbles.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 292 G

This bottle has a roughly cylindrical body, a slightly everted rim, and a rounded lip. The neck is cylindrical but wider at the top than at the bottom. The shoulder curves out and down and has a rounded edge. The wall is straight, and the body is wider at the bottom than at the top. The base is plain. The pontil mark has been removed by grinding.

The object is decorated on the neck, shoulder, and wall. The neck is cut in six vertical facets, which extend from below the lip almost to the junction with the shoulder. The shoulder has two continuous horizontal grooves that frame a band of narrow vertical cuts. The wall is decorated with two rows of raised tear-shaped motifs. Each row contains seven "tears" with countersunk centers; the tears in the upper row have the point at the bottom, while those in the lower row have it at the top.

The tear-shaped motifs here are reminiscent of ninth-century Samarran stucco ornament of the type defined as Style C (see, for example, Herzfeld 1923, pls. 51–54, 59). A bottle that is somewhat similar, having a band of nearly vertical cuts on the shoulder, was acquired in Kermānshāh, in western Iran, and is now in the Museum für Islamische Kunst, Berlin (I.2673; Kröger 1984, no. 183).

DW

PROVENANCE: Christie's, London, sale, October 19 and 21, 1993, lot 323
LITERATURE: Carboni 2001, no. 24

78a,b. **Two Fragments of Relief-Cut Glass**
Probably Iraq, 9th century
Max. dim. of largest fragment 5.5 cm (2⅛ in.)
Transparent light green
Blown and relief-cut
CONDITION: The fragments are broken on all sides.
Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst Sam. 246, 246c

These fragments come from the curved wall of a bowl or bottle. They are decorated with curling stems that have tendrils and terminate in half-palmettes. The stems are notched, and the half-palmettes have outlines and ribs in relief.

The fragments were found during excavations at Samarra, Iraq, in the first quarter of the twentieth century. Samarra became the capital of the ʿAbbāsid caliphs in 836 and was developed on a grand scale until Caliph al-Muʿtamid relocated the capital to Baghdad in 892. It is widely assumed that most of the finds from Samarra belong to the period of caliphal occupation; if this assumption is correct, the fragments support the view that relief-cut glass was already being made in the Islamic world in the ninth century.

DW

LITERATURE: Lamm 1928, p. 78, no. 246

79. **Beaker**
Western Asia or Egypt, 9th–10th century
H. 13.6 cm (5⅜ in.), diam. 14.2 cm (5⅝ in.)
Almost colorless, with a greenish yellow tint
Blown from two gathers and relief-cut
CONDITION: The object was broken in many pieces, with one small loss from the rim and another from the wall; it has been repaired, and the losses have been restored. The surface is dull, with the remains of light gray weathering and slight iridescence. The glass contains a few very small bubbles.
The Metropolitan Museum of Art, New York, Purchase, Rogers Funds and Jack A. Josephson, Dr. and Mrs. Lewis Balamuth, and Mr. and Mrs. Alvin W. Pearson Gifts, 1974 1974.45

This beaker has a conical foot and a rim that was cracked off and ground. The wall tapers and curves in slightly at the bottom. The foot is hollow and very thin, with a rounded edge. The underside of the base is convex. It does not have a pontil mark.

The wall of the beaker has a broad relief-cut frieze, framed by a continuous horizontal rib above and a rather more prominent rib below. The frieze consists of a pattern of three palmettes, half-palmettes, and calyx motifs, all connected at the top and the bottom by scrolls. The spaces between these elements are occupied by three pairs of ring-and-dot motifs alternating with three quatrefoils.

Similar relief-cut beakers include two examples at Corning (58.1.5 and 55.1.121; Harper 1961, pp. 18–20, figs. 16–18, 21), two in the Museum für

Islamische Kunst, Berlin (I.70/62 and I.11/64; Kröger 1984, nos. 194, 195), and one in the British Museum (OA1964.10–12.1; Harden et al. 1968, p. 109, no. 145). At least one rock-crystal beaker of this form exists, a vessel decorated with leaves on scrolling stems, reputedly found at Qazvīn, Iran, and now in the British Museum (Ghirshman 1954, pl. 46a; Pinder-Wilson 1976b, no. 102).

DW

LITERATURE: Jenkins 1975, p. 7; Jenkins 1986, no. 26; *The Islamic World* 1987, p. 17, pl. 6

80. **Beaker**
Western Asia, probably Iran, 9th–10th century
H. 13.6 cm (5⅜ in.), diam. 9.1 cm (3⅝ in.)
Colorless
Blown and relief-cut
CONDITION: The object was broken and has been restored.
The L. A. Mayer Museum for Islamic Art, Jerusalem G73–71

This beaker has a silhouette that suggests a tulip flower. The rim is plain. The wall, which tapers, straightens, and then curves down and in, has a shallow S-shaped profile. The beaker rests on a narrow foot (diam. 1.3 cm [½ in.]).

The wall is decorated with relief-cut ornament arranged in two continuous horizontal bands of unequal width. The broader upper band, which is bordered above and below by pairs of horizontal ribs, contains stylized vegetal motifs. The lower band contains four small palmettes with five leaves alternating with four larger palmettes with seven leaves, two of which end in scrolls.

The only published parallel for the form of the present object appears to be a beaker, also having two bands of ornament, in the Nasser D. Khalili Collection of Islamic Art, London (Piotrovsky and Vrieze 1999, p. 206, no. 175). The upper band contains two running ibexes, while the lower has palmettes that closely resemble those here. The London object is attributed to about the year 1000 (but see p. 159). *DW*

LITERATURE: Hasson 1979, pp. 15 and 35, no. 23

81. **Bowl**
Probably Iran, 9th–10th century
H. 4.2 cm (1⅝ in.), diam. 13.5 cm (5⅜ in.)
Almost colorless, with yellowish tint
Blown and relief-cut
CONDITION: The bowl was broken into many pieces, with small losses, and has been restored. The surface is weathered, pitted, and somewhat iridescent. The glass contains some small bubbles.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 113 KG

This shallow bowl has a tapering wall and a plain rim with a rounded lip. The base is plain and flat. The pontil mark has been removed by grinding.

The wall and the underside of the base are decorated in relief. The wall bears a continuous frieze of six large curvilinear half-palmettes that rise from a narrow horizontal band of overlapping scales. The band forms the border of a medallion that occupies the base of the bowl. The medallion is filled by a fantastic animal, shown partly in profile and partly, it seems, in a bird's-eye view (fig. 97). The creature has a head that in its outline resembles a fleur-de-lis. One interpretation of the head is that it is seen from above, with two curving horns like those of a ram. The rest of the animal appears in profile. The neck, which is divided from the body by two curved parallel lines, is decorated with circular depressions; a row of similar depressions marks the base of the tail. The animal has a single leg, with a tear-shaped haunch and a forward-pointing forelimb apparently terminating in a hoof. It also has one wing, which is raised and points forward; the covert is circular, and the feathers are indicated by long parallel cuts. The large, raised tail extends upward in four crescent-shaped stages.

The animal on the underside of the base resembles a *senmurv*, a fantastic creature usually represented with a dog's head, a bird's wings, a lion's claws, a peacock's tail, and a fish's scales. These animals originally symbolized the *khvarnah* (glory and good fortune) of the Kayānids, the legendary ancestors of the Sasanians. Their presence on the royal robes depicted in the rock reliefs at Taq-i Bustan indicates that they were associated with the *khvarnah* of Sasanian kings as well (Marshak 1998, pp. 84–85). *Senmurv*s appear on a number of late Sasanian and post-Sasanian objects, including a seventh- or eighth-century silver-gilt dish in the British Museum (*Splendeur des Sassanides* 1993, no. 71) and an eighth- or ninth-century caftan from Mochtchevaja Balka, in the northern Caucasus (*Splendeur des Sassanides* 1993, nos. 127, 128). *DW*

LITERATURE: Kunz 1981, no. 621; Carboni 2001, no. 19

Fig. 97. Medallion on base of cat. no. 81. Drawing by Rochelle Kessler. From Carboni 2001, p. 85

82. **Bowl with Horses**
Probably Iran, 9th–10th century
H. 7.3 cm (2⅞ in.), diam. 11.5 cm (4½ in.)
Colorless
Blown and relief-cut
CONDITION: The object was broken into many pieces and has been repaired. The surface is pitted, and there are traces of weathering, especially in the palmettes.
Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst 1.20/65

This deep bowl has a plain rim with a rounded lip. The wall is straight and tapers slightly. The base is convex.

The wall and base have relief-cut ornament. The decoration on the wall consists of a broad frieze framed at the top and bottom by a continuous horizontal line. The frieze contains two horses alternating with two schematic vegetal motifs. Each horse has its head down and ears pointing forward. The eye is large and circular, and the mane and lower jaw are indicated by short parallel cuts. The body, outlined in relief and embellished with shallow circular depressions, has one foreleg, one hind leg, and a curly tail. Each vegetal motif consists of two pointed leaves, one above the other, surrounded by a raised border. The base of the bowl is decorated with four stylized palmettes. The tops of the palmettes point toward the center of the base, and the bottoms of each are linked to their neighbors by continuations of the sides of the stalks.

The present object belongs to a large group of relief-cut vessels that include a bowl with falcons and ibexes in The Corning Museum of Glass (53.1.109; von Saldern 1955; Harper 1961, p. 12 and figs. 5, 6; Charleston 1980, pp. 72–73, no. 28). Both bowls are said to have been found in northeastern Iran. *DW*

PROVENANCE: Said to come from the region of Khorāsān, northeastern Iran
LITERATURE: Kröger 1984, no. 193

83. **Bowl with Hares**
Western Asia, probably Iran, 9th–10th century
H. 6 cm (2⅜ in.), diam. 18.6 cm (7⅜ in.) (without mount)
Opaque turquoise blue
Blown or mold blown and cut
INSCRIPTION, in kufic script: خراسان (Khorāsān)
CONDITION: The object is intact and virtually as new.
Procuratoria di San Marco, Venice 140

This bowl has a rim and wall that are divided into five lobes of equal size. The rim is plain. The wall curves down and in, and the base has a solid foot ring.

The bowl has decoration in both high and countersunk relief on the outside of the wall as well as an inscription on the underside of the base in countersunk relief. The wall bears a frieze divided into five panels, which are framed at the top and the sides by a continuous raised border. The border runs parallel to the rim

and then descends almost to the foot on either side of the junctions between the lobes. Each lobe is decorated with a hare running from right to left. The animal has an oval head, long ears extending backward, a sleek body, extended forelegs and hind legs, and a curly tail. The ears and parts of the body are hatched.

The bowl's elaborate gold-and-silver-gilt mount is embellished with gold filigree, enamels, and gems (Frazer 1984). The mount is in the form of a cradle, with a rim and a base connected by vertical straps attached with hinges, each of which covers a junction between two of the bowl's five lobes. The rim of the mount consists of square and rectangular panels, which conceal both the outside and the inside of the rim and upper wall of the bowl. On the outside, each lobe of the bowl has a trapezoidal enameled plaque flanked by panels decorated with filigree and cabochons. On the inside, the lobes are covered with panels decorated in low relief with acanthus and palmettes. The base is in the form of a foot ring.

Although Kurt Erdmann (1971, p. 103) maintained that the object was cast in a mold and had little or no cold-working, it seems probable that much of the ornament was cut on the wheel. Perhaps the blank was formed by slumping a disk of glass over a mold, as apparently in the case of a bowl at Corning (cat. no. 93). The use of opaque turquoise blue glass is rare; among the few other examples is a bottle also at Corning (cat. no. 75).

The lively hares have a number of parallels, including fragments of a bowl found in the Jawsaq al-Khāqānī at Samarra (Lamm 1928, p. 77, no. 243). The inscription consists of one word, "Khorāsān," the name of a large region in northeastern Iran. Although the meaning is clear, its interpretation is problematic. Because of its vagueness, the word probably does not refer to the place where the bowl was made. More significantly, Khorāsān is the region in which turquoise is mined, and the color of the bowl closely resembles that of the mineral. It has been suggested, therefore, that the inscription is a fraudulent attempt to pass off the glass bowl as a spectacular piece of turquoise.

The history of the bowl is uncertain. Traditionally, it is said to be the gift of Uzun Ḥasan, the head of the Turkoman Aḳ Ḳoyunlu tribe, to the Venetian Signoria in 1472. Uzun Ḥasan is known to have sent diplomatic missions to Istanbul in 1457 and 1460. In 1463 the Venetians entered into an alliance with him, and the following year an ambassador from Uzun Ḥasan visited Venice. The Serene Republic reciprocated by sending ambassadors to the Aḳ Ḳoyunlu, and diplomatic relations continued until 1478, when Uzun Ḥasan died.

It should be noted that Erdmann (1971, p. 104) conjectured that the bowl was a gift from an ʿAbbāsid caliph to his counterpart in Byzantium. He supported this theory by noting that Islamic lobed bowls are imitations of ceramic vessels imported from China and that one such import, of white porcelain, was recovered from the Jawsaq al-Khāqānī, the palace built by Caliph al-Muʿtaṣim at Samarra (Sarre 1925, pp. 61–62, no. 217). However, in the years since Erdmann made this suggestion, Chinese ceramics have been found at numerous sites in western Asia and the occurrence of examples at Samarra has become progressively less remarkable.

The mount is a pastiche. The panels on the interior of the rim have ornament that is similar to that on the stem of a chalice, also in the treasury of San Marco, that has an inscription naming a Byzantine emperor Romanos, presumably Romanos II (r. 959–63) (A. Grabar 1971); they were therefore, probably made in Constantinople in the tenth century. The enameled plaques on the outside of the rim are also Byzantine and date to the tenth or the eleventh century. The filigree panels, on the other hand, are of western European origin. These disparate elements may have been assembled as early as the fifteenth century, when the bowl arrived in Venice, and the mount is certainly older than 1727, when the bowl and its mount were illustrated by Aubry de La Mottraye (La Mottraye 1727, p. 72 and pls. VII, VII*bis*).

DW

LITERATURE: de Montfaucon 1702, p. 52; La Mottraye 1727, p. 72; Pasini 1885–86, p. 94, no. 105; Molinier 1888, pp. 40–41, 94–95, no. 93; Lamm 1928, p. 63; Lamm 1929–30, p. 158, pl. 58:23; Lamm 1939, p. 2597 and pl. 1444A; Charleston 1942, p. 217, fig. 4; Honey 1946, p. 44; *Trésors d'art* 1952, no. 73; Erdmann 1953, p. 196, fig. 55; von Saldern 1955, p. 261, fig. 3; *Mostra d'arte iranica* 1956, no. 486; Harper 1961, p. 13, fig. 7; Gallo 1967, pp. 206–12; Erdmann 1971, pp. 103–4, no. 117; *The Treasury of San Marco* 1984, pp. 209–13, no. 29; Curatola 1993, no. 26; Bloom and Blair 1997, pp. 126–27, fig. 70; Piotrovsky and Vrieze 1999, pp. 265–66, no. 252

84. **Bowl with Lions**
Western Asia or Egypt, 10th–11th century
H. 13 cm (5⅛ in.), max. diam. 15 cm (5⅞ in.)
Almost colorless, with green tint
Blown and cut
CONDITION: The object was broken into many fragments, with losses that include some 7 centimeters (2¾ in.) of the rim, and has been restored. The earliest known photograph of the object (Alinari 38512) shows the loss from the rim but not the other breaks. The surface is almost as new.
Procuratoria di San Marco, Venice 117

This bell-shaped bowl has a slightly everted rim, with a rounded lip. The wall descends almost vertically, then curves down and in. The base is convex.

The bowl is decorated in relief with two lions facing left. Each lion has the right foreleg lifted and the rear legs bent, giving the impression that the animal is walking, with its tail raised and curling forward. The head is almost circular, with a large central eye and a mouth indicated by a wide horizontal cut. Some of the outlines of the lions are notched, and their bodies are decorated with lightly engraved depressions.

The relief cutting, the notched outlines, and the depressions on the bodies of the lions indicate an affinity with numerous relief-cut glasses of the ninth and tenth centuries (see cat. nos. 85–90). The posture of the lions has no close parallel on relief-cut objects but is reminiscent of the engraved lions on a bottle found at Sabra, Algeria (Marçais and Poinssot 1952, pp. 381–82 and pls. 55 and 58; Smith 1957, p. 98, fig. A), and on a

bottle and a beaker recovered from the early eleventh-century underwater shipwreck at Serçe Limanı, Turkey (Bass 1984, p. 66, fig. 2a,b).

Kurt Erdmann compared the animals on this bowl with the lions that appear on the so-called Hedwig glasses (see pp. 160–61). However, the relief of the lions on the Hedwig glasses was produced by slant-cutting the background, their outlines are incised rather than relief-cut, and texture was added by making short parallel cuts, not circular depressions. Thus, although the lions here and on the Hedwig glasses have similar postures, they were clearly executed in two different ways, and it is difficult to see a close connection between them.

DW

LITERATURE: Pasini 1885–86, p. 62, no. 80; Molinier 1888, pp. 40 and 92, no. 68; Lamm 1929–30, p. 166, pl. 61:17; Harper 1961, pp. 20, 28; Erdmann 1971, pp. 107–8, no. 120; Curatola 1993, no. 59

85. **Bottle with Birds**
Western Asia or Egypt, 9th–10th century
H., restored, 13.3 cm (5¼ in.), max. w. 5.1 cm (2 in.)
Colorless
Blown and relief-cut
CONDITION: The rim, neck, and a small part of the shoulder have been restored. Most of the surface is well preserved, but locally it is dull and pitted. The glass contains virtually no bubbles.
The Toledo Museum of Art, Purchased with funds from the Libbey Endowment, Gift of Edward Drummond Libbey 1983.79

This bottle has a flattened egg-shaped body (that is, the horizontal cross section is oval). The original rim and neck are missing. The shoulder slopes and merges with the wall, which curves out, down, and in before blending with the rounded base. There is no pontil mark.

The shoulder, wall, and base have careful relief-cut decoration. The shoulder has two continuous, more or less horizontal ribs, one at the top and the other at the bottom. The wall is decorated with four groups of motifs: each flat face has two pairs of birds along with other elements, while each narrow face has an elaborate geometric motif and two palmettes. The flat faces have three tiers of ornament. The uppermost tier contains two birds facing one another across a tall four-sided figure. Each bird has a curved beak, a head with a countersunk eye, a long body, and a downturned tail. The legs are indicated by a single vertical line, and the wing by a single line behind the neck. Parallel cuts indicate plumage on the back of the head and the wing. The second tier also has two birds facing one another. Each has the head turned back to look over its shoulder, a short curved beak, and a countersunk eye. The legs are indicated by a single line, which links the birds and has an oval pendant at the center. At the bottom of the wall, as the third tier of ornament, is a palmette, the lower end of which forms a diminutive "foot."

Each narrow face has an elongated motif with a ring and dot at the center; above and below each such motif is a vertical stem terminating in a palmette. The upper palmette is upright, the lower palmette inverted. Two additional palmettes adorn the top and bottom of the wall. The palmette at the bottom of the wall, like the palmette at the bottom of the flat faces, forms a foot.

The form of this vessel somewhat resembles that of a slant-cut bottle in the Benaki Museum, Athens (Clairmont 1977, pp. 97–98, no. 323).

DW

LITERATURE: *JGS* 26 (1984), p. 137, no. 3

86. **Bottle with Ibexes**
Western Asia, probably Iran, 9th–10th century
H. 16.7 cm (6⅝ in.), max. diam. 9 cm (3½ in.), diam. at rim 2.4 cm (1 in.)

Colorless
Blown and relief-cut
CONDITION: The object is intact. The surface is dull and pitted, with traces of weathering.
The Corning Museum of Glass 71.1.7

This bottle has a globular body, a very slightly everted rim, and a beveled interior. The neck is narrow and cylindrical. The base has a low splayed foot ring with a convex underside.

Relief-cut decoration appears on the neck and wall. The upper part of the neck is plain, but its midsection has five continuous horizontal ribs. Its lower part is cut in eight contiguous vertical facets. There is a stepped molding at the junction of the neck and the shoulder. The body is decorated with a broad frieze that is framed by a horizontal rib at the junction of the shoulder and the wall and by another rib near the base. The frieze contains three pairs of ibexes facing one another across a vegetal motif consisting of two S-shaped scrolls terminating below in a palmette; two S-shaped scrolls and a heart-shaped motif appear behind them. The ibexes have long curving horns, short bodies, and small tails. The hip joints of the rear legs are marked with a scroll. Many of the outlines are notched, and the heads and feet of the ibexes, as well as some other motifs, are hatched.

Robert J. Charleston has remarked on the cutter's meticulous attention to detail and on the care with which the inside of the rim and the underside of the base—parts that are not normally visible—were finished.

DW

LITERATURE: *JGS* 14 (1972), p. 155, no. 20; Charleston 1980, pp. 70–71, no. 27; Charleston 1990, pp. 70–71, no. 27; Frantz et al. 1992, p. 30, no. 20

87. **Fragment of Cameo Glass**
Probably Iraq, 9th century
Max. dim. 6 cm (2⅜ in.)
Transparent light blue over colorless
Blown, cased, and cut
CONDITION: The fragment is broken on all sides and has traces of grayish weathering.
Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst Sam. 249

This fragment was part of a vessel having relief decoration that included a spray of curving stems, the outermost of which is notched.

This is one of a number of fragments of cameo glass found during excavations at Samarra, Iraq, in the first quarter of the twentieth century. Samarra became the capital of the ʿAbbāsid caliphs in 836 and was developed on a grand scale until Caliph al-Mu'tamid relocated the capital to Baghdad in 892. It is widely assumed that most of the finds from Samarra belong to the period of caliphal occupation; if this is correct, the fragment establishes that cameo glass was already being made in the Islamic world in the ninth century. *DW*

PROVENANCE: Excavated at Samarra
LITERATURE: Lamm 1928, p. 78, no. 249

88. **Cup with Ibexes**
Western Asia or Egypt, 10th century
H. 8.5 cm (3⅜ in.), diam. 8.6 cm (3⅜ in.)
Translucent bluish green over colorless
Blown, cased, cut, and drilled
INSCRIPTION, in kufic script, above ibexes: [indecipherable]
CONDITION: The object was broken, with minor losses, and has been restored. The surface shows the remains of iridescent weathering.
The L. A. Mayer Museum for Islamic Art, Jerusalem G24–69

This cylindrical cup has a plain rounded rim, a straight wall, and a shallow splayed foot ring.

The wall is decorated with a broad band of relief ornament in bluish green on a colorless background; the band is framed by two continuous horizontal lines at the top and one such line at the bottom. Three ibexes with long curving horns, elongated bodies, and tails waving in the air walk from right to left. The outlines of their bodies are notched, and the bodies themselves are covered with shallow dots made by drilling. *DW*

PROVENANCE: Said to have been found at Nishapur
LITERATURE: *JGS* 18 (1976), p. 240, no. 8; Nardi et al. 1976, fig. 10; Hasson 1979, p. 16, fig. 25, and cover; Goldstein et al. 1982, p. 105, no. 19

89. **Bottle with Birds**
Western Asia or Egypt, 9th–10th century
H. 15 cm (5⅞ in.), max. diam. 7.5 cm (3 in.), diam. at rim 3.7 cm (1½ in.)
Translucent green over colorless
Blown, cased, and cut
CONDITION: The object is intact except for a crack at the base of the wall. Most of the weathering has been removed, leaving a dull, pitted surface.
The David Collection, Copenhagen
3/1971

This bottle has a cylindrical body and a rim shaped like a funnel, with a rounded lip. The neck tapers slightly, and the shoulder curves out and down before merging with the wall. The base is plain.

The neck and wall have relief decoration in green on a colorless background. There are three continuous horizontal lines on the neck: near the rim, near the bottom, and immediately above the junction of the neck and shoulder. A fourth horizontal line decorates the shoulder, and two additional lines appear near and at the bottom of the wall. Most of the wall is occupied by a broad band of ornament that contains two pairs of birds standing and facing one another across a full palmette. Beneath each palmette is a tear-shaped motif. Each bird has a long beak, a crest that terminates in tendrils, and a "collar" consisting of two parallel lines at the base of the head. The eyes are represented by dots. The outlines of the birds and palmettes are notched.

The beveled and carefully contoured modeling suggest that this bottle was made in the late ninth or the early tenth century. The tear-shaped designs beneath the palmettes may be compared with similar motifs on a ewer at Corning (cat. no. 90). *DW*

LITERATURE: Leth 1970, pp. 138–39, no. 18; *JGS* 14 (1972), p. 155, no. 21; Leth 1975, p. 17, no. 3/1971; Pinder-Wilson and Ezzy 1976, no. 131; Goldstein et al. 1982, p. 30 and fig. 12

90. Ewer
Western Asia or Egypt, ca. 1000
H. at rim 16 cm (6¼ in.), max. diam. 9.3 cm (3⅝ in.)
Transparent light green over colorless
Blown, cased, cut, and drilled
CONDITION: The object was broken into many pieces and has been restored. The restored parts include most of the rim, part of the handle, parts of the parrot to the left of the pouring lip, and most of the base. The surface has traces of grayish weathering.
The Corning Museum of Glass, Purchased with the assistance of the Clara S. Peck Endowment 85.1.1

This ewer with a pear-shaped body has an outsplayed mouth with a pointed pouring lip and a rounded edge. The neck is narrow. The wall splays to the greatest diameter below the midpoint, then curves down and in. The base consists of a hollow splayed foot ring. The handle has straight parallel sides and a vertical thumb rest.

The ewer has green relief decoration on a colorless background. A continuous green band appears at the edge of the rim, and two similar bands adorn the neck: the upper band curves upward below the pouring lip, while the lower band is horizontal. The wall is almost completely occupied by a panel containing birds and animals. The panel is defined at the top by a border embellished with lightly incised crosses that alternate with deeper circular depressions, and at the bottom by a plain line that turns upward at the extremities and follows the line of the handle until it meets the upper border. Depicted on the panel are two opposed horned animals with crossed forelegs, each having a bird of prey perched on its rump and pecking the back of its neck. Behind them, at the edges of the panel, are two parrot-like birds standing on foliage. Although these face outward, their heads are turned to look at the birds of prey; each holds a palmette spray in its beak. The haunches of the animals and the wing coverts of the raptors terminate in half-palmettes, and their bodies are covered with small circular depressions. Behind the handle, the green overlay is cut in a tall tapering form. The lower end of the handle has a heart-shaped palmette above two volutes, cut in relief. At the highest point on the handle are the remains of a vertical bifurcated thumb rest.

The ewer has one close parallel in colorless glass and several in relief-cut colored glass. The colorless object, the Buckley Ewer in the Victoria and Albert Museum, London, has the same form, bands on the neck, and panel filled with ornament on the body. It is said to come from Iran (Buckley 1935, p. 71). The parallels in colored glass include a deep blue ewer decorated with birds of prey and a purple ewer decorated with ibexes (Piotrovsky and Vrieze 1999, p. 205, nos. 172, 173). The ages of the colored objects, have not, however, been definitively determined.

The present work also has parallels in a related medium—rock crystal. These are six ewers that form one of the most conspicuous elements among the rock-crystal objects usually attributed to workshops in Fatimid Cairo. Perhaps the best known is a ewer in the treasury of San Marco, Venice (Lamm 1929–30, pp. 192–93, pl. 67:1; Erdmann 1971, pp. 112–13, no. 124; Barrucand 1998, no. 87). Like the glass ewer at Corning, this has an everted rim and a narrow neck with two relief bands; a pear-shaped body, the bottom of which is emphasized by a third, sharply defined relief band; a foot ring; and a concave base. The body is decorated with a single panel containing two seated lions separated by scrolling foliage. A kufic inscription invokes "the blessing of God on the imam al-'Azīz Bi'llāh." Al-'Azīz Bi'llāh, the fifth Fatimid caliph, reigned from 975 to 996.

Detail, cat. no. 90

The other rock-crystal ewers are closely similar, each having a pear-shaped body with a single panel of ornament. The second example, also in the treasury of San Marco, has a pair of rams instead of lions (Lamm 1929–30, p. 193, pl. 67:2; Erdmann 1971, pp. 113–15, no. 125). The third, at the Palazzo Pitti, Florence, has a pair of birds and an inscription apparently indicating that it was made between 1000 and 1008 or 1011 (Lamm 1929–30, p. 192, pl. 66; Rice 1956). The fourth ewer, in the cathedral treasury at Fermo, on the Adriatic coast of Italy, also has a pair of birds and an inscription, the meaning of which is disputed (Scerrato 1979, p. 497, no. 521, and p. 519). The fifth, now in the Louvre, again depicts a pair of birds, which have a family likeness to the parrots on the present object (Lamm 1929–30, pp. 193–94, pl. 67:3).

It is, however, the last example, in the Victoria and Albert Museum, that bears the closest resemblance. On a single panel extending from one side of the handle to the other, it contains, surrounded by arabesques, two short-horned animals running toward one another; two birds of prey, their wings outspread as though they have just alighted, perch on the rumps of the animals and peck at their necks (Lamm 1929–30, p. 194, pl. 67:4).

The striking similarity between the present object, the Buckley Ewer, and the rock-crystal ewers raises questions about the place of manufacture and the date of the glass vessels. One of the rock-crystal ewers bears an inscription that associates it with a Fatimid caliph, and the inscription on

another (the work at the Palazzo Pitti) associates it with a Fatimid official. Furthermore, the well-known writer and traveler Naṣir-i Khusraw, who visited Egypt twice between 1047 and 1050, identified Cairo as a center for the working of rock crystal. One might suppose, therefore, that all these objects were made in Egypt in the late tenth or the early eleventh century. However, both the Corning ewer and the Buckley Ewer were found in Iran, and it has been suggested that the rock-crystal ewers are imitations of metal vessels from western Asia (Erdmann 1940). The question of the origin of the two glass vessels, therefore, remains open.

DW

LITERATURE: Pinder-Wilson and Ezzy 1976, no. 132; Whitehouse 1985b; *JGS* 28 (1986), cover and frontispiece; Whitehouse 1990; Whitehouse 1993

91. Box with Lid
Western Asia, probably Iran,
10th century
Box and lid, each: h. 4.8 cm (1⅞ in.), diam. 8.5 cm (3⅜ in.)
Almost colorless, with yellowish tint
Blown and wheel-cut
CONDITION: Both the box and the lid were broken and have been repaired. The surfaces are pitted and retain patches of silver and iridescent weathering.
The David Collection, Copenhagen
16/1974

The box is cylindrical. It has a narrow vertical rim, with the inner edge flush with the inside of the wall and the outer edge cut back to create a narrow ledge to support the lid. The wall is vertical, the base plain. The wall is divided by single vertical cuts into five panels of equal size. Each panel has a rhombus consisting of four transverse cuts that meet the sides of the panel at the midpoints. Inside each rhombus is a countersunk circular boss.

The lid is roughly hemispherical, with a lens-shaped knop. The rim is narrow, with the outer edge flush with the outside of the wall and the inner edge cut back to receive the rim of the box. The wall, which curves up and in, is connected to the knop by a short narrow stem. A frieze, framed at the top by a continuous horizontal line, appears on the wall. The frieze contains ten identical tear-shaped motifs, each "tear" descending from left to right and surrounded by a double slant-cut border. Between each pair of tears, at the bottom, are two short cuts that meet at the top to form an inverted V. *DW*

LITERATURE: Unpublished

92. **Dish**
Western Asia, 9th–10th century
H. 5.2 cm (2⅛ in.), l. 18 cm (7⅛ in.), w., surviving, 5.3 cm (2⅛ in.) (without mount)
Transparent deep reddish purple
Cast and cut
CONDITION: The object has been broken cleanly along the major axis, and one-half is missing. The surviving half is in pristine condition.
Procuratoria di San Marco, Venice 46

This object is part of a shallow dish, the form of which roughly resembles a boat—hence its Italian name, *navicella*. Seen from above, the ends of the dish are semicircular, and the side consists of a narrow rectangular projection with a triangular protrusion at the midpoint. The rim is flat and the oval base is plain.

The dish is decorated on the outside with linear ornament. When complete, the decoration consisted of a pair of half-palmettes at each end and a band of bead-and-reel motifs at the sides.

The object has an elaborate gold and silver-gilt mount embellished with gold filigree and gems (Hahnloser 1971, pp. 106–7). The mount consists of a rim, four straps, a stem, and a foot. The straps are attached to the rim and the stem by hinges. The rim is in the form of a broad collar decorated with a continuous band of openwork made up of scrolling filigree and gems set in bezels. The straps, too, are decorated with openwork panels ornamented with gems. The stem has an openwork foliate knop. The foot is in the form of a raised pedestal shaped like the mouth of a trumpet. It is decorated with vertical panels of openwork filigree scrolls and gems.

Elliptical lobed bowls have a very wide distribution in Europe and Asia; they are common, for example, among Sasanian metalware. Perhaps the closest parallel to the present object is a silver-gilt dish from Khomiakovo, in the Volhenia region of Ukraine, and now in the State Hermitage Museum, Saint Petersburg, that dates from the sixth or the early seventh century (*Splendeur des Sassanides* 1993, no. 84). The Shōsō-in repository at the Tōdaiji Temple, Nara, Japan, has a green glass dish with twelve lobes (Harada et al. 1965, pp. iii–iv, 19, colorpl. 5, pls. 42–45). Although the Shōsō-in was consecrated in 756, it also contains objects transferred from another shrine at the temple in 950.

The color of the San Marco bowl has been described as "ruby" (*rubino*). This may confuse historians of glass, who use the term "gold ruby" to

describe glasses of deep ruby color made with a precipitate of colloidal gold. This process, which was perfected by Johann Kunckel at Potsdam some time before 1679, involves adding gold chloride to the glass and reheating the finished object until its initial gray color turns to ruby. The San Marco bowl is almost certainly not a gold ruby glass; in all probability, it was colored with manganese dioxide, which produces various shades of purple.

The mounted vessel, which originally had a cover, may have served as an incense burner or table ornament. Hans R. Hahnloser attributed this mount and the mounts of two other objects in the treasury of San Marco (Hahnloser 1971, nos. 19, 88) to the same anonymous goldsmith, who was active in Venice in the late thirteenth century. *DW*

LITERATURE: Pasini 1885–86, p. 66, no. 95; Molinier 1888, no. 82; Erdmann 1971, pp. 105–6, no. 119; Gabrieli and Scerrato 1979, fig. p. 485; Curatola 1993, no. 28

93. **Bowl**
Western Asia, perhaps Iran, 9th–10th century
H. 7.6 cm (3 in.), w. 17.8 cm (7 in.)
Translucent deep green
Probably slumped over a mold, then cut, ground, and polished
CONDITION: Slightly less than half the object survives; the surviving part, which was broken into fourteen pieces, has been restored. The surface is dull, with the remains of weathering. A hole with a diameter of .6 centimeters (¼ in.), near the center of the floor, was made by the previous owner to obtain a sample for spectrographic analysis. The glass contains a few spherical bubbles.
The Corning Museum of Glass
55.1.136

This hemispherical bowl has a rim with eight lobes. The rim has a flat top and a beveled inner surface formed by grinding. The wall curves down and in; on the inside, at the junctions of the lobes, there are sharp cusps that extend from the rim to the center of the floor. The base is slightly convex, with a solid foot ring. There is no pontil mark.

The outside of the bowl is decorated with slant-cut ornament consisting of two alternating motifs, each repeated four times. One of the motifs is a standing bird facing to the left. It has a curved beak, a small head, an elongated body, a tiny wing, and a pointed tail. Its neck is embellished with a band of horizontal cuts, and the wing and tail have transverse parallel cuts. The other motif is a tree of life, with the trunk divided at the top into two scrolling half-palmettes and at the midpoint into an inverted palmette flanked by long curving leaves.

Evidently the blank for this bowl was made by sagging a disk of glass—perhaps with the foot ring already formed by stamping (it does not appear to have been applied)—over a lobed form. The shape of the bubbles supports the view that the object was not inflated, and it is difficult to imagine

that the cusps on the interior of the vessel could have emerged so crisp if the parison had been blown in a mold.

The decoration displays a combination of linear relief-cutting and slant-cutting. Prudence Oliver Harper (Harper 1961, p. 26) likened the birds and the tree of life motifs to the birds and vegetal form on a bowl decorated with falcons and ibexes at Corning (53.1.109; Kröger 1995, p. 141, fig. 9). Parallels for the form of the present work include a five-lobed bowl in the treasury of San Marco, Venice (cat. no. 83), and a bowl in The Metropolitan Museum of Art (1970.20; Jenkins 1986, no. 22).

Chemical analysis has shown that the glass of this bowl contains 73.9 percent lead oxide (Brill 1999a, vol. 1, p. 101, vol. 2, p. 204 [sample 5197]). A dish in the Shōsō-in repository at the Tōdaiji Temple, Nara, Japan, has a similar color and is reported to contain 55 percent lead oxide (Harada et al. 1965, pp. iii–iv, 19, colorpl. 5, pls. 42–45). Although the Shōsō-in was consecrated in 756, it also contains objects transferred to it from a second shrine at the temple in 950.

DW

PROVENANCE: Ray Winfield Smith (1062), who reported that it came from Iran

LITERATURE: Smith 1957, no. 532; Harper 1961, pp. 25–26; Marshall 1990, dust jacket

94. **Bottle with Inscription**
Western Asia, probably Iran, 9th–10th century
H. 18.2 cm (7¼ in.), max. diam. 6.2 cm (2½ in.), diam. at rim 2.1 cm (⅞ in.)
Colorless
Blown and cut
CONDITION: The object was broken at the base of the neck and has been repaired without loss. The surface is dull and pitted.
The Corning Museum of Glass
67.1.3

This bottle has a cylindrical neck and an egg-shaped body. The rim has been ground flat, and the neck tapers. The body has a sloping shoulder and

a wall that curves out, down, and in before merging with the rounded base.

The neck, wall, and base are covered with slant-cut ornament arranged in six horizontal bands that are framed by either one or two continuous horizontal ribs. The upper neck has a band of seven vertical oval facets, and the lower neck has six rectangular facets. The shoulder is divided into ten shallow facets. The upper wall has a narrow band of ornament that resembles a kufic inscription but is meaningless. Below this is a broader band containing two small inverted heart-shaped motifs with vegetal scrolls; these spring symmetrically from the tops and in roughly symmetrical patterns from the bottoms. The base of the bottle is in the form of a rosette with seven petals.

DW

LITERATURE: *JGS* 10 (1968), p. 183, no. 22

95. **Bottle with Birds**
Western Asia, probably Iran, 10th–11th century
H. 23.5 cm (9¼ in.), max. diam. 10.8 cm (4¼ in.), diam. at rim 2.2 cm (⅞ in.)
Transparent deep blue
Blown and cut
CONDITION: The object was broken into many pieces, with minor losses, and has been restored (it was damaged in a flood at Corning in 1972). There is a circular hole in the floor, made by the previous owner in order to obtain a sample for spectrographic analysis. The surface is dull and slightly pitted, with the remains of light brown weathering. The glass contains numerous bubbles.
The Corning Museum of Glass
55.1.134

This bottle has a globular body, a long narrow neck, and a plain rim with a flat top finished by grinding. The neck is slightly wider at the bottom than at

the top. The base is slightly convex, with a foot ring made by folding. There is no pontil mark.

The slant-cut decoration is divided into a series of bands defined by either one or two continuous horizontal grooves. The neck has five such bands (from top to bottom): (1) without decoration; (2) with eight facets shaped like parallelograms and arranged in chevrons and with triangular or semicircular facets in the triangles above and below the chevrons; (3) with thirteen small triangular facets, their apexes alternately facing up and down; (4) similar to band 2; and (5) with seven tall rectangular facets. The upper wall has a narrow band containing two ribbons twisted into a cable, with transverse hatching in the spaces between the ribbons. Below this is a wider band decorated with two standing birds facing one another across a fleur-de-lis and with their tails separated by a winged palmette. The bodies of the birds, the fleur-de-lis, and the winged palmette are hatched or crosshatched.

Numerous examples of medieval Islamic glass and ceramics, including the present object, are attributed to Gurgān. While the veracity of some such reports may be doubted, presumably they indicate that the objects at least came from Iran. *DW*

PROVENANCE: Ray Winfield Smith (954), who in *Verres antiques* (see below) noted that it probably came from Gurgān

LITERATURE: Ettinghausen 1952, p. 81 and pl. XV, fig. 4; *Verres antiques* 1954, p. 52, no. 319; Smith 1957, no. 572; Higashi 1991, p. 81, no. 58

96. **Bottle**
Probably Iran, 9th–10th century
H. 21.5 cm (8½ in.), max. diam. 12.4 cm (4⅞ in.), diam. at rim 5.7 cm (2¼ in.)
Transparent pale green
Blown and wheel-cut

CONDITION: The object was broken into many pieces, with losses (especially from the wall and base), and has been restored. The surface has been cleaned.

The David Collection, Copenhagen 10/1963

This bottle has a cylindrical neck and a roughly cylindrical body. The rim is shaped like a funnel, with a ground and polished lip. The neck is wider at the bottom than at the top. The shoulder slopes and has a rounded edge, and the wall tapers.

The neck, shoulder, and wall are decorated in relief. The neck has three narrow friezes, which are framed by continuous horizontal ribs. The friezes at the top and the bottom consist of contiguous rectangular facets. Between these, and separated from

them by plain bands, is a frieze of two hares running from right to left.

The edge of the shoulder and the body have a broad frieze of decoration framed at the top by two horizontal ribs on the shoulder and one similar rib near the bottom of the wall. The frieze contains four groups of birds as well as vegetal motifs in which two designs alternate. The first design has a central ring-and-dot motif, from the top of which springs a vertical stem terminating in a palmette; above the palmette two stems curve up and out and terminate in leaves. Beneath the ring-and-dot motif is a short vertical stem, below which two sinuous stems form an ogival arch and terminate in scrolling tendrils and leaves. On each side of the ring-and-dot motif and the palmette is a bird, facing outward. The bird has a curved beak, small head, and slender body, with the wings folded; the leg and foot extend forward, as if grasping a support. At the bottom of the design, inside the ogival arch, is a smaller bird facing left, with its wings outspread.

The second design also has a central ring-and-dot motif, with a vertical stem supporting a palmette above and a short stem below. Beneath this is a pair of leaflike elements. The ring-and-dot motif and the palmette separate two birds that face one another. Each bird stands in profile and perches on a curvilinear vegetal scroll. Behind the birds' heads are leaf scrolls sprouting from above and below single ring-and-dot motifs.

Many details, such as feathers on the necks and wings of the birds, are hatched with light parallel cuts; other elements, including some of the vegetal motifs, have parallel cuts arranged in a herringbone pattern. Many of the outlines are notched.

The decoration is ambitious, containing no fewer than ten birds and numerous vegetal motifs. It is also carefully executed, with the result that the bottle may be compared favorably with the majority of slant-cut objects. The ring-and-dot motifs combined with palmettes recall the decoration on the underside of a bowl decorated with falcons and ibexes, now in the Corning collection (53.1.109; Harper 1961, p. 13, fig. 6). *DW*

LITERATURE: Leth 1975, p. 15

97. **Jug**
Probably Iran, 10th century
H. 14.5 cm (5¾ in.), max. diam. 10.2 cm (4 in.), diam. at rim 9.1 cm (3⅝ in.)
Transparent yellowish colorless
Blown, applied (handle), tooled, and wheel-cut
CONDITION: The jug was broken and has been repaired. The surface retains traces of iridescence. The glass contains bubbles, the largest of which measures .6 centimeters (¼ in.) in length.
The Metropolitan Museum of Art, New York, Rogers Fund, 1939 39.40.101

This jug has a globular body, a funnel-shaped neck, and a plain rim with the lip thinned by grinding. The neck tapers, and the wall curves down, out, and in. The base has a foot ring made by folding and a kick. There is a pontil mark. The handle, which is oval in cross section, was dropped onto the upper wall, then drawn up and in before being attached to the top of the neck; its circular thumb rest was made by tooling.

The jug has slant-cut decoration on the neck and wall. The decoration on the neck consists of continuous horizontal bands of curvilinear V-shaped elements. The wall has a broad band of ornament framed by two incised grooves at the top and one groove at the bottom. The band, which is interrupted by the handle attachment, contains three roundels, each defined by two concentric grooves. Every roundel contains a bird or animal: long-tailed birds on the roundels at either side of the handle and a lion running to the left on the roundel opposite the handle. The spaces between the roundels are filled with vegetal and geometric motifs. The handle is decorated with transverse cuts.

The principal ornament here, a band of unconnected roundels surrounded by vegetal and geometric motifs, is familiar from Sasanian and early Islamic metalwork (Orbeli and Trever 1935, pl. 29; Baer 1983, fig. 230; Atıl et al. 1985, no. 10), as well as from other examples of Islamic cut glass. A relief-cut glass bowl, excavated at Fusṭāṭ and apparently datable to the ninth century, has a series of roundels containing birds (Pinder-Wilson and Scanlon 1973, p. 26, no. 20). Another bowl, in the Victoria and Albert Museum, has a bird in the center of the floor and a concentric band of roundels containing animals on the wall (*SPA* 1938–77, vol. 6 [1939], pl. 1440c; Charleston 1942, p. 215, pl. II, A,C). A bottle at Corning (64.1.15) is decorated with a band of slant-cut roundels containing quatrefoils. Jens Kröger (1995, p. 175) compared the present object with a tenth-century gold ewer in the Freer Gallery of Art, Washington, D.C. (Lowry 1989). *DW*

PROVENANCE: Excavated at Tepe Madraseh, Nishapur, 1938
LITERATURE: Hauser and Wilkinson 1942, p. 106, fig. 35; Kröger 1995, no. 228

98. **Cup**
Probably Iraq, 9th century
H. 8 cm (3⅛ in.), diam. 9.2 cm (3⅝ in.)
Transparent light green with translucent deep green overlays
Blown, applied, and cut
CONDITION: The object was broken into many pieces, with several losses, and has been restored. The surface is extensively weathered; the weathering of the light green glass is dull and grayish green, while that of the deep green glass is yellowish.
Staatliche Museen zu Berlin–Preussischer Kulturbesitz, Museum für Islamische Kunst Sam. 800

This cylindrical cup has a plain rim, a vertical wall, and a flat base. The decoration consists of two applied pads, each roughly 7 centimeters (2¾ in.) square, with linear wheel-cut ornament. One of the appliqués has a geometric design, as follows: at the center, a rectangular panel with double outlines; four more or less equilateral triangles with the outer borders of the panel as their base lines and their

apexes at the midpoints of the sides of the applied pad; and four oval motifs that have their ends at the corners of the central panel and the pad. The other appliqué has a curvilinear motif of two half-palmettes, one upright and the other inverted, that touch at their midpoints and have groups of three "petals" above and below the junction.

The cup was found in the Jawsaq al-Khāqānī, the palace built by Caliph al-Muʿtaṣim in 836–42 at Samarra, Iraq. It is not known, however, whether it was discarded during the construction of the palace or at some later date. On the other hand, it is generally believed that large parts of Samarra were abandoned and became deserted in the late ninth century (Northedge 1991, pp. 74–79), and so a date in the ninth century is not unlikely.

Several similar cylindrical cups with applied pads and wheel-cut decoration are known (see p. 160).

DW

LITERATURE: Lamm 1928, pp. 68–69, no. 187

99. **Bottle**
Western Asia, perhaps Iran, 9th–10th century
H. 15.2 cm (6 in.), max. diam. 8.5 cm (3⅜ in.), diam. at rim 2.2 cm (⅞ in.)
Translucent green over colorless
Blown, applied, and cut
CONDITION: The object is intact. The colorless glass is smooth, but patches of corrosion appear at the top of the neck. The interior is extensively weathered. The green glass is pitted.
Trustees of The British Museum, London OA1966.12–11.1

This bottle has a globular body, a narrow cylindrical neck, and a plain rim with a flat top finished by grinding. The wall curves in at the bottom and merges with the base, which is plain.

A faint irregularity at the center of the base is the only trace of the pontil mark, most of which was removed by grinding.

The principal decoration consists of two green pads (w. 4.5–4.7 cm [1¾–1⅞ in.]), each of which has been cut to form the silhouette of an animal shown in profile facing right. The first animal is a hare with a long ear, one foreleg and one hind leg, and a tail that ends in a half-palmette; its neck consists of a "collar" with transverse hatching. The second animal, although similar, lacks the long ear and has a large bushy tail. Between the two animals are incised geometric motifs. The lower neck is embellished with two continuous horizontal grooves, and there is a similar groove on the upper wall. *DW*

PROVENANCE: Found in Iran
LITERATURE: Harden et al. 1968, p. 110, no. 148; Pinder-Wilson 1991, pp. 120–21, no. 148

100. **Bottle**
Western Asia, probably Iran, 10th–early 11th century
H. 23 cm (9 in.), max. diam. 13.1 cm (5⅛ in.), diam. at rim 5.7 cm (2¼ in.)
Translucent green and translucent brown over colorless
Blown, applied, and cut
CONDITION: The object was broken into many pieces, with losses, and has been restored. The surface of the colorless glass is dull, with the remains of weathering.
The David Collection, Copenhagen
2/1972

This bottle has a cylindrical body, a cylindrical neck with a horizontal

flange rim, and a rounded lip. The neck is wider at the bottom than at the top. The shoulder slopes and has a rounded edge. The wall tapers slightly and curves in at the bottom. The base is plain and has a pontil mark.

The decoration, which covers the neck, shoulder, and wall, is arranged in four bands that are framed by either one or two continuous horizontal borders. The neck has a single band of short transverse cuts that make an allover pattern of vertical chevrons. The shoulder also has a band of chevrons, but here they form one continuous horizontal row, with the points facing to the right. The wall has two bands of ornament. A narrow band of rather schematic scrolling leaves decorates the junction with the shoulder. Below it, a broader band of abstract and vegetal motifs embellished with crosshatching is interrupted by four colored pads. Each of the latter has been cut in the silhouette of a bird or animal, with incised details. The four motifs are as follows (clockwise): a green hare facing left; a brown bird with impressive plumage, also facing left; a green animal, possibly a lion facing right; and a brown hare facing left. *DW*

LITERATURE: Leth 1975, p. 20, 2/1972

101. **Dish with Rider**
Probably Iran, 10th–11th century
H. 5.3 cm (2⅛ in.), diam. 25 cm (9⅞ in.)
Translucent reddish purple
Probably slumped over a mold, cut, and polished
CONDITION: The dish is incomplete. It was broken, with a large triangular loss from the rim between ten and one o'clock, and has been restored. The surface is dull and pitted, with the remains of dark brown weathering. The glass contains small spherical bubbles.
The Corning Museum of Glass
55.1.139

This dish has a plain rim, a shallow curving side, and a low foot ring. There is no pontil mark.

The interior is decorated in relief with a mule and rider surrounded by four animals. The mule is shown in profile, walking to the left, with its right foreleg raised and the other legs straight. It has long pointed ears, an eye outlined by four straight cuts, a closely cropped mane, and a tail apparently tied in four places, so that it falls in five triangular flounces. The mule is equipped with a nose band and rein, and its saddle has a pommel at the front and back as well as a horizontal strap that passes beneath the tail. The rider is shown in twisted perspective, with his head in profile but his torso rendered frontally. His head is schematic, with a large diamond-shaped eye and no ear; he holds the rein in his left hand and raises his right arm. He appears to be wearing an outer garment resembling a posteen and ankle-length pants. The animals are as follows: at two and six o'clock, ibexes running from right to left; at eight o'clock, a lion with a prominent mane walking from left to right, its head lifted and mouth open as if to roar; at ten o'clock, a snake, seen from above and gliding from right to left, with a triangular head, two circular eyes, and linear markings on its body. The mule, rider, and animals are cut in relief of uniform thickness, without raised borders; the background is plain. Details are indicated by linear cuts, almost all of which are short and straight.

Evidently the blank for this object was made by sagging a disk of glass, perhaps with the foot ring already formed by stamping (it does not appear to have been applied), over a segmental form. The shape of the bubbles supports the view that the object was not inflated, and the irregularities in the outer surface resemble the tool marks that sometimes occur when a glassworker manipulates molten glass over the lower part of the form.

The scene immediately recalls those found on metal dishes of the Sasanian period that are decorated with riders. In those examples, the riders are most often kings (identifiable by their distinctive crowns) who are generally shown on horseback, hunting lions, boars, or other animals (see, for instance, *Splendeur des Sassanides* 1993, nos. 49–56). The differences between the present work and the Sasanian objects are, however, equally evident. The Sasanian riders are armed (usually with swords and frequently with bows and arrows), their mounts have rich trappings, which often include a pair of large balloonlike pompons above the tail, and the hunters

focus their attention on the quarry. Here, the rider has no weapons, he rides on a mule (identified by its ears), and he pays no attention to the four animals that surround him. Ray Winfield Smith, with characteristic acuity, concluded that this dish is not Sasanian and suggested that it was made between the ninth and the eleventh century. This is very probably correct, and a case can be made for dating the object to the tenth century or thereabouts.

Following the collapse of the ʿAbbāsid caliphate in 940, rulers in Iran sought to legitimize their authority by claiming real or supposed connections with earlier dynasties (Bosworth 1973). For example, members of the Būyid dynasty, which originated in Iran and ruled in parts of Mesopotamia and Iran from 932 to 1001, claimed that they descended from the Sasanian emperor Bahrām V Gūr (r. 420–38). One of them, ʿAḍud al-Dawla, revived the ancient title *shāhanshāh* ("king of kings"), inscribed some of his coins in Pahlavi rather than Arabic, and visited the ruins of the old Achaemenid capital at Persepolis. Similarly, the Sāmānids of Transoxiana and Khorāsān, who ruled from 819 to 1005, maintained that they were descendants of Bahrām VI (r. 590), and the Ṣaffārids of Sīstān (r. 861–1003) claimed descent from the founder of the Sasanian dynasty, Ardashīr I.

It is not surprising, therefore, to find that craftsmen in Iran revived Sasanian motifs in the tenth and early eleventh centuries (see, for example, Ghouchani 1998). *DW*

PROVENANCE: Ray Winfield Smith (1236), who reported that it came from Iran

LITERATURE: Smith 1957, p. 231 and no. 530

Painted Glass

STEFANO CARBONI

The great majority of the works included in this chapter were decorated with a brush or a pen in a painterly fashion once their final shape was attained. After being painted, their designs were fired in the kiln at temperatures that stabilized them, chemically and permanently, on the surface without compromising the shapes of the objects themselves. There are two major classes of painted glass—stained and enameled—which are usually treated as entirely separate groups because they were created in different periods and are not characterized by the strict temporal continuity that distinguishes other types of Islamic glass. Stained glass, commonly referred to as "luster-painted," was especially popular in the first three centuries of the Islamic era (the seventh through the ninth), while enameled and gilded glass enjoyed its fame much later, in the thirteenth and fourteenth centuries. Yet both types were produced in the same area (Egypt and Syria), and the impetus behind both was the taste for complex, rich, textured, and/or polychrome surfaces, which are easier to achieve with painting implements than through the application and manipulation of glass trails, as in the hot-worked technique, or in the relief-cut technique. The two classes are therefore discussed here under the same heading, an arrangement that also allows a certain degree of continuity to be demonstrated in the production of stained works. A small group of distinctive objects having gilded and lightly enameled decoration, known as "sandwich glass," defies classification but has been included in this chapter because its designs can be regarded as painterly (cat. nos. 110–112).

The earliest technique of glass painting in the Islamic world involved the application of a monochrome brownish or yellowish metallic pigment, usually on pale-aquamarine-colored bowls (cat. no. 102), although other types of objects, including drinking horns and dishes (cat. nos. 103, 104), are not uncommon. These eighth- or ninth-century creations generally present sketchy figurative or vegetal patterns—and sometimes inscriptions in cursive or kufic calligraphy—that have little artistic appeal (see Carboni 2001, nos. 10, 12). By applying pigments to both sides of open-shaped vessels, glassmakers highlighted details or outlines and exploited the transparent glass wall in order to create subtle shading effects (cat. no. 102). It is not clear, however, whether these effects resulted from a deliberate artistic choice or from random experimentation.

Several factors suggest that this type of glass decoration was developed by Coptic craftsmen who settled in Egypt before the advent of Islam,

Opposite: detail, cat. no. 121

although the role played by Syrian glassmakers remains an open question. In third-century Egypt, silver and copper alloys were applied on glass and fired in a furnace as a substitute for gold; in the sixth or seventh century, experiments in the heating of silver-based pigments were conducted in the same area (Caiger-Smith 1985, p. 25, n. 3). The pioneering role of Coptic glassmakers, as well as an Egyptian origin for stained glass, is corroborated by a small number of fragmentary cups decorated with classical Late Antique motifs similar to the designs on a drinking horn at The Corning Museum of Glass (cat. no. 103) and by a fragment excavated at Fusṭāṭ (Old Cairo) bearing the date 779 in Coptic numerals (Pinder-Wilson and Ezzy 1976, no. 119; Caiger-Smith 1985, pl. 6). Carl Johan Lamm, the first scholar to demonstrate the origin of this type of glass, was so convinced of the attribution that he regretted "the necessity of defending a theory which ought to-day to be regarded as a truism: *lustre was invented by Egyptian glassmakers*, probably as early as the 4th century" (Lamm 1941, pp. 18–19).

While the words "luster-painted" and "stained" have both been used to refer to the type of painted glass under discussion, the latter term is preferable, even though the former is by far the most commonly encountered in the literature on the subject. In discussions of Islamic art, "luster painting" is universally employed to identify a particular class of glazed pottery, painted with metallic compounds and fired in the kiln, that first appeared in ʿAbbāsid Iraq in the ninth century. Such pieces, with their shiny, metallic, truly lustrous surfaces, became so popular and influential in the following centuries that they can be regarded as among the hallmarks of Islamic art production as a whole (Caiger-Smith 1985; Watson 1985). Painting on glass with similar metallic pigments not only began at an earlier date than luster-painted pottery, and in a different region, but the two productions are also artistically dissimilar, finding a common stylistic ground only later, during the eleventh and twelfth centuries.

In addition, the chemical reactions that occur on a glass surface when a pigment containing silver and/or copper is fired at a low temperature differ from those that take place on a glazed ceramic surface—to such an extent that the final result of painting on glass can seldom be described as really lustrous (Caiger-Smith 1985, pp. 24–29; see also pp. 34–35 in this catalogue). On glass the pigment is actually absorbed beneath the surface after a chemical exchange of ions, so that it colors the glass permanently, becoming part of the atomic structure of the object (Brill 1970; see also Heaton 1948 and Lillich 1986). Thus, it is possible to scratch the luster paint from the surface of a ceramic plate after firing but not from a glass vessel. Experiments have shown that silver-based paints turn yellow when first fired, then progressively amber and deep brown; copper-based pigments tend to become red or ruby-colored quickly, resulting in a truly lustrous surface, but they are difficult to control (silver was often added for this reason). Yellow and orange stains can also be obtained from both silver and copper. Proper control of firing time and temperature was clearly important to achieve the desired results, and this aspect still remains one of the most challenging and fascinating in stained-glass production.

Although produced almost exclusively in Egypt and Syria, stained glass has been found in fragmentary form in places as far away as East Asia—in modern Sri Lanka and China, for example—demonstrating its popularity in the Indian Ocean trade (An 1991, p. 130, fig. 10; Carboni forthcoming b, pp. 30–31). Most of the vessels and fragments decorated with staining have been excavated in Egypt or have a putative Egyptian origin;

the principal public collections housing them are in Cairo (Museum of Islamic Art), Athens (Benaki Museum), Stockholm (Nationalmuseum), and London (Victoria and Albert Museum). A remarkable exception is the ninth-century material excavated at Samarra, which is, however, more colorful than the stained glass attributed to Egypt and may have represented a brief attempt at imitation, in line with the experimental nature of artistic production in that temporary capital (Lamm 1928, pp. 93–98, pls. 7, 8; Lamm 1941, pl. 11).

Valuable information concerning Syrian stained glass has been recently obtained from two cups, one in The Corning Museum of Glass (cat. no. 102) and the other excavated at Raqqa, in northern Syria (National Museum, Damascus; al-'Ush 1964, no. 28). Each includes an inscription unequivocally stating that it was made in Damascus, the former perhaps in 786–87. Although the possibility of long-distance patronage suggested by these inscriptions cannot be dismissed entirely, a contemporaneous production in Egypt is confirmed by a similar cup, or goblet missing its stem, found at Fusṭāṭ and believed by some scholars to have been commissioned by a governor of Egypt in office in 773 (Pinder-Wilson and Scanlon 1973, figs. 40–42). Altogether, the scarce and fragmentary stained-glass material available for study today does not allow for an art-historical distinction between Egyptian and Syrian works, but it does seem safe to surmise that Egypt was the leading producer of such objects.

Colorful yellow and orange stains, usually painted against a vividly colored surface and almost entirely covering it, seem to have an Iraqi connection: a few such examples came to light from Samarra, and a fragment excavated in Cairo bears the name of an artist from Basra, an important early Islamic city in southern Iraq (Lamm 1928, pl. 8, nos. 273, 274; Ettinghausen 1942, p. 5, fig. 2). After possibly having a brief initial Samarran season, this production probably developed mainly in Tulunid and Ikhshīdid Egypt in the ninth and tenth centuries. Following a general trend in Islamic art during that period, new shapes, colors, and decorative patterns were developed, supplanting those of the Late Antique tradition, which had dominated the transitional phase in the first two centuries of the Islamic era. The Corning jug (cat. no. 106), a splendid, almost complete specimen reminiscent of this colorful moment in the creation of stained glass, ideally exemplifies the new trends in glassmaking as well as the pervasive influence of Iraq in the Islamic world. Another extraordinary object, a bowl at Corning (cat. no. 105), is so unique that a proper classification for it is impossible. While it may initially seem part of the same "colorful" phase as the Corning jug, the pale blue color of the vessel itself and the classical derivation of the subject matter suggest an earlier dating. Yet even these two isolated examples demonstrate to what extent glassmakers and painters of the time dared to experiment with new colors and "special effects," breaking away from the previous traditions.

The colorful phase of staining does not seem to have lasted long. Under the Fatimids in the tenth to twelfth centuries, the color of choice for glass again became very pale, and almost colorless, and monochrome brownish stains were favored. Dramatic contrasts of weightless pale aquamarine vessels with brownish stains ultimately reflect Coptic influence. This time, however, the pigment was applied only on one side of the wall. A bowl in New York that features double-sided painting and two colors of stain (cat. no. 108) may represent a sort of link between the first and second stages of colorless stained glass, which may have had a continuity despite the "colorful" interlude. A typical

Fig. 98. Fragment of bowl. Egypt, 11th century. Colorless glass, stained. The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 169 KG

though sophisticated example of stained glass from this period is a molded bowl in London (cat. no. 109). Fatimid stained-glass painting, which is often accomplished artistically and also portrays human figures, has clear connections with contemporaneous luster-painted ceramics; the best example is a fragment from a bowl in the al-Sabah Collection, Kuwait (fig. 98). Perhaps the same painters were required to work in both media in the neighboring glass and ceramic workshops at Fusṭāṭ (Carboni 1999, p. 172).

A brief return to dark-colored vessels—this time decorated with geometric and zigzag patterns and sketchy vegetal ornaments in a dull greenish stain—marks the last phase of stained glass in the late Fatimid period and probably also in the early Ayyūbid (eleventh and twelfth centuries). As gilding and enameling gradually became the principal methods of painting on glass, the use of staining pigments did not die out entirely, being occasionally used for filling designs or other specific purposes. For example, stains as well as gilt were utilized to decorate the dark-colored background between marvered trails (see p. 109). A mosque lamp made about 1329–35 (cat. no. 116) is not the only object having certain areas of its emblems painted with stains in order to obtain a specific color that neither enamels nor gilding could duplicate. Thus, although stains lost their central artistic importance in the Fatimid period, painters continued to use them along with enamel and gold as late as the fourteenth century, in Mamluk times.

"Sandwich glass" is the term applied to a small group of vessels and fragments that have stylized decoration in gold leaf, often highlighted with pale blue enameled dots, enclosed within two layers of colorless glass (cat. nos. 110–112). The extant material is so homogeneous that it must either have been the product of a single workshop or have been made in a limited area, but its scarcity makes accurate art-historical and contextual analyses difficult.

The closest parallels with regard to shape are found in certain bottles and bowls most of which were made in the ninth and tenth centuries; the decoration, engraved by scratching the gold layer with a needle point, has counterparts in the group of scratch-decorated glass discussed elsewhere in this catalogue (cat. nos. 68, 73). As a Roman technique briefly revived in the Islamic period, sandwich glass fits nicely in an early stage such as the ninth or tenth century. In addition, an appropriate comparison can be made with contemporaneous Qur'an manuscripts, especially with regard to their gold lettering and illumination. Therefore, until future discoveries provide further information, the most likely dating for Islamic sandwich glass lies within the ninth and tenth centuries and the most probable places of production are the Syrian and Mesopotamian areas. The only decorative detail that does not seem to corroborate this attribution entirely—although a relation with Qur'an manuscripts has been suggested (see discussion under cat. no. 110)—is the presence of small enameled blue dots dispersed on the sandwiched surface. Since decorative enamel does not appear to have been recorded on glass vessels until the late twelfth century (see p. 204), a ninth- or tenth-century dating for sandwich glass would imply that enamel

had indeed been used previously for a brief time and was "rediscovered" three centuries later.

The largest section of this catalogue, including twenty-three works (cat. nos. 113–135), is devoted to enameled and gilded glass, the most treasured, celebrated, and published type of glass from the Islamic world. For approximately two centuries (the thirteenth and fourteenth) in the regions controlled by the Ayyūbids and the Mamluks (present-day Egypt and Syria), glass craftsmen created one technical tour de force after another, endowing each with generous proportions and rich and varied painted decoration.

The vessel was shaped before gilt and/or enamel (opaque colored glass reduced almost to a powder) was applied by means of an oily medium and a brush or a reed pen. Because gilt and the individual enamel colors have different specific chemical qualities, different temperatures are required to permanently fix them on a glass surface. In theory, the various colors could have been applied one at a time, subjecting an object to reheating several times, but such a process would have entailed a high probability of deforming the shape of the object. It seems more likely that glassmakers mastered a procedure that would allow them to apply all the colors at once and fix them in the kiln without having them run into one another, although the exact method they developed remains elusive. Mamluk glassmakers probably tried to obtain "soft" enamels rich in lead that would fuse at lower temperatures and reduce the risks of vessel collapse (Freestone and Stapleton 1998, pp. 126–27). Clearly, mastering the temperature of the wood-fueled kiln and correctly timing the steps of the firing were of paramount importance to the success of the operation.

The fairly large amounts of enameled and gilded objects that survive in excellent condition demonstrate that such vessels were highly prized and probably used only for special occasions. Their production was not, however, limited to special commissions and courtly patronage, for thousands of fragments from objects evidently made for commercial purposes have been found, not only in the expected sites in Egypt and Syria but also in Europe and elsewhere (see, for example, Baumgartner and Krueger 1988, nos. 66–70, for Germany; Foy and Sennequier 1989, no. 124, for France; and Dzhanpoladian and Kalantarian 1988, pl. 54, for the Caucasus).

The painterly surface of enameled objects and the penchant of Mamluk artists and patrons for calligraphic inscriptions make this type of Islamic glass by far the most informative for the art historian. All kinds of objects, including lamps made for tombs, mosques, madrasas (Qur'anic schools), and *khānaqāh*s (hospices) as well as bottles, beakers, and basins, are inscribed with the name of a patron and/or his emblem of office. Such information should facilitate the establishment of an accurate chronology, but in fact painstaking studies aiming to do so (for mosque lamps, for example) have not as yet been undertaken. As a result, much of the extant material without inscriptions—even extraordinary and celebrated objects such as the British Museum canteen (cat. no. 123), the pilgrim's flask in Vienna (cat. no. 124), or the Luck of Edenhall (fig. 99)—cannot be placed in a precise context. In the present catalogue, the six lamps selected for the exhibition (cat. nos. 113–118) are grouped together at the beginning of the section and are used as a sort of yardstick to discuss and attribute a number of other works. However, the wide chronological range of datable mosque lamps (from the late thirteenth through the fourteenth century), combined with limits imposed by the publication, precludes a thorough comparative analysis of decorative patterns.

Fig. 99. "Luck of Edenhall" beaker. Syria or Egypt, 13th century. Brownish colorless glass; blue, white, green, and red enamels; and gold. Free blown, enameled, and gilded. H. 16 cm (6¼ in.). Victoria and Albert Museum, London C.1–1959

The chronology of enameled and gilded glass in the Mamluk period is a promising field of research that needs to be seriously addressed. Lamm, the only scholar who has attempted an assessment of this considerable production (Lamm 1929–30, pp. 241–483, pls. 89–205), subdivided enameled glass into three basic groups, depending on whether he believed the objects came from workshops in Raqqa, Aleppo, or Damascus. Although extremely useful, his pioneering work is not corroborated by convincing evidence and should be revised in light of more recent information. Slow progress continues to be achieved through focused symposiums (Ward 1998), chemical analyses (Henderson and Allan 1990; Henderson 1998), and articles dealing with specific subjects. Yet crucial information, such as the exact place and date of origin of enameled glass and the reasons for its gradual disappearance during the fifteenth century, is still missing.

Enameled and gilded glass developed in the Syrian area in the course of the twelfth century. The city of Raqqa was a glassmaking center with a long tradition and seems to be a good candidate as the putative place of birth. Judging from the few surviving objects, first gilded, then gilded and enameled, glass was made for the rulers of certain areas in the adjacent region of the Jazīra (present-day northeastern Syria, northern Iraq, and southeastern Turkey).

The three earliest datable objects are a fragmentary bottle having only gilded decoration and dedicated to the Zangid atabeg ʿImād al-Dīn of Mosul (r. 1127–46) (British Museum OA1906.7–19.1; Mayer 1939 and Scanlon 1998, p. 27 and fig. 8.1); an elongated beaker (fig. 100), similar to one in the Gulbenkian Museum, Lisbon (cat. no. 128), including the name and emblem of another atabeg of Mosul, Sanjar Shāh (r. 1180–1209) (Carboni 1999, figs. 3, 4); and a large plate excavated at Kubādābād in central Anatolia that was made for the Seljuq sultan Kaikhusraw II (r. 1237–47) (Karatay Medrese Museum, Konya, Turkey, 2162; Carboni et al. 1998, fig. 6). The decoration on the gilded bottle in the British Museum shows a strong Byzantine influence, which may indicate that the initial motivation for gilded glass came from the areas of Anatolia that were formerly controlled by Byzantium, but the Arabic inscription suggests that the object is a product of Islamic origin. The beaker and the plate, on the other hand, are typical Islamic creations, their enamel and gilt decoration demonstrating how the technique was mastered by the end of the twelfth century.

Fig. 100. Detail of beaker, showing the name of Sultan Sanjar Shāh. Probably Syria, ca. 1180–1209. Free blown, enameled, and gilded. Gellatly Collection, on loan to the Freer Gallery of Art, Smithsonian Institution, Washington, D.C. LTS *1985.1.170.8*

The importance of Raqqa in these early stages may be corroborated by the fact that it is closer geographically and culturally than centers such as Damascus and Aleppo to Anatolia and the eastern Islamic world; Iran was particularly accessible, by way of the Jazīra. In central and northwestern Iran, a contemporaneous style of painting found on so-called *mīnāī* ("enameled") pottery is comparable to that found on some enameled glass objects (see, for example, cat. no. 126). In addition, the technique of overglaze painting used on *mīnāī* ceramics required a second firing, as does glass enameling. A comparative study of these two productions, which have up to now been regarded as entirely separate, may prove to be extremely interesting. Such an investigation should also take into account book illustration of the time, although examples of that art are unfortunately as scarce as enameled glass from the period (see cat. no. 126). In short, the developmental stage of enameled and gilded glass should be viewed in the general context of twelfth- and early-thirteenth-century Islamic art in Syria, an area that had been opened to influences from the surrounding regions and had gradually absorbed them.

This type of glass flourished especially in the mid-thirteenth century, during the last decades of Ayyūbid power and the first of Mamluk domination. Nothing suggests that one dynasty was more involved than the other in sponsoring enameled glass; aiming to satisfy a demanding, wealthy clientele, glassmakers continued production independent of political upheavals. It is only toward the end of the century, about the beginning of the reign of Nāṣir Muḥammad ibn Qalāūn (r. 1293–1341, with brief interruptions), that Mamluk patronage seems to have increased, as evidenced by the great number of mosque lamps made for the royal establishment. Consequently, as Cairo became the true and only capital of the empire, most of the enameled and gilded glass made in the fourteenth century may be attributed to Egyptian rather than Syrian workshops. Fusṭāṭ was a well-known center of glass production, and innumerable fragments can still be found at the site. It is equally likely, however, that the ateliers of Damascus, Aleppo, Raqqa, possibly Hama, and other centers in modern-day Syria, Israel, Palestine, and Lebanon had dominated in the course of the thirteenth century, when Syria was the center of Ayyūbid power. Attributions in the catalogue entries reflect this tentative and perhaps too clear-cut geographical distinction, while taking a cautious stand on works that are universally and safely attributed to "Egypt or Syria" in the literature.

As each decade of the thirteenth and fourteenth centuries passed, glassmakers seem to have created objects of increasingly large dimensions and fewer colors. Early on, most gilded and enameled objects were apparently beakers, bottles, and small perfume flasks and bowls with a lively and complex polychrome ornament (see cat. nos. 120–129). Among the subjects depicted on these vessels were human figures, both large and small, including horsemen, courtiers, musicians, and people engaged in a wide range of activities; Christian themes also appear (cat. nos. 121, 123). The mosque lamps, long-necked decanters (fig. 101), and vases that fit well into the fourteenth century from the art-historical standpoint are often 30 to

Fig. 101. Bottle. Egypt, first half 14th century. Yellowish colorless glass; blue, white, red, green, and yellow enamels; and gold. Free blown, enameled, and gilded. H. 50.2 cm (19¾ in.). The Metropolitan Museum of Art, New York, Purchase, Joseph Pulitzer Bequest, 1936 36.33

40 centimeters (11¾ to 15¾ in.) in height and predominantly decorated with rich gold and blue, with red used for outlines (see cat. no. 131). A larger variety of shapes is characteristic of this later phase, as glassmakers regularly imitated forms available in other media: inlaid metalwork (cat. no. 134), pottery (cat. no. 129), leather (cat. no. 123), and ivory (fig. 102; Rogers 1998, pl. 17.1). These artisans also created original vessels, such as the vase in Corning and the footed bowl in Toledo (cat. nos. 131, 133), that have no parallels.

In keeping with the general practice in Mamluk art toward the end of the thirteenth century, glass painters avoided illustrations of human figures altogether and confined their formerly dynamic depictions of animals to a decorative role, often showing them simply as a sequence of nondescript quadrupeds. These restrictions may have been due in part to Nāṣir Muḥammad ibn Qalāūn's having a more orthodox attitude toward the arts. With the exception of the phoenix (*sīmurgh,* in Persian), a birdlike creature newly introduced to Ilkhanid Iran from China, the sketchily depicted animals and birds eventually gave way to increasingly dominant vegetal compositions and large inscriptions (see cat. nos. 131, 132, but also the unique Chinese lion at cat. no. 127). The stylized peony, introduced from the Ilkhanid areas and soon becoming ubiquitous in all media of Mamluk art, symbolizes the nonfigural all-vegetal element in the decoration of enameled and gilded glass (see, for example, Atıl 1981, nos. 19, 25, 26). Complex geometric compositions, which were probably based on early-fourteenth-century Qur'an frontispieces, also appear to belong to this later phase (cat. nos. 134, 135).

The objects presented in this catalogue, many of which are masterpieces of enameled and gilded glass, have been dated according to the general guidelines outlined above, which are admittedly speculative to a certain degree. Details in the decoration of individual works that offer parallels and help in fine-tuning attributions are discussed in the relevant entries. Looking at the entire group of objects—aside from the mosque lamps (which, as mentioned previously, are used as chronological supports)—reveals that the greatest number of masterpieces belong to the thirteenth century. A few attributions may appear controversial, since they revise familiar fourteenth-century datings, but the latter are themselves equally speculative. A case in point is the suggested dating of the Cavour Vase (cat. no. 129) to the late thirteenth century, which follows neither Lamm's initial attribution to the mid-thirteenth century (although agreeing with his art-historical interpretation)

Fig. 102. Drinking horn. Syria, 13th century. Colorless glass; red, blue, white, yellow, and black enamels; and gold. Free blown, enameled, and gilded. H. 29.5 cm (11⅝ in.). The State Hermitage Museum, Saint Petersburg VZ–827

nor the later unanimous ascription to about 1360–70 after the vessel reappeared on the art market in the late 1980s.

Royal patronage of mosque lamps persisted until the time of the sultans Shaʿbān II (r. 1363–77) and Barqūq (r. 1382–99, with a brief interruption). Many of the lamps were still in place when, in the late nineteenth century, the Egyptian authorities decided to discourage looting by storing them in the building that would eventually become the Museum of Islamic Art in Cairo (Wiet 1929). Enameled and gilded lamps from the second half of the fourteenth century continued to develop along the same lines as those from the first half: fewer colors, larger gilded areas (now almost vanished), and sketchier designs. This apparent diminution with regard to composition and color should not be judged too harshly, since the works of every period express particular needs. All Mamluk glass is, in addition, brownish or yellowish and rather bubbly; it thus lacks the transparency and cleanness that distinguish creations of other areas and periods. These traits have even led some to dismiss it as inferior, despite the spectacular decoration that covers the entire surface of many works done in the period.

While not exactly a swan song for artistic quality, the second half of the fourteenth century is more accurately described in terms of a decline or, better yet, an artistic fatigue, in which a progressive exhaustion of patronage led to the shutting down of workshops year after year in the early fifteenth century. The main reason usually cited for the disappearance of enameled and gilded glass is the sack of Damascus in 1401 by Timur (Tamerlane), after which he moved Damascene artists to his capital, Samarqand, where their craft eventually died out. There are two problems with this theory: glassmakers are not specifically mentioned in any of the literary sources, and enameled glass was produced during this period mainly in Cairo, where Timur never set foot. It seems most likely, then, that enameled glass gradually disappeared as the natural result of a combination of economic, political, and artistic factors. The last known datable mosque lamp is dedicated to the emir Jarkasī (d. 1461/62) (Wiet 1929, no. 332 and pl. 89). By the end of the century, gilded and enameled glass lamps in the Mamluk style were being made in Europe (for a later example, see cat. no. 152). That the sultan Qāitbāy (r. 1468–96) was among those who commissioned them was an unequivocal sign that predominance in glass production had shifted from the Islamic to the European world—and to Venice in particular (Carboni 1989, p. 151 and fig. 6; Fernández-Puertas 1998, p. 77 and fig. 23.5).

102. **Cup**
Syria (Damascus), 8th century
(perhaps A.H. 170/A.D. 786–87)
H. 10 cm (4 in.), max. diam. 13.2 cm (5¼ in.)
Bluish colorless, with dark brown and yellowish silver stains
Free blown and stained; tooled on the pontil
INSCRIPTION, in flowing, barely angular kufic script:

بسم الله الرحمن الرحيم بركة من الله لمن يشرب
بهذا القدح مما صنع بدمشق على يدي سنباط [؟]
في سنة ١ [؟]

(In the name of Allāh the Merciful, the Compassionate. Blessing from Allāh on the person who drinks from this cup. That which was made in Damascus at the hands of Sunbāṭ [?] in the year 1 [?].)
CONDITION: The object was broken and has been repaired; about 10 percent is missing. The surface is lightly weathered, resulting in a milky white film. The glass contains scattered small bubbles.
The Corning Museum of Glass 69.1.1

This cup, which does not stand upright, has a small base and flared walls; the rim was thickened by tooling. The decoration consists of a series of horizontal bands with geometric, calligraphic, and vegetal motifs. The largest band, at the center, depicts stylized plant motifs, alternately upright and upside-down; the dark brown outlines of the motifs are drawn on the interior of the vessel, the yellowish highlights on the exterior. Two narrow bands, painted on the outside in yellow, frame the central motif: the band above contains simple dots, the one below alternating dots and pairs of vertical lines; both patterns are painted on the interior in brown. A large scrolling pattern near the base is painted on the exterior in brown. The pattern at the base, within a circle, represents a six-pointed brown star (created by two intersecting triangles) with a large central dot and smaller dots between the vertices; the circle is painted on the outside, the star on the inside. Two narrow bands below the rim complete the decoration: a combination of dots and V-shaped motifs is placed above a band bearing an inscription.

The production of stained glass was limited to the Egyptian and Syrian, and possibly the Mesopotamian, areas in the first centuries of the Islamic era. The present cup is of exceptional importance, since it is one of only three known stained pieces to include inscriptions that provide vital information as to either a place or a date of origin. Its kufic text, plainly stating that it was made in Damascus, clearly identifies it as a Syrian production. Other features confirming this attribution are the faint bluish colorless glass—the most common color for this type of work—the finely blown shape of the vessel, the combination of two different colored stains (brown and yellowish) applied on both sides of the vessel, and the presence of tiny scattered bubbles in the glass. A cylindrical cup, found at Raqqa (National Museum, Damascus, A16021), displays the same qualities; also produced in Damascus, according to its vertically set inscription, it is made of similarly colored glass and stained in the same hues (al-ʿUsh 1964, no. 28). Its function as a libation cup is confirmed by the text, which reads, "Drink and be happy at the sound of music" (al-ʿUsh 1976, p. 175).

In addition to information concerning the place of production, the

text on the present cup mentions its function as a drinking vessel, the name of its maker, and perhaps its date. The presence of the Arabic word *qadaḥ*, meaning "a drinking cup or tumbler," suggests that the vessel would have been used for various unheated drinks, especially water or wine (which, although banned by the religious establishment, was widely consumed among the elite). Regarding the maker of the cup, the inscription employs the words *ṣuni'a* ("it was made") combined with *'alā yaday[n]* ("at the hands of"), implying that the artist in question is the glassmaker rather than the painter, although it is not impossible that the same man performed both tasks. The most likely reading of this individual's name is Sunbāṭ, a non-Arabic appellation, conceivably Greek or Jewish in origin.

The most puzzling aspect of the inscription is the date. The text reads, "That which was made . . . in the year 1"; the last character can be read either as the numeral one or the letter *alif*, which, according to the *abjad* (the numerical value of the letters of the alphabet), corresponds to the number one. This would make sense only if the name of a ruler had been mentioned earlier (it might be the first year of his reign, for example). Assuming that the calligrapher had no reason to leave the date unfinished—it would have been easy to squeeze in two additional numerals even if he were about to run out of space—one explanation would be that the year is written in the form of a riddle and, as such, exploits the decorative line above to complete the date. This line includes a band of repeated V-shaped marks and dots, which could be interpreted as the numbers seven and zero, respectively; in that case, the date would be either A.H. 107 or 170. The latter option, the equivalent of A.D. 786–87, seems more likely, considering that the only dated stained object excavated at Fusṭāṭ, in Egypt, was made in A.D. 779–80 (Pinder-Wilson and Ezzy 1976, no. 119). *SC*

LITERATURE: *JGS* 12 (1970), p. 174, no. 22; Tomobe 1992, pl. 153

103. **Drinking Horn**
Probably Egypt, 8th–9th century
L. 21.5 cm (8½ in.), diam. at rim 5.9 cm (2⅜ in.)
Greenish colorless, with brown and yellow silver stains
Free blown, applied, and stained; tooled on the pontil
CONDITION: The object was broken and has been repaired; among the areas of restoration are a large section at the outer curve of the horn and smaller sections at both joining points of the handle. About 20 percent of the original vessel is missing. The handle appears to be original. The surface is lightly weathered overall, resulting in a milky white film. The glass contains one large bubble and several small ones.
The Corning Museum of Glass
69.1.4

This drinking vessel has the shape of a horn that is sharply curved (almost at a right angle), with a knobbed constricted end and a large applied handle. The exterior surface was once entirely covered with a yellowish stain, which was applied after the handle was attached. The main design, painted in a brown stain and repeated three times around the larger section of the horn, includes a sort of vase that stems into a trilobed cloverlike head, with two pairs of similar but smaller heads branching out from its shoulders and base. Two of the spaces between the vases are filled with a teardrop motif hanging from a thin dark brown line; the handle is placed in the third space between the vases. On either side of the handle, a crownlike pattern is surrounded by dots and short lines. Below the handle is a trilobed flower

with leaves. The main decoration is framed by solid bands of dark brown and yellow stains. The next band of design, on the curved section of the horn, includes long triangular patterns in brown that stem into trilobed heads and are flanked by two thin lines in the same color. This pattern alternates with a narrower line punctuated at the top with three dots. Below this band is a thicker, solid band in brown, followed by a pattern of five inverted teardrop designs alternating with short "filler" lines.

The distinctive curved shape of the drinking horn, obviously derived from the use of animals' horns for libation, has a long history in pre-Islamic glass production, from first-century-A.D. Roman rhytons to seventh-century Germanic and Italian examples. Zoomorphic horns, both in precious metals (particularly silver) and in ivory, are among the best creations of Achaemenian and Parthian artists in Iran during the same period of time and even earlier (Masson and Pugachenkova 1982, pls. 7, 8, 16, 40, 42, 46, 64, 70, 74, and Pfrommer 1993, no. 66, pl. 4, and no. 73, respectively). In the Islamic world, however, this type of vessel never became popular in any medium, with the exception

of carved ivory objects produced in southern Italy. The only other handled glass horn aside from the present one appeared at auction recently and was said to be Islamic from the twelfth or thirteenth century (Sotheby's, London, sale, October 10–11, 1990, lot 43). The last of the three known Islamic glass horns is a celebrated enameled vessel, mounted in an elaborate gilded silver setting and possibly made for export by Ayyūbid or Mamluk glassmakers in the thirteenth century (see fig. 102; Rogers 1998, fig. 17.1).

Judging from its stained decoration, the present object is the earliest of the three horns. Its profile is not particularly harmonious—it curves at an almost ninety-degree angle—and the large squarish handle does not enhance its appearance. Although its decoration makes it an expensive, uncommon object, this horn must have been a utilitarian vessel; its almost complete survival, though in fragments, for about twelve centuries is miraculous.

The definite greenish hue of the object sets it apart from the majority of stained vessels, which have a bluish colorless tinge (cat. no. 102), and may suggest a different area of production, perhaps Egypt rather than Syria. The two tones of yellow and brown stains are, however, the most common combination in the eighth and ninth centuries; here they were applied only on the exterior surface because of the closed shape of the vessel.

The nature of the decoration argues for a dating in the early Islamic period. Indeed, at first sight, the classical artistic language seems to be so prominent in the composition of the pattern that a very early, possibly pre-Islamic, dating would be appropriate. The motif on the main band is reminiscent of the classical Roman, quasi-Pompeian architectural patterns that circulated in the African and Asian provinces of Rome in late antiquity. In reality, this pattern is also strongly characteristic of Islamic art in the transitional Umayyad and early ʿAbbāsid periods and should be viewed as such in this case. It should be compared not to Roman prototypes but to the vases abundantly sprouting with flowers and leaves that are part of the mosaic repertoire of the Dome of the Rock, Jerusalem (ca. 691) (O. Grabar et al. 1996, pp. 82–105, 108–33) or, with a higher degree of naturalism, to the vegetal motif that became more stylized later (cat. no. 108). Vegetal scrolls originating from foreground vases are common decorative motifs in the first two centuries of Islam and are encountered on other stained-glass objects, such as a cup in the Victoria and Albert Museum (Jacobson 1990–93, fig. 10). The motif of the cornucopia, which relates here to both the shape and the symbolic lush vegetal decoration, is known in stained glass from an eighth-century fragmentary cup excavated in Israel and now on loan to the Eretz Israel Museum, Tel Aviv (fig. 1; see also Jacobson 1990–93, figs. 2, 3). *SC*

LITERATURE: *JGS* 12 (1970), p. 175, no. 23; Charleston 1990, no. 30; Frantz et al. 1992, p. 31, no. 21; Barrucand 1998, no. 59

104. **Dish**
Probably Egypt, 8th–9th century
H. 3.4 cm (1⅜ in.), max. diam. 22.5 cm (8⅞ in.)
Translucent pale green, with yellowish brown silver stain
Free blown and stained; tooled on the pontil
INSCRIPTION (partial), in kufic script:

بركة وخير من ما[كول] . . . [؟]/
. . . مودعك [حـ]ـد[يـ]ـث قاعها لما
اكتحلت من الغزال الاغيد

(Blessing and well-being from [the food] eaten [from this dish?] . . . I shall tell you a story, the essence of which lies in the moment my eyes were embellished with kohl when I saw the gazelle with a curving neck.)
CONDITION: The object was broken and has been repaired. About 20 percent of the surface, including small parts of the stained decoration, was missing and was filled in. The surface is lightly weathered, resulting in a milky white film. The glass is of good quality and contains scattered small bubbles.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 44 G

The shape of this dish was produced by tooling after the parison was blown, attached to the pontil, opened, and spun. The walls are flared, and the rim folded outward. The base has a wavy profile and a kick in the center. The silver-stained decoration, painted only on the interior, is monochrome brown and consists of a central eight-petaled flower that has eight triangular figures (each including an unpainted

circle in the center) in the spaces between the tips of its petals. Two bands, one of them filled with brown stain, encircle the central pattern. An inscription was copied around the interior of the wall. A second band filled with brown stain runs above the inscription, and another band was painted on the rim.

This dish is one of the few complete, or nearly complete, vessels decorated with the technique of silver staining. Among such objects, flat-bottomed flared bowls and round-bottomed cylindrical bowls are the most common; plates and dishes, exhibiting various profiles, are rare. No exact counterpart exists for the decoration on this dish, but a number of fragments in the Museum of Islamic Art, Cairo, provide fairly good matches (Lamm 1929–30, pl. 36:1; Pinder-Wilson and Scanlon 1973, figs. 40–42). The figure of a multi-petaled flower, or rosette, radiating from the center of the base is common in early examples of silver-stained glass bowls and cups. A famous cup found in Fusṭāṭ (Pinder-Wilson and Scanlon 1973, figs. 40–42) and believed, perhaps mistakenly, to be from the period of ʿAbd al-Ṣamād ibn ʿAlī, the ʿAbbāsid governor of Egypt for one month in 773, has a twelve-petaled rosette at the bottom. Cups and bowls assigned to this early period are usually painted on both sides (cat. nos. 102, 108), whereas most plates, including the present one, are decorated only on the side facing the viewer. Perhaps this was because the nearly flat surface of dishes would not have rendered the subtle chromatic effects offered by the curving surfaces of bowls or cups.

The kufic inscription here is only partially legible because of damage, and it is thus difficult to read and reconstruct the entire sentence. A section of the inscription is in *kāmil* meter and relates to the function of the object as a food tray, but it does not include any name, date, or location. However, the calligraphic style helps to confirm a dating of about the eighth or ninth century. The end of the sentence offers traditional wishes in honor of the sponsor: the phrase

"Blessing and well-being" customarily ends in *li-ṣāḥibihi* ("to its owner"). Ayyub Sa'diya (1989, p. 67) attributes the verse to 'Alīya bint al-Mahdī, a daughter of an 'Abbāsid caliph (r. 775–85), who allegedly copied her own poems in gold calligraphy on cups. A survey of 'Alīya's divan has revealed no exact match for this inscription. *SC*

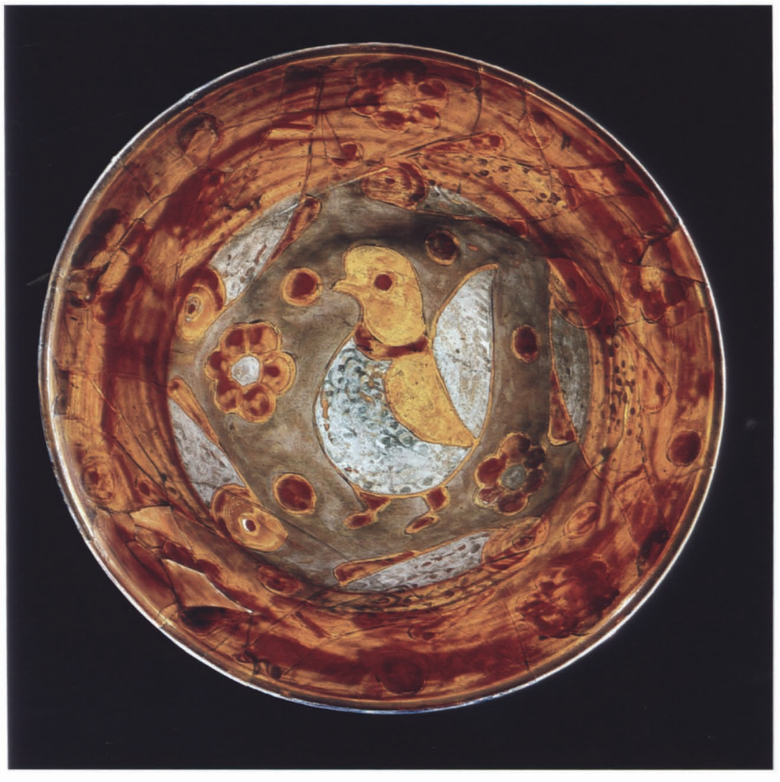
PROVENANCE: Sotheby's, London, sale, April 20–21, 1980, lot 297
LITERATURE: Jenkins et al. 1983, p. 29; Sa'diya 1989, p. 67

105. **Bowl**
Egypt, 9th century
H. 6 cm (2⅜ in.), diam. at rim 15.8 cm (6¼ in.)
Bluish colorless, with golden yellow silver stain, purplish red and orangy brown copper stains
Free blown and stained; tooled on the pontil
CONDITION: The object was broken and has been subsequently repaired with small fills but is otherwise complete. The surface is in good condition, although some light abrasion appears underneath the base. The glass is of good quality, with very few bubbles scattered throughout.
The Corning Museum of Glass, Gift of Lyuba and Ernesto Wolf 99.1.1

This bowl has a small flaring base and a splayed rim. The exterior surface is covered with a purple-red coating, forming a band about 4.1 centimeters (1⅝ in.) wide; the entire surface of the bowl was possibly covered with this wash before the other stains were applied. It is difficult to determine exactly what colors appear on the bowl, but it appears that three were used in total. The decoration on the interior centers around the figure of a plump little bird, perhaps a partridge or pigeon, surrounded by five fish; the background is filled with randomly scattered six-petaled rosettes as well as circle motifs, some single and others concentric (for similar rosettes, see cat. no. 106). The bird's head, wing, and feet appear to have been painted in purple, its body and tail in yellow. It is harder to make out the color of its stomach, an area filled in with a scaled pattern containing a dot within each scale. The bodies of the fish display a pattern of circles made up of thick dark rings. It appears that all the figures were drawn first, then outlined in yellow, after which the red color was used to fill in the flowers, the bird's eye, collar, and legs, and the fins and heads of the fish. The bodies of the bird and the fish were left almost without color, although there is probably a light wash covering them, and details of the scales and feathers are highlighted.

This bowl is the most extraordinary stained-glass object to have survived from the Islamic period. When compared with the rest of the known production in this particular technique, it stands out for a number of reasons, but the most striking is its overall coloristic effect. Its entire surface seems to have been coated with a copper-rich purple-red film before the decorative patterns were drawn. Such an approach—requiring two or perhaps more steps and more than one firing at low temperature after the bowl's shape was achieved—is in itself very unusual. Yet the end result—the object acquires dramatically different hues depending on how the light hits its surface—must have gone beyond the wildest expectations of the glassmakers. Under reflected light, the surface appears to be a rather dull pale brown background over which decorative motifs are drawn in dark outlines and details highlighted in a pale greenish color. Under transmitted light, however, the bowl comes to full life. Such light filters the bluish colorless glass of the bowl, the purple-red wash coating the surface, and the colored stains of the decoration, making the viewer wonder if this fantastic effect were actually planned by the artists. A comparison that comes to mind is the dichroic glass of the first and second centuries A.D., which behaves similarly under the same circumstances (see, for example, Harden et al. 1987, no. 139); in that case, however, the chemical composition of the glass itself causes the effect.

It is unlikely that the painters of the bowl deliberately tried to imitate dichroic glass, although they may have encountered examples of it.



Cat. no. 105, under reflected light (above) and under transmitted light (below)

Nevertheless, clear references to Late Antique motifs are evident in the decoration of the bowl, in both the composition and subject matter. Similar compositions exist on Roman marine mosaics found in Italy and North Africa, which depict fish floating among mythological figures and creatures, battleships, and vegetation, all set against a blank or stylized background representing water (see, for example, Clarke 1979, fig. 14, and Dunbabin 1978, pl. 9, fig. 18). And, since Roman glass was indeed imitated in a few instances (see, for example, cat. nos. 61–67), its influence on the glassmakers of the early Islamic period should not be underestimated.

SC

PROVENANCE: Ernesto Wolf
LITERATURE: *Encyclopedia of Glass* 1995, p. 43; *JGS* 42 (2000), cover illus. and detail, inside cover

106. **Jug**
Perhaps Iraq, 9th–10th century
H. 24.4 cm (9⅝ in.), max. diam. 14.2 cm (5⅝ in.)
Dark blue, with red and yellow-orange copper stains
Free blown, applied (trail and handle), and stained; tooled on the pontil or blowpipe
CONDITION: The object was probably buried at one time. About one-third of the body is missing, but the neck and handle are intact. The glass is of good quality.
The Corning Museum of Glass, Gift of Richard C. Reedy 79.1.33

This ewer is slightly pear shaped and almost globular; it has a low foot and a long flared neck. A curved handle, attached at the shoulder and the rim, is topped by a tall thumb rest in the shape of a solid sphere. The decoration is mottled and difficult to describe but includes vegetal patterns that are set within well-defined leaf-shaped sections and alternate with multipetaled rosettes; it was drawn in a dark red stain, probably composed of a copper-enriched material, and a yellow-orange, or "pumpkin," color. The red appears to have been generally applied over the pumpkin color, but in a few instances pumpkin dots appear over the red. The object, including the bottom of the base, is almost entirely covered in a thick application of a lustrous yellow-orange stain that continues well into the interior of the neck, about 5 to 7 centimeters (2 to 2¾ in.) down. This was probably applied as a paste rather than as a powder, ground-up metallic powder or mercury most likely being first mixed with salt, then spread on the jug with a very fine brush. A spiraling trail in blue glass was applied around the neck before the handle was formed. The handle was begun at the shoulder, and its thumb rest was folded and squeezed before it was attached to the rim.

One distinctive type of stained-glass vessel—the most colorful—exhibits a dark cobalt blue body decorated with rich copper-based stains that appear red and yellow-orange after firing. Many public and private collections contain fragments of such vessels, most of which were excavated at or reported to originate from Fusṭāṭ in Egypt (see, for example, a fragment now in The Corning Museum of Glass; Brill 1970, p. 356, fig. 3, bottom left). An interesting fragment from the rim of such a bowl in the Museum of Islamic Art, Cairo, includes an inscription—exceedingly rare on this type of stained vessel—the only legible word of which seems to be "*(a)l-Baṣrī*" (Ettinghausen 1942, p. 5, fig. 2). Richard Ettinghausen speculates that artists from Basra may have specialized in the techniques of luster painting on pottery and glass staining and that they may have been first employed in the short-lived ʿAbbāsid capital of Samarra, before ending up in Egypt in the Tulunid period. He is inclined to assign the red-and-orange stained glass to Iraq rather than to Egypt. The question remains open, however, since it is not yet possible to distinguish the two productions in glass, although it is in pottery.

The present jug, by far the most complete vessel of its kind in existence, bears decoration that is clearly more related to polychrome luster pottery from Iraq than to monochrome Egyptian pottery. This observation,

while not necessarily solving the problem of origin, helps date the object to the ninth or tenth century rather than to the eleventh. The decorative pattern is difficult to interpret because of the condition of the surface and the mottled effect of the staining, but it is obviously of a vegetal nature and divided into large sections that include buds, rosettes (similar to those found in cat. no. 105), and a flowering band around the base of the neck. The vivid contrast of red and yellow against the dark blue color of the glass adds much to the appeal of the decoration. Also in accord with an attribution to the ninth or tenth century are the shape and color, the fine trailing around the upper part of the neck, and the profile of the handle and thumb rest. Judging from previously excavated material as well as the overall appearance of the object, an Iraqi origin seems more likely than an Egyptian one. *SC*

PROVENANCE: Ratton collection; Ernest Brummer; Kouchakji collection; Sotheby's, London, sale, November 16–17, 1964, lot 205; Sotheby's, New York, sale, December 13, 1979, lot 25

LITERATURE: Eisen and Kouchakji 1927, p. 419, pl. 105; *JGS* 22 (1980), p. 89, no. 10

107. **Bottle**
Probably Egypt, late 9th–early 10th century
H., with replaced neck, 13.5 cm (5⅜ in.), max. diam. 9 cm (3½ in.)
Bluish colorless, with dark brown silver stain
Free blown and stained; tooled on the pontil
CONDITION: The object was broken and has been repaired; the neck was replaced, but the body is almost complete. The surface is slightly weathered, resulting in a milky white film. The glass contains numerous small bubbles.
The David Collection, Copenhagen
1/1985

This bottle has a tapered, slightly curved profile, a flat base, and a narrow shoulder. The decoration consists of large leaves, or perhaps flowers, randomly scattered over the surface and scrolling from thin stems that rise from the base of the vessel; most of the leaves are three-lobed with two curls at the base, the rest are lobed with a pointed tip.

To some extent, the leaves that boldly cover the surface of this bottle resemble the decoration on the drinking horn (cat. no. 103), particularly the lobed leaves that stem from the shoulders of the vase-shaped patterns on the main band. The general effect and the artistic intention of the two vessels are, however, entirely different. While the motifs on the horn are directly inspired by the classical artistic language, the scrolling leaves here are a product of the development of truly Islamic patterns. The ancient scrolling-vine design that Umayyad artists adopted from late antiquity may be the motif that gave impetus to the painting on the bottle, but its interpretation is entirely new. In addition to the differentiation of leaf shapes and a certain freedom of stylization, the scrolls rise directly from the base of the object, with no indication of the foreground or vase from which they usually stem.

An eye to symmetry is evident in the alternation of vertical stems running from the base of the bottle to the base of the neck, almost creating a division into panels, with scrolling stems sprouting two leaves that curve downward, filling the space within the panels. Symmetry and a surface entirely covered with designs were the lessons taught by the ʿAbbāsid artists, with special reference to architectural decoration, when they were called to work at the temporary capital of Samarra in the first half of the ninth century. In the present case, the

artist's struggle to speak an innovative language while still employing motifs from the classical world seems emblematic of this transitional phase in the development of Islamic art. If the architectural decoration of Samarra provided its initial inspiration, this bottle should be attributed to the late ninth or early tenth century, when the soon-to-be universal Islamic artistic language spread to the rest of the Muslim world, especially Tulunid Egypt.

The use of a very dark brown stain, scratched with a fine point to create details of the leaves before firing, combined with the elimination of the customary yellowish stain may also be indicative of a new trend among Egyptian glass decorators, one that can perhaps be related to the contemporary taste for monochrome luster pottery. Not only the painter but the glassmaker as well (assuming they were two different craftsmen) seems to have responded to the innovative spirit. The latter departed from classical shapes to form an object with the wide flat base and bell-shaped body that became widespread in the Islamic world from the ninth century onward.

SC

LITERATURE: Kunz 1981, no. 625; von Folsach 1990, no. 229

108. **Bowl**
Probably Egypt, late 10th–early 11th century
H. 10.7 cm (4¼ in.), max. diam. 15.3 cm (6 in.)
Bluish colorless, with yellow and brown copper and silver stains
Free blown and stained; tooled on the pontil
INSCRIPTION, in kufic script: [thus far not deciphered]
CONDITION: The object was broken in several fragments and has been repaired; it is almost complete. The surface is in good condition. The glass contains scattered small bubbles.
The Metropolitan Museum of Art, New York, Purchase, Rogers Fund and Gifts of Richard S. Perkins, Mr. and Mrs. Charles Wrightsman, Mr. and Mrs. Louis E. Seley, Walter D. Binger, Margaret Mushekian, Mrs. Mildred T. Keally, Hess Foundation, Mehdi Mahboubian and Mr. and Mrs. Bruce J. Westcott, 1974 1974.74

This large bowl has a flat base and straight flared walls; the rim is tooled and slightly lipped. The decoration, painted in yellow and brown stains on both sides of the vessel, includes a calligraphic band of kufic script drawn on the exterior wall below the rim. The remainder of the surface, except the base, is covered by a paneled motif of four large circles in trapezoidal panels alternating with four narrow arches. Each roundel includes a large stylized tree composed of a trunk flanked by pseudovegetal patterns, clusters of three dots, and short horizontal lines, a transitional semicircular section, and a pointed oval upper part; the background is left unpainted. Details are indicated by strokes on the exterior surface, while the main design is painted from the inside. The trapezoidal panels are coated with brown stain, and four large yellow dots are drawn in the corners. Each of the arched panels includes a similar

palmette tree, although the trunk is represented by a wavy double line flanked by bicolored dots.

In its large size, angular shape, and unusual compartmental decoration, this stained bowl is one of the most original and important glass vessels to have become available on the market in the past thirty years. Previously unknown until it was acquired by the Metropolitan Museum in 1974, it had been broken into several fragments and repaired but was revealed as almost complete upon closer examination. Both the color of the glass and the chromatic hues of the stains are within the expected range for this type of vessel from the late eighth century onward. The shape—a sort of squat flared bucket without a handle—is, however, rarely encountered in blown glass, which usually has a curved profile or, when it has straight walls, is almost invariably cylindrical. A comparable glass object, excavated south of Damascus and now in the National Museum there, has been cited as proof that the shape of this bowl is not unique (Jenkins 1986, p. 23). A polychrome luster-painted bowl from ninth- or tenth-century Iraq (excavated at Qaṣr al-ʿAshīq in Samarra and now in Berlin; Sarre 1925, pl. 16, no. 2) is almost identical both in shape and in size to the present vessel and suggests an artistic relationship between stained glass and luster-painted ceramics.

That relationship, which is seldom obvious in the case of luster-painted objects, is confirmed by the decorative program of the glass bowl. A division of the surface into regular panels decorated with a stylized tree is otherwise unknown in glass decoration, let alone in stained glass, but is often seen on luster-painted bowls and plates ranging in origin from ninth-century Iraq to eleventh-century Egypt. The decoration on such bowls and plates is invariably painted on the interior, more visible, surface; on their curved sides, the effect is radial (see cat. no. 104 for a comparable example in glass). Here the vertical profile produces an effect suggestive of an arcaded pattern; however, if the motif were to be transferred to a flat surface, the composition would become equally radial and similar to that of the ceramic examples.

One particularly significant decoration in this regard is exemplified by a ninth-century polychrome bowl in The Hague (Butler 1926, pl. 33a; Jenkins 1968, fig. 2) and, most frequently, by monochrome Fatimid pottery datable to the very beginning of the eleventh century (Pinder-Wilson 1959, pl. 1; Jenkins 1968, fig. 21). These pieces bear stylized palmette trees and additional pseudo-vegetal motifs within panels radiating from a space that may be empty or filled with a flower or rosette (similar to many stained-glass examples in which the rosette is drawn around the pontil mark; see cat. no. 109). While in its shape and polychrome decoration this glass bowl recalls ninth-century luster pottery, in its patterning it is clearly closer to early Fatimid examples. Considering that stained glass of this type was not produced in Iraq, the present bowl can probably be attributed to Egypt in the early Fatimid period, toward the end of the tenth century or the beginning of the eleventh.

The inscription, the second prominent decorative motif, was copied in a kufic script that is unusually flattened (although marked by many long vertical strokes) and that has defied every attempt at interpretation thus far. Apparently containing neither vital information (a date, signature, or place of production) nor the customary good wishes to the owner, it appears to be in prose rather than poetry. Only a few words can be deciphered with any confidence, and these are not sufficient to understand the general meaning of the sentence. In addition, the glassmaker accidentally put his finger over one of the elongated letters while he was handling the vessel after it was freshly painted. His fingerprint, visible to the naked eye, was permanently imprinted when the decoration was fired. *SC*

LITERATURE: Jenkins 1985, fig. 5; Jenkins 1986, no. 20; Tomobe 1992, pl. 155

109. **Bowl**
Egypt, 11th–12th century
H. 7.7 cm (3 in.), max. diam. 11.2 cm (4⅜ in.)
Greenish bluish colorless, with dark brown silver stain
Mold blown, optic blown, and stained; tooled on the pontil
CONDITION: The object is intact. The surface is very lightly weathered, resulting in a thin whitish film. The glass contains numerous small bubbles and some larger ones.
Trustees of The British Museum, London 0A1902.5–17.2

This bowl was blown in a mold having fifteen vertical ribs. The final shape has a nearly globular profile with a small base, a constriction near the top, and a short neck that flares at the opening. The main decoration, painted entirely on the exterior, consists of a band of curling motifs, alternately pointing upward and downward, drawn just below the constriction. The remainder of the decoration includes a radiating motif (starting from the pontil mark near the beginning of the ribbed pattern), a line below the rim, and a dot covering the pontil mark. Some yellow smudges also appear on the surface.

The last phase of painting with stains, usually attributed to Fatimid Egypt, is characterized by a restrained monochrome decoration applied only on the exterior surface. Typical of this phase is the present bowl, which has a reputed provenance—from the Fayyum in the Nile Valley—that supports such an attribution. Its simple decorative program is enhanced by its refined appearance, heightened by vertical ribbing and a curving profile that ends in an elegant splayed opening. The vessel has thicker glass and contains more bubbles than the great majority of stained objects, although its bluish aquamarine color accords with such production. Reminiscent of earlier creations is the radial pattern beginning at the pontil mark underneath the base (see cat. no. 108), which is here extended all the way to the main horizontal band. The curling motifs within the band are often seen

on stained-glass fragments and find parallels as well in Fatimid luster pottery (see, for example, Grube 1976, p. 145, no. 91), but they are too stylized to provide definitive comparative information.

Although this bowl has been previously assigned to the twelfth century on the basis of the development of painting with stains on Islamic glass, it must be pointed out that its shape and vertical ribbing are closer to Roman prototypes than to medieval Egyptian vessels. Although the conventional attribution cannot be seriously challenged, since the development of stained glass in the Islamic period is not entirely understood at present, it is modified slightly here to include the early Fatimid era. It would not be surprising, however, if future studies reassigned this object to an even earlier period. *SC*

PROVENANCE: Said to have been found at Atfih (ancient Aphroditopolis, near al-Wasta), Egypt
LITERATURE: Lamm 1929–30, pl. 37:9; Tomobe 1992, pl. 154

110. **Fragmentary Cup**
Syria, late 9th–10th century
H. 8.5 cm (3⅜ in.), max. diam., reconstructed, ca. 14.7 cm (5¾ in.)
Yellowish colorless glass, pale blue enamel, and gold leaf
Exterior cup free blown and tooled, its inner surface gilded, scratched, and enameled; interior bowl blown into the outer cup; the two layers sandwiched; and the rims fused
CONDITION: The object has been reconstructed from nine large fragments and a number of small chips, which account for about three-quarters of the walls; the base is entirely missing. The surface is lightly weathered, resulting in a faint iridescence. The glass contains scattered small bubbles.
The David Collection, Copenhagen 4/1987

This fragmentary cup has a cylindrical, slightly curved profile and a thickened rim. The gold decoration, first applied as a leaf and then scratched to highlight details, is drawn in four horizontal registers separated by paired thin gold bands. Rising from the base of each of the two central bands is a motif of large split palmettes consisting of mirrored S-shaped foliated elements. From the center of each split palmette there springs a small fleur-de-lis motif with a pointed tip; two-tiered palmettes with a pointed tip also rise from the foreground and alternate with the split palmettes. The uppermost register contains a band of pseudokufic script. The bottom register consists of a toothed row of elongated upright triangles the vertices of which are joined by upside-down V-shaped elements, with blue enameled dots filling the spaces in between. Blue dots are arranged consistently on all four bands to punctuate and highlight the different patterns.

Like mosaic glass (cat. nos. 61–67), "sandwich glass"—in which a gold-leaf decorative pattern is enclosed between two layers of glass—has Roman antecedents, in this case dating from the fourth century A.D. The technique was probably first invented to meet the need for luxury

glass objects incorporating gold. Had the gold leaf been applied to the exterior surface of a vessel, the decoration would have lasted for a short period, even after firing. The idea of encapsulating it between two layers of colorless glass that would reveal the pattern and at the same time preserve it represented a clever artistic solution.

In the Islamic period, the production of sandwich glass probably arose more from the challenge of imitating Roman examples than from the need to preserve the decoration for posterity. The technique was limited and short-lived, judging from the rare surviving examples and fragments, none of which bears an inscription that would link the group to a specific court or period. Obviously a luxury item, sandwich glass was therefore more probably the result of experimentation in an established glass center rather than of caliphal or courtly patronage, although the expense involved in its production made it affordable only to the wealthy.

The present fragmentary bowl, which is complete enough to allow for a reconstruction of its original shape and decorative program, is the most accomplished of the surviving sandwich-glass vessels. Its refined pattern of horizontal registers covers the surface entirely, and it can be assumed that the base also bore some kind of decoration, as do the other known objects and fragments (cat. no. 111). The scheme of the uppermost band, which contains a pseudokufic inscription, is clearly related to designs found in contemporary Qur'an manuscripts on vellum, the most opulent of which were copied in gold (for example, the so-called Blue Qur'an and the Nurosmaniyye Qur'an; Bloom 1989 and Lings 1976, pl. 3, respectively). These manuscripts are not of much help in suggesting an attribution for sandwich glass, since their exact date and place of origin remain controversial. The motif of large split palmettes, which dominates the two central registers here, may also have derived from the illumination of related Qur'ans (Lings 1976, pl. 9). It can, however, be more generally attributed to the development of classical motifs during the formative period of Islamic art, beginning at the end of the seventh century with the mosaics from the Dome of the Rock, Jerusalem (see, for example, O. Grabar et al. 1996, pp. 104–5). The scattered blue enameled dots punctuating the gold patterns also seem to confirm the influence of manuscript production, in which vowels and diacritical marks were commonly represented by colored dots (Lings 1976, pls. 1–9).

It is the less prominent motifs of the decoration that provide better parallels with other glass objects. The double-tiered pointed palmettes that alternate with the large split palmettes on the two central bands and the toothed pattern that frames the base of the bowl are found on many examples of so-called scratch-decorated glass discussed elsewhere in this catalogue (cat. nos. 68–73). A date in the ninth century is established for that group on the basis of archaeological finds; its place of origin is not entirely clear, although the present author is inclined to assign it to Iraq or Syria (Carboni 2001, no. 17a). The utilization of a needlepoint tool to scratch either the glass surface to create patterns or the gold layer to highlight details is also common to both types of glass. It can be suggested, therefore, that the two productions have a close chronological and geographical proximity. *SC*

PROVENANCE: Said to have been found at Nishapur

LITERATURE: Wenzel 1988, colorpl. 1, figs. 1, 2; von Folsach 1990, no. 231

111. **Bottle**
Syria, 9th–10th century
H. 14.5 cm (5¾ in.), max. diam. 10.4 cm (4⅛ in.)
Yellowish colorless glass, pale blue enamel, gold leaf, and silver

Bottle free blown and tooled, its outer surface gilded, scratched, and enameled; body encapsulated by a second glass layer; the two layers sandwiched; neck faceted; tooled on the pontil
CONDITION: The object was broken and has been repaired but is complete. The surface is lightly weathered, resulting in a faint iridescence. The glass contains scattered small bubbles.
Trustees of The British Museum, London 1978.10–11.2

This bottle has a globular body with a small flat base and a long cylindrical neck. The outer layer of glass covers the entire body up to the base of the neck. The gold decoration, first applied as a leaf and then scratched to highlight details, is drawn in two registers, a narrow one on the shoulder and a large one covering the rest of the body, separated by a thick gold band. The narrow band contains a series of horizontal leaflike motifs. The main register presents two alternating patterns rising from the base: a three-tiered palmette with a long pointed tip and a sort of conical flower or leaf branching into pointed ends separated by a central bud. Pale blue enameled dots are placed between the motifs. The underside of the base bears a stylized bird, either a partridge or a pigeon, in the center. The neck was cold-cut, creating seven sides and a heptagonal opening.

There is little doubt that this bottle and the cups in Copenhagen and Corning (cat. nos. 110, 112) were made either in the same workshop or in neighboring ones. The decorative program is simpler here than in the Copenhagen cup: the band of pseudokufic has been replaced by a leafy pattern that may be an extreme stylization of an inscription; the four registers have become a single large band covering the remainder of the body. The motif within this band does, however, share with the Copenhagen cup two distinct alternating patterns, one of which (the two- or three-tiered palmette) is common to both objects and highlights the close relationship between the two works. The second motif on the bottle, a tall three-pointed lilylike flower, does not call to mind any immediate parallels in other media.

Common to the vessels in London and Copenhagen is the presence of scattered pale blue dots arranged in a decorative fashion. As previously mentioned (see cat. no. 110), the influence of Qur'an manuscripts may have provided a direct inspiration. From the technical point of view, however, these enameled dots are entirely unexpected, provided that the attribution to the ninth or tenth century for sandwich glass as a group is correct. Glossy enamel—that is, pulverized glass of different colors applied to the glass surface with a brush and then fired—became common in combination with gilding in Syria and Egypt only at the beginning of the thirteenth century. A few twelfth-century examples and fragments of gilded decoration without enamels are known and were perhaps inspired by contemporary Byzantine glass (see, for example, the fragmentary bottle dedicated to a Seljuq atabeg in Pinder-Wilson 1991, p. 130, no. 163); in the same period, prunts of opaque pale blue glass were applied at regular intervals to the surfaces of beakers and jugs (cat. no. 40). Before this time, however, the only example of the use of enamel in the Islamic world is sandwich glass, which was clearly an experimental, isolated, and short-lived phenomenon. Chemical analysis would reveal the exact composition of the blue enamel, but the nature of sandwich glass prevents access to the decorated surface. Fragments in the Victoria and Albert Museum from the shoulder of a bottle with similar decoration also include enameled dots; these were excavated in an uncontrolled dig at al-Mina, in northern Syria (C333-1937 and C33A-1937; Lane 1938, p. 71; Wenzel 1988, p. 48, fig. 8).

Drawings of stylized birds similar to the one underneath the bases of this bottle and the Corning cup (cat. no. 112) are found on two other fragmentary bases of sandwich-glass vessels. One of these, in the Victoria and Albert Museum, depicts two birds facing each other (363-1900/45); the other, at Corning, represents a *senmurv*, a mythical animal of Iranian origin that is somewhat unexpected in this context (66.1.18; see Wenzel 1988, figs. 7, 9). Such drawings are most likely in imitation of fourth-century Roman sandwich glass, which often includes figures (usually human, replaced with animals by Muslim glassmakers) underneath the base (see, for example, Harden et al. 1987, nos. 154-61).

The shape of this bottle was especially popular from the ninth to the eleventh century, confirming that the group belongs to the early Islamic period (see, for example, Kröger 1984, no. 112, and von Folsach 1990, no. 215). Many of the bottles with this shape bear cold-cut patterns on their bodies, and the necks are usually faceted into a polygonal shape (cat. no. 74 and Tehrani 1987, unnumbered cat. no. 24). Although the decoration on the body is so different here, the profile of the bottle evidently required that the neck be faceted in the same fashion.

SC

LITERATURE: Wenzel 1988, colorpl. 2, figs. 4, 5; Pinder-Wilson 1991, p. 124, no. 155; *Encyclopedia of Glass* 1995, no. 43

112. Cup
Syria, 9th–10th century
H. 7.9 cm (3⅛ in.), max. diam. 8.9 cm (3½ in.)
Yellowish colorless glass and gold leaf
Exterior cup free blown and tooled, its inner surface gilded and scratched; interior bowl blown into the outer cup; the two layers sandwiched; and the rims fused
CONDITION: The object was broken and has been repaired but is almost complete. The surface is lightly weathered, resulting in a faint iridescence. The glass contains scattered small bubbles.
The Corning Museum of Glass
64.1.32

This cylindrical, slightly flared cup has a rounded base. The gold decoration, first painted and then scratched to highlight details, is drawn in two registers, a narrow one below the rim and a larger one on the lower section of the body, framed by thick gold bands. The narrow register contains a series of large dots. The main band has two alternating patterns rising from the base: a two-tiered palmette with a long pointed oval tip and a sort of conical flower or leaf branching into pointed ends separated by a central bud. A bird is depicted underneath the base.

The close relationship between this cup and the bottle in the British Museum (cat. no. 111) is obvious when the main bands of decoration are compared in each. Both show the same alternating pointed palmettes and conical flowers, although the palmettes here have two superimposed lateral leaves (as on the cup in Copenhagen [cat. no. 110]) instead of three as on the bottle in London. Also present is the previously noted figure of a bird (see cat. no. 111).

In addition to the peculiar construction of sandwich-glass vessels, simple overall patterning is another factor that helps to make the group homogeneous. Decorative details noted on the cup in Copenhagen also appear on the London bottle, and the two can be linked, in turn, to the present cup and to the few other known fragments. Thus far, the sandwich-glass group comprises so few objects and fragments that it is too difficult to suggest more precise attributions. Furthermore, archaeological excavations have not provided additional finds, other than fragmentary glass tiles (Lamm 1928, p. 118, no. 338; Wenzel 1988, p. 43, n. 11), suggesting that this production was indeed very limited, perhaps because it was so technically challenging.

SC

LITERATURE: *JGS* 7 (1965), pp. 122–23, no. 9; O. Grabar 1967, p. 152, no. 76; Wenzel 1988, p. 60, fig. 3

113. Lamp
Syria, mid-13th century
H. 21 cm (8¼ in.), diam. 13.3 cm (5¼ in.)
Yellowish grayish colorless glass; red, pale blue, yellow, pale green, and white enamels; and gold
Mold blown, enameled, and gilded
CONDITION: The object is in good condition, with some loss of gilt. The glass contains numerous small bubbles.
Victoria and Albert Museum, London
C330–1900

This lamp, molded in a pattern of vertical ribs, has a globular body with a flared neck and a slightly less flared foot. The main decoration, painted in polychrome enamels and gold in the spaces between the suspension rings, consists of three falconers riding horses. Each of the horses is painted in a different color (red, white, or yellow) and has a knotted tail and a tassel under its belly. The bodies of the falconers are gilded, and their falcons are painted red. The remainder of the surface bears scattered decoration outlined in red enamel and gilt: fish, a bird, vegetal elements, and a scrolling border enclosing a series of mirrored spirals alternating with three-lobed vegetal elements, placed upright at the rim and upside down at the base of the foot. Three small suspension rings are attached to the body; the areas immediately around them are gilded and outlined in red. The attached foot is not molded. A narrow tube for the wick is attached to the interior at the bottom of the vase.

By the thirteenth century, glass lamps had attained their definitive shape, characterized by a nearly globular body, a long flared neck, and an attached flared foot. Over the previous three centuries, they had first developed as vase- or beaker-shaped vessels (cat. no. 6) with attached suspension loops as well as a functional base that acted as a stand. They were often decorated with applied threads tooled into snakelike trails, and the loops had flat medallion-like bases that were attached to the walls of the lamp (Harden et al. 1968, no. 149; Carboni 2001, no. 38). A narrow glass tube, which functioned as the wick holder, was affixed to the base inside the vessel, while oil (or a mixture of oil and water) partially filled the vessel. Slowly, the dimensions of the lamps increased, the straight walls became curved and the profile almost

globular, the neck longer and more flared, and the foot a tall elegant base that mirrored the shape of the neck. It is possible to follow this gradual development over time, since several fragmentary lamps dating from the tenth to the twelfth century have been found during excavations (see, for example, Lamm 1928 for Samarra, Iraq; Bass 1996 for Serçe Limanı, Turkey; and Lusuardi Siena and Zuech 2000 for Italy).

All objects having a nearly globular shape and a prominent neck and foot are usually described as "mosque lamps," a term more properly applied only to the well-known enameled and gilded lamps created for mosques and other religious buildings in Egypt and Syria from the thirteenth to the fifteenth century (see cat. nos. 114–117). Although they may well have been used as lighting devices in mosques, as an extension of their principal function, lamps of this shape that do not have enameled decoration were primarily intended for secular use. Colorless-glass oil lamps were more effective and better designed than the ubiquitous ceramic and stone lighting devices; in addition, their having both a base and attached loops allowed them to either stand or be suspended by means of chains, as well as to be used as portable lights.

The present lamp is the extant object that best demonstrates the transition between the earlier undecorated lamps and the lavish enameled Mamluk examples. Its profile indicates that the shape has reached the final stage of its development—the flared foot is even more elongated than those of most enameled mosque lamps. Yet the glass wick-holder, the sparse decoration, and the relatively small size show that earlier models still played a role in the making of this lamp.

The courtly subject matter of the decoration—three falconers painted in polychrome enamels with no indication of either a foreground or a background—establishes that the lamp was created for secular purposes, although almost all the other enameled vessels of this shape are true mosque lamps (cat. nos. 116–118). The present lamp is said to have come from a Christian monastery in Syria, according to the records of the Victoria and Albert Museum, which acquired it in 1900 from the collection of Captain W. J. Myers, who, in his turn, probably purchased it in Cairo. This hearsay provenance should not, however, be given credibility, unless the object ended up by accident in a Christian building some time between its creation and its acquisition by the monastery. Without a doubt, a wealthy Muslim originally commissioned the lamp, either for his home or perhaps for a hunting lodge. Similar depictions of horsemen, a popular subject on thirteenth-century enameled glass, also appear on a few extant enameled objects (especially bottles; see cat. no. 126) and on a large number of fragments, found in many collections (see, for example, Carboni 2001, no. 89); in both cases, they are usually illustrated in a sequence, all around the vessel's body. The economical treatment here is no doubt related to the function of the lamp as a true lighting device, in which the painted surface is minimized to let the light shine through.

Except for the attached foot, the entire lamp is molded in a pattern of vertical ribs. The shallowness of the ribs suggests that the object was reblown (or optic blown) outside the mold. Ribs are the only molded pattern ever used on enameled vessels, and while examples of such patterning are rare, there are a few notable exceptions (see cat. no. 120). A large beaker in Washington with a ribbed pattern is particularly relevant to the present lamp, since it is also decorated with horsemen and a pseudovegetal scrolling border (Ettinghausen 1962a, fig. 73; Kenesson 1998, pl. 12.4).

SC

PROVENANCE: Said to come from a Christian monastery in Syria; W. J. Myers

LITERATURE: Schmoranz 1898, fig. 8; Lamm 1929–30, pl. 158:1; Liefkes 1997, fig. 35

114. **Mosque Lamp**
Egypt (Cairo), ca. 1285
H. 26.2 cm (10⅜ in.), max. diam. 21 cm (8¼ in.)
Brownish colorless glass; red, blue, white, green, yellow, and black enamels; gold; and orange-yellow stain
Free blown, applied, enameled, gilded, and stained; tooled on the pontil
INSCRIPTION, in *thuluth* script, on neck (with *bunqud-dār* for *bunduqdār*) and body:

مما عمل برسم تربة المقر العالي/ العلائي
البندقدار/ قدس الله روحه

(That which was made for the tomb of the noble, the elevated,/ the ʿAlāʾī, the Keeper of the Bow,/ may Allāh sanctify his soul.)
CONDITION: The object is intact. Most of the gilt and some enamel have been lost from the surface, which is otherwise in good condition. The glass contains numerous small bubbles, a few large ones, and an elongated bubble below the rim.
The Metropolitan Museum of Art, New York, Gift of J. Pierpont Morgan, 1917 17.190.985

This lamp has a flattened, almost globular body with a long flared neck and a low folded foot. Three suspension loops are attached to the body. The enameled and gilded decoration consists of three main registers and four narrower bands of continuous vegetal patterns. Two of the main registers, on the neck and body, carry inscriptions. Each register contains three medallions, placed at even intervals and bearing two confronted bows joined in the middle; these are painted in an orange-yellow stain and set against a solid red background. The inscription on the neck was executed in blue enamel against a background of white scrolls, dots, and commalike motifs in red, green, and yellow. The second calligraphic band, outlined in red and set against a blue background, was once gilded; it is ornamented throughout with three-pointed leaves. The third register is on the underside of the body: three medallions alternate with a series of three upside-down triangular vegetal compositions. The four narrower, sparsely decorated bands, two at the base of the neck and one each at the rim and near the foot, contain a somewhat untidy mass of foliage outlined in thin short strokes of red enamel and filled with gold.

This enameled and gilded vessel is the earliest datable lamp known to have been hung in an extant interior—a *turba*, or tomb, built in Cairo for a Mamluk emir (although a secular building, the *turba* was also a shrine that included a mihrab, or prayer niche). In addition to this distinction, it also demonstrates the transition of enameled lamps from a secular function (cat. no. 113) to a strictly religious one inside mosques and madrasas (cat. nos. 114–118).

The tomb of the emir Aydakīn al-ʿAlāʾī al-Bunduqdār (died ca. 1285–86) was erected in about 1284 as part of a small complex that also included the burial place of his daughter as well as a *khānaqāh* (a sort of hospice for the poor). Now flanked by modern houses, the building is located near two mid-fourteenth-century structures: it is just east of the imposing complex of Sultan Ḥasan and is joined to a corner of the ruined palace of the emir Tāz. The interior of the small mausoleum measures about 6 square meters (64½ sq. ft.) and contains Aydakīn's wooden *tābūt* (grave marker) and a keel-arched mihrab with stucco decoration. The lamp, which was probably the only light in the tomb chamber, was suspended either from the center of the dome directly above the *tābūt* or in front of the mihrab. In fact, the association of the lamp and the mihrab in tombs is commonly represented on carved stonework and tilework from medieval Iran (for example, a stone panel from eleventh- or twelfth-century Iran in the Metropolitan Museum [31.50.1] and a tile panel from Kāshān, Iran, dated 1308/9, also in the Metropolitan Museum [09.87]).

The patronymic al-ʿAlāʾī derives from the name of the first owner of Aydakīn when he was a young *mamlūk* (slave), the emir ʿAlāʾ al-Dīn Āqsunqur. Together with other mamluks, Aydakīn formed an army corps named al-ʿAlāʾiyya, and he quickly gained political influence after the Ayyūbids were replaced by the Mamluks in the middle of the thirteenth century. The Ayyūbid sultan al-Ṣāliḥ II Ayyūb (d. 1249) made him *bunduqdār* (Keeper of the Bow), an honorary title that he kept, together with his patronymic, to the end of his life, as one can infer from the inscription on this lamp. Copied twice in an identical formula, the inscription is outlined in red and filled in with blue enamel around the neck and with gold around the body. On the neck, a rare mistake by the calligrapher has the word *bunduqdār* spelled as *bunqud-dār*—an error (resulting in a meaningless word) that elicits surprise and sympathy from the learned viewer.

A surviving inscription on the top of the exterior wall of Aydakīn's tomb incorporates the emblem of the Keeper of the Bow, a pair of confronted gold bows against a red undivided field, which possibly refers to the sultan's hunting bow or, by extension, his hunting equipment. The decoration of the present lamp includes the same emblem repeated nine times, although the gold is replaced with a yellow stain. The term *bunduq* specifically denotes a hunting bow that shoots pellets rather than arrows (the word means "hazelnut" in modern Arabic), and this may be the reason why there is a cradlelike piece at the center of the strings in the emblem (see Latham

and Paterson 1970, pp. 139–40, and Nicolle 1996, p. 158). Given Aydakīn's association with the Ayyūbids, this emblem may be the earliest one known to have been granted to an emir.

The fairly precise dating of the lamp allows for a general analysis of the decoration of painted and enameled vessels during the last quarter of the thirteenth century. Clearly predominant are the inscriptions, which are historical rather than eulogistic, and the emblems; the remainder of the surface is sparsely decorated with sketchy motifs outlined in red. The once-gilded background of the register on the neck is filled with large spiraling white scrolls having leaves highlighted in red and white or in green and yellow, with a discreet and limited use of polychromy in a composition that is primarily blue and gold (and red, because of the emblem). A reversed color effect characterizes the central band, which has a bold blue background punctuated with three-lobed pointed leaves filled with gold. With its well-delineated shoulder and low foot, this vessel has a more angular profile than most other lamps.

SC

115. Mosque Lamp
Egypt, ca. 1306–10
H. 28.5 cm (11¼ in.), max. diam. ca. 20 cm (7⅞ in.)
Brownish colorless glass; blue, white, red, green, and yellow enamels; and gold
Free blown, applied, enameled, and gilded; tooled on the pontil
INSCRIPTION, in *naskhī* script: on neck, [sura 83 (Surat al-Taṭfīf), verses 22, 24–25] (Verily the pious will be in heaven, . . . On their faces you will see the glow of beatitude. They will be served the choicest wine . . . [Ali 1984, p. 528])
on body,

عز لمولانا السلطان/ الملك المظفر العالم العادل/
ركن الدنيا والدين عز الله نصره

(Glory to our lord, the sultan,/ al-Malik al-Muẓaffar, the learned, the just,/ Rukn al-Dunyā wa al-Dīn, may God grant him victory.)
CONDITION: The object is intact. Most of the gilt and some enamel have been lost from the surface, which is otherwise in good condition. The glass contains numerous small bubbles, a few large ones, and an elongated bubble below the rim.
Victoria and Albert Museum, London
C322–1900

PROVENANCE: Émile Gaillard, to 1904; J. P. Morgan, to 1917
LITERATURE: Artin 1907, pl. 1; Migeon 1907, fig. 296; Mayer 1933, pl. 41:2; Dimand 1944a, fig. 156; Jenkins 1986, no. 47; *The Islamic World* 1987, pl. 36

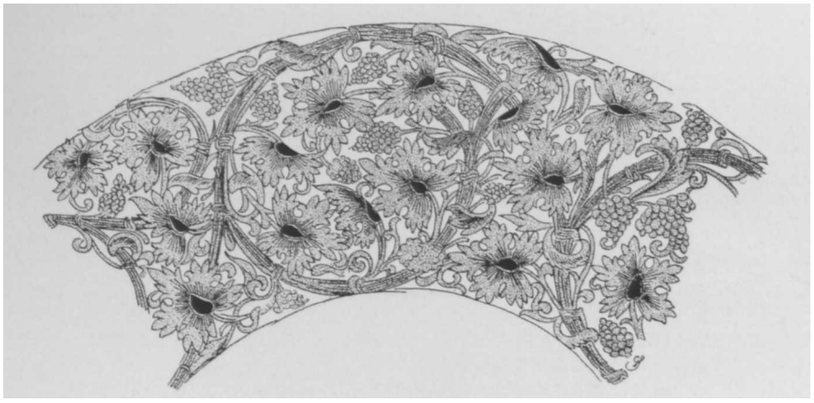


Fig. 103. Cat. no. 115, detail of floral pattern. Drawing from Schmoranz 1898, fig. 58

This lamp has a flattened, almost globular body with a flared neck and a low folded foot. Three large, elaborate suspension loops are attached to the body. The enameled and gilded decoration consists of four registers, two of which carry inscriptions. The inscription on the neck was executed in white enamel against a scrolling vegetal pattern on a blue background; the second calligraphic band, on the body, has a blue inscription against a gilded background. The two other registers, around the base of the neck and on the underside of the body, bear complex floral compositions: the former includes a series of composite pointed multipetaled flowers sparsely filled with enamels; the latter, wide sinuous scrolls with large jagged-edged flowers and clusters of grapelike and pinelike forms gilded and outlined in red (fig. 103). The underside of the base presents a radial pattern centered around the large pontil mark.

Mosque lamps were, of course, also made for buildings erected by Mamluk sultans, not only for those built by their emirs (see cat. nos. 114, 116, 117), from the end of the thirteenth century onward. These lamps often bear inscriptions in the sovereign's name, preceded by a standard formula that begins with the words "Glory to our lord, the sultan. . . ." In the present case, although the name Baybars is not included in the inscription, the combination of the names al-Malik al-Muẓaffar and Rukn al-Dunyā wa al-Dīn leaves no doubt that the patron was Baybars II al-Jāshnakīr (r. 1309–10). Although technically this sultan reigned for less than one year, he was actually coruler from 1299, when he and another emir, Salār, reinstated to the throne the fourteen-year-old Nāṣir Muḥammad ibn Qalāūn, who was kept a virtual captive in the Citadel while they ruled jointly. The complex containing the *khānaqāh* and tomb of Baybars II was built in Cairo between 1306 and 1309, that is, before he formally became sultan. However, Baybars must have used that title in inscriptions on the walls of the building, since Muḥammad had them chiseled out when he regained the throne in 1310 after having his rival strangled. The present mosque lamp, which is dedicated to the sultan and must have been ordered when the complex was almost completed, confirms that Baybars had appropriated such a title before 1309.

The *khānaqāh* and tomb of Baybars II, located on the eastern side of the medieval city, not far from the mosque of al-Aqmar, is one of the best preserved and most impressive monuments in Cairo and shows all the characteristics of traditional Mamluk architecture. Without a doubt, many lamps were used in the interior, but this one may have been hung in front of the impressive mihrab in the tomb chamber, the most sacred area. Unlike the inscription on the lamp made for the emir Aydakīn (cat. no. 114), which states that the lamp was created for his tomb, the inscription here does not clarify the specific function of the vessel. The Qur'anic verses chosen for the inscription around the neck are rarely found on enameled mosque lamps, which usually display verses from the Sura of Light (see cat. nos. 116, 117). Yet their reference to a reward in the afterworld ("Verily the pious will be in heaven," sura 83, v. 22) may suggest that the lamp was indeed meant for Baybars's mausoleum. One other lamp bearing this sultan's name but different Qur'anic verses is in the Musée des Arts Décoratifs, Paris (Lamm 1929–30, p. 429, no. 9). A third one, in blue glass, which includes the titles of the sultan, is almost certainly a nineteenth-century French creation (Metropolitan Museum, 17.190.988; Lamm 1929–30, p. 429, no. 10).

This lamp is more elaborately decorated than earlier ones (cat. no. 114). Its inscriptions, although bold and dominant, are counterbalanced by the rich backgrounds and the painstaking ornamental motifs that fill the two noninscriptional bands. The cornucopia-like decoration on the base (fig. 103)—a motif seen often, with many variations, in Umayyad architectural decoration and wall painting—reflects a classical Arabic influence, which in turn derives from pre-Islamic Byzantine and Hellenistic sources.

Produced during the best period for the decoration of mosque lamps (the first two decades of the fourteenth century), this vessel is ornamented in a style that closely parallels that of contemporary Qur'an manuscript illumination. Appropriately, a celebrated Qur'an in seven parts, one of the masterpieces of Islamic calligraphy and illumination and the earliest extant dated Mamluk Qur'an, was commissioned by Baybars in 1304 as an endowment for the *khānaqāh* complex he started to build two years later. Details of the manuscript's illumination—from the flowerlike compositions in gold with small areas highlighted in color to the meshes of semipalmettes with circular tips—are similar to the decoration here, particularly the two bands on the neck (James 1988, esp. figs. 25, 27). Other Qur'ans from the same period can be cited as well. While it is unlikely that the illuminators of Baybars's Qur'an were actively involved in the making of glass vessels, it may be that a team of designers was at work to provide a homogeneous appearance for the decorative program and furnishings of the *khānaqāh*.

SC

PROVENANCE: Long collection; W. J. Myers
LITERATURE: Schmoranz 1898, pl. 24; Lamm 1929–30, pl. 190:5

116. **Mosque Lamp**
Egypt, ca. 1329–35
H. 35.6 cm (14 in.), diam. 23.9 cm (9⅜ in.)
Brownish glass; blue, grayish blue, red, white, yellow, and pink enamels; orange-yellow and green stains; and gold
Free blown, applied, enameled, and gilded; tooled on the pontil
INSCRIPTION, in *naskhī* script, tending toward a *thuluth* calligraphic style:

on body,

مما عـمل برسم المقر العالي المولوي المخدومي
السيفي الساقي قوصون الملكي الناصري

(That which was made for his excellency, the exalted, the lord, the royal, the well-served Sayf al-Dīn Qawṣūn, the Cupbearer of al-Mālik al-Nāṣir)

on neck, [sura 24 (Sūrat al-Nūr), beginning of verse 35] (God is the light of the heavens and the earth, the

Cat. no. 116, detail showing artist's signature

likeness of His light is as a wick-holder [wherein is a light (the light in a glass, the glass as it were a glittering star)] [Ali 1984, p. 301]);

on foot,

عمل الفقير العبد علي بن محمد البرمكي [؟]
حفظه الله

(The work of the poor slave [of God] ʿAlī ibn Muḥammad al-Barmakī [?], may God safeguard him.)

CONDITION: The object is intact. Some gilt and enamel have been lost from the surface, which is otherwise in good condition. The large pontil mark has a dark inclusion. A drop of blue enamel on the uppermost band probably fell there by accident before firing. The glass contains numerous small bubbles.

The Metropolitan Museum of Art, New York, Gift of J. Pierpont Morgan, 1917 17.190.991

This lamp has an almost globular body with a flared neck and a splayed foot. Six suspension loops are attached to the body. The decoration is divided into nine registers, three on the neck, four on the body, and two on the foot. The narrow bands on the neck depict a background of scrolling leaves, peonies, and flying birds, against which peacocks and parrots turn their necks to look backward; peonies and other vegetal motifs are also depicted on the narrow bands on the body and foot. The largest register on the neck shows an inscription (once gilded) interrupted by three circular medallions, each of which includes a footed red cup set against an orange-yellow background. Three cups identical to this one are depicted inside the large band on the underside of the body, where each is enclosed within a blue lobed cartouche. The main register on the body includes an inscription in blue enamel interrupted by the six rings for suspension. The narrow band on the foot bears a signature, also in blue enamel.

This well-proportioned lamp was made for Sayf al-Dīn Qawṣūn, one of the emirs of the sultan Nāṣir Muḥammad ibn Qalāūn (r. 1293–1341, with brief interruptions). Qawṣūn is known to have come to Egypt from his native Barka (near Samarqand, present-day Uzbekistan) as a merchant of leather goods in 1320, when he was about eighteen years old. He gained access to the court quickly and soon received the titles Emir of a Hundred, Commander of a Thousand, and Cupbearer; in 1327 he married one of the sultan's daughters (Artin 1907, pp. 82–85; Mayer 1933, p. 186). During the struggle for the succession to the throne after his mentor's death in 1341, Qawṣūn was evidently regarded as too powerful, for he was put in jail and strangled there in 1342. His mosque, now mostly in ruins, was built in 1329. The complex with his *khānaqāh* (only the minaret survives intact) and tomb, the last of the buildings he erected in Cairo, was completed in 1335 in an area south of the Citadel. The present lamp may have been commissioned for either complex.

As expected, the emblem shown here is that of Qawṣūn's highest office, Cupbearer (*sāqī*), represented by a red cup against an orange-yellow stained background and a plain upper field. Qawṣūn's name and his affiliation to Sultan Nāṣir Muḥammad ibn Qalāūn dominate the inscription around the body of the lamp, while the religious function of the vessel is underscored by the presence of the most commonly, and appropriately, copied Qur'anic phrase around the neck.

The most unusual and significant piece of information is found, however, in the least prominent inscription, located around the foot (see detail above). Here, a signature states that

the work—either the vessel itself or the enameled decoration, or perhaps both—was accomplished by a certain ʿAlī ibn Muḥammad whose *nisba* (patronymic or place of origin of his family) has thus far been read as Amakī, al-Ramakī, or al-Zamakī (Wiet 1929, pp. 123–24). A similar lamp (Museum of Islamic Art, Cairo, 3154), which is contemporary to the present one, since it was made for the emir Ulmās in 1330, bears the same signature. There, the *nisba* was abbreviated and the article partially dropped, so the signature seems to read as an improbable "Amakī." The article was retained in the present inscription and, although initially the name seems to be al-Ramakī or al-Zamakī, the inaccurate cursive script allows for some interpretation. Thus, the most likely reading is al-Barmakī (the Barmakid), a well-known *nisba* from a family of Iranian origin that rose to power in eighth- and ninth-century ʿAbbāsid Baghdad and soon spread throughout the Islamic world (*The Encyclopaedia of Islam* 1954– , vol. 1 [1960], pp. 1033–36, s.v. "al-Barāmika").

A second reading of the *nisba*, perhaps more improbable but nevertheless fascinating, might relate it to the verb *zammaka*, which, as used for manuscript illumination in fourteenth-century Mamluk Egypt, meant "to encrust, to fill [with gold or color]" (James 1988, pp. 66–67). This meaning would seem to accord as well with the thick application of colored enamels within thin red outlines on a glass surface and would imply that ʿAlī ibn Muḥammad was the painter, or the "encruster," of this lamp. Whether glassmaker or glass painter, this artist is the only one known to be named as a participant in the making of Mamluk enameled and gilded glass vessels.

ʿAlī ibn Muḥammad's signature does not appear on two other lamps that bear the name of Qawṣūn (presumably made for the same building as the present one), which are reported to have been in the Charles Gérôme and Édouard de Rothschild collections and may be nineteenth-century copies (Wiet 1929, p. 159, no. 27; Lamm 1929–30, p. 438, nos. 40, 41). In addition, the nineteenth-century French artist Philippe-Joseph Brocard copied the Qawṣūn inscription on a lamp now in the collection of the Musée des Arts Décoratifs, Paris.

Aside from the prominent inscriptions, the elaborate decoration of this lamp includes many motifs from the repertoire of the early fourteenth century. Unusual for religious furnishings is the presence of flying birds, peacocks, and parrots amid vegetal scrolls, but these would have been barely discernible once the lantern had been suspended from the ceiling and lit. Perhaps, by the second quarter of the fourteenth century, such figures had lost their original significance and had become merely decorative.

SC

PROVENANCE: Mannheim collection; J. P. Morgan

LITERATURE: Schmoranz 1898, pl. 34; Artin 1907, pl. 4; Lamm 1929–30, pls. 191:5, 200:1; Dimand 1930, fig. 120; Kühnel 1970, fig. 184; Nickel 1972, fig. 6; *Arte islámico* 1994, fig. p. 185

117. Mosque Lamp
Egypt or Syria, ca. 1345
H. 33 cm (13 in.), max. diam. ca. 25 cm (9⅞ in.)
Yellowish colorless glass; red, blue, white, yellow, and green enamels; yellow stains; and gold
Free blown, tooled, applied, enameled, and gilded; worked on the pontil
INSCRIPTION, in *naskhī* script, tending toward a *thuluth* calligraphic style: on body,

مما عمل برسم ا/ المقر العالي/ المولوي الأميري/ السيفي طقزدمر/ أمير مجلس/ الملكي الناصري

(That which was made for / His Excellency, the elevated,/ the master, the emir / Sayf al-Dīn Ṭuquzdamur,/ Emir of the Assembly / of al-Malik al-Nāṣir)

on neck, [sura 24 (Sūrat al-Nūr), beginning of verse 35] (God is the light of the heavens and the earth, the likeness of His light is as a wick-holder [wherein is a light (the light in a glass, the glass as it were a glittering star)] [Ali 1984, p. 301])

on foot, العالم (the learned)
CONDITION: The object is intact. Some gilt has been lost and some enamel (especially green and yellow) has decayed on the surface, which is slightly dull in the interior but otherwise in good condition. The glass contains numerous small bubbles.
Trustees of The British Museum, London 0A69.6–24.1

This lamp has an almost globular body with a flared neck and an attached splayed foot. Six suspension loops are attached to the body. The decoration is divided into ten registers, three on the neck, four on the body, and three on the foot. The narrower bands have backgrounds of scrolling leaves with flying birds branching from vegetal scrolls and flowers; a narrow band on the shoulder has lobed arcades each containing a polychrome vegetal composition and sketchy flying birds in the spandrels. The largest register on the neck shows an inscription in blue enamel interrupted by three pointed and shielded medallions, each bearing a footed cup with a frontal eagle above it (both stained in yellow), set against a red background framed in gold. The same medallions also appear, together with lotus blossoms and polychrome vegetal scrolls, inside the large band on the underside of the body. The main register on the body bears an

inscription in gold with red outlines against a blue background with vegetal scrolls. The widest band on the foot has the Arabic word for "the learned" repeated eight times.

Sayf al-Dīn Ṭuquzdamur al-Ḥamāwī, whose name sometimes reads as Ṭuquztamur on other objects, was a Cupbearer (*sāqī*) and then Emir of the Assembly (*amīr majlis*) of the sultan Nāṣir Muḥammad ibn Qalāūn (r. 1293–1341, with brief interruptions). His emblem is unusual in that it includes a pointed shield, which is more common to Europe. The cup is expected, but the eagle above it, seen frontally with its head turned to the right, is less typical. This bird, sometimes double-headed, does appear as an emblem in Mamluk heraldry (Ward 1993, fig. 87; Carboni 1995, pp. 83–84), although its significance is not clear. Originating in the area of the Jazīra (present-day northeastern Syria, northern Iraq, and southeastern Turkey), the symbol may in this case be related to Ṭuquzdamur's appointments in Syria, where he was governor of Hama and Aleppo and then viceroy of the region in 1341–45, toward the end of his life.

The present lamp is one of two dedicated to Ṭuquzdamur that are owned by the British Museum (the second is inventory number OA69.6-24.2). Except for some differences in inscriptions and decorative patterns, the two are very similar. Some time before his death in 1345, Ṭuquzdamur followed the example of many important emirs (see cat. nos. 114, 115) and erected a small *khānaqāh* with a mausoleum in the so-called City of the Dead, in the southern section of Cairo. His most important structure, however, is a bridge over the Great Canal (Meinecke 1992, vol. 1, pp. 191–92, 204). This emir's unmistakable emblem appears on a small number of surviving inlaid metalwork objects (Mayer 1933, pl. 16), as well as on another lamp in the Kunstsammlungen of Veste Coburg, in which the inscription is rubbed off (HA 747; Atıl 1975, no. 76), and on a glass bottle in the Louvre (Magne 1913, fig. 10; Mayer 1933, pp. 238–39).

Although sketchier and less accurate, the decoration here is similar to that of the lamp made for Qawṣūn (cat. no. 116). Rather busy in all the registers, it includes birds among foliage, lobed cartouches in the ornamental band below the base of the neck, and spiraling white scrolls in the background of the large band on the neck, which are also found on Qawṣūn's lamp. The Qur'anic inscription on the neck is in blue and the historical sentence on the body in gold, reversing the scheme of Qawṣūn's lamp. The foot, once gilded but not enameled, includes a manneristic repetition of the Arabic word for "the learned," a practice that became common in the second half of the fourteenth century. *SC*

PROVENANCE: Lord Ashburton; Felix Slade

LITERATURE: Lamm 1929–30, pl. 192:3; Harden et al. 1968, no. 158; Ward 1998, front cover

118. **Mosque Lamp**
Egypt, ca. 1350–60
H. 37 cm (14⅝ in.), max. diam. 23.6 cm (9¼ in.)
Yellowish colorless glass and red, blue, and white enamels
Free blown, applied, and enameled; tooled on the pontil
CONDITION: The neck of this object was broken and has been repaired with two small fills, but the remainder is intact. Some enamel has decayed on the surface, which is slightly dull but otherwise in good condition. The glass contains numerous bubbles and impurities.
Trustees of The British Museum, London 0A81.9–9.3

This lamp has an almost globular body with a flared neck and an attached splayed foot. Six suspension loops are attached to the body. The overall decoration, outlined in red against a blue background, consists of large peonies, rising from a rocklike formation, and smaller six-petaled flowers among luxuriant foliage. Each of the three circular medallions on the neck and underside of the body contains a composite vegetal pattern in red, blue, and white enamels.

Mamluk mosque lamps without inscriptions are less common than those with calligraphy, and all of the extant examples seem to have been made about the middle of the fourteenth century. The present lamp, now in the collection of the British Museum, London, is one of the best of its kind. Unless the gilding has entirely vanished without leaving any traces, it appears that gold was never used on this object. The small number of similar lamps that survive can be associated with buildings erected under the sultan Ḥasan ibn Muḥammad (r. 1347–51, 1354–61). Two of these, now in the Museum of Islamic Art, Cairo, were actually taken from the imposing madrasa that Ḥasan had begun to build in 1356 and which was completed in 1362 after his violent death (Wiet 1929, pp. 9–11, pls. 22, 23). In addition, one of the lamps in Cairo is decorated with circular medallions including part of the name of the sultan, which he used as a sort of calligraphic emblem following the example of his father (Nāṣir Muḥammad ibn Qalāūn, r. 1293–1341, with brief interruptions): "Glory to our lord al-Malik al-Nāṣir." Three other lamps—one each in the Louvre (Magne 1913, fig. 10; Lamm

1929–30, p. 453, no. 106, pl. 193:2), the British Museum (Lamm 1929–30, p. 453, no. 107), and the Victoria and Albert Museum (Dillon 1907, pl. 26; Lamm 1929–30, p. 454, no. 110, pl. 193:3)—complete the small group of vessels decorated with floral motifs that can be attributed, by comparison, to the period of Ḥasan's reign. Some of these may, however, have been created for buildings erected by his emirs; the lamps in the Louvre and one in the Hermitage, for example, include the emblem of the *silāḥdār*, or Keeper of the Sword (see Lamm 1929–30, pls. 193:2 and 205:1, respectively).

Circular medallions including interlaced vegetal patterns in polychrome enamels appear here at even intervals on the neck and the underside of the body. Although it is not clear whether this medallion is the emblem of a Mamluk officer, similar medallions found on a third lamp in Cairo that was also made for Sultan Ḥasan (Wiet 1929, pp. 36–37, pl. 34) confirm the homogeneous nature of the group. Another distinctive feature of these vessels is that their backgrounds are generally blue, while the flowers are outlined in reserve and sometimes gilded. The ingenuity of this artistic solution becomes evident when the lamp is lit and the flowers glitter against the dark blue backdrop, conjuring up appropriate thoughts of a heavenly garden of paradise. A splendid vase in the treasury of the Cathedral of Apt in France is the only other extant vessel presenting a similar overall decoration and color scheme (Magne 1913, fig. 12; Bussagli and Chiappori 1991, pl. 12; Rogers 1998, fig. 17.2; see discussion under cat. no. 131).

Lamm (1929–30, p. 454, no. 111) reports that this mosque lamp was found in the Dayr Todrūs (Monastery of Saint Theodorus) in Fusṭāṭ and was bought in 1869 by A. W. Franks, who donated it to the British Museum in 1881. He also adds that it belongs to the Ḥasan group on stylistic grounds. If the provenance information is accurate, the lamp must have been moved to the monastery, a Coptic building, at a date significantly after its creation.

SC

PROVENANCE: Monastery of Saint Theodorus, Cairo; A. W. Franks
LITERATURE: Harden et al. 1968, no. 159; Pinder-Wilson 1991, p. 134, no. 170; Tomobe 1992, pl. 166

119. **Lamp Globe**
Egypt, ca. 1342–54
H. 14.5 cm (5¾ in.), diam. 14.1 cm (5½ in.)
Grayish colorless glass, red and white enamels, and gold
Free blown, enameled, and gilded
INSCRIPTION, in *naskhī* script:

مما عمل برسم المقر الاشرف العالي ا / لمولوي
الكبيري المحترمي المخدومي ا / لسيفي عزيز
العلاوي الملكي الصالحي عز نصره

(Made for His Excellency, the noble, the elevated,/ the lord, the great, the honored, the master/ Sayf al-Dīn ʿAzīz al-ʿAlāwī, [officer of] al-Malik al-Ṣāliḥ, may his victory be glorious.)
CONDITION: The object is intact. The surface is in good condition except for a loss of gilding. The glass contains numerous small bubbles and some larger ones.
Victoria and Albert Museum, London C333–1900

This object is globular and has two thickened openings at the poles to let chains pass through. The decoration consists of a central register that bears an elaborate inscription interrupted by three circular medallions. The emblem inside the medallions contains a stylized white napkin on a central red background; the upper field was once gilded, and the lower field is white.

Lamps were suspended from the high ceilings of tombs, mosques, and madrasas by three, or sometimes six, long chains, which could easily become entangled when they were serviced by the person in charge of lighting the building. Glass globes

such as the present one represented a practical solution to this problem: the chains, bunched together, passed from the ceiling through the hole in the top of the globe, then branched out as they exited through the bottom hole and were fastened to the lamps's suspension rings. The decoration of the globes loosely matched that of the lamps, especially with regard to historical inscriptions and emblems. Only a few globes have survived, probably because little attention was paid to them when the rush to collect mosque lamps occurred in the second half of the nineteenth century; in the process, most of them must have been discarded or shattered.

Here, it is the matching lamp that has not survived. The inscription and emblem relate that the patron was a certain ʿAzīz al-ʿAlāwī, a *jāmdār* (Keeper of the Wardrobe) of the sultan al-Malik al-Ṣāliḥ. Nothing is known about this emir apart from the name written on the globe, although he must have erected a tomb for himself or some other building, of which no trace remains in Cairo. The most useful piece of information for dating the object is the name of the sultan, although al-Ṣāliḥ is unfortunately not an uncommon name among Mamluk rulers. Most likely, the sultan in question is one of the two sons of Nāṣir Muḥammad ibn Qalāūn who bore the same first name, either al-Malik al-Ṣāliḥ Ismāʿīl (r. 1342–45) or al-Malik al-Ṣāliḥ Ṣāliḥ (r. 1351–54). A comparable globe in the Museum of Fine Arts, Boston, which includes an inscription in the same calligraphic style and the emblem of a *dawādār*, or Holder of the Pen Case, of the sultan Shaʿbān I (r. 1345–46) (Martinovitch 1930, p. 245), is also useful in attributing the present object to the same period. *SC*

PROVENANCE: W. J. Myers
LITERATURE: Schmoranz 1898, figs. 15, 17; Lamm 1929–30, pl. 191:7; Mayer 1933, pl. 31:1

120. **Footed Bowl (Tazza)**
Syria, mid-13th century
H. 18.3 cm (7¼ in.), diam. 63.6 cm (25 in.)
Yellowish colorless glass; blue, red, white, green, yellow, and black enamels; and gold
Molded, optic blown, applied (foot), enameled, and gilded; tooled on the pontil
INSCRIPTION, in *naskhī* script, apparently reading:

طلعة القمر المنير الزاهر/ قامة الغصن الرطيب الناضر

([His/Her] face is like the brilliant shining moon, / the posture like a tender blooming sprout.)
CONDITION: The object is intact. The surface is in good condition except for some loss of gilt. The glass contains numerous tiny bubbles and a few larger scattered ones.
The Metropolitan Museum of Art, New York, Edward C. Moore Collection, Bequest of Edward C. Moore, 1891 91.1.1538

This footed bowl, or tazza, was first blown in a single-part vertical mold with twenty-four ribs and then optic blown and tooled. The mouth was folded upward, pulled over, and secured to the rim. The bowl and foot were made separately. The decoration is divided into a series of registers. Below the rim, at the join of bowl and foot, and at the base of the foot, there are registers with similar interlaced festooned patterns in gold. Three bands linked by four circular medallions cover most of the body of the bowl. The upper and lower bands contain a sequence of various quadrupeds depicted in right profile and set against a vegetal background (a similar band is also present on the foot). The central register, subdivided into four sections by the medallions, alternates an inscription and a row of small human figures engaged in various activities. Each of the four medallions includes the figure of a black eagle painted frontally with spread talons and placed against a white background within a circle; two sketchy birds in profile flanking the eagle; and two pseudovegetal compositions in blue, green, and red above and below the eagle. The underside of the bowl presents four circular medallions: those containing a six-pointed star alternate with those bearing complex pseudovegetal compositions.

This splendid footed bowl, now missing its lid, is justifiably one of the most often reproduced objects in the collection of the Metropolitan Museum. It was reportedly in the possession of a barber in Damascus and, after Charles Schefer acquired it, was copied by the French artists Philippe-Joseph Brocard and J.-D. Imberton in the 1860s and 1870s (Vernoit 1998, p. 111, fig. 25.2). A similar vessel, albeit with different decoration, is now in the British Museum (Lamm 1929–30, pl. 158:5). Several features point to an early dating within the framework of enameled-glass production. As mentioned previously (see cat. no. 113), fluted enameled vessels probably span the late Ayyūbid and early Mamluk periods. The discreet employment of several colored enamels and the generous use of gold, together with other details of the decorative program, also suggest a mid-thirteenth-century attribution.

The emblem and the inscription do not help in linking this luxury object to any particular sultan or emir. Although the image of an eagle does appear as an emblem in Mamluk heraldry, its significance is not clear. In the case of the emir Ṭuquzdamur (see cat. no. 117), the symbol is combined with the sign of one of his offices, the cup of the *sāqī* (Cupbearer), and may be related to his appointments in Syria; the emblem of another emir, Bahādur al-Ḥamawī (d. 1293), employs an eagle above the napkin of the *jāmdār*, or Keeper of the Wardrobe (Mayer 1933, pp. 95–96). Eagles appear alone on several ceramic fragments (Mayer 1933, pls. 2, 3) and on two surviving objects: a spherical incense burner in the British Museum and a manuscript in the Oriental Institute of the Russian Academy of Sciences, Saint Petersburg (Ward 1993, fig. 87, and Petrosyan et al. 1995, no. 22, respectively). The bird of prey on the burner differs in being double-headed, an iconographic feature that links it directly to the original form of this heraldic symbol, which arose in the region of the Jazīra in the twelfth century, as well to the emir Badr al-Dīn Baysarī al-Zāhirī al-Shamsī (d. 1298), an officer of Baybars I and Baraka Khān (Mayer 1933, p. 112). (The present author has suggested elsewhere that the double-headed eagle may be associated with Baraka Khān himself; see Carboni 2001, no. 92.) Assuming that this difference is indeed meaningful, the patron of the present tazza cannot be Badr al-Dīn Baysarī.

The eagle most similar to that on the tazza appears within a hexagon in the frontispiece of the Saint Petersburg

manuscript, a unique work made in the first decade of the fourteenth century for Mūsā ibn al-Malik al-Ṣāliḥ, a nephew of the sultan Nāṣir Muḥammad ibn Qalāūn. There, however, the bird does not seem to be a meaningful Mamluk heraldic symbol, and other features suggest that it may not be original to the manuscript (Carboni 1995, p. 84). Since the title of the manuscript—a panegyric of Muḥammad ibn Qalāūn—is almost identical to that of a text written for Baybars I a few decades earlier, it is possible that the first text included a similar illuminated frontispiece with an emir's eagle emblem. Indirectly, this helps to confirm a thirteenth-century attribution for the tazza.

The inscriptions on the great majority of enameled-glass pieces are eulogic, historical, or Qur'anic. The poetic verse here has, to my knowledge, only one parallel in the medium, the so-called Palmer Cup, although Carl Johan Lamm also mentions a beaker in the Museum of Islamic Art, Cairo, that bears the same inscription (1929–30, p. 374). The two hemistiches, if they are indeed halves of the same verse in a weak *ramal* meter, are written in blue enamel within bands on opposite sides of the vessel. The more legible first half compares the face of the beloved to the moon, a common poetic image. The second hemistich, continuing the imaginative comparison, seems to refer to the tall and slender, cypresslike figure of the beloved, although it has not been possible to find the complete verse in divans of Arabic poetry. The verses on the Palmer Cup, a large beaker from the collection of Waddesdon Manor and now in the British Museum, clearly relate to the function of the vessel as a libation cup (Contadini 1998, pp. 56–57). Here, the relationship between the verse and the object on which it was copied is obscure or, at least, more subtle. The comparison to the moon can perhaps be interpreted literally: the bowl is circular and heavily gilded and was probably filled with an intoxicating beverage that had the effect of making the drinker's posture "tender" and curved (the equivalent of the word *aghyad* on the Palmer Cup). It is also tempting to associate this image with the previously mentioned Badr al-Dīn Baysarī, whose name includes the title "the Full Moon of the Religion," even though his emblem was a double-headed eagle.

SC

PROVENANCE: Charles Schefer; Edward C. Moore

LITERATURE: Gerspach 1885, fig. 44; Migeon 1926, pl. 54; Lamm 1929–30, pl. 160; Dimand 1944a, fig. 155; Kühnel 1970, fig. 181; Nickel 1972, fig. 161; Jenkins 1986, no. 46; Vernoit 1998, fig. 25.1

121. **Bottle**
Syria, mid-13th century
H. 28.2 cm (11⅛ in.), max. diam. 17.8 cm (7 in.)
Yellowish colorless glass; red, blue, green, white, brown, pink, gray-blue, and black enamels; and gold
Free blown, enameled, and gilded; tooled on the pontil
CONDITION: The object is intact. The surface is in good condition except for a minor loss of gilt and some wearing of the enamels. The glass contains numerous small bubbles.
Furussiya Arts Foundation, Vaduz, Liechtenstein

This pear-shaped bottle has a low foot and flared neck. The neck has a bulge at its base, and its opening flares out from another bulge near the top. The pontil mark is large, and the pontil was attached to the bottom at two different times; traces of iron appear on the pontil mark. The enameled decoration is organized into four bands. That on the neck bears a series of seven standing religious figures dressed in long tunics of various colors; some of these wear capes and two wear pointed hoods, although most are bareheaded and haloed. Two of the deacons carry offerings; a bushlike pointed tree separates two figures. The narrow band between the neck and shoulder contains four clover-shaped medallions framed in red and gold with a stylized flower, perhaps a lily, painted in white and green or red and blue at the center; a complex scrolling vegetal pattern, in gold against a blue background, separates the medallions. A narrow band near the base of the bottle bears a series of gilded animals walking to the right and outlined in red against a blue

background filled with gilded scrolls; thirteen quadrupeds are illustrated, including a cheetah, a saluki dog, a bear, a hare, an antelope, and a lion.

The largest register, placed between the two narrow bands, shows a busy open-air scene in which four architectural scenes alternate with four depictions of agricultural activities. One of the buildings is clearly identified by a large cross as a Christian church (see detail at left, following page). The others, occupied by monks and deacons wearing tunics and/or hoods, present a variety of architectural details, including multicolored onion-shaped domes, brick walls, low pointed turrets, and several types of

Cat. no. 121, details: Christian church (left), people picking dates (right)

columns, porticoes, railings, windows, and doors. Each of the scenes in between is distinguished by a tree in the center (different in each case) flanked by farmers and animals engaged in diverse activities. Clockwise, the following scenes can be identified: four people, including a monk and two deacons carrying large jars, collecting dates on a sheet spread on the ground at the base of a palm tree (see detail at right, above); a man with a bell-shaped hat plowing a field behind two oxen, with a fruit tree in the background; a white donkey carrying fruit or berries on its back, a hooded man behind the animal, and a tree in the background; and two men collecting grapes from a vine in a large basket.

This unique object, the work of extremely skilled glassmakers and glass painters, has thus far been the least known of all the extant Islamic enameled and gilded vessels in private collections. First noted and briefly discussed by Melanie Gibson in her report submitted to the University of London (Gibson 1983, pp. 38–40, pls. 5, 6), the bottle was published in color in Hungarian in a general survey of Islamic art and went largely unnoticed (Fehérvári 1987, pl. 122).

The subject matter illustrated on the bottle is in accordance with the well-known production of inlaid metalwork depicting Christian life and religion in Ayyūbid art during the first half of the thirteenth century. Most of these works include both Christian themes and Islamic courtly scenes and were made by Muslim craftsmen in Syria (Katzenstein and Lowry 1983; Baer 1989; Evans and Wixom 1997, nos. 283–85). The only other extant glass vessels with predominantly Christian themes are two beakers in the Walters Art Museum, Baltimore, representing scenes from the Entrance of Christ into Jerusalem (47.17, 47.18; Carswell 1998) and a drinking horn in the Hermitage that shows a series of standing figures similar to those depicted around the neck of this bottle (fig. 102 [Rogers 1998, pl. 17.1]; for another related object, see cat. no. 124). However, the large number of extant fragments illustrating Christian figures and buildings indicates that the theme also enjoyed significant popularity among glassmakers in Ayyūbid Syria (Carboni 2001, no. 88).

This bottle truly stands apart for its artistic accomplishment, its complex yet balanced composition, and the successful incorporation of a large variety of colored enamels. "Islamic" themes are confined to the narrow bands that frame the main scene: above, stylized vegetal patterns interrupted by lobed medallions with a sketchy flower in the center; below, a manneristic and meaningless sequence

of animals walking counterclockwise. The remainder of the painted surface is entirely "Christian" and shows a pleasant contrast between the miniature-like quality of the main scene and the comparative monumentality of the standing figures illustrated around the neck. From the iconographic viewpoint, the depiction of the different buildings and agricultural scenes was inspired by the artistic milieu of twelfth- and thirteenth-century Syria and Mesopotamia, in which the activities of the Christian monasteries influenced and permeated the prevalent Muslim environment. This influence is evident in the illustrated Arabic manuscripts created especially in Baghdad that incorporated Byzantine figures and compositions taken directly from contemporary Gospels and other Christian works (see, for example, Ettinghausen 1962b, pp. 67–80). Monks and bishops seen frontally, wearing pointed hoods and folding their hands in prayer—similar to the figures illustrated around the neck of the bottle—appear in a celebrated Syriac manuscript in the Biblioteca Apostolica Vaticana, Rome, which was copied at the Monastery of Mar Mattai, near Mosul, in 1219–20 (Vat. Syr. 559, fol. 16R; see de Jerphanion 1940, pl. 5, no. 16; Baer 1989, fig. 128). The most common open-air scene depicted in Christian manuscripts is the Entrance of Christ into Jerusalem, which inspired similar scenes on the Baltimore beakers (Carswell 1998) as well as on objects in inlaid metalwork (Baer 1989, figs. 87, 88; Evans and Wixom 1997, no. 285).

The most intriguing aspect of the scenes on the bottle is how to interpret their meaning in light of the absence of inscriptions. Each of the brick buildings except the largest, which is obviously a church, is inhabited by a bearded figure wearing a hooded stole around his neck, thus identifying him as a Christian priest or monk. The edifices may all be part of the same monastic complex, or individual buildings located in different areas of Syria. Gibson identifies three of the agricultural vignettes (excluding the plowing scene) as stages in the wine making process, evidently regarding the trees in the background as mere decorative elements (Gibson 1983, p. 39). It must be noted, however, that the colors of the red and white fruit collected on the mat under the palm tree correspond exactly to those of the dates hanging from the tree itself; clearly, that scene illustrates the collection of dates. The harvesting of grapes seems the correct interpretation of the image showing a deacon, identified by his long cloak, holding a large white bowl and a novice with a shorter garment lifting his hands up to reach the fruit; the shape of the leaves and the arrangement of the fruit in clusters also help to identify the scene. The scene with the white donkey carrying blue, red, and white fruit may represent the sequel to the harvesting of grapes, but only if the scenes are read counterclockwise, that is, contrary to the orientation in left profile of the animals and most figures. For this reason, it is more likely that the fruit is collected from the plant behind, perhaps an olive, apple, or cherry tree judging from the shape of its leaves.

It is tempting to suggest that the open-air settings depict the four seasons—dates for summer, grapes for autumn, plowing for winter, and the uncertain fourth image for spring—and that the buildings are all part of the same complex. In that case, the entire composition would represent a year in the life of an unidentified Syrian monastery. A chronological hiatus between the scenes is further corroborated by the appearance of the same character in more than one image. The hooded elderly monk or priest is shown twice on the neck and five times on the body (three times inside a building, once behind the white donkey, once next to the mat with the dates). He wears a green cloak in all but one case, where the robe is blue. A deacon with a long blue robe is depicted twice on the neck and four times on the body, and the novice or laborer with the short cape appears twice. Therefore, the vignettes are perhaps scenes from the life of an abbot, perhaps a Jacobite, Nestorian, or Maronite saint, the most meaningful of which may be that depicted in the church—the consecration of the chrism (oil mixed with balsam used in various rituals) stored in large jars in the crypt.

This tentative interpretation clarifies neither the reason behind the creation of such an extraordinary object nor its function. While the shape of the body can be related to that of other bottles (see, for example, cat. no. 127), the flaring neck is unusual and probably reflects its function as a pouring vessel in a religious context (for wine, holy water, or chrism). This expensive vessel, created without a doubt in the best Syrian workshop, may celebrate the appointment of a new abbot in a prominent monastery and, as such, may be a diplomatic gift from a local Muslim governor to establish a fruitful relationship among neighbors. Or else, the same motivation may have prompted a bishop or the abbot of a wealthy monastery to present the bottle to a Muslim authority. Whatever story it may one day reveal, the object remains a splendid gem that has fortunately survived in an almost pristine condition.

SC

PROVENANCE: Said to have been found in China

LITERATURE: Gibson 1983, pls. 5, 6; Fehérvári 1987, pl. 122

122. **Perfume Sprinkler (*Qumqum*)**
Syria, ca. 1260–77
H. 6.2 cm (2½ in.), max. w. 4.8 cm (1⅞ in.), max. diam. 2.9 cm (1⅛ in.)
Brownish colorless glass; white, red, purple, yellow, and blue enamels; and gold
Free blown, enameled, and gilded; tooled on the pontil
CONDITION: The object is intact. The surface is lightly weathered, resulting in some loss of gilt and, in particular, of yellow enamel. There are traces of iron on the pontil mark. The glass contains numerous small bubbles and a few larger ones, one of which appears near the pontil mark.
The Corning Museum of Glass
69.1.2

This *qumqum* has a flattened globular shape, a flattened base with a small kick, and a tapered neck ending in a narrow opening. The rim shows traces of gilding. The decoration on the two flattened sides consists of the same figure, a feline standing in left profile above a diagonally striped pattern, the whole enclosed within a circular shield framed in gold. The animal has both of its right legs raised, and its tail is long and winding. On one side of the *qumqum*, it is outlined in gold and painted in white against a red background, while the diagonal stripes are alternating yellow and blue, outlined in gold; on the other side, it is dark purple against a white background and the stripes are yellow and red. On the shoulder of each side there is a cloverlike square diamond (one a bit irregular in shape), painted in gold and filled in with five small red enameled dots.

Perfume bottles, called *qamāqim* (singular, *qumqum*) in Arabic, were produced in great numbers by Ayyūbid and Mamluk glassmakers. These bottles are typically not globular but either oval in section or flattened on two sides and at the base. While larger *qamāqim* have long narrow necks, smaller ones, such as the present object, have shorter, more proportionate necks, which always end in an opening the size of a pinprick, so that only a few drops of the precious liquid will pass through at one time. Both sizes may have been intended as elements of toilet sets, the small portable ones being filled from the large ones with the use of a funnel.

Most of the small enameled and gilded *qamāqim* that have survived seem to belong to the second half of the thirteenth century. Although they are generally devoid of specific information, sometimes an emblem will help toward a more precise attribution, as the heraldic feline does here. This royal emblem, probably a lion, originated in heraldic symbols first adopted by Seljuq atabegs and Urtuqid rulers in Anatolia. Here, it is thought to be the symbol of the sultan Baybars I (r. 1260–77), the Mamluk champion who fought both the troops of the last Crusade and those of the Ilkhanids as they pushed westward. Originally a *mamlūk* (slave) of the emir Aydakīn (see cat. no. 114), he was freed by the ruler al-Ṣāliḥ II Ayyūb (r. 1240–49) and eventually elected sultan in 1260. Baybars's lion, often depicted in pairs, figures prominently on his coins and buildings, for example, his madrasa in Cairo (1262–63) and his fortress in Kerak (1263) (see, respectively, Mayer 1933, pp. 107–8, and Meinecke 1992, vol. 1, pp. 13, 15).

The fact that the emblem on this *qumqum* is composite—also including a diagonal striped pattern below the lion—may indicate that its patron was someone in Baybars's service who dutifully included the symbol of the reigning sultan. Unlike the emblems of the emir's office (cat. nos. 114, 116, 117), the striped pattern may be the coat of arms of a family, specifically the Hama branch of the Ayyūbids, who

served the Mamluks as governors of that Syrian town (Atıl 1981, no. 46). In particular, al-Malik al-Manṣūr was governor of Hama between 1244 and 1284 and thus served during the entire period of Baybars's reign (Meinecke 1972, p. 224, n. 87).

The color scheme of the emblem is different on each side of the *qum-qum*: the lion's colors are reversed (white on red versus purple on white), and the stripes combine yellow with blue on one side and yellow with red on the other. Red and white were the most common colors used in the depiction of heraldic lions (Carboni 2001, no. 92). At this early stage of development of Mamluk heraldry, however, it is likely that the pattern itself, and not the color, was the distinguishing feature. Later on, as symbols of office became more widespread, it was necessary to differentiate among colors and to divide the emblem's fields in different ways. The colors on this flask may thus be regarded as artistic flourishes that were meant to make the object more appealing without obscuring the significance of the emblem. *SC*

PROVENANCE: Ispenian collection; Paravicini collection
LITERATURE: Pavell 1910, p. 51; Lamm 1929–30, pl. 126:9; Mayer 1933, pl. 1:7; *JGS* 12 (1970), p. 175, no. 24; Ferber 1975, no. G 19; Atıl 1981, no. 46

123. **Canteen**
Egypt or Syria, third quarter 13th century
H. 22.5 cm (8⅞ in.), max. diam. ca. 21.3 cm (8⅜ in.), diam. at narrower side ca. 15 cm (5⅞ in.), diam. at rim ca. 0.3 cm (⅛ in.)
Pale brown glass; brownish red, white, blue, pale green, yellow, pink, mauve, and grayish black enamels; and gold
Free blown, applied, enameled, and gilded; tooled on the pontil
CONDITION: The object is intact. The surface is in good condition except for an extensive loss of gilt. The glass contains numerous small bubbles.
Trustees of The British Museum, London OA69.1–20.3

This flask has an irregularly flattened globular shape: one of the wider sides is flattened and tapers when viewed in profile, and the opposite side is curved and bulged; the lower halves of both narrower sides are flattened. The base is flat with a kick in the center and a large pontil mark (diam. ca. 2.7 cm [1⅛ in.]), with much glass residue. The cylindrical short neck thickens at the rim and is flanked by two applied handles. The decoration on the flat side, all within a circle, consists of an eleven-pointed rosette framed by a radiating pattern within an eight-lobed flower containing vegetal scrolls. The pattern is in gold with red outlines, while the flower is outlined in blue. The curved side bears an irregular four-sided lobed motif that includes a complex geometric figure divided into two sections and filled with vegetal patterns. The areas outside the central figure are filled with vegetal scrolls that end either in human, animal, or bird heads or in two hands with a pointed finger. Again, only red and blue enamels and gold occur on this side.

To the left of the curved side, a horseman in profile kills a wolflike animal with a spear; a hare runs below the horse, while two ducks or herons fly above it. The man is bearded, and there is a halo around his head. He wears a conical hat topped with short floating ribbons, a short mantle, trousers, and boots. The powerful brownish red horse is caparisoned with a saddle, bridles, and reins. Within a circular medallion on the flattened lower half a female harp player, seen in profile, wears a veil and a long tunic. Around her float a beaker, a plant, and a footed tray with fruit. The entire range of colors was used on this side.

To the right of the curved side, a horseman kills a lion with a javelin under a large pointed tree while a bird flies above. The man, who has curly black hair and a halo, wears a long coat with sleeves and boots. The white horse stands in a less powerful pose than the animal on the opposite side and is caparisoned in a simpler fashion. The gold lion turns its head toward the viewer. The trunk of the tree, its colorful surface divided into pointed sections, rises from the frame of the medallion below the horse. Within a circular medallion on the flattened lower half a drinking man, depicted frontally, sits cross-legged. He holds a beaker in his right hand and wears a turban, a long tunic with *tiraz* bands on the sleeves, boots, and a belt. Around him are a beaker, a footed tray with fruit, and a footed bottle with a long neck. The entire range of colors was also used on this side of the flask.

Unlike the "Christian" bottle (cat. no. 121), this canteen is decorated in a puzzling manner, mixing Christian iconography with figures and motifs integral to the artistic heritage of Islamic art; in this regard, it is similar to the pilgrim's flask in Vienna (cat. no. 124). Each of the two narrower sides depicts the prominent figure of a Christian knight/hunter/saint set above the illustration of another figure

(wine drinker or female harp player) placed within a circular medallion, the latter a standardized feature of traditional Islamic art. The riders are unmistakably identified as Christian by their clothing and headdresses (the so-called kettle helmets worn by Crusader infantrymen) as well as by details in the caparison of the horses, such as the scalloped flaps of the saddle and the flanged bands at the neck and breast (Alexander 1996, p. 238). Popular Byzantine images, such as those of Saint George and Saint Demetrios, the latter a Crusader from Thessalonica, could have served as prototypes for the rider figures (Evans and Wixom 1997, nos. 81, 203).

Although the remainder of the decoration—more prominent because it was painted on the wider sides—is somewhat unusual, it clearly falls within the canons of late Ayyūbid and early Mamluk patterns and compositions. No inscriptions, or pseudo-inscriptions, are present on the vessel.

The mixed iconography of this flask makes it difficult to understand the type of patronage that lay behind its creation. It is known that the glass painters were local artists who were also familiar with Christian (mainly Syriac and Coptic) subjects, having seen them depicted on walls, carved stones, icons, and portable objects (see discussion under cat. no. 121). It cannot be determined, however, whether these subjects were incorporated as symbols of vanquished Christianity for Muslim patrons, or whether they were made for affluent Crusaders or monasteries that appreciated the local artistic-glass production (it should be remembered that Venice did not begin to produce enameled glass drawing upon Islamic techniques until the end of the thirteenth century; see cat. no. 151). Arguing for the second theory is the bottle with the unmistakable all-Christian subject (cat. no. 121), which proves that non-Muslim patronage or, at least, Christians receiving gifts especially made for them existed in the Greater Syria area.

The shape of this object finds more parallels in leather flasks than in metal vessels, although an exceptionally large inlaid-metalwork canteen of similar shape is in the collection of the Freer Gallery of Art, Washington, D.C. (Atıl et al. 1985, no. 17). The decoration of that unique canteen consists of scenes from the life of Jesus and depictions of saints under an arched portico combined with illustrations of the Ayyūbid and Mamluk horsemanship exercises known as *furūsiyya* (some of the horsemen, dressed as Crusaders, wear kettle helmets and flowing capes, as here); also among its ornamentation are small figures within circular medallions (including drinkers and harp players), Arabic inscriptions, series of animals, and the typical Islamic vegetal and geometric repertoire of the period. A similar blending of Muslim and Christian influences is found on the metalwork produced for the Ayyūbid sultan Najm al-Dīn (Atıl et al. 1985, no. 18, fig. 53). It is likely that objects such as these gave rise to a fashion that continued well into the Mamluk period and attracted a more varied patronage. While its patron remains unknown, this splendid glass canteen probably has its origins in this artistic influence.

SC

PROVENANCE: Collection of a noble family in Würzburg; Felix Slade

LITERATURE: Schmoranz 1898, pl. 20; Migeon 1907, fig. 302; Lamm 1929–30, pl. 126:18; Harden et al. 1968, fig. 153; Pinder-Wilson and Ezzy 1976, no. 136; Pinder-Wilson 1991, p. 132, no. 165, 166; Tomobe 1992, pl. 159; Alexander 1996, p. 238, no. 199; Rogers 1998, colorpl. D, fig. 17.4

124. **Pilgrim's Flask**
Probably Syria, third quarter 13th century
H. 36 cm (14⅛ in.), w. 27 cm (10⅝ in.)
Brownish colorless glass; blue, red, yellow, green, black, and white enamels; and gold
Free blown, applied, enameled, and gilded; tooled on the pontil
INSCRIPTION, in gold *naskhī* script, on borders of medallions and on bands around neck, the last word repeated to fill entire inscribed area:

عز لمولانا السلطان السلطان السلطان . . .

(Glory to our lord, the sultan, the sultan, the sultan. . . .)
CONDITION: The object is intact. The surface is in good condition except for some loss of gilt. There is a whitish film on the interior that was left by the residue of the soil it once contained. The glass contains numerous bubbles.
The Cathedral and Diocesan Museum, Vienna L–6

This flask has a globular shape flattened on two sides; its neck has a bulged base ending in a flared, then inwardly turned, rim. Each of the two small handles applied from the shoulder to the neck ends in a small loop. The base is flat with a small kick in the center. The main decoration, found around the body of the flask, consists of four large circular medallions, each framed by a gold calligraphic border. The areas outside the medallions contain single and three-lobed leaves or flowers that stem from gilded vegetal scrolls and are painted in red, white, green, yellow, and blue. A blue line encloses four lobed medallions on the

shoulder; two of these bear a busy gilded vegetal pattern, while the other two surround the bases of the handles.

The medallions on the wider sides depict male and female figures playing musical instruments around a central tree on the edge of a pond. While similarly composed, the two scenes differ slightly. One shows a male lute player and flutist and two female tambourinists, the other a male lute player, a female tambourinist, and two young men listening and drinking. The background of each scene includes gilded vegetal scrolls and footed bowls with fruit. The medallion on each of the narrower sides shows the figure of a haloed falconer

riding a horse, which is red on one side of the flask and white on the other; the horses' tails are knotted, and large tassels hang from their necks and bellies. Above the bulbous section of the neck, the decoration consists of two calligraphic bands framing a series of ten standing figures with heads bent to the right; dressed in robes and trousers of various colors, these figures are most likely praying.

This bottle and the amphora-shaped object in the same collection (cat. no. 125) are the earliest enameled and gilded vessels to be reported in historical sources. Although it is not known how Duke Rudolf IV Hapsburg (1339–65) came to possess the two objects, records indicate that they were part of the large collection of relics he donated to the Collegiate Chapter of Saint Stephen's Church in 1365. Both bottles contained a whitish soil that was said to have been mixed with the blood of the Holy Innocents, the children slain by Herod in an attempt to kill the Messiah. Such a relic would have been highly coveted (not unlike a piece of the Holy Cross) by pilgrims and soldiers who ventured to the Holy Land during the period of the Crusades. Rudolf himself never traveled to the part of the eastern Mediterranean affected by the Crusades; in addition, the last Crusaders had withdrawn in 1291, and the region was firmly in the hands of the Mamluks by the fourteenth century.

The year 1365 is clearly a terminus ante quem for the creation of both bottles, but it does not provide a precise enough dating. Rudolf, who was born in 1339 (after the presumed making of these vessels), probably inherited them from his father, Albert II (1298–1358), or grandfather Albert I (1255–1308). It may be suggested, therefore, that the bottles were brought from the Holy Land before the last Crusaders left in 1291, a year that provides a more useful ante quem dating.

The basic shape of this bottle parallels that of the small flat-sided perfume sprinklers known as *qamāqim* (cat. no. 122), which were made in the period of the sultan Baybars I (r. 1260–77). Here, apart from the larger dimensions, the vessel has been transformed into a so-called pilgrim's flask by adding two looping handles at the sides of the neck and by enlarging the diameter and shape of the neck itself. Its size and material indicate that the object was never meant to be functional as a portable object but was instead a stationary pouring vessel. Two similar pilgrim's flasks in enameled and gilded glass that are larger, less elaborately decorated, and of later date than the present one survive in collections in Toledo and Dijon (Lamm 1929–30, pl. 183 and colorpl. G, respectively).

Common in the Syro-Palestinian region at the time of the Crusades, this type of bottle was also produced for Christian patrons, as shown by an object in the Madina collection having a molded cross in the central medallions (Atıl 1981, no. 61). The figural decoration on the four sides and neck links the present bottle to three other extraordinary objects in this catalogue—the "Christian" bottle, the canteen in the British Museum, and the bottle with horsemen in the Metropolitan Museum (cat. nos. 121, 123, 126). The stylized water in the foreground of the two larger scenes also recalls a similar treatment on the Gulbenkian beaker with birds (cat. no. 128). Other details of the decorated background, such as the vegetal scrolls ending in polychrome enameled leaves, are so clearly characteristic of late-thirteenth-century vessels that the attribution of this bottle to the third quarter of the century is almost certain.

A detail in the drawing of the haloes around the heads of the two falconers—a curly decoration at either side of the head—also helps to date this object more accurately. This feature is also found in drawings of human figures representing the constellations in a copy of the *Kitāb ṣuwar al-kawākib al-thābita* (Book of the Images of the Fixed Stars; British Library Or. 5323), which is datable to the second half of the thirteenth century and was probably produced in the Jazīra region of northern Mesopotamia. It also appears in images of the archangels Gabriel and Michael in the British Library's copy of al-Qazvīnī's *Kitāb ʿajā'ib al-makhlūqāt wa gharā'ib al-mawjūdāt* (The Wonders of Creation and the Oddities of Existence [Or. 14140]; Carboni 1992), probably produced in Mosul in 1310–15. This minor detail assumes a greater importance because it suggests that the cultural and artistic milieu of the area, controlled mostly by atabegs under Seljuq and Ilkhanid rule—and therefore open to Persian influence—greatly affected the creation of the most extraordinary works of Ayyūbid and early Mamluk glassmakers (see also cat. nos. 120, 126).

The scenes represented here—music making and drinking in a garden setting, along with falcon hunting—are typical Mamluk courtly pastimes. The figures, both male and female,

wear turbans and veiled headdresses in the Arab fashion, whereas the bareheaded men at prayer may be interpreted as a conventional decorative motif. Like the canteen in London (cat. no. 123), this bottle is decorated in a manner that obscures its raison d'être. Christian patronage—or at least a production aimed at a clientele without particular religious inclinations—cannot be excluded. Royal pastimes and falcon hunting were common to both cultures, although the characters here are all portrayed in Arab dress, unlike the Christian hunters on the canteen. Further arguing for non-Muslim patronage are the presence of devotees around the neck, the meaningless inscription encircling all the figural scenes, and the flanged bridles of the falconers' horses. In addition, the fact that the object found its way to Vienna as a reliquary shortly after it was created indicates that it was in the hands of a Catholic proprietor at a very early stage.

SC

PROVENANCE: Said to have been brought from the Holy Land and to contain earth from Bethlehem stained with the blood of the Holy Innocents; given to the Collegiate Chapter of Saint Stephen's Church, Vienna, by Duke Rudolf IV in 1365

LITERATURE: Bucher 1888, pl. 1; Schmoranz 1898, pl. 4; Migeon 1907, fig. 306; Fry 1910, pl. 3:1; Glück and Diez 1925, fig. 430; Kühnel 1925, fig. 152; Lamm 1929–30, pl. 158:3; Saliger 1987, pp. 22–24; Vernoit 1998, colorpl. E, fig. 25.9

125. **Handled Bottle**

Probably Syria, late 13th–early 14th century

H. 37 cm (14⅝ in.), diam. 20 cm (7⅞ in.)

Yellowish colorless glass; red, blue, green, yellow, and white enamels; and gold

Free blown, applied, enameled, and gilded; tooled on the pontil

INSCRIPTION, in *naskhī* script, on two bands around neck, one below shoulder, and one on body, repeated over entire inscribed area: . . . العالم (the learned)

CONDITION: The object is cracked but complete. The surface is in good condition except for some loss of gilt. There is a whitish film on the interior that was left by the residue of the soil it once contained. The glass contains numerous bubbles.

The Cathedral and Diocesan Museum, Vienna L–5

This amphora-shaped bottle has two curved handles attached at the sides of the neck. The narrow cylindrical neck ends in a bulbous section that has a splayed rim and rests on a low foot. The two handles were applied at diametrically opposite ends from the shoulder to the neck, where they end in short snakelike trails below the bulbous top. The decoration is arranged in registers that consist of four narrow calligraphic bands framing larger bands that contain medallions as well as vegetal and geometric patterns. The register on the shoulder bears a stylized vine motif composed of flowers with a blue button at the center and clusters of grapes attached to gilded scrolls outlined in red. Two medallions on opposite sides include in the center, against a blue background, the figure of a gilded bird of prey with open wings standing above another bird. The band below contains a complex vegetal pattern in blue interrupted by four medallions bordered with a calligraphic band and bearing scrolling patterns. The register below includes a complex geometric grid based on the repetition of a series of six-pointed blue stars at the center of each unit. The decoration on the neck features interlaced lobed motifs outlined in blue; their intersections form clover and trefoil patterns containing abstract vegetal designs. All the remaining areas are filled with scrolls ending in bicolored leaves (red and white, yellow and green, or blue and white).

Having been given to the Collegiate Chapter of Saint Stephen's Church in Vienna as part of the same donation from Duke Rudolf IV, this bottle and the pilgrim's flask (cat. no. 124) share some details of decoration, although the overall program differs in each. A noteworthy element common to both is the appearance of narrow bands bearing the cyclical and meaningless repetition of a single word (here, "the learned"; there, "the sultan") painted in gold with red outlines. The cloverlike pattern present here in the trellis pattern on the neck is also echoed below the base of the neck on the flask. The organization of the decoration into horizontal registers links this object to most of the enameled and gilded vessels made for a nonspecific patronage in the late thirteenth or the early fourteenth century. This feature of the decoration also seems to date the bottle at least one or two decades later than the pilgrim's flask. The contemporaneity of the two

PROVENANCE: Said to have been brought from the Holy Land and to contain earth from Bethlehem stained with the blood of the Holy Innocents; given to the Collegiate Chapter of Saint Stephen's Church, Vienna, by Duke Rudolf IV in 1365
LITERATURE: Schmoranz 1898, p. 34, pl. XIII; Migeon 1907, fig. 301; Schmidt 1922, fig. 30; Lamm 1929–30, pl. 159:5; Saliger 1987, p. 24; Vernoit 1998, colorpl. E, figs. 25.9, .10

objects should not be taken for granted, for it is not known how and when Rudolf acquired the two vessels before he bequeathed them in 1365. They were, however, probably both filled with earth from the same source, supposedly containing the blood of the Holy Innocents, and reached Europe at the same time.

The amphora shape of the bottle reflects some pre-Islamic influences. Unfortunately, no parallels for the most distinctive decorative feature—the striking geometric pattern on the lowermost register—can be found either in enameled glass or in Qur'anic illumination. The only manuscript illumination to include a somewhat comparable overall motif is the finis-piece of a Mamluk Qur'an dated 1306–10 in the Chester Beatty Library, Dublin (James 1988, fig. 30), which suggests a similar attribution.

SC

126. Bottle
Probably Syria, late 13th century
H. 43.5 cm (17⅛ in.), diam. 93 cm (36⅝ in.)
Greenish colorless glass; red, blue, green, yellow, purple, brown, pink, white, gray-blue, and black enamels; and gold
Free blown, enameled, and gilded; tooled on the pontil

CONDITION: The object is intact except for minor losses of gilt and enamels. The surface is in fairly good condition. The glass contains numerous small and large bubbles.
The Metropolitan Museum of Art, New York, Rogers Fund, 1941 41.150

This large bottle has a domed profile, a slightly flared cylindrical neck, and a low tooled foot. The decoration is divided into a series of bands. The band on the upper body includes three large medallions, each containing an eight-petaled green-and-red central star from which a complex scrolling pattern radiates outward to create a floral pattern; the outlines are in red, the background is blue and gold, and there are eight alternating

Cat. no. 126, detail

pointed elements in red and white. The spaces between the medallions are filled with vegetal decoration, red-and-white flowers, and blue, green, and yellow dots. The main register depicts a colorful scene with horsemen carrying shields, bows, and other weapons. The scene is framed by narrow bands, filled with a crosshatched motif, that also surround the medallions above in an uninterrupted pattern. Narrow bands at the base and upper midsection of the neck as well as on the underside of the body contain sketchier scrolling motifs outlined in red against a blue background. The figure of a *sīmurgh* encircles the neck; this fantastic bird has a blue body, red-and-white wings, and a floating feathery green-and-yellow tail.

In 1941 a fortunate series of events brought this masterpiece of Islamic enameled and gilded glass to the Metropolitan Museum. Said to have been acquired by the Austrian vice-consul Champion in Cairo in 1825 (Schmoranz 1898, p. 31), the bottle is one of the earliest enameled objects, if not the earliest, reported in the nineteenth century—well before French, Venetian, and Austrian artists began to imitate this type of glass (see cat. nos. 153–157). Champion dutifully presented his prized possession to the Hapsburg emperor, and the bottle went on display in the Kunsthistorisches Museum. In 1938 it was sold along with other objects to purchase an important thirteenth-century Austrian chalice from a cloister near Innsbruck; it was subsequently acquired by the Metropolitan.

Apart from its astonishing technological accomplishment, evidenced by its size and variety of colors, the most extraordinary aspect of the bottle is its figural decoration. If it were not known that enameled and gilded glass was produced exclusively in Syria and Egypt, the object might well be attributed to Seljuq Anatolia or Iran or to Ilkhanid Iraq or Iran. Its iconography is clearly related to that of extant manuscripts produced by those cultures, such as the illustrations from the *Varqa va Gūlshāh*, of about 1225–50 (Alexander 1996, pp. 64–67, no. 58), and the so-called *Small Shāhnāma*s of the first half of the fourteenth century (Simpson 1979).

Enameled glass of this type was also perhaps influenced, both technologically and artistically, by *mīnāī* pottery, although that relationship has not been investigated thus far. The small figures on the tazza in the Metropolitan Museum (cat. no. 120), for example, bear a close resemblance to those in scenes depicting courtly pastimes on Persian *mīnāī* pottery of the late twelfth and early thirteenth centuries. Not surprisingly, this influence continued after the advent of the Ilkhanids, by which time Mamluk glassmakers had become extremely skilled in applying enamels and gold on glass.

The early Mamluks were fascinated by the imagery that the Ilkhanids, their sworn enemies, brought with them from the east (they also quickly incorporated the artistic traditions that were developing in Iran at almost the same time). The Ilkhanid influence is especially visible in metalwork and in the illumination of Qur'an manuscripts. A typical example here is the phoenix floating in midair, its tail wrapped around the neck of the bottle; deriving from the Chinese *fen-huang*, this bird became the *sīmurgh* of the Ilkhanids and was represented in the architectural decoration of their summer palace at Takht-i Sulaimān in the 1270s.

In the scene fourteen men—each differentiated by costume, weapon, gesture, and attitude—mount their horses, which are made equally distinct by their postures and colors. The result is an extraordinary yet ambiguous composition that could conceivably represent either a series of individual duels or two armies involved in a battle. Most of the horsemen are of the Mongol/Ilkhanid type, but some wear turbans and are supposedly Arabs. In fact, rather than depicting an actual

battle between the Mamluks and Ilkhanids, the scene is more likely the representation of a Mamluk tournament, or *furūsiyya* (horsemanship) exercise, in which some of the horsemen wear Mongol costumes to mimic real duels. From the iconographic point of view, the so-called Baptistère de Saint-Louis, a large basin in the Louvre, can be cited as the equivalent in inlaid metalwork: there, some of the horsemen appear to be Ilkhanid, while others are clearly Crusaders (Behrens-Abouseif 1989; Alexander 1996, pp. 68–71, no. 59; Ward 1999). The Freer Canteen is also relevant in this context (see discussion under cat. no. 123).

A bottle of similar shape and dimensions in the Gazira Museum, Cairo, provides the best parallel for the present object, although its decorative program is less complex and refined, featuring musicians within the large medallions and a main register without a figural scene (Lamm 1929–30, pl. 181:7). A model for both may be a smaller bottle with the same profile, a fluted molded pattern, and a decoration including polo players and the so-called Rasūlid five-petaled rosette (see cat. nos. 131, 132), dating to the third quarter of the thirteenth century and now in Berlin (Porter 1998, fig. 21.6). While it has a different shape, another bottle, excavated in the Caucasus and now in the Hermitage, depicts a sequence of horsemen closely related to those on the present vessel (Kramarovsky 1998, pl. 22.1).

SC

PROVENANCE: Imperial House of Hapsburg, deposited in the Kunsthistorisches Museum, Vienna
LITERATURE: Schmoranz 1898, pls. VI, VII; Migeon 1927, fig. 304; Lamm 1929–30, pl. 186; Dimand 1944b; Aga-Oğlu 1954, fig. 6; Jenkins 1986, no. 48; *The Islamic World* 1987, pl. 34

127. Bottle
Probably Syria, late 13th century
H. 40 cm (15¾ in.), max. diam. 27 cm (10⅝ in.), diam. at rim 6 cm (2⅜ in.)
Brownish colorless glass; blue, red, green, yellow, and white enamels; and gold
Free blown, enameled, and gilded; tooled on the pontil
CONDITION: The object is intact. The surface is in excellent condition, with negligible loss of gilt. The glass contains numerous small bubbles.
Calouste Gulbenkian Museum, Lisbon 2370

This large bottle has a domed profile with a neck that is long, narrow, and slightly flared and a low foot. The decoration, arranged in registers, covers the neck and the entire upper body. The main band of decoration on the neck is made up of three narrow blue bands. The central band is punctuated by two almond-shaped medallions, each of which has a multicolored lobed and pointed flower or leaf in the middle; four smaller circular medallions are framed by the bands. On the body, the central register is framed by two bands that include circular medallions with multicolored three-lobed flowers in the middle, spaced at regular intervals. The main scene depicts two large crouching lions, placed at diametrically opposite ends and set in a landscape of gilded plants against a blue background. Long floating ribbons are attached to the left forepaw of each lion, and two balls with swirling ribbons appear behind them. Each lion has a massive round head—seen frontally, framed by red and green curls, and topped by a knotted floating ribbon—and a collar with a bell attached, a gilded scaly hide, and a long furry tail.

In its profile and dimensions, this large bottle resembles the one in the Metropolitan Museum depicting dueling horsemen (cat. no. 126). The lively epic imagery of that bottle is replaced here by a richly textured, predominantly gilded, and static image of two lions quietly crouching as they stare out at the viewer. The only hints of movement occur in the animals' tails and in the ribbons that float against the dense gold-and-blue vegetal background. If the scene on the New York object is directly influenced by contemporaneous Ilkhanid iconography, there is no doubt that these two lions look entirely Chinese, thus confirming that the ultimate inspiration for Mamluk glass painters came from farther east. The route of transmission, however, was the same—westward through Central Asia to the Iranian world and thence to the Mamluk lands. In the present object, which has a unique iconography among extant vessels, the original source was maintained almost unchanged, being stylized only to a slight degree. The bottle is also one of the few Islamic objects with a reputed Chinese provenance (Hardie 1998, p. 89, fig. 20.4), although this hearsay attribution may be based more on its subject matter than on factual evidence. It is intriguing, nevertheless, to think of this object as a symbolic courier that traveled westward to the shores of the Mediterranean, later to return full circle to China.

It has been suggested that this image of a Chinese lion was transmitted to Islamic glassmakers through the medium of Central Asian textiles (Ribeiro and Hallett 1999, p. 56). Confirming this supposition are a number of silk tapestries, attributed to eleventh- and twelfth-century Central Asia, that show a Chinese lion chasing a ball with floating ribbons attached to it, represented here by the stylized motif suspended above the back of each lion (Watt and Wardwell 1997, fig. 22). The ferocious-looking lion chasing a flaming pearl or a ball with ribbons entered Chinese iconography through western Asian sources at the beginning

of the tenth century and became popular before the advent of the Mongols, who were instrumental in bringing the motif to Central Asia and Iran (Rawson 1984, pp. 113–14, figs. 96, 97). To the Chinese, these seemingly playful lions were guardian figures, but it is unlikely that Mamluk artists regarded them as anything more than an exotic subject to copy. The derivation from textiles, rather than from other media such as painting on silk or lacquerwork, is further confirmed by the textured vegetal background, which is also found on many Central Asian silks (Watt and Wardwell 1997, nos. 19, 22). Finally, the lavish use of gold to depict the lions' fur and the unusual scaled treatment of the fur definitely point to Central Asian and Ilkhanid gold-threaded silks, which influenced similar creations in Mamluk Egypt and Naṣrid Spain (Suriano and Carboni 1999, p. 69).

Apart from the exceptional central register, the decoration on this bottle is almost disappointingly conventional—in every way comparable to the average production during the late thirteenth and the early fourteenth century.

Many bottles of the period resemble the present one in having horizontal registers on the neck and body that depict sketchy pseudo-vegetal decoration outlined in red and punctuated by small medallions with stylized composite flowers. However extraordinary in subject matter and accomplished in the central register, this bottle bears no inscriptions and was probably not meant for a specific patron. If it ever did reach China, it was not as the product of a specific commission but rather as part of the Indian Ocean or the Silk Road trade in extravagant and expensive merchandise. In this case, the creativity of the artist, who evidently had access to and liked to copy subjects depicted on eastern textiles, is restricted to the inspired composition of the main scene; unfortunately, for the remainder of the surface, he reverted to conventional motifs. *SC*

PROVENANCE: Said to have been acquired in China; Comtesse de Béhague

LITERATURE: Lamm 1929–30, pl. 420:1; Hardie 1998, fig. 20.4; Ribeiro and Hallett 1999, no. 10

128. **Beaker**
Probably Syria, late 13th century
H. 33.5 cm (13¼ in.), diam. at rim 20 cm (7⅞ in.), diam. at base 15 cm (5⅞ in.)
Grayish colorless glass; red, blue, green, yellow, and white enamels; and gold
Free blown, enameled, and gilded; tooled on the pontil
CONDITION: The object is intact. The surface is in excellent condition except for some loss of gilt. The glass contains numerous small bubbles.
Calouste Gulbenkian Museum, Lisbon 2378

This large beaker has a cylindrical profile that flares near the top; a protruding flat foot is attached to the base. Two narrow gilded bands, one below the rim and the other around the base, are finely drawn in a laced pattern that ends in pointed crenellations. The enameled decoration on the lower register consists of a stylized marine landscape: a strip of land in red, green, and gold is surrounded by blue-and-gold water in which many fish and a single crab swim. The main scene, filling most of the walls of the beaker, depicts twenty-one birds, three winged insects, and two small red Chinese-style clouds, all floating against the transparent surface of the beaker. Although generally arranged in horizontal rows and having a certain symmetry (the same bird being illustrated twice at diametrically opposite ends), the composition is not rigidly balanced. The birds are painted in various combinations of red, blue, green, yellow, and white enamels; many have spotted bodies. Their features identify them as a *sīmurgh* (phoenix), a vulture, a magpie, a hoopoe, a parrot, a type of crested fowl, two ducks with intertwined necks, and a bird of prey attacking a large duck or goose. The insects, which have antennae, are perhaps butterflies or dragonflies.

Beakers with a curved flaring profile, small base, and comparatively large opening are perhaps the most common enameled and gilded vessels created by Ayyūbid and Mamluk glassmakers. The earliest-known beaker of this type is also the earliest datable example of enameled glass. Now on loan to the Freer Gallery of Art, Washington, D.C., it was made for the sultan Sanjar Shāh, a Jaziran atabeg who ruled in the Mosul region between 1180 and 1209 (see fig. 100; Carboni 1999, pp. 173–74, figs. 3, 4). Such vessels were made in various dimensions, and the few surviving examples that present identical or very similar decorative patterns in different heights and diameters suggest that they were produced as sets of beakers nesting inside one another and matched with a similarly decorated bottle (Piotrovsky and Vrieze 1999, no. 169; Carboni 2001, no. 87). In a few cases, a narrative scene may also have been developed sequentially on beakers from the same set (Carboni 2001, no. 86).

This celebrated beaker in the Calouste Gulbenkian Museum is exceptional both for its dimensions and for its subject matter. Its height and diameter place it among the largest known vessels of this type, matched only by a few others, including a fluted beaker in the Freer Gallery and another beaker in the Bayerisches Nationalmuseum, Munich (Lamm 1929–30, pls. 159:3 and 1, respectively; see also Ettinghausen 1962a, fig. 73, and Ribeiro and Hallett 1999, p. 62). Since these large beakers had bases that were relatively small in diameter, a foot ring was added for better stability—a practical feature that spoiled the elegant profile of the object.

The scene depicted here is unique for enameled glass and as such is difficult to interpret. It is set in the open air, probably on the coast of an island, as indicated by the wavy stripe

of land and the rippled water painted near the base of the vessel. The island is inhabited by a population of fancifully painted birds and insects; two modest red clouds, mirroring the shape of the ripples in the water, indicate the sky. Although the birds are painted in imaginary colors, they can be identified with an acceptable degree of accuracy. Jessica Hallett (Ribeiro and Hallett 1999, p. 67) has suggested that the scene was inspired by the illustrations of individual or paired birds found in scientific manuscripts, particularly a Mamluk copy of the *Kitāb manāfiʿ al-ḥayawān* (The Book on the Usefulness of Animals), a bestiary attributed to Egypt and dated 1354. Although the parallel is certainly valid, a more likely source of inspiration, judging from the demonstrated influence of Ilkhanid models on Mamluk glass painters (see cat. nos. 126, 127), can be found in earlier copies produced in Iran, including a well-known bestiary in the Pierpont Morgan Library, New York, and a number of dispersed folios from another contemporaneous manuscript (Schmitz et al. 1997, pp. 9–24, no. 1, pls. 1–4, figs. 1–38). Copies of al-Qazvīnī's *Kitāb ʿajāʾib al-makhlūqāt wa gharāʾib al-mawjūdāt* (The Wonders of Creation and the Oddities of Existence), a cosmography compiled in the third quarter of the thirteenth century and containing a section on the animal kingdom, are also relevant in this context (von Bothmer 1971; Carboni 1989 and 1992).

In addition to the parallels with pseudoscientific manuscripts, the overall composition and the presence of a waterscape may also indicate that this congregation of birds has a narrative meaning. The most immediate analogue is Farīd al-Dīn ʿAṭṭār's *Manṭiq al-ṭayr* (Conference of the Birds), a twelfth-century Sufi parable in which the protagonists are various kinds of birds, led by Solomon's sacred bird, the hoopoe (Rypka et al. 1968). The earliest extant painting illustrating this story is a miniature that was added to a late-fifteenth-century manuscript in about 1600, when it was rebound for the Safavid shah ʿAbbās I (Metropolitan Museum 63.210.11; *The Islamic World* 1987, pl. 79). Except for the complex rocky background in the illustration, the types of birds and the composition (including the stream of water) are similar to those on the beaker. Unfortunately, no Ilkhanid

Cat. no. 128, additional view

copies of the *Manṭiq al-ṭayr* have survived to confirm a direct influence, but the resemblance is nevertheless striking.

Tales featuring birds were also common among Arab geographers. For example, the late-fourteenth-century miscellaneous manuscript *Kitāb al-bulhān* in the Bodleian Library, Oxford, contains an illustration of the story "Mountain of the Birds." Located in Upper Egypt near the Nile, this mountain was said to have on its summit a small building that once a year magically attracted birds from all over the world (Carboni 1988, pp. 89–90, pl. 50).

The uniqueness of the decoration and the absence of inscriptions make it impossible to know whether the painter copied the scene with full awareness of its meaning or whether he was simply told to select some image from available miniature paintings. As often happened with enameled glass objects, however, the result proved to be extraordinary.

SC

PROVENANCE: Said to have been found in China; Emorfopoulos collection
LITERATURE: Lamm 1929–30, pl. 181:6; Kühnel 1963, pl. 1; Kühnel 1970, fig. 180; Pinder-Wilson 1976a, fig. 4; Pinder-Wilson and Ezzy 1976, no. 142; Tomobe 1992, pl. 158; Ribeiro and Hallett 1999, no. 1

129. The Cavour Vase
Probably Syria, late 13th century
H. 24.5 cm (9⅝ in.), max. diam. 19.5 cm (7⅝ in.)
Dark blue glass; green, red, white, blue, and yellow enamels; and gold
Free blown, enameled, and gilded; tooled on the pontil
INSCRIPTION: in kufic script, below rim,

عز لمولانا الملك السلطان

(Glory to our lord the sultan.)

in *naskhī* script, around neck,

اعز لمولانا الملك المجاهد المرابط المثاغر سلطان الاسلام والمسلمين قامع الكفر محي العدل في العالم

(Glory to our lord the king, the holy soldier, the defender, sultan of Islam and the Muslims, tamer of unbelievers, possessor of justice in the world.)

in *naskhī* script, around middle of body,

أعز لمولانا السلطان الملك العالم العامل المجاهد المرابط الملك العالم العادل المجاهد المرابط المثاغر المظفر المتوكل المنصور سلطان الإسلام العامل العادل المجاهد المرابط المثاغر المتوكل المنصور سلطان الاسلام والمسلمين قامع الكفر والمشركين محي العدل في العالم

(Glory to our lord the sultan, the king, the learned, the doer, the holy soldier, the defender, the king, the learned, the just, the holy soldier, the defender, the pious, the victorious, trusting in God, the triumphant, sultan of Islam, the doer, the just, the holy soldier, the defender, the pious, trusting in God, the triumphant, sultan of Islam and

the Muslims, tamer of unbelievers and polytheists, possessor of justice in the world.)

CONDITION: The neck of the object was broken and has been repaired, but the remainder is intact. The gather of glass at the bottom probably represents a repair made before the object was placed in the annealing kiln. The surface is in good condition, although there is some loss of enamel and gilt. The glass contains numerous small and large bubbles.

Museum of Islamic Art, Qatar

This pear-shaped vase rests on a low splayed foot; it has a short curved neck that flares at the opening and ends in a rounded thickened rim. In addition to the pontil mark under the base, there is a gather of glass off center at the bottom of the vessel. The decoration is arranged in a series of registers indicated by gilded bands. The uppermost band on the neck bears an inscription in white enamel set against a scrolling background. A narrow inscription was copied in gold at the base of the neck. The shoulder band presents six complex, symmetric vegetal compositions in white, blue, and red against a scrolling gilded background; three of these elements are included, alternately, within a pointed lobed yellow frame. The register below the shoulder is decorated with twelve similar complex vegetal elements in the same combination of colors, and six of these are framed, alternately, within an eight-lobed red band; the motifs are arranged in close proximity, so that the gilded scrolls provide a continuous background. Below are a narrow trellis motif and a calligraphic band in the same hand as that on the neck. The widest band, on the lower body, bears three other complex symmetric elements against gilded scrolling patterns; alternating with these are three large green parrot-like birds (see detail on following page), each with a long bifurcated tail, red beak and legs, spread wings, and head turned backward. Another band just above the base shows a crenellated pattern composed of semicircular white elements with gold or red dots on top.

Although it was one of the earliest documented enameled-glass vessels,

the Cavour Vase did not become famous until it reappeared in the late 1980s on the art market in London. It was traditionally thought to have been brought to France from the Holy Land (Lamm 1929–30, p. 293), and its inscriptions were deciphered for the first time in an 1861 letter addressed by the Sicilian scholar Michele Amari to the owner of the vase, Camillo Benso, count of Cavour (Lavoix 1887, p. 490; Guidi 1899, p. 40; Newby 1998, p. 36). At the count's death, in the same year, the vase entered the collection of his niece's husband, Marchese Carlo Alfieri di Sostegno, who exhibited it in Florence in 1878 and bequeathed it to Queen Margherita of Italy in 1897. It remained in the collection of the royal family of Savoia after the declaration of the Republic of Italy in 1947 until it was put on the market. When published by Lamm (1929–30, pl. 110), the vase was encased in a gilt-silver cage, comprising some sixteenth-century elements, that had been assembled in the nineteenth century for its protection and display. This disguise made the object almost unrecognizable when it appeared for sale, and it attained a certain notoriety when a number of experts saw it as a nineteenth-century imitation of Mamluk enameled glass.

The authenticity of this spectacular object is guaranteed, however, by its documentation in 1861—that is, a few years before any European glassmaker acquired the technical skill necessary to create such a work (see cat. nos. 153–157). Art-historical considerations, as well as technological and chemical investigations, have further confirmed the attribution to the thirteenth or fourteenth century (Newby and Sheppard 1991; Newby 1998). Within this range, the vase has been dated from about 1240 (Lamm 1929–30, p. 293) to the second half of the fourteenth century (Lavoix 1887, p. 491). Recent scholarship has suggested a

Cat. no. 129, detail

dating to about 1350–75, which is based principally on the similar inscriptions and decoration on a gilded blue jug in the Ashmolean Museum, Oxford, that includes the name of the sultan Ṣalāḥ al-Dīn Muḥammad (r. 1361–63) (see Newby 1998, p. 37, pls. 10.12, .13).

Yet there are other considerations that make an earlier attribution equally plausible. While the most immediate parallels for the profile of the vase can be found in Syrian pottery (Jenkins et al. 1983, figs. 20, 21), the most telling comparison is to the so-called Barberini Vase, a celebrated silver-inlaid wine jar in the Louvre (Alexander 1996, pp. 160–61, no. 128). This large unique vase, which is dedicated to the Ayyūbid sultan Ṣalāḥ al-Dīn II (r. 1237–60), has different proportions but a similar decorative program, including polylobed medallions and long eulogic inscriptions in both kufic and *naskhī* scripts. Complex inscriptions invoking the heroic and pious attributes of the ruler first became common in the early thirteenth century in Ayyūbid Syria and the southeastern Anatolian region ruled by the Seljuq atabegs and continued later under the Mamluks. Here, the text and calligraphic style accord better with a thirteenth-century attribution.

In addition, the bold polychrome vegetal scrolls, further highlighted by the deep blue color of the vase itself, are consistent with the decorative language of that century. Of the numerous dark blue or purple glass vessels that Martine Newby (1998, pp. 37–39) lists as comparable to the Cavour Vase, only two are datable: a spheroconical drinking bottle of about 1295–96 in the Victoria and Albert Museum (cat. no. 130) and the previously mentioned gilded jug of 1361–63 in the Ashmolean. Neither of these objects is truly comparable on stylistic grounds to the much more accomplished vase. Nevertheless, the bottle and a small jug in a private collection (Kunz 1981, no. 632) do present similar pointed lobed patterns and simpler versions of the polychrome vegetal

Fig. 104. Fragment of vessel. Egypt or Syria, 13th century. Purple glass; red, white, and blue enamels; and gold. The Corning Museum of Glass 96.1.1

scrolls with crescent-shaped pointed tops; a dark purple fragment in The Corning Museum is similarly decorated (fig. 104). These vessels probably represent a terminus post quem rather than ante quem for the vase.

The three green birds illustrated on the vase have not been securely identified. Perhaps exotic parrots or parakeets with the tails of lyrebirds, or else birds of paradise, they may have originated in China, initially during the Tang dynasty (Michaelson 1999, pp. 97–98). Similar birds, although clearly identified as parrotlike, also appear on a bottle in the Metropolitan Museum and a beaker in Lisbon (cat. nos. 125, 126). Furthermore, the open wings and head turned backward are reminiscent of illustrations of the phoenix (Arabic *qūqīs*) in late-thirteenth- and early-fourteenth-century manuscripts (Carboni 1992, p. 263, pl. 20). That symbol of immortality and hope was reborn from the fire, and perhaps this extraordinary work of art—itself born from fire and ash—was meant to carry the same message.

SC

PROVENANCE: Said to have been brought to Europe from the East by the d'Allinges family; Camillo Benso, count of Cavour; Marchese Carlo Alfieri di Sostegno; Italian royal family of Savoia

LITERATURE: Lavoix 1887, fig. p. 489; Guidi 1899; Lamm 1929–30, pl. 110; Newby and Sheppard 1991; Newby 1998

130. **Spheroconical Container**
Egypt or Syria, ca. 1295–96
H. 15.3 cm (6 in.), max. diam. 10.7 cm (4¼ in.)
Dark purple glass; white, red, and pale blue enamels; and gold
Free blown, enameled, and gilded; tooled on the pontil
INSCRIPTION, in *naskhī* script:

عز لمولانا السلطان الملك الأشرف ابو الفتح عمر
ولد السلطان الملك المظفر

(Glory to our lord, the sultan, the ruler, al-Ashraf Abū al-Fatḥ ʿUmar, son of the sultan al-Malik al-Muẓaffar.)
CONDITION: The object is intact. The surface is in good condition, although only a few traces of gilt remain.
Victoria and Albert Museum, London
C153–1936

This heavy vessel has a spheroconical shape, the upper section almost hemispherical and the lower pointed at the base; the cylindrical bulged neck tapers toward the narrow opening. The decoration below the shoulder consists of an inscription in white enamel against a background of gilded scrolls and six-pointed star patterns. Between the shoulder and the neck three floral motifs, each topped by a crescent and a pointed circle, alternate with circular medallions having fields divided into small multicolored triangular patterns. The lower section of the vessel bears three similar floral motifs that alternate with pointed circles; scrolling gold motifs fill the background.

The function of so-called spheroconical vessels, most of which are heavy ceramic containers, has long been the subject of debate and is still not entirely clear. Archaeological, technical, epigraphic, and/or literary evidence has thus far established three different functions for these objects. Some were aeolipiles, the primitive steam-driven apparatuses also known

as fire blowers (Rogers 1969); others were vessels for quicksilver, which was widely traded in the medieval Islamic world and required sturdy containers for safety (Ettinghausen 1965). The majority were probably a type of drinking vessel called a *fuqqāʿa*, made to contain a fermented drink similar to beer (*fuqqāʿ*), which gushed out from the narrow opening after the cloth or skin sealing it was pierced. The neck and the opening were designed to make the action of drinking more comfortable (Ghouchani and Adle 1992), while the overall shape allowed for safer transportation, storage in a bed of straw, and rapid cooling of the liquid when the vessel was inserted into crushed ice. Other hypotheses, all now obsolete, have interpreted these objects as hand grenades, containers for holy water (*zemzemiyya*), or loom weights.

Spheroconical containers in glass, less common than ceramic examples, survive in limited numbers in public and private collections. Although they are most often undecorated, some are molded, marvered, or enameled and gilded (see, for example, Mostafa 1959; Ettinghausen 1965, pls. 46b, 47a; Marchal et al. 1971, no. 287; von Saldern et al. 1974, nos. 745, 746; Maddison and Savage-Smith 1997, nos. 210, 211; Carboni 2001, no. 53b). While the walls are generally solid and thick, they are not as sturdy as those of their ceramic counterparts; it is therefore probable that glass spheroconical objects were used mainly as containers for *fuqqāʿ*, wine, and unfermented juices, and perhaps also for perfumes and essences.

In addition to this container, there are two other extant enameled and gilded *fuqqāʿāt*, one in the Louvre and the other in the Museum of Islamic Art, Cairo (Porter 1998, fig. 21.1, and Mostafa 1959, figs. 3–7, respectively). Although the present object is dark purple and the Louvre vessel is made of clear glass, their decorative programs are comparable and both bear inscriptions dedicated to the Rasūlid sultan of Yemen, al-Malik al-Ashraf ʿUmar II ibn al-Muẓaffar, who reigned for less than one year in 1295–96. The Louvre inscription includes a longer titulature, giving Ashraf's genealogy back to Rasūl, the founder of the dynasty (Van Berchem 1904, p. 45). A writer, astronomer, and artist, Ashraf was also the maker of a well-known astrolabe, now in the collection of the Metropolitan Museum (91.1.535a–h).

The Mamluks had close diplomatic ties to the Rasūlids, principally because of mutual trade interests in the Indian Ocean. Mamluk artists are known to have created about fifty inlaid-metalwork and glass objects for the Rasūlids, either as diplomatic gifts from Mamluk sultans or as specific commissions from the Rasūlids (Porter 1987; see cat. no. 132). Although made for a Rasūlid sultan, this vessel and the one in the Louvre do not bear the customary emblem of the dynasty (a five-petaled rosette); there is instead a circular medallion divided into small red, white, and black triangles. While this pattern is unique—it does not appear, for example, on the astrolabe Ashraf made when he was still an heir to the throne—its presence on two objects created for the sultan after his accession cannot be coincidental. Most likely, it is a personal emblem of this short-lived ruler rather than a decorative motif (see Porter 1998, p. 93, for the latter interpretation).

The spheroconical glass object in Cairo, datable to about 1293 and dedicated to the Mamluk emir Altunbughā, confirms the popularity of this particular type of vessel at the end of the thirteenth century. Whether it was a personal drinking vessel for intoxicating drinks (ʿUmar possessed at least two) or was used to store other liquids is still a matter of speculation. In either case, it seems to be symbolic of courtly pastimes, particularly those involving libation.

SC

PROVENANCE: Said to have been acquired in an Egyptian port from a merchant from Yemen; Wildred Buckley

LITERATURE: Lamm 1931; Buckley 1939, no. 92; Newby 1998, fig. 10.1

131. **Handled Vase**
Egypt or Syria, ca. 1310–30
H. 30.2 cm (11⅞ in.), max. diam. 16.2 cm (6⅜ in.)
Yellowish colorless glass; yellowish stain, red, blue, white, green, and yellow enamels; and gold
Free blown, applied, enameled, and gilded; tooled on the pontil
INSCRIPTION, in vertical *thuluth* script, repeated on body: العالم (the learned)
CONDITION: The object is intact except for the loss of a top loop from one handle, which has also caused a chip at the neck. The surface is lightly weathered, resulting in a light milky white film, and there has been some loss of gilt. The glass contains numerous small bubbles and some large ones.
The Corning Museum of Glass
55.1.36

This pear-shaped object has a low splayed foot ring and a long neck that flares widely at the rim, which is folded outward. Two snakelike handles were applied from the shoulder to the neck at opposite sides, the attachment at the shoulder being in the shape of a pointed medallion. The decoration is divided into a series of registers. Below the rim are four rows of diagonally arranged gilded fish, outlined in red and alternating directions from row to row; the same pattern is found in the lowermost register. The central band on the neck, framed by two smaller bands of scrolling patterns with blue dots, includes two small circular medallions located on opposite sides; each medallion contains a six-petaled rosette painted with yellowish stain on the interior wall against a red enameled background drawn on the exterior wall. A complex vegetal pattern in red, blue, white, green, yellow, and gold fills the space outside the medallions. The band at the base of the neck contains four larger medallions, two between each handle; each medallion includes a blooming polychrome peony, and scrolling vegetal patterns highlighted in blue fill the background within and outside the medallions. Two large concentric medallions bearing vegetal patterns with blue dots interrupt the calligraphic band on the body.

Five other spectacular objects have the same profile and similar dimensions as the present vase: two in the al-Sabah Collection, Kuwait

National Museum (Carboni 2001, no. 98a,b) and one each in the Metropolitan Museum (Lamm 1929–30, pl. 184:2), the Gazira Museum, Cairo (Hamdy et al. 1969, no. 174; Porter 1998, p. 93), and the Treasury of the Cathedral of Saint Anne, Apt, Vaucluse (Magne 1913; Bussagli and Chiappori 1991, pl. 12; Rogers 1998, fig. 17.2). The shape has no known parallels in Mamluk metal or ceramic production, and it has been suggested that the glassmakers were inspired by Chinese celadon vases, the applied snakelike handles being seen as derivations of the originals' dragon handles with pendent rings (Rogers 1998, p. 72). Nevertheless, whether influenced or not by Chinese models, snakelike handles had become common by the thirteenth century on late Ayyūbid and early Mamluk glassware. Moreover, the profile of these vases may equally be understood as a variation of that of the mosque lamp (see cat. nos. 114, 115), adapted for use as a pouring vessel. The creativity of Mamluk glassmakers, demonstrated on many occasions, should not be underestimated in this case.

With the exception of the extraordinary vase in France, which bears an overall decoration of large peonies and other flowers in reserve against a blue background (suggesting a mid-fourteenth-century attribution; see cat. no. 118), all the objects have similar decorative programs, divided into horizontal registers. Although there are many variations and each vase is unique, the recurrence of certain features—circular medallions, scrolling vegetal patterns, and nonspecific inscriptions—indicates a limited area and period of production. The most accomplished and pleasing from the decorative standpoint, the Corning piece distinguishes itself from the other four, which form a more homogeneous group. A well-balanced, successful composition is here achieved by the lively schools of fish at the top and bottom, the prominent (though repetitive) inscription, the heraldic six-petaled rosette, and the staggered circular medallions, which enlarge proportionally along with the body.

L. A. Mayer interprets the rosette, also present on a lamp in the Victoria and Albert Museum (Lamm 1929–30, pl. 200:2), as the emblem of several Mamluk emirs. One of these, Kāfūr al-Rūmī, was a governor of the fortress of Damascus who died in 1285 (Mayer 1933, pp. 135–36); another, Sayf al-Dīn Bahādur Ās, held office in Damascus and in Safad, Syria, from 1311 until his death in 1329 (Mayer 1933, pp. 93–94; Meinecke 1992, vol. 2, p. 129, no. 119). The decoration and colors of the Corning vase, along with the absence of a dedication, seem to place it between the latter two dates, in the second or third decade of the fourteenth century. The similar vase in Cairo is inscribed with a series of titles that may suggest it was dedicated to al-Malik al-Mujāhid ʿAlī, Rasūlid sultan of Yemen (r. 1321–63; see discussion under cat. no. 132). Although the five-petaled rosette of the Rasūlids does not appear in its decoration, the inscription would further confirm the attribution of the group to the second quarter of the fourteenth century. *SC*

PROVENANCE: Tigrane Pasha, Cairo
LITERATURE: Schmoranz 1898, pl. V; Lamm 1929–30, pl. 179:8; Vavra 1954, pl. 35; Charleston 1990, opp. p. 80, no. 32; Tomobe 1992, pl. 167; Rogers 1998, fig. 17.3

132. **Bowl**
Probably Egypt, ca. mid-14th century
H. 17.8 cm (7 in.), max. diam. 36.8 cm (14½ in.)
Grayish colorless glass; red, white, blue, yellow, and green enamels; and gold
Free blown, enameled, and gilded; tooled on the pontil
INSCRIPTION, in *thuluth* script on main register:

عز لمولانا السلطان الملك المجاهد علي بن داؤود
عز نصره

(Glory to our lord, the sultan al-Malik al-Mujāhid ʿAlī ibn Dāwūd, may His victory be glorious.)
CONDITION: The object is intact. The surface is in good condition except for some loss of gilt. The glass contains numerous small bubbles and several larger ones.
The Toledo Museum of Art, Purchased with funds from the Libbey Endowment, Gift of Edward Drummond Libbey 1944.33

This large hemispherical bowl rests on a low attached foot and has a thickened slightly splayed rim. The decoration, all painted on the exterior wall, is organized in a series of registers. A six-pointed star encircled by a polygonal radiating pattern surrounds the foot; above it is a narrow band with sketchy vegetal patterns and gilded birds outlined in red. A similar sketchy decoration is found on a narrow band just below the rim. The largest register contains a gilded inscription set within three cloudlike blue medallions; separating these are concentric circular medallions each containing a red five-petaled rosette in the center. Four polychrome pointed flowers, or leaves, surround the medallions. The rim is gilded.

The spheroconical vessel dedicated to the sultan al-Malik al-Ashraf ʿUmar II, who ruled from 1295 to

1296 (cat. no. 130) is among the group of works that Mamluk craftsmen in Cairo created for export to the Rasūlid court of Yemen, either as gifts from the Mamluk sultans or as a consequence of direct Rasūlid patronage. The present large bowl belongs to the same line of production, which was principally in inlaid metalwork but also extended to glass and textiles. Venetia Porter (1987, p. 236, and 1998, p. 93) lists ten glass vessels and one fragment made for the Rasūlid court, identifying them as such because they include an inscribed dedication and/or the five-petaled rosette commonly identified as the emblem of that dynasty. Two of these are dedicated to al-Ashraf ʿUmar II (see discussion under cat. no. 130), three to his successor, al-Malik al-Muʾayyad Dāwūd (r. 1296–1321), and four—including the present bowl and a handled vase in Cairo (see discussion under cat. no. 131)—to al-Malik al-Mujāhid ʿAlī (r. 1321–63). Of the remaining two objects, which bear the five-petaled rosette but no dedication, a fluted bottle in Berlin (I.2573; Porter 1998, fig. 21.6) is probably the earliest, for its decoration suggests a dating to the reign of al-Malik al-Muẓaffar Yūsuf (r. 1250–95). Authors of the period report that the rosette was usually red on a white background within a circular medallion, although this color scheme is reversed in two of the extant objects and a gilded background appears in another.

The four vessels dedicated to the sultan al-Mujāhid are all large and decorated in a rather simple manner, although they do not seem to belong to matching sets and were created at different times. Two of these, in the Freer Gallery of Art, Washington, D.C., are a long-necked bottle (Lamm 1929–30, pl. 180:7; Ettinghausen 1962a, fig. 87; Porter 1998, fig. 21.3) and a bowl (Lamm 1929–30, pl. 179:9; Ettinghausen 1962a, figs. 78–85; Porter 1998, colorpl. H, fig. 6.8), both ornamented with red rosettes and short inscriptions containing only al-Mujāhid's name and not his genealogy. The handled vase in Cairo has a simple inscription mentioning the sultan's name, but it has no rosettes and its attribution is therefore somewhat tentative.

The present bowl bears the customary simple inscription set within cloudlike medallions having blue backgrounds (the same type of inscribed medallion would become common on metalwork during the second half of the fourteenth century, continuing until the demise of the Mamluk dynasty in 1517). Although painted on the exterior wall, the large inscription is properly legible only by looking inside the vessel from the top, probably because the open shape of the bowl facilitated this way of reading. It also can be read, when the light hits it from above, as a projected shadow on the ground—a fascinating characteristic that, whether deliberate or not, makes al-Mujāhid's

Cat. no. 132, additional view

name "extend" beyond the physical limits of the glass surface. The six-pointed star at the bottom of the bowl is not often encountered on enameled glass, but a few examples can be cited, such as one in the L. A. Mayer Museum for Islamic Art, Jerusalem (Lamm 1929–30, pl. 161:1, 2); it should not be regarded as a particularly meaningful motif. A comparison among the four vessels bearing al-Mujāhid's name suggests that the Toledo bowl is probably the most recent and can be attributed to the last decade or so of his reign. *SC*

PROVENANCE: George Eumorfopoulos; Edward Drummond Libbey
LITERATURE: Lamm 1929–30, pl. 180:9; Corning Museum 1982, fig. p. 166; Porter 1987, fig. p. 238; Porter 1998, fig. 21.4

133. **Footed Bowl with Lid**
Probably Egypt, mid-14th century
H., with lid, 25.4 cm (10 in.), max. diam. 16.5 cm (6½ in.)
Brownish colorless glass; blue, red, white, yellow, and green enamels; and gold
Free blown, applied, enameled, and gilded; tooled on the pontil
INSCRIPTION, in elongated *thuluth* script: on lid, last word repeated,

السلطان الملك . . . العالم . . .

(The sultan, the king . . . the learned)

on bowl, repeated, العالم (the learned)
CONDITION: The object is intact, and the two parts clearly belong together. The surface is in good condition except for extensive loss of gilt. The glass contains numerous small bubbles and some large ones.
The Toledo Museum of Art, Purchased with funds from the Libbey Endowment, Gift of Edward Drummond Libbey 1970.56ab

This large bowl with a separate lid has a flattened rounded profile and a diameter that narrows considerably toward the top; its rim is thick and slightly splayed. A splayed foot with a bulge on the upper section and a rim folded downward was attached to the base of the bowl; the domed upper section of the lid, showing a bubble inside the spherical top, was blown and then attached to the lid. The lid, a low flattened dome topped with a small onion-shape, has a wide tooled flange and a protruding ring at the base that allow it to rest inside the opening of the bowl. A large pontil mark containing traces of metal is visible at the attachment of the foot and bowl; a second such mark appears at the top of the lid.

The decoration on the bowl is divided into a series of registers. The main band, framed by narrow bands with sketchy motifs in red, bears a gold inscription outlined in red against a blue background interrupted by four circular medallions, each of which contains a multicolored peony drawn against a scrolling background. The underside of the bowl bears four similar medallions alternating with curved trapezoidal figures filled with vegetal motifs in red. Two narrow bands with abstract decoration and four small polychrome flowers appear on the foot. The decoration on the lid, showing a calligraphic register framed by two narrow bands, is similar to that on the upper body. The top is decorated with three stylized pointed shields, the same small flowers appearing on the foot, and two-colored circular buds, or leaves, against a scrolling red background.

The present object is one of only two intact enameled and gilded footed

bowls with covers to have survived; the other, which is larger (h. 31.1 cm [12¼ in.], max. diam. 21 cm [8¼ in.]), is in the Freer Gallery of Art, Washington, D.C. (Ettinghausen 1962a, figs. 74–77). However, a small number of similar bowls without lids, called tazzas (cat. no. 120), and of lids without matching bowls (such as one in the Victoria and Albert Museum, London [334-1900]) demonstrate that this type of vessel was not a rarity.

Although the objects in Toledo and Washington are decorated differently, their profiles, proportions, and construction are identical and clearly indicate that they were created in the same workshop. Notwithstanding the monumentality of the present vessel and the extraordinary technical skill required to make it, the decoration is so standard and the inscription so repetitive as to reveal scarce creativity on the part of the painter, as well as a lack of direct patronage. Although the inscription on the lid begins with the words "the sultan, the king," it is far from meaningful; in fact, the endless repetition of "the learned" (*al-ʿālim*), with its rhythmic recurrence of elongated letters, probably served the purpose of nicely filling the larger registers on the lid and bowl.

While it does not include inscriptions, the bowl in Washington is enlivened by its decoration, in which sequences of winged animals seen in profile are alternated with circular medallions containing phoenixes. Like its counterpart in Toledo, it can be regarded as a standardized creation, but its decoration—comparable to that on a large bowl in the same collection made for the Rasūlid sultan al-Malik al-Mujāhid ʿAlī (r. 1321–63) (see cat. no. 132)—provides a clue toward a more precise attribution for both bowls.

Usually described as a sweetmeat bowl, the tazza covered with a domed lid became popular in the Ayyūbid and Mamluk periods but was also common in Iran in the thirteenth century; examples in inlaid metalwork include the Vescovali Vase and the Wade Cup (Ward 1993, fig. 10, and Rice 1955, pls. I, II, respectively). Such objects exist in glass with trailed and marvered decoration (Jenkins 1986, no. 50) as well as undecorated, with a missing lid (Atıl 1981, fig. 59). Considering that this type of vessel was also common in medieval Europe, both as a chalice and as a libation cup, it must be regarded as one of the most successful and long-lived forms ever to have crossed the boundaries of various cultures.

SC

PROVENANCE: Edward Drummond Libbey

LITERATURE: *JGS* 13 (1971), p. 141, no. 34; Corning Museum 1982, fig. p. 166

134. Candlestick
Probably Egypt, ca. 1340–65
H. 22.2 cm (8¾ in.), max. diam. 20.6 cm (8⅛ in.)
Brownish colorless glass; red, blue, pale green, and white enamels; and gold
Free blown, applied (candleholder), enameled, and gilded; tooled on the pontil
INSCRIPTION, in *naskhī* script, repeated three times, with "the sovereign, the learned" written a fourth time at the end:

[ا]عز لمولانا العالم العادل المجاهد المرابط
المثاغر المويد المظفر المنصور الملك العالم العادل
المجاهد المرابط المثاغر المويد المظفر المنصور
الملك العالم العادل المجاهد المرابط المثاغر المويد
المظفر المنصور الملك العالم

(Glory to our lord, the sovereign, the learned, the just, the holy warrior, the defender, the protector of the frontiers, the fortified [by Allāh], the triumphant, the victorious.)
CONDITION: The object is intact except for a deep crack on the upper side that runs along the perimeter of the body. The surface is in good condition except for some loss of gilt and deterioration of enamel. The glass contains numerous bubbles.
The Corning Museum of Glass, Acquired with funds from the Clara S. Peck Endowment 90.1.1

This object consists of a hollow, slightly tapered conical base topped by an attached cylindrical candleholder. Three protruding rings have been tooled or applied to the center of the candleholder, to the shoulder, and near the bottom. The base of the candleholder bears a large pontil mark, indicating that the object was tooled with the pontil inserted inside the base. The area between the base of the candleholder and the shoulder was sunken when the two pieces were joined; it is decorated with lobed compartments filled with scrolling and floral patterns in white and red enamels. The lower half of the candleholder is ornamented with an interlaced vegetal scroll in gold. The largest register on the body of the candlestick shows a complex geometric composition made up of octagons, stars (both five- and eight-pointed), and elongated hexagons, each filled with either a small circle, a whirling rosette, or a spadelike motif. Red enamel and gold were used for the outlines of the composition; blue, red, white, and almost turquoise pale green enamels were employed in addition to gold in order to fill the small areas. A calligraphic band, drawn in gold against a red background (the latter painted on the interior wall) just above the protruding ring, forms a sort of base for the main decoration. Another narrow band at the base contains a scrolling pattern in gold against a blue background.

Only two enameled and gilded glass candlesticks have survived; the location of one of these, said to have been found in China and once owned by George Eumorfopoulos, is unknown (Fry 1910, pl. 2:1; Hardie 1998, fig. 20.5). The second, the Corning work, passed through the hands of various members of the Rothschild family in Paris from the end of the nineteenth century until World War II. The two objects are similar only in their shape, which had long been established in Islamic inlaid metalwork. They are decorated somewhat differently, and the Corning candlestick is most likely several decades more recent.

The polychrome enamels and the gilt cover the surface here to such a great extent that the underlying honey-colored glass is barely visible. At first, several features suggest an attribution to the mid- or late thirteenth century: the overall covering of the surface, the gold calligraphic band copied against a red background painted on the interior wall, and the predominantly red and white lobed compartments drawn on the section surrounding the candleholder. Yet the main geometric decoration and the text of the inscription argue for a fourteenth-century date—proof that a number of decorative motifs were passed from one century to the other.

Originating from an eight-pointed star that expands into an eight-armed polygonal figure, the main geometric pattern creates a repetitive mesh made up of regular elongated hexagons and five-pointed stars. The earliest examples of such patterns are found in the illuminated frontispieces and finispieces of Qur'an manuscripts from Mamluk Egypt that date to the second decade of the fourteenth century, which thus represents a terminus ante quem for works in other media. The very first of these Qur'ans, having a central twelve-pointed star motif in its double-page finispiece, is dated 1313 (James 1988, fig. 38). Soon becoming extremely popular for its endless decorative possibilities, the motif was ubiquitous in Mamluk art of the later fourteenth and the fifteenth century, during which time it was exported to the Maghrib and Andalusia. The most outstanding

works to employ this pattern are the mosaics (both in stone and in wood inlaid with ivory or bone) that were created for mosque furniture and architectural decoration, and the Corning candlestick may well have been used in a religious setting. Nevertheless, Qur'an illumination remains the main inspiration for the decoration on this object: not only does it make use of the polychrome common to both media, but some of its octagons contain the stylized whirling-rosette motif that was often used as a verse separator in Mamluk Qur'ans.

Although the cursive calligraphic style of the inscription does not point to any specific period in Mamluk history, the long and repetitive text is another feature suggesting a fourteenth-century attribution. Although, curiously, the word "sultan" is not present, the sequence of epithets and the word *al-malik* (the ruler) leave no doubt that the object was dedicated to a Mamluk sultan. The combination of one of the epithets, *al-manṣūr* (the victorious), with *al-malik* implies that the candlestick was made for one of four sultans who bore both names and ruled from 1341 to 1382 (Bosworth 1996, pp. 76–77). The choice is narrowed by a small blue jug in the Ashmolean Museum, Oxford, that has a gilded inscription of similar content and style including the name Muḥammad, which clearly refers to the ruler who reigned between 1361 and 1363 (see discussion under cat. no. 129). The candlestick may have been made for that sultan or for an earlier al-Malik

al-Manṣūr who ruled briefly in 1341; art-historical considerations argue against its belonging to the period of the other two sultans with the same name, who reigned after sultan Sha'bān II (r. 1363–77).

SC

PROVENANCE: Alfred de Rothschild; Alphonse de Rothschild; Édouard de Rothschild; Sotheby's, London, sale, April 25, 1990, lot 355
LITERATURE: Schmoranz 1898, figs. 34–36; Lamm 1929–30, pl. 126:17; Hoare 1985, pp. 168–69; *JGS* 33 (1991), cover

135. **Spittoon or Basin**
Probably Egypt, ca. 1350
H. 17.1 cm (6¾ in.), max. diam. 31.8 cm (12½ in.)
Brownish colorless glass; red, white, and blue enamels; and gold
Free blown, enameled, and gilded; tooled on the pontil
CONDITION: The object is intact. The surface is in good condition, with most of the gilding and enameling still in place. A small bulge in the rim is probably due to inaccurate tooling. The surface contains numerous small bubbles.
The Cleveland Museum of Art, Purchase from the J. H. Wade Fund 1944.235

This object has a flat base that curves at the edge, a tapered body that narrows considerably toward the opening, and a large outsplayed neck with a rim that folds onto the outside wall. The decoration is divided into a series of registers. The two widest bands, on the body and the neck, each contain five large medallions. The enameling on the neck was applied on the upper side (the interior) of the wall; that on the other main band, as well as on the remainder of the decoration, was painted on the exterior wall. Each medallion is decorated with a complex star pattern in the shape of a twelve-pointed star: from a central six-petaled gilded rosette surrounded by an area of white enamel, the pattern branches out into sectors filled in blue, red, and gold; small cloverlike motifs in gold fill the larger blue sectors. Between the medallions there are

complicated scrolling vegetal motifs in white and gold set against a blue background. Bands near the rim, at the narrowest diameter, and near the base each contain a wavy crenellated motif in blue against a gold background.

The geometric decoration inside the large circular medallions here clearly relates to the pattern on the Corning candlestick (cat. no. 134), and the two objects must therefore be nearly contemporary. In this large vessel, the pattern—a twelve-armed polygon originating from a central star—is easier to visualize because it is framed by the circumference of the medallion. Although large and prominent, the medallions are well balanced within the decorative composition, alternating with complex interlaced vegetal scrolls and narrow bands bearing a quasi-architectural crenellated motif (one of the latter marks the transition between the body and the constricted neck).

The best parallel for the decoration of this vessel is a shallow circular plate in New York bearing four circular medallions that loop around a central one having a complex six-armed pattern with a six-petaled rosette in the center; it also employs the same combination of blue, red, white, and gold (fig. 105; Schmoranz 1898, figs. 34, 36; Artin 1902, fig. 307; Lamm 1929–30, pl. 139:1). In addition, the vegetal scrolls that fill the surface outside the medallions are almost identical to those on the present work, and a crenellated band around the rim strongly recalls the three bands here. Despite certain small differences in the geometric patterns and color combinations, the two objects are so similar that the plate in New York may possibly have functioned as a cover for the basin in Cleveland. What is clear, however, is that the two works originated at the same time in the same factory.

None of the other surviving Mamluk enameled-glass objects has the same shape as this vessel. Somewhat surprisingly, there also seem to be no comparable examples in extant contemporaneous metalwork, although an illustration of a metal vessel of similar shape appears in a poetic anthology copied in Isfahan, Iran, in 1341 (Swietochowski and Carboni 1994, fig. p. 33). The profile—a bulbous body narrowing toward the neck, which flares out in a wide, gently sloping arc toward the rim—is obviously that of a spittoon, a type of vessel common, for example, in metalwork and enameled glass from eighteenth-century Mughal India (Michell and Zebrowski 1999; Carboni 2001, no. 105).

The functional shape of most spittoons allows expectorations to be caught more easily and to "disappear" inside the vessel. This clear-glass example, although heavily enameled and gilded, would not completely serve the latter purpose and must therefore have been either a ceremonial object or a water basin of unusual shape. Its large size is another factor pointing to a ceremonial function, since most spittoons are small and evidently intended for individual use. Small glass spittoons from earlier periods were made of dark blue glass to conceal their contents; among these are one preserved in the treasury of the Shōsō-in, Nara, Japan (late seventh–eighth century), and two excavated in Fusṭāṭ (Old Cairo) in an eighth- to ninth-century context (Pinder-Wilson 1970, p. 66, no. 10; Pinder-Wilson and Scanlon 1973, p. 18, no. 2, fig. 3).

SC

Fig. 105. Plate. Syria or Egypt, mid-14th century. Brownish colorless glass; red, white, and blue enamels; and gold. Free blown, enameled, and gilded. Diam. 21.6 cm (8½ in.). The Metropolitan Museum of Art, New York, Edward C. Moore Collection, Bequest of Edward C. Moore, 1891 91.1.1533

PROVENANCE: J. P. Morgan

LITERATURE: Hollis 1945, p. 181; Cleveland Museum 1966, p. 210; Pinder-Wilson and Ezzy 1976, no. 143; Atıl 1981, no. 51

Glass in the Age of the Empires

STEFANO CARBONI

It is perhaps surprising that the artistic glass produced in the later period—the so-called Age of the Empires—is no match for that created under the great tradition of previous centuries, especially the tenth through the fourteenth. The empires in question are those that broadly divided the Muslim world into three large political regions at the end of the fifteenth century and the beginning of the sixteenth, after the collapse of the Timurids in Iran and the Mamluks in the Near East. The Safavid (1501–1732), Zand (1751–94), and Qajar (1779–1924) dynasties held power in the Greater Iranian area until after World War I. The Ottomans (1281–1923), the longest-lasting power in the history of Islam, grew from a small tribal sovereignty in Anatolia to an empire that included most of North Africa, the eastern Mediterranean regions, the Arabian Peninsula, and much of eastern Europe. The Mughals (1526–1858) created one of the richest and most legendary dynasties on the Indian subcontinent before the British Empire, hungry for control of the Indian Ocean routes in the age of European colonialism, weakened and eventually supplanted them.

Although the Safavid, Ottoman, and Mughal courts were great patrons of the arts, there are no glass objects that can be directly associated to their royal patronage. It also seems that, with the exception of India, wealthy patrons—noblemen and members of the court and the merchant class—were not especially interested in locally produced glassware other than of a functional or generically decorative nature. This is not to say that artistically decorated glass was not present, appreciated, and prized at Ottoman, Safavid, and Qajar courts and affluent homes, but rather that the fashion of the times dictated that European glass be preferred. The industry had generally declined in the Islamic world after the fifteenth century, and the possibility of its being revived was hindered by the increasing number of good-quality Venetian products imported from the sixteenth century onward (Charleston 1964 and 1975); later, crystal-like lead glass from Bohemia and England, as well as Dutch goods, had the same effect. Venetian glass was found, for example, in the ruins of the sixteenth-century palace of Saraçhane in Istanbul (Hayes 1992, pp. 410–20), and the Venetian *bailo* (ambassador) to the Ottoman court, Marcantonio Barbaro, ordered nine hundred mosque lamps from the Murano glass factories on behalf of the vizier Ṣoqollu Meḥmed Pasha (Carboni 1989, p. 151, fig. 7).

Opposite: detail, cat. no. 137

Mughal India clearly stands apart in any survey of glass production in the later Islamic period. Unlike the situation pertaining to the rest of the Islamic world, little is known of the region's glass production (mainly bangles and utilitarian objects; see Dikshit 1969, pl. 3, and Digby 1973, pp. 82–83) before the advent of the Mughals, whereas a relatively large number of decorated vessels survive from the eighteenth and nineteenth centuries. In this case, it is probably thanks to the introduction of European objects, beads, and mirrors in the area that the industry was revived and quickly entered the mainstream of Mughal artistic creation. The earliest reference to glassmaking in the Mughal period is in Abū al-Faḍl's *Ā'īn-i Akbarī* (1596–97), in which glass made in Bihar and near Agra is mentioned (Dikshit 1969, p. 114; Diba 1983, p. 191; Markel 1991, p. 83).

Beginning from the late seventeenth century, the shapes of Mughal glass vessels can be compared to those of contemporary metal objects, such as *ḥuqqa* (water pipe) bases and spittoons (see cat. nos. 136–139). The decoration, either floral or figural, follows models found in all aspects of artistic endeavor, from textiles to metalwork, semiprecious-stone carving, and miniature painting. Although glass was produced in several centers of the Mughal-dominated regions (especially Gujarat), Lucknow in Uttar Pradesh was probably the most important manufacturer of enameled and gilded *ḥuqqa* bases intended for an upscale market (cat. no. 137; Markel 1993, esp. p. 119). Good-quality bubble-free glass—either colorless, rich blue, or green (the last two providing a vivid background for gilded decoration)—can be attributed mainly to the first half of the eighteenth century on the basis of similar shapes and decoration in other media. This high-quality production was not limited to *ḥuqqa* bases and spittoons, which were the most common glass objects on the outdoor terraces of the rich, but also included rare sets of teapots, teacups, and saucers (*Indian Heritage* 1982, no. 393; Markel 1991, fig. 8). The smoking of tobacco, often enhanced with opium, the chewing of betel leaves (*pān*), and the drinking of tea were clearly the preferred activities for which artistic glass objects were created.

The influence of European glass can be immediately recognized in the shape of the painted square bottles made in the northwestern regions, especially in Kutch and Gujarat (cat. nos. 140, 141). In fact, it cannot be excluded that, at least initially, these "gin" or "case" bottles were imported from Europe before being decorated in India and sold on the local market. The quality of the painted scenes places these objects in a provincial milieu, somewhat detached from the Mughal court and its immediate surroundings. While the comparable European vessels were made in sets that included six or eight bottles and several glasses nested in portable cases, the Mughal bottles belong to sets in that they illustrate scenes of similar subject matter, although no glasses are known to have accompanied them (for bottles belonging to the same sets, see von Saldern 1980b, pls. 18, 19, and Carboni 2001, no. 105b,c). The function of a set of Mughal bottles is not clear, however: other types of drinking vessels may have been used with them, or they may have contained perfumed water rather than drinkable liquids. Another class of bottles, undoubtedly perfume or rose-water sprinklers, were likely imported from Europe (probably from England), where they were made exclusively for the Indian market (cat. nos. 143, 144).

Another type of late Indian glass that deserves attention is that known as opalescent. Although

Fig. 106. Plate. India, early 18th century. Opalescent green glass; pink, white, and green enamels; and gold. Mold blown, applied, enameled, and gilded; tooled on the pontil. H. 1.3 cm (½ in.), diam. 10.2 cm (4 in.). The Metropolitan Museum of Art, New York, Purchase, Mrs. Stuart Cary Welch Gift, 1987 1987.158

translucent enough to let some light pass through, opalescent glass is neither truly transparent nor opaque. This type of rather bubbly glass, produced at lower temperatures in the kiln and therefore technologically easier to achieve, is rare in the production of Islamic glass. Since only two colors of such glass are known to have been made—pale green and, very infrequently, white—it seems obvious that they were intended to imitate green and white jade, the Mughals' favorite semiprecious stones. The few extant pieces indicate that plates of varying dimensions and shapes, tastefully decorated with gilding and pale-colored enamels, were made in green glass (cat. no. 142; fig. 106), whereas at least one footed bowl and matching plate are known in whitish glass (Metropolitan Museum 2000.490a,b).

Naturally, glass was also produced in India as everyday ware for multiple purposes. Bubbly bottle green and blue glass vessels of different shapes—mostly jars, bottles, and teapots—are usually assigned to the factories of Kapadvanj in Gujarat (Dikshit 1969, pls. 42–46; Markel 1991, figs. 18–27).

Regarding glass production in the Iranian region between the thirteenth and the seventeenth century, there is a profound gap: no objects or records have survived, nor is there any evidence to demonstrate that the industry was moribund. From our understanding of the development of shapes and decoration, the last objects attributable to the period before the gap are long-necked molded bottles with various patterns (see, for example, cat. nos. 21–24). After these, the next

proofs of glassmaking in Iran are reports of seventeenth-century European visitors. Established trade links and its effective monopoly on glass production made Venice not only the main exporter of glass to Safavid Iran but also, however unwillingly, the impetus for the revival of glassmaking in the region. The earliest known record of the export of Venetian glass, beads, and mirrors is found in a diary of the consul Alessandro Malipiero from the late sixteenth century (Charleston 1974, p. 12). The most famous passage, however, is by the French traveler Jean Chardin, who wrote in 1666–70 that "the Art of Glass-making was brought into Persia within these four score Years," adding that "a Beggarly and Covetous Italian taught it at Chiras [Shīrāz] for the Sum of Fifty Crowns" (Chardin 1927, p. 275). Chardin's words imply that a renegade Venetian glassmaker (glassmakers of the Serenissima Republic were required by law to keep the secrets of their trade) went to Iran to make his fortune teaching the craft. As confirmed by the travelers Thomas Herbert in 1627 and Jean-Baptiste Tavernier in 1638, there were three or four glass factories making wine bottles in Shīrāz just a few decades after the presumed arrival of the greedy Venetian glassmaker (Herbert 1928, p. 45; Tavernier 1677, p. 248; see also Charleston 1989, p. 305). According to Chardin, "the glass of Shiraz is the finest in the country; that of Ispahan [Isfahan], on the contrary, the worst because it is only glass re-melted" (Chardin 1927, p. 275; see also Charleston 1974, p. 18). That the factories of Shīrāz made glass from raw ingredients seems to have been confirmed by Jean de Thévenot in 1667, who wrote that "they make their Glass of a White Stone, almost as hard as Marble, which they get in a Hill four days Journey from Schiraz" (Charleston 1974, p. 18).

The most representative example of the line of Shīrāz wine bottles is a flat-sided dark green type that contains about 700 milliliters. One of these, donated to Queen Anne of England in 1708 by a visiting ambassador, was apparently in the cellars of the duke of Rutland from 1758 until the collector Jerome Strauss bought it, still filled with its liquid, in the first decades of the twentieth century (fig. 107; see also Lamm 1939, pl. 1450b, and Charleston 1974, fig. 14a,c). Wine containers of varying capacities were produced in industrial quantities in the glass factories of Shīrāz, Isfahan, and Qum in the eighteenth and nineteenth centuries (for Qum, see Charleston 1974, p. 23 and n. 49).

Bottles, both for storing and decanting wine, along with bases for water pipes (in Persian, *nārghīl* or *qaliān*) seem to have been the only glass vessels produced in Iran between the seventeenth and the nineteenth century. The fact that glasses and beakers continued to be imported from Europe is confirmed by numerous illustrations in oil paintings from the Zand and Qajar periods (Diba 1998, pp. 158, 205). The most common mold-blown decorative patterns, found both on decanters and water pipes, are fine twisted ribs and a row of stylized cypress trees framed by thick vertical ribs. The molds were also used to impress a variety of objects, of differing final shapes, among them a "swan-" necked rose-water bottle (sometimes called an *ashkdān*, or "container for tears," since it was believed that wives wept into them when their husbands were away; see cat. nos. 145, 147), a tall decanter standing on a low foot, and a gracious ewer with an applied glass "butterfly" at the end of a curved spout (Jenkins 1986, nos. 56–61; Charleston 1989, fig. 16a–d; von Folsach 1990, nos. 255, 256, 258, 259). Numerous examples—in clear, dark blue, brown, purple, and

Fig. 107. Bottle. Shīrāz, Iran, first half 18th century. Dark green glass. Free blown and applied; tooled on the pontil. H. 23 cm (9 in.), w. 16.5 cm (6½ in.). The Metropolitan Museum of Art, New York, Funds from various donors, 1997 1997.358

green glass—are in the collections of major museums, such as the British, the Victoria and Albert, and the Metropolitan, which acquired them in the second half of the nineteenth century, probably shortly after they were made. Often arranged inside niches of private and public buildings in Tehran, Shīrāz, and, especially, Isfahan, and sometimes filled with colored water, these molded vessels were also appreciated for their elegant shapes and clear colors (Lamm 1929–30, p. 501, no. 107; Charleston 1974, pp. 20–21). The Venetian influence is particularly evident in bottle-shaped water-pipe bases decorated with the enclosed lamp-worked glass flowers that were a Murano specialty from the late seventeenth century on. Exported to Iran, these *pipe con frutti dentro* were

also made locally at the beginning of the eighteenth century, according to a description of glass factories in Shīrāz by E. S. Waring in 1807 (Charleston 1974, pp. 14–15, fig. 5; Diba 1983, fig. 3; Charleston 1989, fig. 18).

In the Ottoman capital of Istanbul, despite the ubiquitous presence of vessels imported from Venice and later from Bohemia, there is documentary evidence that glass was made locally as early as the reigns of Bayezid II (1481–1512) and Süleymān the Magnificent (1520–66). Archival documents mention makers of lanterns, lamps, and mirrors, as well as windowpanes (Bayramoğlu 1976, pp. 43–46; Rogers 1983, pp. 241–44). It is possible that, at this early period, local glass was made by using imported cullet. The only physical evidence of locally manufactured glass in the sixteenth and seventeenth centuries comes from the previously mentioned excavations of the palace of Saraçhane, where the most typical vessel found was a flask with a truncated body and a molded decoration of twisted ribs (Hayes 1992, p. 410, figs. 156–58). The industry must have been fairly well developed, however, since a well-known manuscript, the *Sūrnāma-i humāyūn*, celebrating the circumcision of a son of Murād III (r. 1574–95) in 1582 contains illustrations showing glassworkers parading in front of the sultan. Four scenes in one copy of this work show, respectively, the corporations of the glassmakers, window makers, and manufacturers of flasks and bottles, along with a working domed kiln on wheels (Topkapı Sarayı Library 44, fols. 32v–33r; Jenkins 1986, inside covers; Atasoy 1997, pls. 38, 39). Some craftsmen blow and tool glass around the kiln, while others proudly exhibit finished products such as large bottles and hourglasses. Glass factories are documented near the Gate of Eyüp and the area of Tekfur Sarayı, and there was also a small mosque at Aksarayı named after the corporation of glassmakers (*camcilar mescidi*) (Eyice 1967, p. 175).

Unfortunately, no extant object in any collection, including those of the Topkapı Sarayı and the Museum of Turkish and Islamic Art, Istanbul, can be safely attributed to the first centuries of Ottoman domination; such works are likely to be either of uncertain attribution or of foreign manufacture (Charleston 1964 and 1975; Rückert 1963; Zecchin 1968; Rogers 1983; Carboni 1989; Atasoy 1990). Among the former group, for example, are certain thick dark green globular vessels with a small opening, which are sometimes identified as hand grenades (*humbara*) but were probably multipurpose containers (Bayramoğlu 1976, pp. 44–45; Clairmont 1977, p. 140, nos. 518, 519; Rogers 1983, pp. 257–59; Carboni 2001, no. 103a). Another example is provided by a large number of bottles, found in collections worldwide, that are principally made of thin honey-colored, vivid pale blue, or clear glass and have a deep kicked base. Usually associated with the island of Rhodes, these have an unbalanced chemical composition that is more characteristic of European than of Islamic glass and which makes the surface "sweat" and become brittle (Carboni 2001, no. 103d). There is no way to prove, therefore, if these two groups of vessels were manufactured in the capital or somewhere else along the eastern Mediterranean coasts under Ottoman domain, or if they were imported from Europe.

A reliable history of Ottoman glass begins only in the late eighteenth century, when a factory was established at Beykoz, on the Asiatic side, near Istanbul, with the intention of manufacturing high-quality decorative glass that would make European imports unnecessary. Initially inspired by foreign models,

especially Venetian (scientific and technical advice was actually requested from European glassmakers), the Beykoz wares later developed their own colors and shapes (cat. nos. 148–150; see also Eyice 1967, pp. 178–79; Bayramoğlu 1976, pp. 57–81; and Küçükerman 1985). The *çeşm bülbül* (eye of the nightingale) and the bright-colored opaque glass with gilded and enameled decoration, including white *lattimo*, represent typical creations of these factories. A certain type of vase for tulips (*lāledān*), with a flattened low body, long neck, and no additional decoration, has one of the most elegant shapes produced there (Bayramoğlu 1990). Another factory was founded at Paşabahçe, near Beykoz, at the end of the nineteenth century, but World War I and the collapse of the Ottoman Empire sealed the end of a glassmaking tradition about which there is still much to be learned.

136. ***Ḥuqqa* Base**
India, late 17th–early 18th century
H. 17 cm (6¾ in.), max. diam. 14 cm (5½ in.)
Grayish colorless
Free blown and wheel-cut; tooled on the pontil
INSCRIPTION: in Farsi, on body,

سر نپیچد اگر بر سرش نهد اخگری
صحبت اندوز حقه کی خدمت ادب گذار
تا نپرسیدش حرف سن نگوید بیش کمتری
ازو میتوان آدابِ محبت آموخت

(If you put burning charcoal on its head / The *ḥuqqa*, a teacher of etiquette, / Will not respond unless drawn upon. / Thus one can learn from it manners of refinement.)

in Farsi, on shoulder,

بسم الله الرحمن الرحیم است کلید در گنج حکیم

(In the name of Allāh the clement and merciful is the key to the wise treasure.)
CONDITION: The object is intact and in good condition except for a light milky film. The glass contains numerous bubbles, both small and large.
The Cleveland Museum of Art, The Norweb Collection 1969.287

This globular base for a water pipe has a small kicked base and a cylindrical neck encircled by a ring applied about two-thirds from the top. The wheel-cut decoration consists, on the body, of four elongated lobed cartouches containing Persian poetry; below the cartouches are two bands, one with pointed petals, the other with a zigzag pattern. Around the shoulder are four narrow bands, including, respectively, a row of pointed petals, a chevron pattern, an Arabic inscription, and a second row of chevron motifs. The upper part of the neck bears a row of pointed petals framed by chevron patterns; the protruding ring shows a simple curved incised motif.

A water pipe, or *ḥuqqa* (also called a hubble-bubble; *nārghīl* or *qaliān* in Persian), is a smoking device formed by a container for perfumed water, a detachable bowl in which the tobacco burns, and a long snakelike tube. The smoking of tobacco was introduced at the Mughal court from Iran through the Deccan at the very beginning of the seventeenth century, toward the end of the emperor Akbar's reign (d. 1605), and soon spread rapidly (*Indian Heritage* 1982, no. 385; Zebrowski 1997, p. 225).

Although bases for water pipes were initially adapted from existing objects, such as carved coconut shells or ceramic bottles, two basic types—globular and bell shaped with a short neck—became standard in the Deccan and in northern India. In order to stand, the globular type sometimes needed a support, which was provided by a thick ring that would accommodate its convex base. Glass *ḥuqqa* bases usually have a kicked base for this purpose, but a molded-glass *ḥuqqa* apparatus, datable to about 1765–71 and possibly made in England for export, includes a ring for support (Nationalmuseet, Copenhagen; *Indian Heritage* 1982, no. 385). Although a firm chronology for glass water-pipe bases cannot be established, because no extant object bears a date or attribution, comparison with metal models, especially *bidri* types, is useful (*bidri* is the name for a zinc alloy made in Bidar, Deccan). Thus, it seems that the production of globular glass bases

began at the end of the seventeenth century or at the very beginning of the eighteenth, whereas bell-shaped *ḥuqqa*s were developed about 1740 and quickly replaced the globular ones (Carboni 2001, no. 104).

This *ḥuqqa* base is a rare example because of its wheel-cut decoration, and its inscription—referring to its "social" function at the Mughal court—makes it an even more extraordinary object. The latter commends the silent attitude of the *ḥuqqa*, an inseparable companion for many members of the royal entourage, which "responds" only when asked to—that is, its water bubbles when the smoke is breathed in—and thus obeys the rules of etiquette. The creation of bases with cold-cut decoration was probably inspired by the great tradition of stone- and gem cutters in India, but the influence of European and especially English glass was key to their production. References to the export of cut glass to India can be found as early as the mid-seventeenth century (Digby 1973, pp. 86–87; Carboni 2001, no. 104f), and British lead crystal, including hubble-bubbles, flooded the market in the second quarter of the eighteenth century. Compositional analysis does not provide definitive evidence to distinguish English glass from that locally produced, since it appears that ingots of lead glass were imported to India in the nineteenth century to make new glass (*Indian Heritage* 1982, p. 106; Diba 1983, p. 193). It is art-historical analysis, therefore, that is more useful in establishing which products were created, or at least decorated, by Mughal craftsmen (see Carboni 2001, no. 104e,f). There is little doubt that the present object, with its witty Persian verses, was decorated in India.

SC

LITERATURE: Unpublished

137. ***Ḥuqqa* Base**
India (probably Lucknow, Uttar Pradesh), first half 18th century
H. 20.3 cm (8 in.), max. diam. 17.2 cm (6¾ in.)
Grayish colorless glass; red, pink, yellow, and pale and dark green enamels; and gold
Free blown, enameled, and gilded; tooled on the pontil
CONDITION: The object is intact and in good condition. The glass contains numerous small bubbles.
Los Angeles County Museum of Art, From the Nasli and Alice Heeramaneck Collection, Museum Associates Purchase M.76.2.13

This globular base for a water pipe has a small kicked base and a cylindrical neck encircled by a ring applied about halfway from the top. The polychrome enameled and gilded decoration consists of a pond scene with water lilies, lotus blossoms, and their leaves rising on thin stems from a curled leaf motif that creates a groundline. A narrow band around the base of the neck bears stylized lotus blossoms; the upper neck presents flowering lotuses.

This exceptional *ḥuqqa* base is perhaps the most memorable extant example of Mughal glass. When filled with water, it would have provided a lively stylized illustration of a colorful pond—a counterpart to one that a smoker sitting on a balcony with a view over a formal Mughal garden might admire. Although the scene is formal in its overall composition, it

also has a dynamic, tantalizing confusion that separates it from most conventional Mughal works. In addition, the subject matter of water lilies and lotus flowers is far less common than a whole range of other flowers, including poppies and irises, and gives this object a vaguely exotic, Chinese quality.

An analysis of comparable works has suggested a precise place of production for this *ḥuqqa* base, namely, Lucknow, southeast of Delhi, in Uttar Pradesh (Markel 1991, p. 85, fig. 3; Markel 1993, p. 119). The association with Lucknow can also be supported by comparing this unusual polychrome-enamel object with the silver-gilt and enameled products, including *ḥuqqa* bases with floral decoration, that were made there in the second half of the eighteenth century (Zebrowski 1997, pp. 86–89, figs. 73, 74). There were other known centers of glass production in the Mughal provinces—in Gujarat (Kapadvanj), Bihar (Patna), Rajasthan (Alwar), and Sind (Hyderabad)—but Lucknow remains the most likely place of origin (Digby 1973, p. 83; Diba 1983, p. 191).

One of the earliest illustrations of a globular glass *ḥuqqa* base appears in a painting of a shop in a bazaar that is thought to have been produced by an atelier in Bikaner, Rajasthan, about 1700 (Digby 1973, pp. 85–86, pl. 3). Accordingly, Stephen Markel (1991, p. 85) has suggested that this object may date to the first quarter of the eighteenth century; in view of the comparison with the gilt and enameled *ḥuqqa* bases made in Lucknow, this dating can perhaps be extended to the second quarter. *SC*

PROVENANCE: Nasli and Alice Heeramaneck
LITERATURE: Welch 1963, p. 174, no. 81; Dikshit 1969, pl. IIB; *Indian Heritage* 1982, no. 386; Welch 1985, no. 185; Markel 1991, p. 85, fig. 3; Markel 1993, p. 118, fig. 133

138. ***Ḥuqqa* Base**
India, first quarter 18th century
H. 19.7 cm (7¾ in.), max. diam. 17.2 cm (6¾ in.)
Dark blue glass and gold
Free blown, applied, and gilded; tooled on the pontil
CONDITION: The object is intact. The surface is in good condition, but a substantial amount of the gilt has been lost or scratched. The glass contains numerous small bubbles.
The Cleveland Museum of Art, Cornelia Blakemore Warner Fund 1961.44

This globular base for a water pipe has a slightly flared neck encircled by a ring applied about three-fourths of the way from the top. The decoration on the body consists of six large flowering poppy plants painted in gold; details are scratched away. A stylized vegetal groundline and concentric geometric bands between the shoulder and the base of the neck frame the main subject. Six small poppy plants are also drawn around the upper part of the neck.

Metal *ḥuqqa* bases of the *bidri* type influenced glass examples not only through their shape (see cat. no. 137) but also through their decorative patterns, which almost invariably employ floral or vegetal motifs. Large flowering and budding poppies, lilies, carnations, and irises, among many other designs, are depicted at even

intervals around the surface of the *bidri ḥuqqa* bases; often five or six of these appear, either freestanding or framed within lobed arches, while sometimes the flowers are smaller and more numerous (see, for example, Zebrowski 1997, figs. 360, 373–93, 395–99). This decorative repertoire became standard in both the Deccan and Mughal India and was inevitably transferred to glass *ḥuqqa* bases. Among such objects, there is a small group that is notable for the bold, rich contrast between the dark color of the vessel and the gilded decoration. Most common are green bases, two of which are in the British Museum and the al-Sabah Collection, Kuwait (Pinder-Wilson 1991, p. 139, no. 177, and Carboni 2001, no. 104a, respectively). The latter, which illustrates several varieties of poppy plants, differs in that the flowers are in reserve against a gold background, instead of being gilded, thus exploiting the green color of the glass. The same effect was achieved on another base, in the Victoria and Albert Museum, on which the pattern consists of an overall repetition of stylized trees or pointed leaves (Dikshit 1969, pl. 6).

The blue *ḥuqqa* base in Cleveland is a splendid example of gold decoration against a blue background and bears close comparison with the green object in the British Museum. Both depict the same number of flowered and budding poppies, although they are of different varieties (the ones on the Cleveland *ḥuqqa* base have smaller and denser petals), which are repeated in miniature size around the upper section of the neck above the ring. The remaining elements of the decoration, including a stylized vegetal groundline and concentric bands on the shoulder, are also similar, leaving little doubt that the two objects were created in the same workshop.

It is not surprising that the most often illustrated flowers on *ḥuqqa* bases are poppies, for opium—the dry condensed juice of *Papaver somniferum*, which has narcotic effects—was regularly mixed with tobacco in the *chillam* (burning bowl). From the earliest days of the Mughal dynasty, the consumption of opium and alcohol was a luxurious pastime at the court. The emperors Humayun (r. 1530–40, 1555–56) and Jahangir (r. 1605–27), who were particularly fond of the substances, make detailed references in their memoirs to instances of indulging in them. *SC*

LITERATURE: Marcus 1962, p. 244, fig. 1; Welch 1963, p. 174, no. 80; Dikshit 1969, pl. IIA

139. **Spittoon**
India, mid-18th century
H. 9.7 cm (3⅞ in.), max. diam. 8.9 cm (3½ in.)
Dark blue glass, white enamel, and gold
Free blown, enameled, and gilded; tooled on the pontil
CONDITION: The object is intact. The surface is in good condition except for some loss of gilt. The glass contains scattered small bubbles.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 138 G

This object has the profile of two bell-shaped elements, one upright and the other upside down, joined at the constriction. The opening is flared. The decoration consists of a latticework surrounding stylized irises painted in white enamel. The network was drawn in gold and creates pointed medallions. The remainder of the

decoration includes horizontal gold lines below the rim, at the constriction, and near the base.

Like *ḥuqqa* bases and pots for tea or wine, spittoons (*pikdān*) were kept in the households and on the terraces of Mughal noblemen. In addition to tobacco smoking, chewing betel nut (*pān*) was a common activity that required the use of both a *pāndān* (betel box) and *pikdān* (*pik* is the expectorated juice).

Although they were produced in large numbers, spittoons are rarer today than *ḥuqqa* bases and *pāndān*s, probably because of the nature of their use; examples in glass are even more infrequent than those in metal. The shape of the spittoon evolved in the same manner as that of the *ḥuqqa* base. The lower section of early Deccani and Mughal spittoons was globular, while the upper part was large and splayed and its walls gently inclined so that the expectorated juice would be caught and would flow into the globular cup below (Zebrowski 1997, figs. 260, 261). The upper section remained unchanged for some time, but in the course of the eighteenth century the lower became bell shaped in imitation of *ḥuqqa* bases (Zebrowski 1997, p. 183 and figs. 263, 264). Toward the middle of the century the upper section assumed an inverted bell shape, of the same or slightly larger dimensions as the lower chamber (Zebrowski 1997, figs. 255, 265–68).

This small glass spittoon in dark blue glass, gold, and white enamel, which is comparable in size to a number of metal *pikdān*s, clearly has the latest developed form and can be attributed to the mid-eighteenth century or later. Only two other glass spittoons are published in the relevant literature (Dikshit 1969, pl. XXXA,B; the objects are in the Victoria and Albert Museum and formerly in the Agarwal collection, Hyderabad); both conform to the earlier types in that they have splayed, gently sloping upper sections.

The color and decoration of this *pikdān* narrow the attribution to the middle of the eighteenth century. Dark cobalt blue glass was used particularly in combination with gold in the first half of the century (cat. no. 138), whereas white enameling came to be frequently used in the second half. Individual flowers or plants inside medallions created by a lattice are one of the most familiar patterns in the Deccan and in Mughal India, from metalwork to carpets and textiles (see, for example, a mango-shaped *ḥuqqa* base in the Victoria and Albert Museum; Zebrowski 1997, fig. 409). The well-balanced illustration of stylized white irises within lobed pointed medallions against a dark blue background is especially appealing and successful in the present object, which, given its excellent state of preservation, must have been almost never used as a spittoon. *SC*

LITERATURE: Carboni 2001, no. 105

140, 141. **Two Bottles**
Europe or India, painted in Gujarat, India, second quarter 18th century
Cat. no. 140: H. 13.2 cm (5¼ in.), w. 6.3 cm (2½ in.), l. 6.2 cm (2½ in.)
Cat. no. 141: H. 13.3 cm (5¼ in.), w. 6.7 cm (2⅝ in.), l. 6.4 cm (2½ in.)
Translucent grayish colorless glass; red, pink, pale green, black, beige, yellow, white, dark blue, and pale pink enamels; and gold
Mold blown, painted, and gilded; tooled on the pontil
CONDITION: Both objects are intact and in good condition except for some loss of paint and gilt. The glass contains numerous small bubbles.
Los Angeles County Museum of Art, Gift of Varya and Hans Cohn
M.88.129.201 (cat. no. 140), M.88.129.203 (cat. no. 141)

Each of these square bottles has a flat base and a short cylindrical neck that ends in a splayed opening. Each was blown in a mold having two sides that joined diagonally. Painted decoration appears on all four sides of the bottles. Two opposite sides on both bottles depict flowering plants stemming from a tuft of leaves and set within columns topped by a lobed arch. The other two opposite sides of one vessel (cat. no. 140) show, respectively, a man and a woman standing facing each other and a woman with a puppy on her lap sitting on a tall-backed chair; both scenes are set against a background of tall gilded plants and flowering branches. The corresponding two sides of the other bottle (cat. no. 141) show, respectively, two standing women facing in the same direction and a woman seated on a similar tall-backed chair with another woman bending to touch her feet in the customary gesture of greeting reserved for an elder; all the figures are illustrated against the same sort of background as on the other vessel. Each bottle is decorated with flowers

140

141

between the shoulder and the base of the neck and with pointed gilded motifs on the neck.

Square bottles of this type constitute a large proportion of the enameled glass vessels to have survived from eighteenth-century India. Their shape derives from the Dutch and German molded vessels, produced primarily in the second half of the seventeenth century, that were known as case bottles because they were stored in compartments inside a large case (Ritsema van Eck and Zijlstra-Zweens 1993–95, vol. 1, no. 279; Ohm 1973, p. 54). After the Dutch East India Company established a trade factory in Gujarat in 1618, the Netherlands became a relevant force in western India in the seventeenth and eighteenth centuries. Some of the painted Indian bottles have caps that include a Dutch coin, which indicates that the objects themselves are of foreign manufacture (Dikshit 1969, pl. XXXVII; Digby 1973, p. 95; Liefkes 1997, p. 105).

In the mid-eighteenth century, a glass factory was opened in Bhuj by Ram Singh Malam, a Gujarati craftsman who, after spending some time in the Netherlands, had found a patron in Maharao Lakha (r. 1741–60), the ruler of the small kingdom of Kutch (Goswamy and Dallapiccola 1983, pp. 20–21). While it cannot be established that it was Ram Singh who introduced painted case bottles to India, his influence in the region must have given impetus to their production in Kutch and Gujarat. Stephen Markel has attributed such bottles to the Kathiawar Peninsula, Gujarat, in the second quarter of the eighteenth century (Markel 1991, p. 88). Slight variations in the style of painting, however, may suggest the involvement of various ateliers in the Mughal provinces, including those in Ahmadabad, Surat, Bhuj, and perhaps Hyderabad in Sind.

Square bottles such as these are blown in a two-part mold having halves that are triangular in section. The body is thus divided diagonally, with the seams being visible at two corners, which are invariably concealed with paint. This method of construction is clearly postindustrial European.

Compositional analysis provides these bottles with an even stronger European connection, since their glass is of lead-potash nature (Carboni 2001, no. 106). There is little doubt, however, that they were painted in India. This evidence, combined with reports regarding the export of glass ingots from Europe to India for smelting, makes an attribution of the undecorated bottles to India—perhaps using Dutch molds—equally possible (Carboni 2001, under no. 104).

The present works, two of six bottles in the Los Angeles County Museum that may have belonged to the same set, well represent the entire group in their method of construction, glass quality, and decoration. Figural scenes appear on two opposite sides, and large flowered plants on the other two sides. The figures are set outdoors in a garden, and the space is framed by architectural columns and lobed arches painted at the corners and on the shoulder, mimicking a canopy. The couple depicted on one vessel (cat. no. 140) has parallels in objects in Kuwait, New York, Liège, and Corning (Carboni 2001, no. 106a; Jenkins 1986, no. 51; Philippe 1982, and pl. 75; and Dikshit 1969, pl. XXXVIII, respectively). The style of painting compares well with that of contemporary miniatures in northwestern India, especially in Rajasthan, but also became widespread in Gujarat by the mid-eighteenth century.

SC

PROVENANCE: (cat. nos. 140, 141)
Varya and Hans Cohn
LITERATURE: (cat. nos. 140, 141)
von Saldern 1980b, p. 189, pls. 17–19, no. 195c,d; Markel 1991, p. 88, figs. 9, 10

142. **Plate**
India, late 18th century
H. 4 cm (1⅝ in.), max. diam. 22 cm (8⅝ in.), diam. of foot ring 13.8 cm (5⅜ in.)
Opalescent green glass; red, pink, and green enamels; and gold
Blown, applied, enameled, and gilded; tooled on the pontil
CONDITION: The object is intact except for a chip at the rim, and in good condition except for some loss of gilt. The glass contains numerous bubbles.
The Toledo Museum of Art, Purchased with funds from the Libbey Endowment, Gift of Edward Drummond Libbey 1983.61

This large shallow plate stands on an applied tubular foot ring and a kicked base. The decoration on the interior consists of two concentric narrow bands, one around the rim and the other roughly corresponding to the

diameter of the foot ring, that contain five-petaled pink flowers alternating with green leaves against a vivid red background. Thick gold lines frame these bands, and the remainder of the surface is filled with poppies in full bloom and vegetal patterns in gold with scratched details. The exterior presents stylized leaf motifs below the rim and around the foot ring.

A little-known type of Mughal glass, with an opalescent pale green body and a bubbly texture, is probably intended to imitate jade objects or, perhaps, Chinese celadons. In addition to the present work, two other green glass plates are found in the Metropolitan Museum and The Corning Museum of Glass, although they differ in shape and/or dimensions. The object in New York, which was perhaps the saucer for a matching cup, is smaller (diam. 10.2 cm [4 in.]) and has a molded lobed rim (see fig. 106; *JGS* 30 [1988], p. 105, no. 10). At the center of the decoration on its interior is an elaborate dense full-blown pink poppy with a lobed edge reminiscent of the shape of its rim. Between the poppy and the edge is a narrow band of pink multipetaled flowers and scrolling leaves against a white background that finds an immediate parallel in the two red bands of the Toledo plate. The plate in Corning is as large as the present one but has an oval shape (74.6.2; l. 24.8 cm [9¾ in.], w. 18.3 cm [7¼ in.]) and a molded lobed rim. Its decoration, like that of the Toledo plate, is in gold and arranged largely in concentric bands. The distinctive appearance of the Corning plate is created by the radial pattern made by the narrow gold bands that connect the central floral decoration and the bands running along the perimeter. Records at the museum document that the plate was acquired in Delhi and thus further support an Indian attribution; they also indicate a date (1735) that is acceptable in view of the decorative scheme, although too precise in the absence of additional information.

The composition here—the gilded open poppies and the interspersed leaves framed by bands with a red background—is sophisticated and refined but also rather formal. It suggests an attribution not earlier than the second half of the eighteenth century, somewhat later than the two other objects previously mentioned. All three plates demonstrate, however, that the production of gilded and enameled Mughal glass was not limited to functional objects such as *ḥuqqa* bases, bottles, and spittoons, which are derived from, and comparable with, metalwork models (cat. nos. 136–139). Although probably created in imitation of carved jade vessels, opalescent green enameled and gilded glass attests to a certain degree of inventiveness and originality on the part of Indian glassmakers and painters. *SC*

PROVENANCE: Edward Drummond Libbey
LITERATURE: Unpublished

143, 144. **Two Sprinklers**
Probably Europe (possibly England), for the Indian market, late 18th–19th century
Cat. no. 143: H. 20.3 cm (8 in.), max. diam. 7.6 cm (3 in.)
Cat. no. 144: H. 17.1 cm (6¾ in.), max. diam. 6.9 cm (2¾ in.)
Cat. no. 143: translucent dark emerald green
Cat. no. 144: brownish purple
Mold blown and applied; tooled on the pontil
CONDITION: The objects are intact. Their surfaces are lightly weathered, resulting in a milky white film. The glass is of good quality, although it includes scattered small bubbles.
The al-Sabah Collection, Dār al-Āthār al-Islāmiyyah, Kuwait National Museum LNS 299 G (cat. no. 143), LNS 301 G (cat. no. 144)

Each of these globular bottles has a long tapered neck that ends in a small opening as well as a low applied foot. Both body and neck bear molded vertical ribs, and two bulges appear near the base of the neck.

Rose-water sprinklers were popular in Mughal and Deccani India, as in most Islamic countries, and they became one of the main glass exports of English factories to India as well as to Ottoman Turkey. Chemical analyses have shown that this type of sprinkler contains a significant amount of lead (Carboni 2001, no. 107g). Although that fact is not sufficient proof that they were made in Europe for the Indian market (lead glass in the form of ingots for remelting was apparently exported to India), the containers have colors, such as a peculiar bright purple, and a bubble-free clarity that strongly suggest a European manufacture. The unfinished rim, however, is a feature that one would not expect to find on an English or European object of the eighteenth or nineteenth century. Thus, a definitive attribution cannot be

143 (left), 144 (right)

reached at the moment. Most of these objects have vertical ribs, as in the present examples, although some bear a honeycomb decoration (see *Indian Heritage* 1982, no. 394).

Moreshwar Dikshit (1969, p. 135) suggested that such sprinklers may have been made in the Kapadvanj Peninsula in Gujarat, but he also recognized that the quality of the bottles is much more refined than the typical products from that area. (The average Kapadvanj objects are bowls, cups, bottles, and jars in green, blue, and amber glass that is extremely bubbly; see Dikshit 1969, pls. XLII, XLIII, XLVI, and Markel 1991, figs. 18–27.)

Whether the sprinklers were produced in Europe or India, the association with the latter country is very strong: none of these objects has been assigned a provenance from another area of the Islamic world. The sprinklers in Kuwait (eight more are in the collection in addition to the two presented here) are reportedly from Hyderabad, India. Two bottles, one at Corning (75.6.12) and the other in the Victoria and Albert Museum (V&A 13–1893), were acquired in Delhi and Bijapur, respectively. The great majority of such sprinklers are in public and private collections in Delhi, Bombay, Benares, and Poona (Dikshit 1969, p. 135). *SC*

LITERATURE: (cat. no. 143) Carboni 2001, no. 107e; (cat. no. 144) Carboni 2001, no. 107b

145. Bottle
Iran, 18th–19th century
H. 38.1 cm (15 in.), max. diam. 11 cm (4⅜ in.)
Translucent deep blue
Blown in dip mold
CONDITION: The object is intact and in pristine condition. The glass contains some bubbles and particles of unfused batch material.
The Metropolitan Museum of Art, New York, Gift of J. Pierpont Morgan, 1917 17.190.829

This bottle has a roughly globular body. The mouth is almost vertical, with the upper edge drawn up in a long tonguelike extension, and has a rounded lip. Immediately below the lip is a hollow bulge. Beneath it, the neck consists of a narrow tube, wider at the bottom than at the top, that curves in two directions at the top, then descends vertically. The lower part of the neck has spiraling ribs that were formed in a dip mold. The base has a splayed foot ring made by folding, a conical kick, and a large annular pontil mark (1.4 cm x 1.6 cm [½ x ⅝ in.]).

The parison was blown in a dip mold, then inflated to the desired shape and size. During this inflation, the ribs were eliminated from the wall, but they remained on the lower neck. *DW*

LITERATURE: Jenkins 1986, no. 59

145

146

146. **Bottle**
Iran, 18th–19th century
H. 30.6 cm (12 in.), max. diam. 11.9 cm (4¾ in.), diam. at rim 7.3 cm (2⅞ in.)
Transparent deep blue
Blown in dip mold
CONDITION: The object is intact. The lower part of the interior has a cloudy surface, which may have resulted from the bottle's being partly filled with a liquid that evaporated and left a semi-opaque deposit. The glass contains some bubbles and particles of unfused batch material.
The Metropolitan Museum of Art, New York, Gift of Henry G. Marquand, 1883 83.7.227

This bottle has a roughly globular body and an outsplayed rim with a rounded lip. Immediately below the lip is a hollow bulge that leads into the narrow tube of the neck, which is wider at the bottom than at the top. The base has a splayed tubular foot ring made by folding, a conical kick, and an annular pontil mark (diam. 1.2 cm [½ in.]). The bottom of the rim, the neck, and the upper wall are decorated with spiraling ribs. *DW*

LITERATURE: Jenkins 1986, no. 61; *Arte islámico* 1994, pp. 186–87

147. **Bottle**
Iran, 18th–19th century
H. 30.7 cm (12⅛ in.), max. diam. 8.6 cm (3⅜ in.)
Transparent deep blue and opaque white
Blown in dip mold and applied
CONDITION: The object is intact. The interior has a cloudy surface, which may have resulted from the bottle's being partly filled with a liquid that evaporated and left a semiopaque deposit.
The Corning Museum of Glass, Gift of the Victoria and Albert Museum
59.1.575

This bottle has a roughly globular body. The mouth is inclined, with the upper edge drawn up in a narrow tonguelike extension, and has a rounded lip that was finished with a continuous white trail. The neck is a narrow tube, wider at the bottom than at the top, that descends in an S-shaped curve. The lower part of the neck and the upper wall have faint spiraling ribs formed in a dip mold. The base has a splayed foot ring made by folding, a conical kick, and a large annular pontil mark. *DW*

LITERATURE: Unpublished

148. **Container in the Shape of a Bird**
Turkey (Beykoz, Istanbul), 19th century
H. 10.5 cm (4⅛ in.), l. 19.2 cm (7½ in.), max. w., across wings, 9.2 cm (3⅝ in.)
Opalescent white glass; opaque pink and orangy red enamels; and gold
Free blown from three gathers, applied, ground, enameled, and gilded
CONDITION: The object is intact except for a chip on the right foot. The surface and enamel are almost as new, but some of the gilt has been lost.
The Corning Museum of Glass, Gift of I. C. Elston, Jr. 54.1.160a,b

This container in the form of a bird has a hollow head with a small pouring hole in the beak and a semicircular crest, made by pinching, at the back. The body, which is also hollow, is roughly egg shaped but tapers toward the tail. The bird has two rudimentary front legs with flat feet, each made from a separate bit; a third short "leg" and foot are applied near the tail. The wings are represented by horizontal trails that extend from below the head almost to the tail. The trails were crimped to produce a corrugated effect. The tail, which was made from a separate bit, is flat and fan shaped. An opening in the middle of the back, used to fill the object, has a short bulbous neck and a large rounded rim made by trailing. The mouth is closed by a stopper with a globular knop. The mouth, the three feet, and the stopper were finished by grinding.

Gilded and enameled ornament almost completely covers the surface of this object. The enamel on the head, body, tail, and feet is pink, while that on the wings is an orangy red. Short parallel lines and spots on the head indicate feathers, and double outlines mark the large round eyes. The mouth and the centers of the eyes are gilded. On the body there is an overall pattern of overlapping semicircular scales, outlined in pink and containing gilded lines of various lengths that resemble the barbs of a feather; similar groups of lines adorn the wings. The upper surface of the tail has a schematic pattern of feathers, the two front feet have schematic claws, and there is simple frondlike decoration below the rim. The top of the rim is gilded.

For a similar object, see Canav 1985, nos. 251–55. *DW*

LITERATURE: Unpublished

149. **Ewer**
Turkey (Beykoz, Istanbul), 19th century
H., ewer and stopper, 17.9 cm (7 in.), h., ewer, 15.5 cm (6⅛ in.), max. diam. 6.7 cm (2⅝ in.), diam. at rim 2 cm (¾ in.)
Opaque white glass; opaque orange, light green, pink, and black enamels; and gold
Free blown, applied, ground, enameled, and gilded
CONDITION: The object is intact except for chips in the lower edge of the stopper. The surface and enamel are almost as new, but some of the gilt has been lost on both the ewer and the stopper.
The Corning Museum of Glass
55.1.21a,b

This object, a ewer with a stopper, has a slender pear-shaped body. The plain rim has a flat top and a rounded edge. The cylindrical neck is wider at the bottom than at the top and merges with the wall. The lower part of the vessel, consisting of a shallow conical foot with a rounded edge, was applied. The underside of the foot is hollow and bears a circular pontil mark containing scale. A spout was applied to the upper wall, drawn up and out, and cracked off. Opposite the spout is a handle attached to the upper neck and the top of the wall. The stopper has a knop shaped like an onion. The tips of both the spout and the stopper were finished by grinding.

The ewer has been decorated with gilded and enameled designs. On the upper neck there is a horizontal band of freely painted pink chevrons that begin and end at the upper handle attachment. The lower neck and the wall are divided by gilding into four horizontal rows of compartments. The spout interrupts the top three rows and intrudes upon the bottom one, while the handle interrupts the top two and intrudes upon the third. Thus, the top two rows have two compartments on each side of the vessel, the third row has seven compartments, two of which are incomplete, and the fourth row has nine compartments, two of which are incomplete. Each compartment contains a single flower with six pink petals and an orange center atop a short stem with two or more leaves painted in green and black. The edge of the foot is decorated with a continuous band of nine contiguous purplish pink arcs. Appearing on the bottom of the spout is a spray of pink-and-orange flowers on a green-and-black stem, with leaves of the same colors. The top of the handle also has a flower, with pink petals, on a short stem with leaves of green and black. The top of the rim, the top of the spout, and the narrowest part of the stopper are gilded.

Ewers with this form and decoration were made in large numbers at Beykoz in the nineteenth century. They occur in a variety of colors (see Canav 1985, nos. 175, 176, 188–191, 235–48).

DW

LITERATURE: Unpublished

150. **Sprinkler**
Turkey (Beykoz, Istanbul), 19th century
H. 20.6 cm (8⅛ in.), max. diam. 6.5 cm (2½ in.), diam. at rim 2.1 cm (⅞ in.)
Opaque white glass; opaque yellow, light green, light blue, pink, orangy red, and black enamels; and gold
Free blown, applied, enameled, gilded, and threaded
CONDITION: The object is intact except for a chip in the rim. The surface and enamel are almost as new, but most of the gilt has been lost.
The Corning Museum of Glass
55.1.20

This sprinkler has a slender pear-shaped body and a plain rim with a flat top and a rounded edge. The cylindrical neck is wider at the bottom than at the top and merges with the wall. The lower part of the vessel, consisting of a shallow conical foot with a rounded edge, was applied. The underside of the foot is hollow and has a circular pontil mark. At the top of the neck, the interior has been threaded to receive a screw-in stopper.

The sprinkler is abundantly decorated with gilded and enameled ornament. The upper part of the neck bears a row of four flowers on short stems, each of which has a pair of leaves at the bottom. The petals of the flowers are either pink or red, and the calyxes, stems, and leaves are green with black outlines. Below these, on the lower neck, is a continuous horizontal band of pink flowerlike motifs; an identical band adorns the top of the foot. Between these bands, occupying most of the wall, are two bunches of flowers, each with a large pink rose at the center surrounded by sprays of forget-me-nots and flowers resembling daisies. The roses are pink, the forget-me-nots have blue petals and yellow centers, and the daisies have red petals and yellow centers; the stems and leaves are green with black outlines. Between the bunches are single red flowers on leafy stems and small gilded stems with leaves. The lower part of the foot is decorated with four flowers, either pink or red, on stems with leaves, similar to the flowers on the neck. The underside of the foot has a smudged and indecipherable mark in red enamel.

Rose-water sprinklers with this form and decoration were made in large numbers at Beykoz in the nineteenth century, usually from opaque white or opaque blue glass (see Canav 1985, nos. 223, 234).

DW

LITERATURE: Unpublished

Imitations of Islamic Glass

DAVID WHITEHOUSE

Finely decorated medieval glass from the Islamic world has attracted European attention in two broad periods: in the later Middle Ages, when it was prized as the rare product of an exotic civilization, and since the 1860s, when it began to be collected, studied, and imitated.

The medieval importation to Europe of luxurious Islamic glass, its preservation in treasuries, and its occasional discovery in archaeological excavations have been previously noted (see p. 8). Alongside this movement of luxury objects, a far more prosaic traffic was taking place between glassmakers in Islamic lands and their counterparts in Europe.

The success of the glass industry in Venice was due in part to the use of raw materials of exceptional purity (Whitehouse 1998). The basic ingredients of glass are silica, soda or potash, and lime. The most accessible source of silica is sand. In the Middle Ages soda was obtained from the ash of halophytic plants, such as *Salsola kali*, and potash came from the ashes of ferns and other potassium-rich vegetation. Very probably, lime was introduced as an impurity in one of the other ingredients. By 1332 Venetian glassmakers had abandoned local sand and were importing quartz pebbles from the mainland. For superior soda, they went farther afield: to Syria and Egypt (Ashtor and Cevidalli 1983; Jacoby 1993). A Venetian document of 1255 (Zecchin 1987, p. 5) refers to *Alumen album* (white plant ash) from Alexandria; however, by the late thirteenth century, Syrian plant ash was preferred, and by the early fourteenth century its use was mandatory.

At the same time, the Venetians imported broken glass for recycling. The document of 1255 cited above also refers to "*vitrum in massa*" (glass in the form of chunks or blocks) arriving from the East, and in 1277 an agreement between Doge Jacopo Contarini and the titular prince of Antioch, Bohemond VII, exempted Venetians from paying duty in the port of Tripoli except when they exported broken glass.

A third material imported from the Islamic world was cobalt, which was used to color the blue enamel found on a well-known and much-discussed group of glass vessels: the so-called Aldrevandin group. The group takes its name from a beaker in the British Museum (cat. no. 151) bearing the inscription "+ MAGISTER. ALDREVANDIN. ME. FECI" (Master Aldrevandin made me). This and the other objects in the group are painted in colored

Opposite: detail, cat. no. 155

enamels with combinations of Latin inscriptions, Christian religious images, European secular scenes and heraldic devices, and animals. Between 1280 and 1351 Venetian documents contain five records of "painters of beakers," and it is generally believed that the Aldrevandin glasses were made in Venice (Carboni 1989).

Although the iconography of the Aldrevandin vessels is European, the technique employed to execute it—enameling—is not. Two schools of thought exist concerning the origin of enameling on glass in Venice: one holds that the technique was acquired from Byzantium, and the other that the source was Islamic. Whichever view prevails (the majority opinion today favors the second opinion), the compositional similarity of Venetian and Islamic enamels suggests that the knowledge of enameling on glass arrived in Venice by the same route as the glassmakers' raw materials.

A remarkable reversal of roles began to take place between Venetian glassmakers and the Islamic world in the late fifteenth century. By this date, Venice was acknowledged throughout Europe as the leading manufacturer of fine glassware. Indeed, such was the excellence of Venetian glass that it began to infiltrate the markets of the Near East. Thus, Santo Brascha of Milan traveled to the Holy Land in a Venetian ship, the captain of which sent a consignment of glass to Damascus for a functionary of the Mamluk sultan Qāītbāy (r. 1468–96) (Charleston 1964, p. 158). Later, in 1512, the Venetian merchant Martino Merlini wrote to his brother, who was traveling in the East, about the demand for enameled glass. At about the same time, Tome Pires noted that Venetian ships brought glass of all kinds to Egypt.

The Venetians, and perhaps also glassmakers from other parts of Europe, such as Catalonia, exported a variety of their products to the Near East, including vessels with forms and ornament calculated to appeal to their new customers. A hanging lamp in Düsseldorf (cat. no. 152) is just such an object, its traditional Islamic form decorated with a heterogeneous collection of ornament that includes enameled lily-of-the-valley motifs and a botched Arabic inscription.

Although scholars and collectors began to take a serious interest in the art and antiquities of the Islamic world in the early nineteenth century, glass did not become a focus of attention until the 1860s (see p. 9). In 1863 Ismāʿīl Pasha ascended the Egyptian throne and began to transform the city of Cairo through an ambitious program that attracted European businessmen and investors. Many of these were French, and displays of medieval mosque lamps at the Paris expositions of 1867 and 1878 attracted significant attention. Similarly, in Vienna, the glass exhibited at the 1873 world's fair included two medieval enameled vessels from Saint Stephen's Cathedral (cat. nos. 124, 125). "Oriental," "Arabian," and "Moorish" styles were already fashionable during the period, and glassmakers soon began to produce ambitious imitations and adaptations of Islamic ornament. Among the most significant of those engaged in this endeavor—although by no means the only ones—were Philippe-Joseph Brocard in Paris, Émile Gallé in Nancy, the firm of J. and L. Lobmeyr in Vienna, and Antonio Salviati in Murano.

Philippe-Joseph Brocard (d. 1896) was a celebrated decorator of glass who became fascinated by mosque lamps (Hilschenz-Mlynek 1973, p. 155; Hilschenz-Mlynek and Ricke 1985, pp. 47–51). Working to perfect enamels that were compatible with the glass he decorated, Brocard produced replicas of medieval lamps and other objects (cat. nos. 153, 154). He first displayed his creations in 1867 at the Paris exposition, where they were an instant success. Thereafter, he exhibited at the Union Centrale des Beaux-Arts Appliqués à l'Industrie, Paris, in 1869; the 1873 Vienna world's fair, where he won a medal (for two of his exhibited works, see Neuwirth 1981, pp. 86–87); the 1878 Paris exposition, where he also received a medal; and the 1882 Salon de l'Union Centrale des Arts Décoratifs. At the 1886 exhibition of the

Union Centrale, Brocard crowned his career by winning a gold medal. Five years later, he was awarded a patent for "a new procedure for the application of enamels to glass and metal foil."

Brocard's ability to replicate Islamic enameled glass is illustrated by an anecdote concerning a fourteenth-century lamp formerly in the collection of Albert Goupil, a prominent Parisian collector:

> Of this precious lamp, there exists at present nothing but a fine copy in the Musée des Arts Décoratifs, in Paris, and an etching inserted in Henry Lavoix's article on "La Collection Albert Goupil" in the Gazette. . . . The original itself is lost. After the copy just referred to had been so successfully executed, Goupil took it into his head to get some damaged portions of the enamel mended, the result of the attempt being that this lamp, unique in its kind, was utterly destroyed in the fire. The copy therefore figured alone in [Goupil's] celebrated collection, until the auction which took place after his death. (Schmoranz 1899, p. 15)

The copy was much admired, to the extent that

> a learned curator of one of our great libraries, who at the same time as being a scholar is a[n art] lover and connoisseur of the first rank, in an article published in an art journal, devoted enthusiastic lines to it. . . . Then, one fine day, he discovered that this marvel not only is not unique, but is in fact the work of a talented artist, whose work Paris has admired for years. (Gasnault 1887–88, pp. 232–33)

Another, far more prominent French glassmaker, some of whose early products were decorated in a style that imitated glass from the Islamic world, was Émile Gallé (1846–1904). In 1845 Gallé's father, Charles Gallé-Reinemer, founded a glass and ceramics business at Nancy, some 280 kilometers (175 miles) east of Paris. At first, the goods he sold were manufactured elsewhere, but when the German annexation of Lorraine after the Franco-Prussian War resulted in the loss of one of his suppliers, he opened a factory at Nancy in 1871.

Émile Gallé attended the local lycée and then traveled in Germany and England, where he pursued his interests in music and the decorative arts. After the trip ended in Paris, he formed a friendship there with the glassmaker Eugène Rousseau. In 1874, when his father retired, Émile became the artistic director of the family business (Warmus 1984, pp. 11–25).

Émile Gallé developed into both a successful businessman and an outstanding designer in the Art Nouveau style. His creations attracted international recognition at the Paris Exposition Universelle in 1889, the Chicago world's fair in 1893, the Paris exposition of 1900, the Exposition de l'École de Nancy in Paris in 1903, and the Saint Louis world's fair in 1904. Gallé's glass was acquired for prominent collections, including those of Roger Marx, the editor of the *Gazette des beaux-arts*; the industrialist Édouard Hannon; the Philadelphia Museum of Art, which bought a piece from the Saint Louis world's fair; the Russian and Danish royal families; and Louis Pasteur, who received the Pasteur Coupe, a goblet with elaborate applied and engraved ornament, as a gift from the École Normale Supérieure on the occasion of his seventieth birthday.

One of the features of Gallé's success as a businessman was his versatility. His contemporary Charles de Meixmoron de Dombasle wrote to Gallé about the factory at Nancy: "In 1883 you built enormous studios for the production of faience, glassware, and [for you] a new industry, cabinetmaking. It is in the context of this fine factory . . . that your works should best be viewed in order to appreciate fully the character and variety of your production" (Meixmoron de Dombasle 1900, p. L).

Gallé, like Brocard, was interested in enameling on glass, and he used this medium to explore historical themes drawn from ancient Egypt,

Japan, and the Islamic world (Bloch-Dermant 1980). Gallé himself recorded some of the stages in the development of this interest. In a statement for the jury of the 1889 Paris exposition (reprinted posthumously in his *Écrits pour l'art* [Gallé 1908]), he wrote:

> Since 1878, I have devoted myself continually to developing a palette that would allow me to decorate glass with the aid of colors and low-temperature vitrifiable enamels. . . . I also developed reflecting colors by mixing them with hard Arabian enamels. Finally, in 1884, I produced for the Union Centrale des Arts Décoratifs a new series of transparent enamels in relief. . . . I therefore present you today with the results of my continued research: opaque enamels with artificial and bizarre colors, muted nuances designed to add some "spice" to an already impressive array of colors. You will note the opaque enamels colored with gold preparations that produce pinks and lilacs that lend themselves to equally interesting work. (Quoted in Warmus 1984, p. 185)

Gallé's exquisite version of an Islamic hanging lamp (cat. no. 155) combines some of the techniques described in his notes with two additional techniques: acid etching and iridizing.

The Viennese firm of J. and L. Lobmeyr was another highly successful maker of decorative glass (Rath 1998; Neuwirth 1999). The founder of the company, Josef Lobmeyr (1792–1855), was granted permission from the emperor to operate a glass factory in 1822, and the following year he opened a shop in Vienna. The company prospered. After Lobmeyr received his first order from the imperial household, in 1835, he expanded the business by buying a rival firm, Janke and Görner, three years later. He won an honorable mention at the Vienna exhibition of industrial products in 1839.

In the years that followed, Lobmeyr went from strength to strength. In 1842 the company acquired glass factories in Slavonia, at Marienthal and Zvečevo; in 1845, it displayed chandeliers and other lighting devices at an exhibition of applied art in Vienna. When Josef died in 1855, his son, also named Josef (1828–1864), took over the business. Another son, Ludwig (1829–1917), became a partner in 1859, and the company adopted the name J. & L. Lobmeyr in the following year. Following the death of Josef Jr. in 1864, Ludwig became the sole proprietor of the company.

The years of Ludwig Lobmeyr's proprietorship brought international success. One of the surest ways to achieve eminence in the late nineteenth century was to be acclaimed at the many world's fairs that took place not only in Europe but also in the United States and elsewhere. Lobmeyr went to the London exhibition of 1862, where he was awarded a medal for "excellence in the manufacture of crystal, tableware, and chandeliers." The company exhibited in Vienna in 1871 and 1873, the second time *hors concours*, and in 1876 Lobmeyr received a special award at the Philadelphia world's fair. In a sense, however, the crowning achievement of the period was a special exhibition at the Österreichischen Museum für Kunst und Industrie in 1874.

Under Ludwig's direction, Lobmeyr produced a wide range of glassware decorated in "Oriental" styles (Neuwirth 1981). Some of these objects were faithful copies of medieval originals: about 1900, for example, the company reproduced a thirteenth-century gilded and enameled beaker from Syria or Egypt that is one of the treasures of the Hessisches Landesmuseum in Kassel, Germany (Baumgartner and Krueger 1988, no. 65). The decoration, and occasionally the forms, of other Lobmeyr products were freely adapted from examples taken from many periods and places in the Islamic world and beyond, including the Alhambra, İznik ceramics, and medieval manuscripts. Usually, the source of such examples was a printed collection of designs, such as Owen Jones's *Plans, Elevations, Sections, and Details of the Alhambra* (2 vols., London,

1842–45) or Albert-Charles-Auguste Racinet's *L'Ornement polychrome; cent planches en couleur, or et argent* . . . (Paris, 1873).

Among Lobmeyr's many "Orientalizing" products, introduced in the 1870s and 1880s, were gilded and enameled vessels with "Arab" decoration (see, for example, Neuwirth 1981, pp. 33–51, pls. 9–11, 12, 14, 15, 17, 18), a "Moorish collection" (Neuwirth 1981, p. 40, pl. 12), vessels gilded and enameled in "Persian" style (Neuwirth 1981, p. 48, pl. 16), and a "Turkish series" (Neuwirth 1981, pp. 58–59, pls. 21, 22). A tumbler in The Corning Museum of Glass (cat. no. 157) is a typical example of Lobmeyr's so-called Arab decoration.

The last of the four glassmakers represented in this chapter is Antonio Salviati (1816–1890) (Sarpellon et al. 1989; Barr 1998, pp. 19–42). Salviati was born and raised in the northern Italian town of Vicenza but later moved to Venice, where he practiced as an attorney. In 1859 he founded Salviati Dott. Antonio fu Bartolomeo, a company specializing in the manufacture of glass mosaics, for both churches and public buildings, and glass tesserae. Salviati's collaborator, Lorenzo Radi, in his experiments with the composition of glass, developed new colors and rediscovered how to make *calcedonio*, a marbled glass that resembles the mineral chalcedony. At the 1862 London world's fair, Salviati displayed both mosaics and chalcedony glass, which were so admired that he was commissioned to manufacture mosaics for Saint Paul's Cathedral, the Houses of Parliament, and the South Kensington Museum (now the Victoria and Albert Museum). Two years later, the same combination of products won prizes at the First Glass Exhibition, held in Murano. The pattern was established: in the future, Salviati would own or be a partner in two types of factories, one specializing in the manufacture of mosaics, the other concentrating on blown glass.

In 1866 Salviati returned to London in order to seek capital for business expansion. Sir Austen Henry Layard, a wealthy archaeologist, politician, and diplomat, was one of several English investors who enabled him to set up the Società Anonima per Azioni Salviati and C. Recruiting many of Murano's most talented glassworkers and designers, Salviati began to produce a broad range of blown glass. He exhibited at the Paris exposition of 1867 and in 1869 won a gold medal at the Second Glass Exhibition, held in Venice. The company changed its name to the Venice and Murano Glass and Mosaic Company (Salviati and C.) in 1872. Salviati and his English backers were partners until 1877, when they bought him out. While the Venice and Murano Glass and Mosaic Company continued to produce glass, concentrating on imitations of Roman and pre-Roman vessels, Salviati established a new company, Salviati Dott. Antonio, which specialized in imitations and adaptations of Venetian forms from the sixteenth to the eighteenth century.

At the London exhibition of 1869, Salviati showed a number of gilded and enameled imitations of Mamluk hanging lamps. According to the local newspaper *La voce di Murano* (April 5, 1869), he received a commission in the same year from the khedive of Egypt to make similar lamps. A lamp of this type, blown by Antonio Seguso, decorated by Leopoldo Bearzotti and Antonio Tosi, and signed "Salviati & C." is in the collection of the Museo Vetrario, Murano (Barovier Mentasti et al. 1982, p. 224, no. 417).

151. **The Aldrevandin Beaker**
Venice, probably early 14th century
H. 13 cm (5⅛ in.), max. diam. 10.9 cm (4¼ in.)
Colorless glass and white, yellow, black, blue, red, and green enamels
Free blown and enameled; tooled on the pontil
INSCRIPTION: + MAGISTER. ALDREVANDIN. ME. FECI (Master Aldrevandin made me)
CONDITION: The object is intact, and the surface is in good condition. The glass contains small bubbles and some black specks.
Trustees of The British Museum, London 76.11–4.3

This cylindrical beaker has a slightly flared opening and rests on an applied foot ring; the base has a high conical kick. The enameled decoration was applied on both sides of the glass. On the exterior, two narrow strips of yellow bordered by red lines enclose the upper band, inside which a Latin inscription was copied in white letters. The larger decorated area, bordered by the upper band on top and by another yellow-and-red strip below, includes three heraldic shields arranged at even intervals against a vegetal background. The shields contain, respectively, three blue stag's horns set against a yellow background, three red keys also on a yellow ground, and white and black horizontal bars. The backgrounds of the first two shields are painted on the inner wall, as is the black enamel of the third shield. A white pearled border painted on the exterior surrounds the shields, whereas the red line that frames them was drawn inside. The vegetal composition is made up of white stems and three-lobed or heart-shaped leaves; the red, blue, and green leaves are painted on the interior.

This beaker is the most celebrated, and one of the best preserved, of a group of enameled-glass objects created in Europe, more precisely in Venice, some time between the last two decades of the thirteenth century and the first half of the fourteenth. These vessels were formerly referred

to as "Syro-Frankish," since Carl Johan Lamm believed that they were produced for the Crusaders on the Syrian coast by European or Jewish glassmakers educated in the Islamic tradition (Lamm 1929–30, pp. 278–79, pl. 99, and 1941, pp. 77–99). The fact that the small group known by Lamm included the only beakers ever reported to have been found outside of Europe—in the northern Caucasus, in western Anatolia, Acre, and Fusṭāṭ—reinforced his attribution. Several decades later, the group has grown with the addition of several intact and fragmentary vessels and dozens of fragments found in Europe, from Ireland to Russia and from Sweden to Sicily. After the group was cautiously attributed to Europe in the late 1960s (Harden et al. 1968, pp. 151–52), numerous new finds were studied, published, and exhibited in 1988 that suggested, with some reservations, that Venice was the center of manufacture (Baumgartner and Krueger 1988, nos. 72–119). The Venetian attribution is generally accepted at present, although some scholars suggest that other glassmaking centers in Europe may have been involved (see, for example, Krueger 1998, p. 109).

The great majority of objects in this group are beakers, of two basic types; there are also a few bowls and footed vessels. One type of beaker, narrow and tall, flares all the way from the base to the opening and is thus similar to thirteenth-century Syrian objects (cat. no. 40; fig. 99). Another similarity is that the decoration often includes gilding and is applied exclusively to the exterior walls (Baumgartner and Krueger 1988, nos. 102, 106, 108; Carboni 1998, fig. 23.1, 2). The second type, exemplified by the present beaker, has a larger diameter and less elegant proportions and is almost cylindrical, although the opening is flared; the decoration is applied on both sides, and yellow enamel is employed rather than gold. While intermediate shapes are also found, their decorative techniques are usually related to those of the second type (Baumgartner and Krueger 1988, nos. 72, 91; Carboni 1998, fig. 23.3, 4). It seems possible that the first type was created after a direct contact with Islamic shapes, techniques, and technology, and is therefore earlier than the second, which reflects the Venetian glassmakers' taste after they became more confident in making enameled glass.

Definitive evidence that enameled glass was made in Venice is provided by numerous documents in the Archivio di Stato, in which the names of a few painters are also mentioned (Zecchin 1969, 1970, and 1973). Two of these, Bartolomeus and Petrus, signed vessels that were excavated in London, Stralsund (Germany), and Tartu (Estonia) (Clark 1983, pp. 154–55; Krueger 1998, fig. 24.1; Carboni 1998, colorpl. L, fig. 23.7, respectively). Some beakers were made for specific patrons (for example, the Scala family of Verona; see Carboni 1998, fig. 23.2), but their wide distribution indicates that most were created for commercial purposes. A document mentioning the decoration of more than four thousand beakers by a certain Gregorio in order to repay a debt corroborates the commercial aspects of this production (Zecchin 1969, pp. 40–41; Carboni 1998, p. 102). The concentration of finds in the Anglo-Saxon regions demonstrates that Venice exported the vessels to the cities of the Hanseatic League. Perhaps such objects were initially produced in response to a special interest on the part of the knights of the Teutonic Order, who had established their headquarters in the city after leaving the Holy Land in 1291 (Carboni 1998, pp. 102–3).

Aldrevandin, the maker and/or painter of the present beaker, is not mentioned in the archival documents. There is little doubt, however, that he was one of the craftsmen working in Venice together with Bartolomeus, Petrus, and Gregorio. Technical and stylistic details, including the choice of colors, the style of calligraphy, and the depiction of trefoil and heart-shaped leaves, link this beaker to the majority of those in the group. It has been pointed out that at least two of the shields here bear the coats of arms of Swabian families (Read 1902, p. 226), which confirms that some of these vessels were created for Germanic customers. Yet, the presence of three different coats of arms implies that maestro Aldrevandin did not receive a specific commission (two different shields may indicate the celebration of a marriage, but three elude any similar explanation), and thus he must have simply used an available sketchbook to create a desirable item for the export market. *SC*

PROVENANCE: R. Gedon, Munich, acquired in 1876

LITERATURE: Read 1902, pp. 224–26; Dillon 1907, pl. 28; Lamm 1941, pl. 23.3; Pfeiffer 1966, fig. 2; Harden et al. 1968, pp. 151–52, no. 205; Baumgartner and Krueger 1988, no. 103; Tait 1991, p. 152, no. 192; Verità 1998, fig. 28.1

152. Lamp
Venice or Barcelona, ca. 1500
H. 30.5 cm (12 in.), diam. 18.4 cm (7¼ in.)
Colorless and translucent reddish purple glass; opaque white, red, light green, blue, and black enamels; and gold
Body free blown from two gathers and partly blown in dip mold (*mezza-forma* technique), foot blown from another gather, applied, enameled, and gilded (with gold foil and gold in suspension)
CONDITION: The object was broken in many pieces, with losses to the rim, neck, and wall, as well as the almost total loss of the foot, and has been restored. The surfaces of the glass and enamel are generally in good condition, but much of the gilt has been lost or is worn; scattered areas of gilt preserved beneath the enamel, even at the bottom of the wall, reveal its former extent.
Kunstmuseum Düsseldorf P1978–1

This lamp has a colorless and roughly globular body, a plain rim with a rounded lip, and a neck with a straight tapering side. The underside of the floor has a large irregular pontil mark. Most of the foot is restored, but enough survives to show that it was purple and hollow. The body is decorated with twelve vertical ribs that are wider and more prominent at the top than at the bottom. The lamp has three equidistant purple handles, which were dropped onto three of the ribs near their tops, drawn up, out, and in to form a loop, and then drawn down and attached to the ribs.

Elaborate gilded and enameled decoration appears on the neck, wall, foot, and handles. The neck is decorated with four continuous horizontal bands. The uppermost, narrow band has an illegible "inscription," presumably intended to imitate Arabic calligraphy, made of gold foil outlined in black and interspersed with gold-foil leaves, set against a blue background. Above and below the inscription are narrow bands of gold foil decorated with alternating white and red dots. The second, widest band contains four large medallions alternating with four small ones, surrounded by dense foliage made by applying gold foil, scratching the outlines and details, and cross-hatching the background. Each larger medallion has a narrow border of gold foil beneath a ring of white dots and contains a gold-foil quatrefoil with narrow serrated leaves superimposed on a quatrefoil with semicircular leaves; the ends of the semicircular leaves are white outlined in black, all the leaves have spots of various colors, and the background is red, green, or (in two cases) blue. Each small medallion is bordered in the same way as the larger medallions and contains two superimposed quatrefoils made of gold foil decorated with enameled spots; the background is white, red, or (again in two cases) blue.

The third, narrow band of ornament on the neck bears a row of contiguous lozenges outlined in gold foil, each of which contains two superimposed quatrefoils, one with broad cordate leaves and the other with narrow oval leaves, set against a crosshatched background. The quatrefoils with broad leaves have five spots of enamel, located at the center and on each leaf: a pattern of a blue spot at the center and white spots on the leaves alternates with one of a white spot at the center and blue spots on the leaves. The quatrefoils with narrow leaves have plain backgrounds. The junction of each pair of lozenges is covered with a red spot. Above and below the lozenges are narrow borders of gold foil with a row of alternating red and white spots. The lowest band of ornament on the neck consists of a row of gold-foil isosceles triangles, the apexes of which point down and are covered with a white spot.

On the wall, the exposed ribs are covered with vertical strips of gold foil that are broader than the ribs themselves, and similar strips of foil cover the handles. Between each pair of gold-foil strips is a vertical spray of small leaves or flowers on short stems, arranged in pairs. Each leaf or flower is bulbous, with a spiky outer edge. Clockwise from any of the handles, the sprays are blue, red, white, and green. The edges of some flowers overlap the strips of gold foil, and the spaces between the flowers and the foil are decorated with small leaflike elements made of gold applied in a liquid medium with a brush. The decoration on the very small surviving part of the foot seems to include white and green flowers or leaves similar to those on the wall.

The ribs were made by using a technique, widely practiced in Venice beginning in the fifteenth century, known as *mezza-forma*, or *mezza-stampatura*. The glassworker takes a

partly inflated parison, gathers additional glass on its lower part, and further inflates it in a dip mold, thereby producing ribs on only part of the object, hence the term *mezza-forma*, which literally means "half-molding."

The decoration was carried out in three stages, each of which probably involved returning the object to the furnace several times. First, the gold foil was applied, embellished with styluses or similar pointed tools, and fixed by firing; next, the enamels were applied and fired; and finally, the gold in a liquid medium was applied and fired. This sequence of events is confirmed by the frequent occurrence of enamel on top of foil and by the occasional occurrence of gold paint on top of enamel.

The gold foil on the upper neck is extensively torn and the spots of enamel there are oval, while the foil near the bottom of the neck is intact and the enamel spots are circular—differences caused by the method employed to fix the gold and enamel. Rather than being placed in a kiln and fired, the object was held on the end of a pontil, inserted into the mouth of the furnace, and constantly rotated to ensure that the surface was evenly heated. During this process, the glass became soft, and centrifugal force caused the mouth to widen; in turn, the foil tore and the circular spots of enamel stretched until they were oval. The large irregular pontil mark is probably the result of attaching the object to a pontil on two occasions, first to form the vessel and then to fire the ornament. *DW*

LITERATURE: *JGS* 21 (1979), p. 120, no. 6

153. **Bottle**
Attributed to Philippe-Joseph Brocard, Paris, ca. 1870–80
H. 50.9 cm (20 in.), max. diam. 22.7 cm (9 in.), diam. at rim 5.6 cm (2¼ in.)
Transparent very pale green glass; opaque white, yellow, green, blue, and red enamels; and gold
Free blown from two gathers, applied, enameled, and gilded
INSCRIPTION: on neck, in *naskhī* script, repeated three times, and on roundel panels: العالم (the learned)
CONDITION: The object is intact. The enamel is in good condition, but most of the gilt has been lost. The glass contains many bubbles and particles of unfused batch material.
The Metropolitan Museum of Art, New York, Gift of Anthony Blumka, in honor of Justin Frederick Nasatir, 1998 1998.396

This bottle has a biconical body and a plain rim, with a rounded lip. The top of the neck tapers to a thick horizontal trail, triangular in cross section; below the trail, it is cylindrical and wider at the bottom than at the top. The foot, made from a second gather, is a tall hollow cone, truncated at the top, with a tubular edge made by folding out and down. There is a large circular pontil mark.

Both the neck and the wall are decorated, the former with eleven continuous horizontal bands, four above the trail and seven below it. The first band from the top shows, on a plain background, a vegetal scroll with red outlines and gilded stems and leaves; the second has, on a blue background, a different vegetal scroll, decorated in the same manner as the first. The pattern on the first band reappears on the third, fifth, seventh, ninth, and eleventh bands, while that on the second is repeated on the fourth and sixth bands. The eighth band is broader and contains a phoenix, flying to the right and having a white body, red wings, and a blue and white tail, set against a background of yellow and green scrolls. The tenth band, which is also broad, has a blue *naskhī* inscription repeated three times, with white, yellow, and green scrolls in the background.

The wall is decorated with a broad horizontal frieze bordered above and below by narrow bands that are identical to the second band on the neck. The frieze contains four roundels alternating with four rectangular panels. Each roundel contains arabesques on a blue background surrounded by a border that is identical to the first band on the neck. Each panel has a blue inscription against a background of white, yellow, green, and red scrolls. The areas between the roundels and the upper border of the frieze contain arabesques, while those between the roundels and the lower border contain pairs of confronted peacocks separated by rosettes, with arabesques in the backgrounds.

A gilded and enameled bottle of the same form is signed "Brocard à Paris 1869" (Hilschenz-Mlynek and Ricke 1985, no. 8). *DW*

LITERATURE: Unpublished

154. **Lamp**
Decorated by Philippe-Joseph Brocard, Paris, ca. 1870–80
H. 31.7 cm (12½ in.), max. diam. 24 cm (9½ in.)
Transparent pale bluish green glass; opaque white, red, yellow, light green, and deep blue enamels; and gold
Free blown from two gathers, enameled, and gilded
CONDITION: The object is intact and in pristine condition except for the loss of some gilt, scratches on two handles, and signs of wear on the underside of the foot.
The Corning Museum of Glass, Gift of Mr. and Mrs. Arthur Appleton 78.3.16

This hanging lamp has a roughly conical body, a plain rim with a rounded lip, and a funnel-shaped neck. The wall curves down and out, then turns sharply in before curving down again at the bottom. The foot is hollow and bell shaped, with a rounded edge. There is a pontil mark on the underside of the floor. Spaced at regular intervals on the upper wall are six vertical handles, which were dropped onto the surface, drawn out, down, and in, and reattached. When the glass was cast off, small amounts of excess material were drawn up over the lower part of the handle and, in some cases, formed a diminutive loop.

The neck, body, and foot are covered with ornament outlined in red and enlivened with gilt and other colors. The ornament is arranged in nine continuous horizontal bands: three on the neck, five on the body, and one on the foot. From top to bottom, the neck is decorated with (1) a narrow band of scrolling leaves or flowers dotted with blue enamel and interrupted at regular intervals by three polychrome lotus flowers; (2) a broad band containing a prominent inscription in imitation of Mamluk *thuluth* script, set against a background of scrolling tendrils and leaves and blue enamel; and (3) a band ornamented in the same manner as band 1.

On the body, the decoration consists of (4) a narrow band of twelve sexfoils, each of which contains alternately a lotus flower or a rosette; each sexfoil is separated from its neighbors by a pair of polychrome trefoils, one of which points down from the top of the band while the other points up from the bottom; (5) a broad band of vegetal ornament with leaves, flowers, and bunches of grapes interrupted by six shield-shaped panels containing the handles (in the spaces between the handles, three large polychrome flowers alternate with various small polychrome details); (6) at the greatest diameter, a narrow band of vegetal ornament on a blue background; (7) a broad band of vegetation containing three medallions with narrow borders of scrolling leaves, alternating with shields, all of which have short inscriptions, and each area of vegetation between the medallions and the shields includes three polychrome flowers; and (8) a narrow band similar to bands 1 and 3 but without the lotus flowers.

The foot has a broad blue pseudo-*thuluth* inscription against a background of vegetation with white stems and red, green, and blue leaves.

DW

LITERATURE: *JGS* 21 (1979), p. 124, no. 27 (one of two); Frantz et al. 1992, p. 80, no. 75

155. Lamp
Made at Cristalleries de Gallé, Nancy, ca. 1884
H. 21.6 cm (8½ in.), max. diam. 15 cm (5⅞ in.), diam. at rim 13.1 cm (5⅛ in.)
Colorless glass (parts of the surface have been lightly iridized and appear pale purple); opaque red, white, and blue enamels; yellow stain; and gold
Free blown from two gathers, applied, acid-etched, iridized, stained, enameled, and gilded
SIGNED: beside pontil mark, EG [or similar]; underneath edge of foot, Gallé [;] E Gallé
CONDITION: The object is intact.
The Corning Museum of Glass 69.3.9

This hanging lamp has a biconical body, a plain rim with a rounded lip, and a funnel-shaped neck. The wall splays with a slightly convex profile and has a rounded carination below the midpoint of the body before it tapers to the foot. The floor is narrow and flat. The hollow foot, which was blown from a second gather, has the form of a bell, with a thickened edge made by folding down and in; there is an annular pontil mark (diam. 1.2 cm [1/2 in.]) on its underside. The upper wall has six equally spaced vertical handles, each formed by dropping a bit onto the surface, drawing it out, down, and in, and attaching it.

The exteriors of the neck, wall, and foot, as well as the handles, are completely covered with ornament, which was acid-etched and selectively stained, gilded, or enameled, and partly iridized. The neck has a broad frieze with narrow borders at the top and bottom. Each of the almost identical borders is divided by a continuous wavy line into a series of shallow lunettes, alternately upright and inverted, that are filled with a motif resembling a parasol with a fringe. The edges of the borders and the ornament they contain are gilded; the edges and the wavy line in the lower border are enhanced with dots of enamel. The upper border is partly iridized, the lower without iridescence. The frieze contains three circular medallions alternating with three cartouches having elaborate curvilinear outlines. Within the gilded and enameled border of each medallion there is a single figure outlined in gold and filled with yellow stain, seen against a background of flowers. One medallion shows a monkey carrying a club; each of the others depicts a human figure, wearing a headdress and full-length garment with long sleeves, who appears to be dancing. Each cartouche has a gilded and enameled border containing the outline of a leaf on a short stem, which is also gilded and enameled; the background and interior of the leaf are filled with foliage and flowers. Neither the medallions nor the cartouches are iridized. The areas between the medallions and the cartouches are iridized and filled with a continuous pattern of circles containing lotus flowers or flowers with five square-ended petals.

The body of the lamp has, at the widest point, a band of ornament almost identical to the bands on the neck, but with no iridescence and no enamel on the wavy line. Above this band, there are three medallions alternating with three cartouches, each of the six placed in a space between the handles. The medallions appear directly below the cartouches on the neck, and the cartouches below the medallions. The medallions on the wall have the same design and colors as those on the neck; they contain a horse and rider, a dancing figure wearing a long-sleeved full-length garment, accompanied by three birds, and another dancing figure with the head of a monkey. The cartouches are larger and more elaborate than those on the neck, and each contains a palmette with five leaves. The areas between the medallions and the cartouches have the same iridized pattern as the corresponding areas on the neck. The handles, too, have this pattern, and are gilded. The same iridized pattern covers the lower part of the wall and all but the edge of the foot, which has a gilded band of flowers with six petals and no iridescence; the outer edge of the band is enlivened with dots of enamel. The underside of the foot bears three very small, finely engraved signatures.

This lamp is a tour de force of glassmaking. The glass is virtually bubble free, and the vessel was formed with outstanding skill. Apart from the iridized patches on the band at the top of the neck, which appear to be fortuitous, the decoration was carried out with great precision.

The figures in the medallions may have been copied from nineteenth-century Iranian manuscripts or metalwork. The leaf in the cartouches on the neck resembles the *boteh*, or "Paisley pine," and this, together with the palmettes in the cartouches on the wall, may have been inspired by woven Kashmir shawls.

The object cannot be dated precisely. Philippe Garner (1976, pp. 92, 95) noted that Gallé began to experiment with enamels about 1873 and had perfected a wide range of colors by 1884, when he submitted works to the eighth exhibition of the Union Centrale des Arts Décoratifs. Garner dated the lamp about 1880, as did Tsuneo Yoshimizu (1985, p. 360). Yvonne Brunhammer, on the other hand, stated that it could not be earlier than 1882 and proposed a date about 1884 (Brunhammer et al. 1976, p. 213).

DW

PROVENANCE: Sotheby's, London, sale, December 9, 1968, lot 154
LITERATURE: *JGS* 12 (1970), p. 181, no. 61; Brunhammer et al. 1976, p. 213, fig. 320; Garner 1976, p. 92; Goldstein 1977, p. 45, n. 27; Goldstein 1978, p. 4; Hakenjos 1982, p. 724, no. 88; Yoshimizu 1985, pp. 227–28 and 300, no. 46

156. **Bowl**
Probably Venice, late 19th century
H. 17.1 cm (6¾ in.), diam. 21.1.cm (8¼ in.)
Translucent sapphire blue glass; green, red, and white enamels; and gold
Free blown from two gathers, enameled, and gilded
CONDITION: The object is in pristine condition.
The Toledo Museum of Art, Museum Purchase 1947.59

This bowl has an almost hemispherical body, a hollow foot shaped like the mouth of a trumpet, and a slightly everted rim with a rounded lip. The wall curves down and in, and its profile resembles an elongated letter S. The splayed foot has a rounded edge. On the underside of the floor is a pontil mark.

Opulent gilded and enameled ornament appears on the wall, the inside of the rim, and the bottom of the foot. The decoration on the wall consists of a continuous frieze bordered at the top and bottom by schematic bead-and-reel motifs. The frieze contains two large cartouches connected by small medallions. At the center of each panel is an inverted palmette with zoomorphic and vegetal ornament. The palmette is surrounded by an oval motif with a scalloped outline, on either side of which are areas, also with scalloped outlines, that contain foliage and birds. Each of the small medallions bears a palmette. The decorations on the inside of the rim and the foot consist of similar narrow bands with scrolling leaves bordered by bead-and-reel motifs.

This bowl is a pastiche. Its form is that of a *coppa*, a stemmed cup or bowl much favored by Venetian glassmakers during the Renaissance, the most celebrated example of which is the Coppa Barovier in the Museo Vetrario, Murano (Barovier Mentasti et al. 1982, pp. 74–78, no. 65). The decoration of the present work, however, apart from the simplified bead-and-reel motifs, was inspired by ornament from Ottoman Turkey. *DW*

PROVENANCE: Christie's, London, sale, March 17, 1932, lot 87
LITERATURE: Unpublished

157. **Tumbler**
Made in the factory of J. and L. Lobmeyr, Vienna, last quarter 19th century
H. 11.2 cm (4⅜ in.), diam. 7.2 cm (2⅞ in.)
Colorless glass; opaque white, red, yellow, green, and blue enamels; and gold
Free blown, ground (rim and edge of base), enameled, and gilded
INSCRIPTION, on underside of base: Inschrift: / Erhole deine Seele / duch mich. (Inscription: / Thy spirit relaxes / you, me.)
CONDITION: The object is intact, and apart from slight wear on the underside of the base, it is as new.
The Corning Museum of Glass, Bequest of Jerome Strauss 79.3.850

This tumbler has a plain rim, a straight slightly tapering side that curves in at the bottom, and a hollow base. The side of the base splays before curving in at the bottom, and the underside is very slightly concave. There is no pontil mark.

The wall and base have gilded and enameled ornament. At the top of the wall, there is a continuous horizontal band of gold above a similar band of blue enamel, both with very narrow red borders. Below this is a wide frieze bordered at the top and bottom by narrow friezes containing vegetal ornament with gilded leaves and stems as well as four blue-and-gold rosettes that alternate with gold-and-red flowers; in each case, the frieze of ornament is contained between two bands of gold with red borders. The wide frieze contains a long cartouche with rounded ends that are separated by a medallion. The cartouche bears a pseudo-Arabic inscription in white with red borders, interlaced with a running scroll. The scroll has a blue stem and red and green leaves, the background a seemingly haphazard pattern of yellow spots; the stem, green leaves, and spots are all outlined in red.

The base is decorated with a gold band with red outlines, identical to the bands on the wall. The underside bears the Lobmeyr monogram in blue enamel and a white cursive inscription in three lines.

The clear glass, brilliant enamels, and above all the ornament of this vessel are characteristic of the "Arab" glassware introduced by Lobmeyr in the late 1870s. *DW*

PROVENANCE: Jerome Strauss (S2158)
LITERATURE: Unpublished

Glossary

DAVID WHITEHOUSE

Words appearing in *italic* type are defined elsewhere in the glossary.

abrasion: the technique of grinding shallow decoration with a wheel or some other device.
alkali: in glassmaking, a soluble salt consisting mainly of potassium carbonate or sodium carbonate. One of the essential ingredients of *glass*, generally accounting for about 15 to 20 percent of the *batch*, it acts as a *flux*, reducing the melting point of the *silica*.
annealing: the process of slowly cooling a completed object in an auxiliary part of the furnace, or in a separate furnace, to remove strain and so make the glass more durable.
applied decoration: heated glass elements (such as disks and *trails*) applied during manufacture to a glass object that is still hot; they are either left in relief or rolled on a *marver* until they are flush with the surface.
batch: the mixture of raw materials (often *silica*, *soda* or *potash*, and *lime*) that is melted to make *glass*. *Cullet* is added to the batch to help the melting process.
bit: A small amount of molten glass gathered on a *pontil* in order to be applied to the work at hand.
blank: any cooled glass object that requires further forming or decoration to be *finished*.
block: thick piece of wood out of which a hemispherical recess has been hollowed. It is used to form the *gather* into a sphere, prior to inflation.
blowing: the technique of forming an object by inflating a gob of molten glass gathered on the end of a *blowpipe*.
blowpipe: hollow iron or steel tube, today usually about 5 feet long, for blowing glass. Blowpipes have a mouthpiece at one end and are usually fitted at the other end with a metal ring that helps to retain the *gather*.
bubble: a pocket of gas trapped in glass, either intentionally or accidentally, during the melting process. Very small bubbles are known as *seeds*.
cameo glass: glass of one color covered, usually by *casing*, with one or more layers of a contrasting color. The outer layers are acid-etched, *carved*, *cut*, or *engraved* to produce a design that stands out from the background.
cane: either a thin monochrome rod or a composite rod consisting of groups of differently colored rods bundled together and fused to form a polychrome design visible when seen in cross section.
carving: the removal of glass from the surface of an object by means of hand-held tools.
casing: the application of a layer of glass over a layer of contrasting color. The *gaffer* either covers one *gather* with another or inflates a gob of hot glass inside a preformed *blank*. The two components adhere and are inflated together.
casting: the generic name for a wide variety of techniques used to form glass in a *mold*.
cold-working: the collective term for the many techniques used to alter or decorate glass when it is cold.
colored glass: glass that is colored either by impurities in the basic ingredients in the *batch* or by one of three main processes: using a dissolved *metallic oxide*, forming a dispersion of some substance in a colloidal state, or suspending particles of pigments.
combed decoration: various bichrome or multicolored patterns made by applying threads of opaque glass of a color different from that of the molten glass body, rolling them into the body by *marvering*, and then combing or dragging them.
cullet: (1) raw glass or pieces of broken glass from a cooled *melt*, remelted to form objects; (2) scrap glass intended for recycling.
cutting: the technique whereby glass is removed from the surface of an object by grinding it with a rotating wheel, made of stone, wood, or metal, and an abrasive suspended in liquid.
decolorizer: a substance (such as manganese dioxide) used to remove or offset the greenish or brownish color in glass that results from iron impurities in the *batch* or from iron or other impurities encountered in the production process.
dip mold: one-piece cylindrical mold that is open at the top so that the *gather* can be dipped into it and then inflated. See also *optic mold*.
enamel: a vitreous substance made of finely powdered glass that is colored with metallic oxide and suspended in an oily medium for ease of application with a brush.
engraving: the process of cutting into the surface of an *annealed* glass object either by holding it against a rotating copper wheel fed with an abrasive or by scratching it, usually with a diamond. See also *carving* and *cutting*.
faceting: the process of grinding and polishing an object to give the surface a pattern of planes.
finishing: the process of completing the formation or decoration of an object. It may entail manipulating the object into its final shape while it is hot, detaching it from the blowpipe prior to *annealing*, or grinding, *cutting*, or *polishing*.
firing: the process of (1) heating the *batch* in order to fuse it into glass by exposing it to the required temperature in a crucible, (2) reheating unfinished glassware while it is being worked, or (3) reheating glassware in a low-temperature kiln to fuse *enamel* or *gilding*.
flux: a substance, such as *potash* or *soda*, that lowers the melting temperature of another substance.
free-blown glass: glassware shaped solely by inflation with a *blowpipe* and manipulation with *tools*.
frit: *batch* ingredients, such as *sand* and *alkali*, that have been partially reacted by heating but not completely melted; after cooling, frit is ground to a powder and melted.
furnace: an enclosed structure for the production and application of heat. In glassmaking, furnaces are used for melting the *batch*, maintaining pots of glass in a molten state, and reheating partly formed objects at the *glory hole*.
fusing: the process of (1) melting the *batch*; (2) heating pieces of glass in a *kiln* or *furnace* until they bond (see *casting* and *kiln forming*); or (3) heating *enameled* glasses until the enamel bonds with the surface of the object.
gaffer (English, corruption of "grandfather"): the master craftsman in charge of a team of hot-glass workers.
gather: (n.) a mass of molten glass (sometimes called a gob) collected on the end of a *blowpipe*, *pontil*, or *gathering iron*; (v.) to collect molten glass on the end of a tool.
gathering iron: a long thin rod used to *gather* molten glass.
gilding: the process of decorating glass by the use of gold leaf, gold paint, or gold dust.
glass: a homogeneous material with a random liquidlike (noncrystalline) molecular structure. The manufacturing process requires that the raw materials be heated to a temperature sufficient to produce a completely fused *melt*, which, when cooled rapidly, becomes rigid without crystallizing.

glory hole: an opening in the side of a glass *furnace*, primarily used to reheat glass that is being fashioned or decorated.

inclusions: a collective term for bubbles, metal and glass particles, and other foreign materials added to the glass for decorative effects.

iridescence: a rainbowlike effect that changes according to the angle from which it is viewed or the angle of incidence of the light source. On ancient glass, iridescence results from *weathering*; on certain later glasses, it is a deliberate effect.

jacks: a tool that has two metal arms joined at one end by a handle and is used to form the mouths of open vessels.

kick: a concavity in the base of a vessel. Formed by pushing in with a tool, it strengthens the bottom of the vessel and reduces its capacity.

kiln: an oven used to process a substance by burning, drying, or heating. In contemporary glassworking, kilns are used to *fuse enamel* and for *kiln-forming* processes such as slumping.

kiln forming: the process of *fusing* or shaping glass (usually in or over a *mold*) by heating it in a *kiln*.

lead glass: glass that contains a high percentage of lead oxide (at least 20 percent of the *batch*). It is relatively soft, and its refractive index gives a brilliance that may be exploited by covering the surface with polished wheel-cut facets.

lime: calcined limestone, which, when added to the glass *batch* in small quantities, gives stability. Before the seventeenth century, when its beneficial effects became known, lime was introduced fortuitously as an impurity in the raw materials.

luster: a shiny metallic effect made by painting the surface with metallic oxides dissolved in acid and mixed with an oily medium. Firing in oxygen-free conditions at a temperature of about 1,150°F (600°C) causes the metal to deposit in a thin film that, after cleaning, has a distinctive shiny surface. The term is applied to both ceramics and glass, but "staining" is more appropriate for the latter.

marver (French *marbre*, "marble"): an even, flat surface over which softened glass is rolled in order to smooth it or to consolidate applied decoration.

melt: the fluid glass produced by melting a *batch* of raw materials.

metallic oxide: the oxide of a metal. Oxides may be used to color glass and *enamel* or to produce stained or iridized surfaces. The resultant color depends primarily on the oxide used, but it can also be affected by the composition of the glass itself and the presence or absence of oxygen in the furnace. See *luster*, *iridescence*, and *staining*.

mold: a form used for shaping and/or decorating molten glass. Some molds, such as *dip molds*, impart a pattern to the *parison*, which is then withdrawn and blown and tooled to the desired shape and size; others are used to give the object its final form, with or without decoration.

mold blowing: inflating a *parison* of hot glass in a mold. The glass is forced against the inner surfaces and assumes the shape of the mold, together with any decoration that it bears.

mold pressing: forcing hot glass into an open or multipart mold by means of a plunger.

mosaic glass: objects made from preformed elements placed in a mold and heated until they fuse.

natron: sodium sesquicarbonate, originally obtained from the Wadi Natrun, northwest of Cairo, and commonly used as the *alkali* constituent of *batch*.

optic mold: an open mold with a patterned interior in which a *parison* of glass is inserted, then inflated to decorate the surface.

parison (French, *paraison*): a *gather*, on the end of a *blowpipe*, that is already partly inflated.

pattern-molded glass: glassware that has been blown into a mold having a raised pattern on the interior; the object thus shows the pattern with a concavity on the inside, underlying the convexity on the outside.

piece mold: a *mold* made of two or more parts.

polishing: smoothing the surface of a cold object by holding it against a rotating wheel fed with a fine abrasive.

pontil, pontil mark: the pontil, or punty, is a solid metal rod that is usually tipped with a wad of hot glass and then applied to the base of a vessel to hold it during manufacture. The irregular or ring-shaped scar often left on the base when it is removed is called the "pontil mark."

post technique: technique in which the *pontil* is attached to a flat plate of glass called a "post," which is then affixed to the base or base ring of the vessel.

potash: potassium carbonate, an alternative to *soda* as a source of *alkali* in the manufacture of glass. Potash glass is slightly more dense than *soda:lime glass* and passes from the molten to the rigid state more quickly, thus being more difficult to manipulate into elaborate forms. However, it is harder and more brilliant and lends itself to decorative techniques such as faceting.

prunt: a blob of glass applied to a glass object primarily as decoration but also to afford a firm grip in the absence of a handle.

qumqum (Arabic, "sprinkler"): an object with a tall narrow neck and oblate spheroid body, used in the Islamic world for sprinkling perfumed water.

reducing atmosphere: an atmosphere in a *kiln* or *furnace* that is deficient in oxygen. It is sometimes created deliberately to reduce oxides to their metallic state, as in the case of *staining*.

refractory: a substance, usually clay, capable of resisting high temperatures.

relief cutting: removing the background of a cut-glass vessel in such a way that the decoration so produced stands in high relief.

rock crystal: natural quartz, chemically pure *silica*. From earliest times, glassmakers have sought to imitate this material, which is usually colorless (or nearly so).

sagging: the process of reheating a *blank* so that it gradually flows under its own weight over or into a *mold* with the shape of the desired object.

sand: the most common form of *silica* used in making glass, collected either from the seashore or, preferably, from deposits having fewer impurities. Before being used in a *batch*, it is washed, heated to remove carbonaceous matter, and screened to obtain uniformly small grains.

scale: an accidental *inclusion* in glass, consisting of corrosion products that detach from the metal implements used to stir the *batch* or to form the object.

seam mark: a slight narrow ridge on a glass object formed by seepage of molten glass into gaps in the joins between parts of a mold.

seeds: minute bubbles of gas, usually occurring in groups.

silica: silicon dioxide, a mineral that is one of the essential ingredients of glass. The most common form used in glassmaking has always been *sand*.

size: in glassworking, the name applied to several glutinous materials, such as glue and resin, used to affix color or gold leaf.

soda: sodium carbonate. Soda (or alternatively *potash*) is commonly used as the *alkali* ingredient of glass. It serves as a *flux* to reduce the fusion point of the *silica* when the *batch* is melted.

soda:lime glass: historically the most common form of glass. It contains three major compounds, usually in the following proportions: *silica* (about 60–75 percent), *soda* (12–18 percent), and *lime* (5–12 percent). Soda:lime glasses are relatively light and upon heating remain plastic and workable over a wide range of temperatures; they thus lend themselves to elaborate manipulative techniques.

staining: in glassworking, the process of coloring the surface by applying a metallic oxide, which is then fired at a relatively low temperature. The oxide imparts a yellow, brownish yellow, or ruby stain, which may be painted, *engraved*, or etched.

swirled ribbing: a pattern of spiraling vertical ribs made by inflating the *parison* in a *dip mold* with vertical ribs, withdrawing it, and twisting it before continuing the process of inflation.

tool: (n.) any instrument used by glassworkers to develop and shape an object, including the *blowpipe*, *pontil*, *gathering iron*, *block*, and *jacks*; (v.) to alter an object with a tool.

trail: a strand of glass, roughly circular in section, drawn out from a *gather*.

trailing: the process of applying *trails* of glass as decoration on a vessel by laying or winding softened threads onto its surface. See also *combed decoration*.

weathering: changes on the surface of glass caused by chemical reaction with the environment. It usually involves the leaching of *alkali* from the glass by water, leaving behind siliceous, often laminar weathering products.

wheel engraving: a process of decorating the surface of glass by the grinding action of a rotating wheel, using disks of various materials and sizes and an abrasive in a grease or slurry.

Bibliography

'Abd al-Khaliq 1976 Hana' 'Abd al-Khaliq. *Al-zujāj al-islāmī* (Islamic glass). Baghdad, 1976.

Abdurazakov 1972 A. A. Abdurazakov. "Étude chimique des verres d'Asie Centrale, datant du Moyen Âge." In *IX^e Congrès International du Verre: Communications artistiques et historiques, Versailles, 27/9–2/10, 1971,* pp. 161–78. Paris, 1972.

Aga-Oğlu 1954 Mehmet Aga-Oğlu. "Remarks on the Character of Islamic Art." *Art Bulletin* 36 (September 1954), pp. 175–202.

Alexander 1996 David Alexander, ed. *Furusiyya*. Vol. 2. Exh. cat. King Abdulaziz Public Library. Riyadh, 1996.

Ali 1984 Ahmed Ali, trans. *Al-Qur'ān: A Contemporary Translation.* Princeton, 1984.

Allan 1995 James W. Allan. "Investigations into Marvered Glass: I." In *Islamic Art in the Ashmolean Museum*, edited by James W. Allan, pt. 1, pp. 1–30. Oxford Studies in Islamic Art, 10. Oxford, 1995.

Allen 1987 Francis N. Allen. *The Hedwig Glasses: A Survey*. Hyattsville, Md., 1987.

Amindjanova 1965 A. Amindjanova. "Srednevekovye stekliannye sosudy iz muzeev Tashkenta i Samarkanda" (Medieval glass vessels in the museums of Tashkent and Samarqand). *Istoriia material'noi kul'tury Uzbekistana* 3 (1962), pp. 87–100.

Amindjanova 1965 M. Amindjanova. "Sredneaziatskoe srednevekovoe steklo v sobranii Ermitazha" (Medieval glass from Central Asia in the collection of the Hermitage). *Istoriia material'noi kul'tury Uzbekistana* 6 (1965), pp. 153–58.

An 1990 Jiayao An. "On the Early Islamic Glasses Discovered in China in Recent Years." *Kaogu* 12 (1990), pp. 1116–26. In Chinese.

An 1991 Jiayao An. "Dated Islamic Glass in China." *Bulletin of the Asia Institute*, n.s., 5 (1991), pp. 123–37.

***Antigüedades árabes* 1780** *Antigüedades árabes de España.* Madrid, 1780.

***Arte islámico* 1994** *Arte islámico del Museo Metropolitano de Arte de Nueva York.* Exh. cat. Antiguo Colegio di San Ildefonso. Mexico City, 1994.

Artin 1902 Ya'qūb Artin. *Contribution à l'étude du blason en Orient.* London, 1902.

Artin 1907 Ya'qūb Artin. "Description de quatre lampes en verre émaillé et armoiriées." *Bulletin de l'Institut Égyptien*, 5th ser., 1 (1907), pp. 69–92.

Ashtor and Cevidalli 1983 Eliyahu Ashtor and Guidobaldo Cevidalli. "Levantine Alkali Ashes and European Industries." *Journal of European Economic History* 12 (winter 1983), pp. 475–522.

Atasoy 1990 Nurhan Atasoy. "Belgelerde Osmanlı camı." In *I. Uluslararasi Anadolu Cam Sanati Sempozyumu, 26–27 Nisan 1988/ First International Anatolian Glass Symposium, April 26th–27th, 1988,* pp. 87–94. Istanbul, 1990.

Atasoy 1997 Nurhan Atasoy. *1582 Surname-i hümayun: An Imperial Celebration.* Istanbul, 1997.

Atıl 1973 Esin Atıl. *Ceramics from the World of Islam*. Exh. cat. Freer Gallery of Art, Smithsonian Institution. Washington, D.C., 1973.

Atıl 1975 Esin Atıl. *Art of the Arab World*. Exh. cat. Freer Gallery of Art, Smithsonian Institution. Washington, D.C., 1975.

Atıl 1981 Esin Atıl. *Renaissance of Islam: Art of the Mamluks*. Exh. cat. National Museum of Natural History, Smithsonian Institution, and other institutions. Washington, D.C., 1981.

Atıl 1990 Esin Atıl, ed. *Islamic Art and Patronage: Treasures from Kuwait.* Exh. cat. Organized by the Trust for Museums Exhibitions, Washington, D.C. New York, 1990.

Atıl et al. 1985 Esin Atıl, W. T. Chase, and Paul Jett. *Islamic Metalwork in the Freer Gallery of Art*. Exh. cat. Freer Gallery of Art, Smithsonian Institution. Washington, D.C., 1985.

Auth 1976 Susan H. Auth. *Ancient Glass at the Newark Museum from the Eugene Schaefer Collection of Antiquities*. Newark, N.J., 1976.

Auth 1990 Susan H. Auth. "Intarsia Glass Pictures in Coptic Egypt." In *Annales du 11^e Congrès de l'Association Internationale pour l'Histoire du Verre, Bâle, 29 août–3 septembre 1988*, pp. 237–46. Amsterdam, 1990.

Azarpay 1995 Guitty Azarpay. "A Jataka Tale on a Sasanian Silver Plate." *Bulletin of the Asia Institute*, n.s., 9 (1995), pp. 99–125.

Azuar and Puche 1994 Rafael Azuar and C. Puche. "Vidrio." In *El Castillo del Río (Aspe, Alicante): Arqueología de un asentamiento andalusí y la transición al feudalismo (siglos XII–XIII)*, pp. 181–88. Alicante, 1994.

Baer 1983 Eva Baer. *Metalwork in Medieval Islamic Art*. Albany, N.Y., 1983.

Baer 1989 Eva Baer. *Ayyubid Metalwork with Christian Images.* Studies in Islamic Art and Architecture, supplement to *Muqarnas*, 4. Leiden and New York, 1989.

Bahrami 1952 Mehdi Bahrami. "A Gold Medal in the Freer Gallery of Art." In *Archaeologica Orientalia in Memoriam Ernst Herzfeld*, edited by George C. Miles, pp. 5–20. Locust Valley, N.Y., 1952.

Balog 1974 Paul Balog. "Sasanian and Early Islamic Ornamental Glass Vessel-Stamps." In *Near Eastern Numismatics, Iconography, Epigraphy and History: Studies in Honor of George C. Miles*, edited by Dickran K. Kouymjian, pp. 131–40. Beirut, 1974.

Balog 1976 Paul Balog. *Umayyad, 'Ābbasid and Ṭūlūnid Glass Weights and Vessel Stamps.* Numismatic Studies, 13. New York, 1976.

Barnes et al. 1986 Lynus Barnes, Robert H. Brill, E. C. Deal, and G. V. Piercy. "Lead Isotope Studies of Some of the Finds from the Serçe Liman Shipwreck." In *Proceedings of the Twenty-Fourth International Archaeometry Symposium*, edited by Jacqueline S. Olin and M. James Blackman, pp. 1–12. Washington, D.C., 1986.

Barovier Mentasti et al. 1982 Rosa Barovier Mentasti, Attilia Dorigato, Astone Gasparetto, and Tullio Toninato, eds. *Mille anni di arte del vetro a Venezia.* Exh. cat. Palazzo Ducale and Museo Correr. Venice, 1982.

Barr 1998 Sheldon Barr. *Venetian Glass: Confections in Glass, 1855–1914*. New York, 1998.

Barrucand 1998 Marianne Barrucand, ed. *Trésors fatimides du Caire*. Exh. cat. Institut du Monde Arabe, Paris. Gand and Paris, 1998.

Bass 1984 George F. Bass. "The Nature of the Serçe Limani Glass." *Journal of Glass Studies* 26 (1984), pp. 64–69.

Bass 1987 George F. Bass. "Oldest Known Shipwreck Reveals Splendors of the Bronze Age." *National Geographic* 172 (December 1987), pp. 692–733.

Bass 1996 George F. Bass. *Shipwrecks in the Bodrum Museum of Underwater Archaeology*. Bodrum, 1996.

Baumgartner and Krueger 1988 Erwin Baumgartner and Ingeborg Krueger. *Phönix aus Sand und Asche: Glas des Mittelalters*. Exh. cat. Rheinisches Landesmuseum Bonn and Historisches Museum Basel. Munich, 1988.

Bayramoğlu 1976 Fuat Bayramoğlu. *Turkish Glass Art and Beykoz-Ware.* Translated by Leylâ Melek Kermenli. Publications of the RCD Cultural Institute, 57. Istanbul, 1976.

Bayramoğlu 1990 Fuat Bayramoğlu. "Lâledan." In *I. Uluslararasi Anadolu Cam Sanati Sempozyumu, 26–27*

Nisan 1988/First International Anatolian Glass Symposium, April 26th–27th, 1988, pp. 81–83. Istanbul, 1990.

Behrens-Abouseif 1989 Doris Behrens-Abouseif. "The Bapistère de Saint-Louis: A Reinterpretation." *Islamic Art* 3 (1989), pp. 3–13.

Bendiner 1996 Kenneth Bendiner. "Orientalism." In *The Dictionary of Art*, edited by Jane Turner, vol. 23, pp. 502–5. London, 1996.

Van Berchem 1904 Max van Berchem. "Notes d'archéologie arabe, troisième article: Étude sur les cuivres damasquinés et les verres émaillés, inscriptions, marques, armoiries." *Journal asiatique* (January–February 1904), pp. 5–96.

Bezborodov 1975 M. A. Bezborodov. *Chemie und Technologie der antiken und mittelalterlichen Gläser*. Mainz am Rhein, 1975.

Bloch-Dermant 1980 Janine Bloch-Dermant. *The Art of French Glass, 1860–1914*. New York, 1980.

Bloom 1989 Jonathan Bloom. "The Blue Koran: An Early Fatimid Kufic Manuscript from the Maghrib." In *Les Manuscrits du Moyen-Orient: Essais de codicologie et de paléographie; actes du Colloque d'Istanbul (Istanbul, 26–29 mai 1986)*, edited by François Déroche, pp. 95–99. Varia Turcica, 8. Istanbul and Paris, 1989.

Bloom and Blair 1997 Jonathan Bloom and Sheila Blair. *Islamic Arts*. Art and Ideas. London, 1997.

Bosworth 1973 Clifford Edmund Bosworth. "The Heritage of Rulership in Early Islamic Iran and the Search for Dynastic Connections with the Past." *Iran* 11 (1973), pp. 51–62.

Bosworth 1996 Clifford Edmund Bosworth. *The New Islamic Dynasties: A Chronological and Genealogical Manual*. 2d ed. New York, 1996. [1st ed.: Edinburgh, 1967.]

von Bothmer 1971 Hans Caspar Graf von Bothmer. "Die Illustrationen des Münchener Qazwīnī von 1280 (Cod. Monac. Arab. 464): Ein Beitrag zur Kenntnis ihres Stils." Ph.D. diss., University of Munich, 1971.

Boucharlat and Lecomte 1987 Rémy Boucharlat and Olivier Lecomte. *Fouilles de Tureng Tepe*. Vol. 1, *Les Périodes sassanides et islamiques*. Mémoire [Éditions Recherche sur les civilisations], 74. Centre de Recherches d'Archéologie Orientale, Université de Paris 1, 6. Paris, 1987.

Brill 1965 Robert H. Brill. "The Chemistry of the Lycurgus Cup." In *Comptes rendus: VII^e Congrès International du Verre, Bruxelles, 28 juin–3 juillet 1965*, sec. B, pp. 223.1–223.13. [Brussels], 1965.

Brill 1967 Robert H. Brill. "A Great Glass Slab from Ancient Galilee." *Archaeology* 20 (April 1967), pp. 88–95.

Brill 1970 Robert H. Brill. "Chemical Studies of Islamic Luster Glass." In *Scientific Methods in Medieval Archaeology*, edited by Rainer Berger, pp. 351–77. UCLA Center for Medieval and Renaissance Studies, Contributions, 4. Berkeley, Los Angeles, and London, 1970.

Brill 1972 Robert H. Brill. "Scientific Investigations of Early Stained Glasses." In *IX^e Congrès International du Verre: Communications artistiques et historiques, Versailles, 27/9–2/10, 1971*, pp. 307–16. Paris, 1972.

Brill 1976 Robert H. Brill. "Scientific Studies of the Panel Materials." In Leila Ibrahim, Robert Scranton, and Robert H. Brill, *Kenchreai, Eastern Port of Corinth: Results of Investigations by the University of Chicago and Indiana University for the American School of Classical Studies at Athens*. Vol. 2, *The Panels of Opus Sectile in Glass*, pp. 225–55. Leiden, 1976.

Brill 1978 Robert H. Brill. "Some Miniature Glass Plaques from Fort Shalmaneser, Nimrud, Part II: Laboratory Studies." *Iraq* 40 (spring 1978), pp. 23–39.

Brill 1979 Robert H. Brill. "A Small Glass Factory in Afghanistan." *Journal* [Glass Art Society] (1979), pp. 26–27.

Brill 1988 Robert H. Brill. "Scientific Investigations of the Jalame Glass and Related Finds." In *Excavations at Jalame: Site of a Glass Factory in Late Roman Palestine; Excavations Conducted by a Joint Expedition of the University of Missouri and The Corning Museum of Glass*, edited by Gladys Davidson Weinberg, pp. 257–94. Columbia, Mo., 1988.

Brill 1989 Robert H. Brill. "Thoughts on the Glass of Central Asia with Analyses of Some Glasses from Afghanistan." In *XV International Congress on Glass, Leningrad, 2–7 July 1989: Proceedings; Archaeometry*, pp. 19–24. Leningrad, 1989.

Brill 1992 Robert H. Brill. "Chemical Analyses of Some Glasses from Frattesina." *Journal of Glass Studies* 34 (1992), pp. 11–22.

Brill 1993 Robert H. Brill. "Glass and Glassmaking in Ancient China, and Some Other Things from Other Places." *Journal* [Glass Art Society] (1993), pp. 56–69.

Brill 1995 Robert H. Brill. "Chemical Analyses of Some Glass Fragments from Nishapur in The Corning Museum of Glass." In Kröger 1995, pp. 211–33.

Brill 1997 Robert H. Brill. "Composición química de algunos vidrios de la Catedral de León." In *Conservación de vidrieras históricas: Análisis y diagnóstico de su deterio; restauración*, pp. 114–31. Los Angeles, 1997. [Proceedings of a conference held in Santander, Spain, July 4–8, 1994.]

Brill 1999a Robert H. Brill. *Chemical Analyses of Early Glasses*. 2 vols. Vol. 1, *Catalogue of Samples*. Vol. 2, *Tables of Analyses*. Corning, N.Y., 1999.

Brill 1999b Robert H. Brill. "Scientific Research." *Annual Report* [The Corning Museum of Glass] (1999), p. 23.

Brill forthcoming Robert H. Brill. "Scientific Investigation of Some Glasses from Wearmouth and Jarrow." To appear in a comprehensive publication of the Wearmouth and Jarrow excavations by R. Cramp. English Heritage Press. Forthcoming.

Brill and Cahill 1988 Robert H. Brill and Nicholas D. Cahill. "A Red Opaque Glass from Sardis and Some Thoughts on Red Opaques in General." *Journal of Glass Studies* 30 (1988), pp. 16–27.

Brill and Fenn 1992 Robert H. Brill and Philip M. Fenn. "Glasswares in Famen Temple." In *Selected Papers from the First International Symposium on the History and Culture of the Famen Temple*, pp. 254–58. [Xian], 1992. In Chinese.

Brill and Shirahata 1997 Robert H. Brill and Hiroshi Shirahata. "Laboratory Analyses of Some Glasses and Metals from Tell Brak." In David Oates, Joan Oates, and Helen McDonald, *Excavations at Tell Brak*. Vol. 1, *The Mitanni and Old Babylonian Periods*, pp. 89–94. Cambridge, 1997.

Brill and Weintraub 1992 Robert H. Brill and S. Weintraub. "Chemical Analyses of Some Stained Glass Windows in León Cathedral." In *XVI Congreso Internacional del vidrio/ International Congress on Glass/ Internationaler Glaskongress/ Congrès International du Verre*, vol. 7, pp. 143–48. Published in *Boletín de la Sociedad Española de Cerámica y Vidrio* 31-C (1992).

Brill and Whitehouse 1988 Robert H. Brill and David Whitehouse. "The Thomas Panel." *Journal of Glass Studies* 30 (1988), pp. 34–50.

Brill and Wosinski 1965 Robert H. Brill and J. F. Wosinski. "A Huge Slab of Glass in the Ancient Necropolis of Beth She'arim." In *Comptes rendus: VII^e Congrès International du Verre, Bruxelles, 28 juin–3 juillet 1965*, sec. B, pp. 219.1–219.11. [Brussels], 1965.

Brill et al. 1974 Robert H. Brill et al. *Glass from The Corning Museum of Glass: A Guide to the Collections*. Corning, N.Y., 1974.

Brill et al. 1991 Robert H. Brill, S. S. C. Tong, and D. Dohrenwend. "Chemical Analyses of Some Early Chinese Glasses." In *Scientific Research in Early Chinese Glass: Proceedings of the Archaeometry of Glass Sessions of the 1984 International Symposium on Glass, Beijing, Sept. 7, 1984, with Supplementary Papers*, edited by Robert H. Brill and John H. Martin, pp. 31–58. Corning, N.Y., 1991.

Brisch 1975 Klaus Brisch. "Recent Acquisitions of the Museum of Islamic Art." *Apollo* 102 (December 1975), pp. 422–23.

Brisch et al. 1971 Klaus Brisch, Jens Kröger, Friedrich Spuhler, and Johanna Zick-Nissen. *Museum für Islamische Kunst, Berlin: Katalog 1971*. Berlin, 1971.

Brisch et al. 1979 Klaus Brisch, A. Hauptmann-von Gladiss, Jens Kröger, Friedrich Spuhler, and Johanna Zick-Nissen. *Museum für Islamische Kunst, Berlin: Katalog 1979*. Berlin, 1979.

Brunhammer et al. 1976 Yvonne Brunhammer et al. *Art Nouveau: Belgium, France*. Exh. cat. Rice Museum, Institute for the Arts, Rice University, Houston, and Art Institute of Chicago. Houston, 1976.

Bucher 1888 Bruno Bucher. *Die Glassammlung des K. K. Oesterreich. Museums*. Vienna, 1888.

Buckley 1935 Wilfred Buckley. "Two Glass Vessels from Persia." *Burlington Magazine* 76 (1935), pp. 66–71.

Buckley 1939 Wilfred Buckley. *The Art of Glass*. London, 1939.

Bussagli and Chiappori 1991 Mario Bussagli and Maria Grazia Chiappori. *Arte del vetro*. Rome, 1991.

Butler 1926 Alfred Joshua Butler. *Islamic Pottery: A Study Mainly Historical*. London, 1926.

Caiger-Smith 1985 Alan Caiger-Smith. *Lustre Pottery: Technique, Tradition, and Innovation in Islam*

and the Western World. London, 1985.

Canav 1985 Üzlifat Canav. *Ancient Glass Collection: Türkiye Şişe ve Cam Fabrikalari A.Ş.* Istanbul, 1985.

Carboni 1988 Stefano Carboni. *Il Kitāb al-bulhān di Oxford*. Eurasiatica, 6. Turin, 1988. In Italian and Arabic.

Carboni 1989 Stefano Carboni. "Oggetti decorati a smalto di influsso islamico nella vetraria muranese: Tecnica e forma." In *Arte veneziana e arte islamica: Atti del Primo Simposio Internazionale sull'Arte Veneziana e l'Arte Islamica*, edited by Ernst J. Grube, Stefano Carboni, and Giovanni Curatola, pp. 147–66. Venezia e l'Oriente Vicino. Venice, 1989.

Carboni 1992 Stefano Carboni. "The Wonders of Creation and the Singularities of Ilkhanid Painting: A Study of the London Qazwīnī, British Library Ms. Or. 14140." Ph.D. diss., School of Oriental and African Studies, University of London, 1992.

Carboni 1995 Stefano Carboni. "The Arabic Manuscripts." In Petrosyan et al. 1995, pp. 77–91.

Carboni 1998 Stefano Carboni. "Gregorio's Tale; or, Of Enamelled Glass Production in Venice." In Ward 1998, pp. 101–6.

Carboni 1999 Stefano Carboni. "Glass Production in the Fatimid Lands and Beyond." In *L'Égypte fatimide: Son art et son histoire; actes du colloque organisé à Paris les 28, 29 et 30 mai 1998*, edited by Marianne Barrucand, pp. 169–77. Paris, 1999.

Carboni 2001 Stefano Carboni. *Glass from Islamic Lands: The al-Sabah Collection*. London, 2001.

Carboni forthcoming a Stefano Carboni. "A Central Asian Anthropomorphic Glass Rhyton." In *Festschrift in Honor of Ralph Pinder-Wilson*. Forthcoming.

Carboni forthcoming b Stefano Carboni. "Mantai: Glass Report." To appear in the final report on the 1980–84 excavations at Mantai, Sri Lanka. Forthcoming.

Carboni et al. 1998 Stefano Carboni, Lisa Pilosi, and Mark Wypyski. "A Gilded and Enamelled Glass Plate in The Metropolitan Museum of Art." In *Prehistory and History of Glassmaking Technology*, edited by Patrick McCray, pp. 79–102. Ceramics and Civilization, 8. Westerville, Ohio, 1998.

Carswell 1998 John Carswell. "The Baltimore Beakers." In Ward 1998, pp. 61–63.

Chardin 1927 Sir John Chardin. *Sir John Chardin's Travels in Persia*. Edited by N. M. Penzer. Translated by Edmund Lloyd. London, 1927.

Charleston 1942 Robert J. Charleston. "A Group of Near Eastern Glasses." *Burlington Magazine* 81 (September 1942), pp. 212–18.

Charleston 1964 Robert J. Charleston. "The Import of Venetian Glass into the Near-East, Fifteenth-Sixteenth Century." In *Annales du 3e Congrès des Journées Internationales du Verre, Damas, 14–23 novembre 1964*, pp. 158–68. Liège, [1964].

Charleston 1974 Robert J. Charleston. "Glass in Persia in the Safavid Period and Later." *AARP: Art and Archaeology Research Papers*, no. 5 (June 1974), pp. 12–27.

Charleston 1975 Robert J. Charleston. "Types of Glass Imported into the Near East, and Some Fresh Examples: Fifteenth-Sixteenth Century." In *Festschrift für Peter Wilhelm Meister zum 65. Geburtstag am 16. Mai 1974*, edited by Annaliese Ohm and Horst Reber, pp. 245–51. Hamburg, 1975.

Charleston 1980 Robert J. Charleston. *Masterpieces of Glass: A World History from The Corning Museum of Glass*. New York, 1980.

Charleston 1989 Robert J. Charleston. "Glass." In *The Arts of Persia*, edited by R. W. Ferrier, pp. 295–305. New Haven and London, 1989.

Charleston 1990 Robert J. Charleston. *Masterpieces of Glass: A World History from The Corning Museum of Glass*. Rev. ed. New York, 1990.

***Chinese Archaeology* 1999** *The Golden Age of Chinese Archaeology: Celebrated Discoveries from the People's Republic of China*. Edited by Xiaoneng Yang. Exh. cat. National Gallery of Art, Washington, D.C., and other institutions. Washington, D.C., Kansas City, New Haven, and London, 1999.

Clairmont 1972 Christoph W. Clairmont. "Some Islamic Glass in the Metropolitan Museum." In *Islamic Art in The Metropolitan Museum of Art*, edited by Richard Ettinghausen, pp. 141–52. New York, 1972.

Clairmont 1977 Christoph W. Clairmont. *Catalogue of Ancient and Islamic Glass*. [Based on the notes of Carl Johan Lamm.] [Benaki Museum.] Athens, 1977.

Clark 1983 John Clark. "Medieval Enamelled Glasses from London." *Medieval Archaeology* 27 (1983), pp. 152–56.

Clarke 1979 John R. Clarke. *Roman Black-and-White Figural Mosaics*. Monographs on Archaeology and the Fine Arts, 35. New York, 1979.

Cleveland Museum 1966 Cleveland Museum of Art. *Cleveland Museum of Art Handbook*. Cleveland, 1966.

Contadini 1998 Anna Contadini. *Fatimid Art at the Victoria and Albert Museum*. London, 1998.

Corning Museum 1982 The Corning Museum of Glass. *Glass Collections in Museums in the United States and Canada*. Corning, N.Y., 1982.

Curatola 1993 Giovanni Curatola, ed. *Eredità dell'Islam: Arte islamica in Italia*. Exh. cat. Palazzo Ducale, Venice. [Italy], 1993.

Diba 1983 Layla Soudavar Diba. "Glass and Glassmaking in the Eastern Islamic Lands: Seventeenth to Nineteenth Century." *Journal of Glass Studies* 25 (1983), pp. 187–93.

Diba 1998 Layla Soudavar Diba, ed. *Royal Persian Paintings: The Qajar Epoch, 1785–1925*. Exh. cat. Brooklyn Museum of Art. Brooklyn, N.Y., 1998.

Digby 1973 Simon Digby. "A Corpus of 'Mughal' Glass." *Bulletin of the School of Oriental and African Studies* 36 (1973), pp. 80–96.

Dikshit 1969 Moreshwar G. Dikshit. *History of Indian Glass*. Pandit Bhagwanlal Indraji Endowment Lectures, 1967. Bombay, 1969.

Dillon 1907 E. Dillon. *Glass*. The Connoisseur's Library. London, 1907.

Dimand 1930 Maurice S. Dimand. *A Handbook of Muhammadan Decorative Arts*. New York, 1930.

Dimand 1944a Maurice S. Dimand. *A Handbook of Muhammadan Art*. 2d ed. New York, 1944.

Dimand 1944b Maurice S. Dimand. "An Enameled-Glass Bottle of the Mamluk Period." *The Metropolitan Museum of Art Bulletin*, n.s., 3 (November 1944), pp. 73–77.

Van Doorninck 1982 Frederick H. van Doorninck. "An Eleventh Century Shipwreck at Serçe Liman, Turkey: 1978–81." *International Journal of Nautical Archaeology and Underwater Exploration* 11 (1982), pp. 7–11.

Van Doorninck 1990 Frederick H. van Doorninck. "The Serçe Limanı Shipwreck: An Eleventh-Century Cargo of Fatimid Glassware Cullet for Byzantine Glassmakers." In *I. Uluslararasi Anadolu Cam Sanati Sempozyumu, 26–27 Nisan 1988/ First International Anatolian Glass Symposium, April 26th–27th, 1988*, pp. 58–63. Istanbul, 1990.

Dunbabin 1978 Katherine Dunbabin. *The Mosaics of Roman North Africa: Studies in Iconography and Patronage*. Oxford Monographs on Classical Archaeology. New York, 1978.

Dzhanpoladian and Kalantarian 1988 R. M. Dzhanpoladian and A. A. Kalantarian. *Torgovye sviazi srednevekovoi Armenii v VI–XIII vv.: Po dannym steklodeliia* (Trade links in Armenia in the Middle Ages, sixth–thirteenth century: Glass production). Srednevekovye pamiatniki, 6. Hayastani hnagitakan hushardzannere, 14. Erevan, 1988. In Russian, Armenian, and English.

Eisen and Kouchakji 1927 Gustavus A. Eisen and Fahim Kouchakji. *Glass: Its Origin, History, Chronology, Technic and Classification in the Sixteenth Century*. 2 vols. New York, 1927.

***The Encyclopaedia of Islam* 1954–** *The Encyclopaedia of Islam: New Edition*. Leiden and London, 1954–.

***Encyclopedia of Glass* 1995** *Sotheby's Concise Encyclopedia of Glass*. London, 1995.

Engle 1984 Anita Engle. *One Thousand Years of Glassmaking in Ancient Jerusalem*. Readings in Glass History, 18. Jerusalem, 1984.

Erdmann 1940 Kurt Erdmann. "Islamische Bergkristallarbeiten." *Jahrbuch der Preussischen Kunstsammlungen* 61 (1940), pp. 125–46.

Erdmann 1952 Kurt Erdmann. "Zur Datierung der Berliner Pegasus-Schale." *Archäologischer Anzeiger* [supplement to *Jahrbuch des Deutschen Archäologischen Instituts, 1950–51* (65–66)] (1952), cols. 115–31.

Erdmann 1953 Kurt Erdmann. "Die fatimidischen Bergkristallkannen." In *Wandlungen christlicher Kunst im Mittelalter*, pp. 189–205. Forschungen zur Kunstgeschichte und christlichen Archäologie, 2. Baden-Baden, 1953.

Erdmann 1971 Kurt Erdmann, with A. Grabar and Hans R. Hahnloser. "Opere islamiche." In Hahnloser 1971, pp. 101–27.

***Erwerbungen islamischer Kunst* 1965** *Erwerbungen islamischer Kunst, 1954–1964: Sonderausstellung anlässlich der Gedenkfeier für Prof. Dr. Ernst Kühnel, 1882–1964, [und] Prof. Dr. Kurt Erdmann, 1901–1964*. Exh. cat. Museum Dahlem. Berlin, 1965.

Ettinghausen 1942 Richard Ettinghausen. "An Early Islamic Glass-Making Center." *Record of the Museum of Historic Art, Princeton University* 1, no. 2 (fall 1942), pp. 4–7.

Ettinghausen 1952 Richard Ettinghausen. "The 'Beveled Style' in the Post-Samarra Period." In *Archaeologica Orientalia in Memoriam Ernst Herzfeld*, edited by George C. Miles, pp. 72–83. Locust Valley, N.Y., 1952.

Ettinghausen 1962a Richard Ettinghausen, ed. *Ancient Glass in the Freer Gallery of Art*. Smithsonian Publication 4509. Washington, D.C., 1962.

Ettinghausen 1962b Richard Ettinghausen. *Arab Painting*. Treasures of Asia. Geneva, 1962.

Ettinghausen 1965 Richard Ettinghausen. "The Uses of Sphero-Conical Vessels in the Muslim East." *Journal of Near Eastern Studies* 24 (1965), pp. 218–29.

Ettinghausen and Grabar 1987 Richard Ettinghausen and Oleg Grabar. *The Art and Architecture of Islam, 650–1250*. The Pelican History of Art. Harmondsworth, England, and New York, 1987.

Evans and Wixom 1997 Helen C. Evans and William D. Wixom. *The Glory of Byzantium: Art and Culture of the Middle Byzantine Era, A.D. 843–1261*. Exh. cat. The Metropolitan Museum of Art. New York, 1997.

Eyice 1967 Semavi Eyice. "La Verrerie en Turquie de l'époque byzantine à l'époque turque." In *Annales du 4e Congrès International d'Étude Historique du Verre, Ravenne-Venise, 13–20 mai 1967*, pp. 162–82. Liège, [1967].

Fehérvári 1987 Géza Fehérvári. *Az Iszlám művészet története*. Budapest, 1987.

Fenn et al. 1991 Philip M. Fenn, Robert H. Brill, and Shi Meiguang. "Addendum to Chapter 4." In *Scientific Research in Early Chinese Glass: Proceedings of the Archaeometry of Glass Sessions of the 1984 International Symposium on Glass, Beijing, Sept. 7, 1984, with Supplementary Papers*, edited by Robert H. Brill and John H. Martin, pp. 59–64. Corning, N.Y., 1991.

Ferber 1975 Stanley Ferber, comp. and ed. *Islam and the Medieval West*. Exh. cat. University Art Gallery, State University of New York at Binghamton. Binghamton, N.Y., 1975.

Fernández-Puertas 1998 Antonio Fernández-Puertas. "Gilded and Enamelled Glass in al-Andalus." In Ward 1998, pp. 74–77.

Field and Prostov 1942 Henry Field and Eugene Prostov. "Excavations in Uzbekistan, 1937–1939." *Ars Islamica* 9 (1942), pp. 143–50.

Fillitz 1996 Hermann Fillitz. *Der Traum vom Glück: Die Kunst des Historismus in Europa*. Vol. 2, *Katalog*. Exh. cat. Künstlerhaus and Akademie der Bildenden Künste. Vienna, 1996.

von Folsach 1990 Kjeld von Folsach. *Islamic Art: The David Collection*. Copenhagen, 1990.

von Folsach and Whitehouse 1993 Kjeld von Folsach and David Whitehouse. "Three Islamic Molds." *Journal of Glass Studies* 35 (1993), pp. 149–53.

Foy forthcoming Danièle Foy. "Un Atelier de verrier à Beyrouth au début de la conquête islamique." *Syria*. Forthcoming.

Foy and Sennequier 1989 Danièle Foy and Geneviève Sennequier. *À travers le verre du Moyen Âge à la Renaissance*. Exh. cat. Musée Départemental des Antiquités de la Seine-Maritime. Rouen, 1989.

Frähn 1821 Christian Martin Frähn. *Das muhammedanische Münzkabinett des Asiatischen Museums der Kaiserliche Akademie der Wissenschaften zu St. Petersburg*. Saint Petersburg, 1821.

Franks and Nesbitt 1871 Augustus W. Franks and Alexander Nesbitt. *Catalogue of the Collection of Glass Formed by Felix Slade, Esq., F.S.A.* London, 1871.

Frantz et al. 1992 Susanne K. Frantz, Dwight P. Lanmon, Jane Shadel Spillman, Atsushi Takeda, and David Whitehouse. *Treasures from The Corning Museum of Glass*. Exh. cat. Yokohama Museum of Art. Yokohama, 1992. In Japanese and English.

Frazer 1984 Margaret English Frazer. "Turquoise Glass Bowl: Metalwork." In *The Treasury of San Marco* 1984, p. 211.

Freestone and Gorin-Rosen 1999 Ian C. Freestone and Yael Gorin-Rosen. "The Great Glass Slab at Bet She'arim, Israel: An Early Glass-making Experiment?" *Journal of Glass Studies* 41 (1999), pp. 105–16.

Freestone and Stapleton 1998 Ian C. Freestone and Colleen P. Stapleton. "Composition and Technology of Islamic Enamelled Glass of the Thirteenth and Fourteenth Centuries." In Ward 1998, pp. 122–28.

Fry 1910 Roger Fry. "The Munich Exhibition of Mohammedan Art, II." *Burlington Magazine* 17 (1910), pp. 327–33.

Fukai 1977 Shinji Fukai. *Persian Glass*. Translated by Edna B. Crawford. New York, 1977.

Gabrieli and Scerrato 1979 Francesco Gabrieli and Umberto Scerrato. *Gli arabi in Italia: Cultura, contatti e tradizioni*. Milan, 1979.

Gallé 1908 Émile Gallé. *Écrits pour l'art: Floriculture, art décoratif, notices d'exposition, 1884–1889*. Edited by Henriette Gallé-Grim. Paris, 1908. [Reprinted, Marseilles, 1980.]

Gallo 1967 Rodolfo Gallo. *Il tesoro di S. Marco e la sua storia*. Venice and Rome, 1967.

Gardin 1957 Jean-Claude Gardin. *Céramiques de Bactres*. Mémoires de la Délégation Archéologique Française en Afghanistan, 15. Paris, 1957.

Garner 1976 Philippe Garner. *Émile Gallé*. London, 1976.

Gasnault 1887–88 Paul Gasnault. "Exposition des acquisitions du Musée des Arts Décoratifs en 1887." *Revue des arts décoratifs* 8 (1887–88), pp. 225–34.

Gawain McKinley n.d Gawain McKinley. *Ancient Glass and Glazed Wares*. Dealer's cat. London, n.d.

Gerspach 1885 Édouard Gerspach. *L'Art de la verrerie*. Bibliothèque de l'enseignement des beaux-arts. Paris, 1885.

Ghirshman 1954 Roman Ghirshman. *Iran from the Earliest Times to the Islamic Conquest*. Harmondsworth, England, 1954.

Ghirshman 1964 Roman Ghirshman. *The Arts of Ancient Iran from Its Origins to the Time of Alexander the Great*. Translated by Stuart Gilbert and James Emmons. The Arts of Mankind. New York, 1964.

Ghouchani 1998 Abdullah Ghouchani. "Sasanian Motifs and Early Islamic Metalwork." In *The Art and Archaeology of Ancient Persia: New Light on the Parthian and Sasanian Empires*, edited by Vesta Sarkhosh Curtis, Robert Hillenbrand, and J. Michael Rogers, pp. 188–91. London and New York, 1998.

Ghouchani and Adle 1992 Abdullah Ghouchani and Chahryar Adle. "A Sphero-Conical Vessel as Fuqqāʿā, or a Gourd for 'Beer.'" *Muqarnas* 9 (1992), pp. 72–92.

Gibson 1983 Melanie Gibson. "Enamelled Glass of Syria, Twelfth to Fourteenth Centuries." M.A. report, School of Oriental and African Studies, University of London, 1983.

Glück and Diez 1925 Heinrich Glück and Ernst Diez. *Die Kunst des Islam*. Propyläen-Kunstgeschichte, 5. Berlin, 1925.

Goldstein 1977 Sidney M. Goldstein. "Forgeries and Reproductions of Ancient Glass in Corning." *Journal of Glass Studies* 19 (1977), pp. 40–62.

Goldstein 1978 Sidney M. Goldstein. "Forgeries and Reproductions of Ancient Glass in Corning." *Glass*, no. 5 (October 1978), pp. 2–10. In Japanese.

Goldstein et al. 1982 Sidney M. Goldstein, Leonard S. Rakow, and Juliette K. Rakow. *Cameo Glass: Masterpieces from Two Thousand Years of Glassmaking*. Corning, N.Y., 1982.

Golvin 1965 Lucien Golvin. *Recherches archéologiques à la Qal'a des Banū Hammād*. Paris, 1965.

Goswamy and Dallapiccola 1983 B. N. Goswamy and A. L. Dallapiccola. *A Place Apart: Painting in Kutch, 1720–1820*. Delhi, 1983.

A. Grabar 1971 A. Grabar. "Calice con manici dell'imperatore romano." In Hahnloser 1971, pp. 60–61.

O. Grabar 1967 Oleg Grabar. *Sasanian Silver: Late Antique and Early Mediaeval Arts of Luxury from Iran*. Exh. cat. The University of Michigan Museum of Art. Ann Arbor, 1967.

O. Grabar et al. 1996 Oleg Grabar, Mohammad al-Asad, Abeer Audeh, and Said Nuseibeh. *The Shape of the Holy: Early Islamic Jerusalem*. Princeton, 1996.

Grenet 1982 Frantz Grenet. "Trois documents religieux de Bactriane Afghane." *Studia Iranica* 11 (1982), pp. 155–62.

Grose 1989 David Frederick Grose. *Early Ancient Glass: Core-Formed, Rod-Formed, and Cast Vessels and Objects from the Late Bronze Age to the Early Roman Empire, 1600 B.C. to A.D. 50*. New York, 1989.

Grube 1976 Ernst J. Grube. *Islamic Pottery of the Eighth to the Fifteenth Century in the Keir Collection*. London, 1976.

Grube 1991 Ernst J. Grube, ed. *A Mirror for Princes from India: Illustrated Versions of the "Kalilah wa Dimnah," "Anvar-i Suhayli," "Iyar-i Danish," and "Humayun Nameh."* Bombay, 1991.

Gudenrath 1991 William Gudenrath. "Techniques of Glassmaking and Decoration." In *Five Thousand Years of Glass*, edited by Hugh Tait, pp. 213–41. London, 1991.

Gudenrath and Whitehouse 1990 William Gudenrath and David Whitehouse. "Recent Research on the Portland Vase, III: The Manufacture of the Vase and Its Ancient Repair." *Journal of Glass Studies* 32 (1990), pp. 108–21.

Guidi 1899 Ignazio Guidi. "Di un vaso arabo posseduto dal Signor

Marchese Alfieri di Sostegno, Senatore del regno d'Italia." In *Actes du Onzième Congrès International des Orientalistes*. Pt. 3, *Langues et archéologie musulmanes*, pp. 39–43. Paris, 1899.

Gurevich 1981 F. D. Gurevich. *Drevnii Novogrudok: Posad—okol'nyi gorod* (Ancient Novogrudok: The artisanal quarter). Leningrad, 1981.

Gyllensvard 1982 Bo Gyllensvard. "Carl Johan Lamm, 1902–1981." *Journal of Glass Studies* 24 (1982), pp. 121–22.

Hadad 1998 Shulamit Hadad. "Glass Lamps from the Byzantine through Mamluk Periods at Bet Shean, Israel." *Journal of Glass Studies* 40 (1998), pp. 63–76.

Hadad 2000 Shulamit Hadad. "Incised Glass Vessels from the Umayyad and Abassid-Fatimid Periods at Bet Shean, Israel." *Bulletin of the American Schools of Oriental Research*, no. 317 (February 2000), pp. 63–73.

Hahnloser 1971 Hans R. Hahnloser, ed. *Il tesoro e il museo*. Vol. 2 of *Il tesoro di San Marco*. Florence, 1971.

Hakenjos 1982 Bernd Hakenjos. "Émile Gallé: Keramik, Glas und Möbel des Art Nouveau." Ph.D. diss., University of Cologne, 1982.

Hamdy et al. 1969 Ahmad Hamdy, Wafiyya Izzy, J. Michael Rogers, and Abd al-Rauf Ali Yusuf. *Islamic Art in Egypt, 969–1517*. Exh. cat. Semiramis Hotel. Cairo, 1969.

Harada et al. 1965 Yoshito Harada, Jō Okada, Kazuo Yamasaki, and Kōzō Kagami. *Glass Objects in the Shōsōin*. Tokyo, 1965. In Japanese.

Harden et al. 1968 Donald B. Harden, K. S. Painter, Ralph H. Pinder-Wilson, and Hugh Tait. *Masterpieces of Glass*. Exh. cat. British Museum. London, 1968.

Harden et al. 1987 Donald B. Harden, Hansgerd Hellenkemper, K. S. Painter, and David Whitehouse. *Glass of the Caesars*. Exh. cat. The Corning Museum of Glass, Corning, N.Y.; British Museum, London; and Römisch-Germanisches Museum, Cologne. Milan, 1987.

Hardie 1998 Peter Hardie. "Mamluk Glass from China?" In Ward 1998, pp. 85–90.

Hardy-Guilbert 1984 Claire Hardy-Guilbert. "Les Niveaux islamiques du secteur Apadana, Ville Royale." *Cahiers de la Délégation Archéologique Française en Iran* 14 (1984), pp. 121–210.

Harper 1961 Prudence Oliver [Harper]. "Islamic Relief Cut Glass: A Suggested Chronology." *Journal of Glass Studies* 3 (1961), pp. 9–29.

Harper et al. 1978 Prudence Oliver Harper, with Jens Kröger, Carol Manson Bier, and Martha L. Carter. *The Royal Hunter: Art of the Sasanian Empire*. Exh. cat. Asia House Gallery. New York, 1978.

al-Hassan and Hill 1986 Ahmad Yusuf al-Hassan and Donald R. Hill. *Islamic Technology: An Illustrated History*. Cambridge, 1986.

Hasson 1979 Rachel Hasson. *Early Islamic Glass*. [L. A. Mayer Memorial Institute for Islamic Art.] Jerusalem, 1979.

Hauser and Wilkinson 1942 Walter Hauser and Charles K. Wilkinson. "The Museum's Excavations at Nīshāpūr." *Bulletin of The Metropolitan Museum of Art* 37 (1942), pp. 83–119.

Hayes 1992 J. W. Hayes. *Excavations at Saraçhane in Istanbul*. Vol. 2, *The Pottery*. Princeton, 1992.

Heaton 1948 Noël Heaton. "The Origin and Use of Silver Stain." *Journal of the British Society of Master Glass-Painters* 10, no. 1 (1948), pp. 9–16.

Henderson 1996a Julian Henderson. "Glass Production in Raqqa, Syria: New Evidence for an Interim Assessment." In *Annales du 13e Congrès de l'Association Internationale pour l'Histoire du Verre, Pays Bas, 28 août–1 septembre 1995*, pp. 257–68. Lochem, The Netherlands, 1996.

Henderson 1996b Julian Henderson. "New Light on Early Islamic Industry: Excavations in Raqqa, Syria." In *From River Trent to Raqqa: Nottingham University Archaeological Fieldwork in Britain, Europe and the Middle East, 1991–1995*, edited by R. J. A. Wilson, pp. 59–71. Nottingham, 1996.

Henderson 1998 Julian Henderson. "Blue and Other Coloured Translucent Glass Decorated with Enamels: Possible Evidence for Trade in Cobalt-Blue Colourants." In Ward 1998, pp. 116–21.

Henderson 1999 Julian Henderson. "Archaeological and Scientific Evidence for the Production of Early Islamic Glass in al-Raqqa, Syria." *Levant* 31 (1999), pp. 225–40.

Henderson and Allan 1990 Julian Henderson and James W. Allan. "Enamels on Ayyubid and Mamluk Glass Fragments." *Archeomaterials* 4 (summer 1990), pp. 167–83.

Herbert 1928 Sir Thomas Herbert. *Travels in Persia, 1627–1629*. Edited by William Foster. London, 1928.

Herrmann 1989 Georgina Herrmann. "The Art of the Sasanians." In *The Arts of Persia*, edited by R. W. Ferrier, pp. 61–79. New Haven and London, 1989.

Herrmann 1999 Georgina Herrmann. *Monuments of Merv: Traditional Buildings of the Karakum*. Reports of the Research Committee of the Society of Antiquaries of London, 62. London, 1999.

Herzfeld 1923 Ernst Herzfeld. *Der Wandschmuck der Bauten von Samarra und seine Ornamentik*. Berlin, 1923.

Higashi 1991 Elizabeth L. Higashi, ed. *Glass from the Ancient World: So Diverse a Unity*. Exh. cat. Mardigian Library, University of Michigan-Dearborn. Dearborn, 1991.

Hilschenz-Mlynek 1973 Helga Hilschenz[-Mlynek]. *Das Glas des Jugendstils: Katalog der Sammlung Hentrich im Kunstmuseum Düsseldorf*. Materialien zur Kunst des 19. Jahrhunderts, 8. Munich, 1973.

Hilschenz-Mlynek and Ricke 1985 Helga Hilschenz-Mlynek and Helmut Ricke. *Glas: Historismus, Jugendstil, Art Déco*. Vol. 1, *Frankreich*. Materialien zur Kunst des 19. Jahrhunderts, 32. Munich, 1985.

Hoare 1985 Oliver Hoare. *The Unity of Islamic Art: An Exhibition to Inaugurate the Islamic Art Gallery of the King Faisal Center for Research and Islamic Studies, Riyadh, Saudi Arabia*. Exh. cat. Riyadh, 1985.

Hollis 1945 Howard Hollis. "Two Examples of Arabic Enameled Glass." *Bulletin of the Cleveland Museum of Art* 32 (December 1945), pp. 179–81.

Holmyard 1956 E. J. Holmyard. "Alchemical Equipment." In *A History of Technology*, edited by Charles Singer, E. J. Holmyard, A. R. Hall, and Trevor I. Williams. Vol. 2, *The Mediterranean Civilizations and the Middle Ages, c. 700 B.C. to c. A.D. 1500*, pp. 731–52. Oxford, 1956.

Holum et al. 1988 Kenneth G. Holum, Robert L. Hohlfelder, Robert J. Bull, and Avner Raban. *King Herod's Dream: Caesarea on the Sea*. Exh. cat. Evans Gallery, Smithsonian Institution, Washington, D.C., and other institutions. New York and London, 1988.

Honey 1946 William B. Honey. *Glass: A Handbook for the Study of Glass Vessels of All Periods and Countries and a Guide to the Museum Collection*. [Victoria and Albert Museum.] London, 1946.

***Indian Heritage* 1982** *The Indian Heritage: Court Life and Arts under Mughal Rule*. Exh. cat. Victoria and Albert Museum. London, 1982.

Invernizzi 1966 Antonio Invernizzi. *Museo Civico, Torino: Sezione d'arte orientale*. Turin, 1966.

***The Islamic World* 1987** *The Metropolitan Museum of Art: The Islamic World*. Introduction by Stuart Cary Welch. New York, 1987.

***Islamische Kunst* 1954** *Islamische Kunst aus den Berliner Museen*. Exh. cat. Museum Dahlem. Berlin, 1954. [Supplement: 1959.]

Jacobson 1990–93 Gusta Lehrer Jacobson. "A Luster-Painted Cup from Hurbat Migdal." *Israel: People and Land* [Eretz Israel Museum, Tel Aviv] 7–8 (1990–93), pp. 83–90. In Hebrew.

Jacoby 1993 David Jacoby. "Raw Materials for the Glass Industries of Venice and the Terraferma, about 1370–about 1460." *Journal of Glass Studies* 35 (1993), pp. 65–90.

James 1988 David James. *Qur'āns of the Mamlūks*. New York, 1988.

Jenkins 1968 Marilyn Jenkins[-Madina]. "The Palmette Tree: A Study of the Iconography of Egyptian Lustre Painted Pottery." *Journal of the American Research Center in Egypt* 7 (1968), pp. 119–26.

Jenkins 1975 Marilyn Jenkins[-Madina]. In "Islamic Art." *The Metropolitan Museum of Art Bulletin*, n.s., 33, no. 1 (spring 1975).

Jenkins 1985 Marilyn Jenkins[-Madina]. "Islamic Art in The Metropolitan Museum of Art." *Arts and The Islamic World* 3, no. 3 (autumn 1985), pp. 51–56.

Jenkins 1986 Marilyn Jenkins[-Madina]. "Islamic Glass: A Brief History." *The Metropolitan Museum of Art Bulletin*, n.s., 44, no. 2 (fall 1986), pp. 3–56.

Jenkins et al. 1983 Marilyn Jenkins [-Madina], Manuel Keene, and Michael Bates. *Islamic Art in the Kuwait National Museum: The al-Sabah Collection*. Exh. cat. Kuwait National Museum, Kuwait City. London, 1983.

de Jerphanion 1940 Guillaume de Jerphanion. *Les Miniatures du manuscrit syriaque no. 559 de la Bibliothèque Vaticane*. Vatican City, 1940.

JGS*: *Journal of Glass Studies

Jiménez 1991 Pedro Jiménez. "El vidrio." In *Una casa islámica en Murcia: Estudio de su ajuar (siglo XIII)*, edited by Julio Navarro Palazon, pp. 71–80, 252–65. Serie Islam y arqueología, 1. Murcia, Spain, 1991.

Jones and Michell 1976 Dalu Jones and George Michell, eds. *The Arts of Islam*. Exh. cat. Hayward Gallery. London, 1976.

Katzenstein and Lowry 1983 Ranee A. Katzenstein and Glenn D. Lowry.

"Christian Themes in Thirteenth-Century Islamic Metalwork." *Muqarnas* 1 (1983), pp. 53–68.

Kawami 1992 Trudy S. Kawami. *Ancient Iranian Ceramics from the Arthur M. Sackler Collections*. New York, 1992.

Kenesson 1998 Summer S. Kenesson. "Islamic Enamelled Beakers: A New Chronology." In Ward 1998, pp. 45–49.

Kervran 1984 Monique Kervran. "Les Niveaux islamiques du secteur oriental du tépé de l'Apadana, III: Les Objets en verre, en pierre et en métal." *Cahiers de la Délégation Archéologique Française en Iran* 14 (1984), pp. 211–35.

Kiani 1984 M. Yusuf Kiani. *The Islamic City of Ğurğān*. Archäologische Mitteilungen aus Iran, supplement, 11. Berlin, 1984.

Koch 1995 Alexander Koch. "Der Goldschatzfund des Famensi: Prunk und Pietät im chinesischen Buddhismus der Tang-Zeit." *Jahrbuch des Römisch-Germanischen Zentralmuseums Mainz* 42 (1995), pp. 403–542.

Kolbas 1983 Judith G. Kolbas. "A Color Chronology of Islamic Glass." *Journal of Glass Studies* 25 (1983), pp. 95–100.

Kordmahini 1988 Helen A. Kordmahini. *Glass from the Bazargan Collection*. [Iran National Museum.] Tehran, 1988. In English and Arabic.

Kozloff 1981 Arielle P. Kozloff, ed. *Animals in Ancient Art from the Leo Mildenberg Collection*. Exh. cat. Cleveland Museum of Art and other institutions. Cleveland, 1981.

Kramarovsky 1998 Mark Kramarovsky. "The Import and Manufacture of Glass in the Territories of the Golden Horde." In Ward 1998, pp. 96–100.

Kröger 1984 Jens Kröger. *Glas*. Islamische Kunst, 1. [Museum für Islamische Kunst, Berlin.] Mainz am Rhein, 1984.

Kröger 1995 Jens Kröger. *Nishapur: Glass of the Early Islamic Period*. New York, 1995.

Kröger 1998 Jens Kröger. "Gläser aus spätantiker und islamischer Zeit in der Abegg-Stiftung." In *Entlang der Seidenstrasse: Frühmittelalterliche Kunst zwischen Persien und China in der Abegg-Stiftung*, edited by Karel Otavsky, pp. 299–322. Riggisberger Berichte, 6. Riggisberg, Switzerland, 1998.

Kröger forthcoming Jens Kröger. *Parthisches, sasanidisches und islamisches Glas: Die Glasfunde von Ktesiphon (Iraq) nach den Ausgrabungen der Ktesiphon-Expedition 1928–29 und 1931–32*. Forthcoming.

Krueger 1998 Ingeborg Krueger. "An Enamelled Beaker from Stralsund: A Spectacular New Find." In Ward 1998, pp. 107–9.

Küçükerman 1985 Önder Küçükerman. *Cam sanatı ve geleneksel türk cançılığından örnekler/The Art of Glass and Traditional Turkish Glassware*. Ankara, 1985.

Kühnel 1925 Ernst Kühnel. *Islamische Kleinkunst*. Bibliothek für Kunst- und Antiquitäten-Sammler, 25. Berlin, 1925.

Kühnel 1963 Ernst Kühnel. *Islamische Kleinkunst: Ein Handbuch für Sammler und Liebhaber*. 2d ed. Bibliothek für Kunst- und Antiquitätenfreunde, 25. Brunwsick, 1963.

Kühnel 1970 Ernst Kühnel. *Islamic Arts*. Translated by Katherine Watson. London, 1970.

Kunz 1981 Martin Kunz, ed. *3000 Jahre Glaskunst von der Antike bis zum Jugendstil*. Exh. cat. Kunstmuseum Luzern. Lucerne, 1981.

Lamb 1965 Alastair Lamb. "A Note on Glass Fragments from Pengkalan Bujang, Malaya." *Journal of Glass Studies* 7 (1965), pp. 35–40.

Lamm 1928 Carl Johan Lamm. *Das Glas von Samarra*. Forschungen zur islamischen Kunst, 2. Die Ausgrabungen von Samarra, 4. Berlin, 1928.

Lamm 1929–30 Carl Johan Lamm. *Mittelalterliche Gläser und Steinschnittarbeiten aus dem Nahen Osten*. 2 vols. Forschungen zur islamischen Kunst, 5. Berlin, 1929–30.

Lamm 1931 Carl Johan Lamm. "Les Verres trouvés à Suse." *Syria* 12 (1931), pp. 358–67.

Lamm 1935 Carl Johan Lamm. *Glass from Iran in the National Museum, Stockholm*. Stockholm and London, 1935.

Lamm 1939 Carl Johan Lamm. "Glass and Hard Stone Vessels." In *SPA* 1938–77, vol. 3 (1939), pp. 2592–2606.

Lamm 1941 Carl Johan Lamm. *Oriental Glass of Mediaeval Date Found in Sweden and the Early History of Lustre-Painting*. Kungl. Vitterhets Historie och Antikvitets Akadamiens Handlingar, 50, 1. Stockholm, 1941.

La Mottraye 1727 Aubry de La Mottraye. *Voyages du s^r. A. de La Motraye, en Europe, Asie & Afrique; où l'on trouve une grande varieté de recherches geographiques, historiques & politiques*. The Hague, 1727.

Lane 1938 Arthur Lane. "Medieval Finds at Al Mina in North Syria." *Archaeologia* 87 (1938), pp. 19–78.

Lane 1965 Arthur Lane. *Early Islamic Pottery: Mesopotamia, Egypt and Persia*. The Faber Monographs on Pottery and Porcelain. London, 1965. [1st ed.: 1947.]

Latham and Paterson 1970 J. D. Latham and W. F. Paterson. *Saracen Archery: An English Version and Exposition of a Mameluke Work on Archery (ca. A.D. 1368)*. London, 1970.

Lavoix 1885 Henri Lavoix. "La Collection Albert Goupil, II: L'Art oriental." *Gazette des beaux-arts*, 2d ser., 32 (October 1, 1885), pp. 287–307.

Lavoix 1887 Henri Lavoix. "Le Vase arabe du marquis Alfieri." In *Gazette des beaux-arts*, 2d ser., 36 (December 1, 1887), pp. 488–92.

Lee 1993 In-sook Lee. *Ancient Glass in Korea*. Seoul, 1993. In Korean.

Legeza 1988 Laszlo Legeza. "Tantric Elements in Pre-Hispanic Philippines Gold Art." *Arts of Asia* 18, no. 4 (July–August 1988), pp. 129–37.

Leth 1970 André Leth. *C. L. Davids samling: Fjerde del jubilaeumsskrift, 1945–70*. Copenhagen, 1970.

Leth 1975 André Leth. *Davids samling: Islamisk kunst/The David Collection: Islamic Art*. Copenhagen, 1975.

Liefkes 1997 Reino Liefkes, ed. *Glass*. London, 1997.

Lierke 1999 Rosemarie Lierke. *Antike Glastöpferei: Ein vergessenes Kapitel der Glasgeschichte*. Mainz am Rhein, 1999.

Lillich 1986 Meredith Parsons Lillich. "European Stained Glass around 1300: The Introduction of Silver Stain." In *Europäische Kunst um 1300*, edited by Elisabeth Liskar, pp. 45–60. Akten des XXV. Internationalen Kongresses für Kunstgeschichte, 6. Vienna, Cologne, and Graz, 1986.

Lings 1976 Martin Lings. *The Quranic Art of Calligraphy and Illumination*. London, 1976.

Lledó 1997 Berta Lledó. "Mold Siblings in the Eleventh-Century Cullet from Serçe Limani." *Journal of Glass Studies* 39 (1997), pp. 43–55.

Lowry 1989 Glenn D. Lowry. "On the Gold Jug Inscribed to Abu Mansur al-Amir Bakhtiyar ibn Mu'izz al-Dawla in the Freer Gallery of Art." *Ars Orientalis* 19 (1989), pp. 103–15.

Lukonin and Ivanov 1996 V. G. Lukonin and A. A. Ivanov. *Lost Treasures of Persia: Persian Art in the Hermitage Museum*. Washington, D.C., 1996.

Lusuardi Siena and Zuech 2000 Silvia Lusuardi Siena and Roberta Zuech. "Una lampada di tipo islamico dal *castrum* di Ragogna (Udine, Friuli)." In *Annales du 14^e Congrès de l'Association Internationale pour l'Histoire du Verre, Italia/Venezia-Milano 1998*, pp. 243–47. Lochem, The Netherlands, 2000.

McKinnon and Brill 1987 E. E. McKinnon and Robert H. Brill. "Chemical Analyses of Some Glasses from Sumatra." *Archaeometry of Glass: Proceedings of the Archaeometry Session of the XIV International Congress on Glass, 1986, New Delhi, India*, sec. 2, pp. 1–14. Calcutta, 1987.

Maddison and Savage-Smith 1997 Francis Maddison and Emilie Savage-Smith. *Science, Tools and Magic*. 2 vols. Nasser D. Khalili Collection of Islamic Art, 12. London, 1997.

Magne 1913 Lucien Magne. *Décor du verre: Gobeleterie, mosaïque, vitrail*. L'Art appliqué aux métiers. Paris, 1913.

Manzari et al. 1976 Maria Manzari, Jamie Fuller, Mona Lang, Blossom Regan, and Jack Soultanian Jr. *Ancient and Antique Glass in the Queens College Art Collection, Queens College of the City University of New York*. New York, 1976.

Marçais and Poinssot 1952 George Marçais and Louis Poinssot. *Objets kairouanais, IX^e au XIII^e siècle: Reliures, verreries, cuivres et bronzes, bijoux*. Vol. 2. Direction des antiquités et arts. Notes et documents, 11. Tunis, 1952.

Marchal et al. 1971 Henri Marchal et al., eds. *Arts de l'Islam, des origins à 1700, dans les collections publiques françaises*. Exh. cat. Orangerie des Tuileries. Paris, 1971.

Marcus 1962 Margaret F. Marcus. "A Gilded Blue Glass Vase from Mughal India." *Bulletin of the Cleveland Museum of Art* 49 (December 1962), pp. 243–47.

Markel 1991 Stephen Markel. "Indian and 'Indianate' Glass Vessels in the Los Angeles County Museum of Art." *Journal of Glass Studies* 33 (1991), pp. 82–92.

Markel 1993 Stephen Markel. "Luxury Arts of Lucknow." *Arts of Asia* 23, no. 2 (March–April 1993), pp. 108–20.

Marshak 1998 Boris I. Marshak. "The Decoration of Some Late Sasanian Silver Vessels and Its Subject-Matter." In *The Art and*

Archaeology of Ancient Persia: New Light on the Parthian and Sasanian Empires, edited by Vesta Sarkhosh Curtis, Robert Hillenbrand, and J. Michael Rogers, pp. 84–92. London and New York, 1998.

Marshall 1990 Jo Marshall. *Glass Source Book*. London, 1990.

Martin 1929 Fredrik Robert Martin. *Lustre on Glass and Pottery in Egypt from the Period of Hadrian to Saladin*. Collana di studi d'arte ceramica, 3. Faenza, 1929.

Martinovitch 1930 N. Martinovitch. "A Glass Globe of Arghūn." *Eastern Art* 2 (1930), p. 245.

Marye 1893–94 Georges Marye. "L'Exposition d'art musulman." *Gazette des beaux-arts*, 3rd ser., 10 (December 1, 1893), pp. 490–99; 11 (January 1, 1894), pp. 54–72.

Masson and Pugachenkova 1982 M. E. Masson and G. A. Pugachenkova. *The Parthian Rhytons of Nisa*. Translated by Caroline M. Breton Bruce. Revised by Antonio Invernizzi. Monografie di Mesopotamia, 1. Florence, 1982.

Matcham and Dreiser 1997 Jonathan Matcham and Peter Dreiser. *The Techniques of Glass Engraving*. London, 1997. [1st ed.: 1982.]

Mayer 1933 L. A. Mayer. *Saracenic Heraldry: A Survey*. Oxford, 1933.

Mayer 1939 L. A. Mayer. "A Glass Bottle of the Atabak Zangī." *Iraq* 6 (1939), pp. 101–3.

Meinecke 1972 Michael Meinecke. "Zur mamlukischen Heraldik." *Mitteilungen des Deutschen Archäologischen Instituts, Abteilung Kairo* 28 (1972), pp. 214–87.

Meinecke 1992 Michael Meinecke. *Die mamlukische Architektur in Ägypten und Syrien (648/1250 bis 923/1517)*. 2 vols. Abhandlungen des Deutschen Archäologischen Instituts Kairo, Islamische Reihe, 5. Glückstadt, Germany, 1992.

Meixmoron de Dombasle 1900 Charles de Meixmoron de Dombasle. "Réponse du Président, M. Ch. de Meixmoron de Dombasle, au récipiendaire, M. Émile Gallé." *Mémoires de l'Académie de Stanislas* [Nancy], 5th ser., 17 (1899–1900), pp. XXXIX–LXI.

Melikian-Chirvani 1982 Assadullah Souren Melikian-Chirvani. *Islamic Metalwork from the Iranian World, Eighth–Eighteenth Centuries*. London, 1982.

Merrill 1989 Nancy O. Merrill. *A Concise History of Glass Represented in the Chrysler Museum Glass Collection*. Norfolk, Va., 1989.

Meyer 1987 Carol Meyer. "Glass from the North Theater Byzantine Church, and Soundings at Jerash, Jordan, 1982–1983." *Bulletin of the American Schools of Oriental Research*, supplement, no. 25 (1987), pp. 175–222.

Meyer 1992 Carol Meyer. *Glass from Quseir al-Qadim and the Indian Ocean Trade*. Studies in Ancient Oriental Civilization, 53. Chicago, 1992.

Michaelson 1999 Carol Michaelson. *Gilded Dragons: Buried Treasures from China's Golden Ages*. Exh. cat. British Museum. London, 1999.

Michell and Zebrowski 1999 George Michell and Mark Zebrowski. *The Architecture and Art of the Deccan Sultanates*. The New Cambridge History of India, 1, no. 7. New York, 1999.

Migeon 1907 Gaston Migeon. *Manuel d'art musulman*. Vol. 2, *Les Arts plastiques et industriels*. Paris, 1907.

Migeon 1926 Gaston Migeon. *Les Arts musulmans*. Bibliothèque d'histoire de l'art. Paris and Brussels, 1926.

Migeon 1927 Gaston Migeon. *Manuel d'art musulman: Arts plastiques et industriels*. 2d ed. Paris, 1927.

Miles 1948 George C. Miles. *Early Arabic Glass Weights and Stamps*. Numismatic Notes and Monographs, 111. New York, 1948.

Molinier 1888 Émile Molinier. *Le Trésor de la basilique de Saint Marc à Venise*. Venice, 1888.

de Montfaucon 1702 Bernard de Montfaucon. *Diarium Italicum. Sive Monumentorum Veterum, Bibliothecum, Musaeorum, &c. Notitae Singulares in Itinerario Italico Collectae. Additis Schematibus ac Figuris*. Paris, 1702.

Morton 1985 Alexander H. Morton. *A Catalogue of Early Islamic Glass Stamps in the British Museum*. London, 1985.

Mostafa 1959 Mohamed Mostafa. "Neuerwerbungen des Museums für Islamische Kunst in Kairo." In *Aus der Welt der islamischen Kunst: Festschrift für Ernst Kühnel zum 75. Geburtstag am 26.10.1957*, pp. 89–92. Berlin, 1959.

***Mostra d'arte iranica* 1956** *Mostra d'arte iranica: Catalogo/Exhibition of Iranian Art: Catalogue*. Exh. cat. Palazzo Brancaccio, Rome. Milan, 1956.

***Museums of Shaanxi* 1994** *Ten Major Museums of Shaanxi*. Hong Kong and Xian, 1994.

Nardi et al. 1976 Shulamit Nardi et al. *L. A. Mayer Memorial Institute of Islamic Art*. Jerusalem, 1976.

Naumann and Naumann 1976 Rudolf Naumann and Elisabeth Naumann. *Takht-i Suleiman: Ausgrabung des Deutschen Archäologischen Instituts in Iran*. Ausstellungskataloge der Prähistorischen Staatssammlung, 3. Munich, 1976.

Negro Ponzi 1970–71 Mariamaddalena Negro Ponzi. "Islamic Glassware from Seleucia." *Mesopotamia* 5–6 (1970–71), pp. 67–104.

Neuwirth 1981 Waltraud Neuwirth. *Orientalisierende Gläser: J. & L. Lobmeyr*. Vol. 1. Neuwirth Handbuch, Kunstgewerbe des Historismus, 1. Vienna, 1981.

Neuwirth 1999 Waltraud Neuwirth. *Schöner als Bergkristall: Ludwig Lobmeyr, Glas Legende/Surpassing the Beauty of Rock Crystal: Ludwig Lobmeyr, Glass Legend*. Neuwirth Dokumentation, 1. Vienna, 1999.

Newby 1991 Martine S. Newby. "The Glass from Farfa Abbey: An Interim Report." *Journal of Glass Studies* 33 (1991), pp. 32–41.

Newby 1998 Martine S. Newby. "The Cavour Vase and Gilt and Enamelled Mamluk Coloured Glass." In Ward 1998, pp. 35–40.

Newby and Sheppard 1991 Martine S. Newby and Christopher Sheppard. *The Cavour Vase: An Extraordinary Blue Islamic Enamelled Glass Vase*. London and Geneva, 1991.

Nickel 1972 Helmut Nickel. "A Mamluke Axe." In *Islamic Art in The Metropolitan Museum of Art*, edited by Richard Ettinghausen, pp. 213–25. New York, 1972.

Nicolle 1996 David Nicolle. *Medieval Warfare Sourcebook*. Vol. 2, *Christian Europe and Its Neighbours*. London, 1996.

Northedge 1991 Alastair Northedge. "Creswell, Herzfeld, and Samarra." *Muqarnas* 8 (1991), pp. 74–93.

Northedge et al. 1988 Alastair Northedge, Andrina Bamber, and Michael Roaf. *Excavations at 'Āna, Qal'a Island*. Iraq Archaeological Reports, 1. Warminster, England, 1988.

Ohm 1973 Annaliese Ohm. *Europäisches und aussereuropäisches Glas*. [Museum für Kunsthandwerk.] Frankfurt am Main, 1973.

Oliver 1980 Andrew Oliver Jr. *Ancient Glass in the Carnegie Museum of Natural History, Pittsburgh*. Pittsburgh, 1980.

Öney 1990 Gönül Öney. "12.–13. Yüzyıl Anadolu cam işçiliğinde kadeh." In *I. Uluslararasi Anadolu Cam Sanati Sempozyumu, 26–27 Nisan 1988/First International Anatolian Glass Symposium, April 26th–27th, 1988*, pp. 64–69. Istanbul, 1990.

Orbeli and Trever 1935 I. A. Orbeli and K. V. Trever. *Sasanidskii metall: Khudozhestvennye predmety iz zolota, serebra i bronzy/Orfèvrerie sasanide: Objets en or, argent et bronze*. Moscow and Leningrad, 1935.

Paris 1961–62 *Sept mille ans d'art en Iran*. Exh. cat. Musée du Petit Palais. Paris, 1961.

Pasini 1885–86 Antonio Pasini. *Il tesoro di San Marco in Venezia*. 2 vols. Venice, 1885–86.

Pavell 1910 F. V. Pavell. "Oriental Glass." *Museum of Fine Arts* [Boston] *Bulletin* 8 (December 1910), pp. 50–51.

Perrot 1970 Paul Perrot. "Glass." In *"From the World of Islam": An Exhibition of Paintings, Carpets, Glass, Pottery, and Textiles from the Collections of the Albright-Knox Art Gallery, Buffalo, N.Y., The Corning Museum of Glass, Corning, N.Y., the Textile Museum, Washington, D.C., Private Collections, New York*, pp. 17–20. Exh. cat. Fox-Richmond Gallery, Keuka College. Keuka Park, N.Y., 1970.

***Persian and Arab Art* 1885** *Illustrated Catalogue of Specimens of Persian and Arab Art Exhibited in 1885*. Exh. cat. Burlington Fine Arts Club. London, 1885.

***Persian Art* 1931** *Catalogue of the International Exhibition of Persian Art*. Exh. cat. Royal Academy of Arts. London, 1931.

***Persian Pottery* 1980** *Enjoying Seven Thousand Years of History: The World of Persian Pottery*. Tokyo, 1980. In Japanese.

***Persisches Glas* 1963** *2000 Jahre persisches Glas*. Exh. cat. Städtisches Museum Braunschweig. Brunswick, 1963.

Petrosyan et al. 1995 Iuri A. Petrosyan, Oleg F. Akimushkin, Anas B. Khalidov, Efim A. Rezvan, Marie Lukens Swietochowski, and Stefano Carboni. *Pages of Perfection: Islamic Paintings and Calligraphy from the Russian Academy of Sciences, Saint Petersburg*. Exh. cat. Musée du Petit Palais, Paris; Villa Favorita, Lugano; and The Metropolitan Museum of Art, New York. Lugano and Milan, 1995.

Pfeiffer 1966 W. Pfeiffer. "Magister Aldrevandin me fecit." *Verhandlungen des Historischen Vereins für Oberpfalz und Regensburg* 106 (1966), pp. 206ff.

Pfrommer 1993 Michael Pfrommer. *Metalwork from the Hellenized East:*

Catalogue of the Collections. [J. Paul Getty Museum.] Malibu, Calif., 1993.

Philippe 1970 Joseph Philippe. *Le Monde byzantin dans l'histoire de la verrerie (V^e^-XVI^e^ siècle)*. Bologna, 1970.

Philippe 1982 Joseph Philippe. *Glass History and Art from the Beginnings until Today*. Liège, 1982.

Pinder-Wilson 1959 Ralph H. Pinder-Wilson. "An Early Fatimid Bowl Decorated in Lustre." In *Aus der Welt der islamischen Kunst: Festschrift für Ernst Kühnel zum 75. Geburtstag am 26.10.1957*, pp. 139–43. Berlin, 1959.

Pinder-Wilson 1970 Ralph H. Pinder-Wilson. "Glass in Asia during the T'ang Period." In *Pottery and Metalwork in T'ang China: Their Chronology and External Relations; a Colloquy Held 29 June to 2 July 1970*, edited by William Watson, pp. 62–71. Colloquies on Art and Archaeology in Asia, 1. London, 1970.

Pinder-Wilson 1976a Ralph H. Pinder-Wilson. "Elegance and Ornament in Islamic Glass." *Apollo* 103 (April 1976), pp. 282–85.

Pinder-Wilson 1976b Ralph H. Pinder-Wilson. "Rock Crystal and Jade." In Jones and Michell 1976, pp. 119–30.

Pinder-Wilson 1991 Ralph H. Pinder-Wilson. "The Islamic Lands and China." In *Five Thousand Years of Glass*, edited by Hugh Tait, pp. 112–43. London, 1991.

Pinder-Wilson 1996 Ralph H. Pinder-Wilson. "Glass from the Islamic World." In Géza Fehérvári, W. G. Lambert, Ralph H. Pinder-Wilson, and Marian Wenzel, *Art of the Eastern World*, pp. 90–115. London, 1996.

Pinder-Wilson and Ezzy 1976 Ralph H. Pinder-Wilson and Waffiya Ezzy. "Glass." In Jones and Michell 1976, pp. 131–44.

Pinder-Wilson and Scanlon 1973 Ralph H. Pinder-Wilson and George T. Scanlon. "Glass Finds from Fustat: 1964–71." *Journal of Glass Studies* 15 (1973), pp. 12–30.

Pinder-Wilson and Scanlon 1987 Ralph H. Pinder-Wilson and George T. Scanlon. "Glass Finds from Fustat: 1972–1980." *Journal of Glass Studies* 29 (1987), pp. 60–71.

Piotrovsky and Vrieze 1999 Mikhail B. Piotrovsky and John Vrieze, eds. *Earthly Beauty, Heavenly Art: Art of Islam*. Exh. cat. De Nieuwe Kerk, Amsterdam. Amsterdam and Lund, 1999.

Pollak 2000 Rachel Pollak. "Glass Vessels of a Fatimid Hoard from Caesarea Maritima." In *Annales du 14^e^ Congrès de l'Association Internationale pour l'Histoire du Verre, Italia/ Venezia-Milano 1998*, pp. 238–42. Lochem, The Netherlands, 2000.

Pope 1931 Arthur Upham Pope. "More about Persian Glass." *Apollo* 13 (January 1931), pp. 10–12.

Porter 1987 Venetia Porter. "The Art of the Rasulids." In *Yemen: Three Thousand Years of Art and Civilisation in Arabia Felix*, edited by Werner Daum, pp. 232–53. Exh. cat. Staatliches Museum für Völkerkunde, Munich. Innsbruck and Frankfurt am Main, 1987.

Porter 1998 Venetia Porter. "Enamelled Glass Made for the Rasulid Sultans of the Yemen." In Ward 1998, pp. 91–95.

Pugachenkova 1959 G. A. Pugachenkova. *Zodchestvo Uzbekistana* (Architecture of Uzbekistan). Tashkent, 1959.

Pugachenkova and Rempel 1965 G. A. Pugachenkova and L. I. Rempel. *Istoriia iskusstv Uzbekistana s drevneishikh vremen do serediny deviatnadtsatogo veka* (History of Uzbek art from ancient times to the mid-nineteenth century). Moscow, 1965.

Pulak 1998 Cemal Pulak. "The Uluburun Shipwreck: An Overview." *International Journal of Nautical Archaeology* 27 (August 1998), pp. 188–224.

Qaddumi 1987 Ghadah Hijjawi Qaddumi. *Variety in Unity: A Special Exhibition on the Occasion of the Fifth Islamic Summit in Kuwait*. Exh. cat. Kuwait National Museum. Kuwait City, 1987.

Rackham 1925–26 Bernard Rackham. "A Glass Beaker from Persia in the Victoria and Albert Museum." *Artibus Asiae* 1 (1925–26), pp. 307–8.

Rath 1998 Peter Rath. *Lobmeyr 1823: Helles Glas und klares Licht.* Vienna, Cologne, and Weimar, 1998.

Rawson 1984 Jessica Rawson. *Chinese Ornament: The Lotus and the Dragon*. London, 1984.

Read 1902 Charles Hercules Read. "On a Saracenic Goblet of Enamelled Glass of Medieval Date." *Archaeologia* 58 (1902), pp. 217–26.

Redman 1986 Charles L. Redman. *Qsar es-Seghir: An Archaeological View of Medieval Life*. Orlando, Fla., 1986.

Reiche 1996 Andrzej Reiche. "Early Islamic Glass from Bijan Island (Iraq)." In *Continuity and Change in Northern Mesopotamia from the Hellenistic to the Early Islamic Period: Proceedings of a Colloquium Held at the Seminar für Vorderasiatische Altertumskunde, Freie Universität Berlin, 6th–9th April, 1994*, edited by Karin Bartl and Stefan R. Hauser, pp. 195–217. Berliner Beiträge zum Vorderen Orient, 17. Berlin, 1996.

Reinaud 1828 Joseph-Toussaint Reinaud. *Monumens arabes, persans et turcs, du cabinet de M. le Duc de Blacas et d'autres cabinets; considérés et décrits d'après leurs rapports avec les croyances, les moeurs et l'histoire des nations musulmanes*. 2 vols. Paris, 1828.

Ribeiro and Hallett 1999 Maria Queiroz Ribeiro and Jessica Hallett. *Os Vidros da dinastia mameluca no Museu Calouste Gulbenkian/Mamluk Glass in the Calouste Gulbenkian Museum*. Lisbon, 1999.

Rice 1955 David Storm Rice. *The Wade Cup in the Cleveland Museum of Art*. Paris, 1955.

Rice 1956 David Storm Rice. "A Datable Islamic Rock Crystal." *Oriental Art* 2 (1956), pp. 85–93.

Rice 1958 David Storm Rice. "Early Signed Islamic Glass." *Journal of the Royal Asiatic Society of Great Britain and Ireland* (1958), pp. 8–16.

Riefstahl 1967 Rudolf M. Riefstahl. "The Complexities of Ancient Glass." *Apollo* 86 (December 1967), pp. 428–37.

Riis and Poulsen 1957 P. J. Riis and Vagn Poulsen. *Hama: Fouilles et recherches de la Fondation Carlsberg, 1931–1938*. Vol. 4, no. 2, *Les Verreries et poteries médiévales*. Nationalmuseets skrifter. Større Beretninger, 7. Copenhagen, 1957.

Ritsema van Eck and Zijlstra-Zweens 1993–95 Pieter C. Ritsema van Eck and Henrica M. Zijlstra-Zweens. *Glass in the Rijksmuseum*. Translated by Mary Maclure. 2 vols. Zwolle, 1993–95.

Rogers 1969 J. Michael Rogers. "Aeolipiles Again." In *Forschungen zur Kunst Asiens: In Memoriam Kurt Erdmann, 9. September 1901–30. September 1964*, edited by Oktay Aslanapa and Rudolf Naumann, pp. 147–58. Istanbul, 1969.

Rogers 1983 J. Michael Rogers. "Glass in Ottoman Turkey." *Istanbuler Mitteilungen* [Deutsches Archäologisches Institut, Abteilung Istanbul] 33 (1983), pp. 239–66.

Rogers 1998 J. Michael Rogers. "European Inventories as a Source for the Distribution of Mamluk Enamelled Glass." In Ward 1998, pp. 69–73.

Rowland 1966 Benjamin Rowland. *Ancient Art from Afghanistan: Treasures from the Kabul Museum*. New York, 1966.

Rowland 1971 Benjamin Rowland. *Art in Afghanistan: Objects from the Kabul Museum*. London, 1971.

Rückert 1963 Rainer Rückert. "Venezianische Moscheeampeln in Istanbul." In *Festschrift für Harald Keller, zum sechzigsten Geburtstag, dargebracht von seinen Schülern*, edited by Hans Martin Freiherrn von Erffa and Elisabeth Herget, pp. 223–34. Darmstadt, 1963.

Rypka et al. 1968 Jan Rypka, with Otakar Klíma et al. *History of Iranian Literature*. Edited by Karl Jahn. Dordrecht, 1968. [Translation of *Dejiny perské a tádzické literatury*. Prague, 1956.]

Sa'diya 1989 Ayyub Sa'diya, ed. *Dimashq al-shām aqdam madīna fī al-'ālim* (Damascus: The oldest city in the world). Damascus, 1989.

Salam 1978 Hayat Salam. "Glass." In Oleg Grabar, Renata Holod, James Knustad, and William Trousdale, *City in the Desert: Qasr al-Hayr East; an Account of Excavations Carried Out at Qasr al-Hayr East on Behalf of the Kelsey Museumof Archaeology at the University of Michigan, with the Help of Harvard University and the Oriental Institute, the University of Chicago*, pp. 138–47. 2 vols. Harvard Middle Eastern Monographs, 23, 24. Cambridge, Mass., 1978.

von Saldern 1955 Axel von Saldern. "An Islamic Carved Glass Cup in The Corning Museum of Glass." *Artibus Asiae* 18 (1955), pp. 257–70.

von Saldern 1968 Axel von Saldern. *Ancient Glass in the Museum of Fine Arts, Boston*. Greenwich, 1968.

von Saldern 1980a Axel von Saldern. *Ancient and Byzantine Glass from Sardis*. Archaeological Exploration of Sardis. Monographs, 6. Cambridge, Mass., and London, 1980.

von Saldern 1980b Axel von Saldern. *Glass 500 B.C. to A.D. 1900: The Hans Cohn Collection, Los Angeles, Cal./ Glas von der Antike bis zum Jugendstil: Sammlung Hans Cohn, Los Angeles, Cal.* Exh. cat. The University of California, Los Angeles; Museum für Kunst und Gewerbe, Hamburg; and Israel Museum, Jerusalem. Mainz am Rhein, 1980.

von Saldern 1996 Axel von Saldern. "Early Islamic Glass in the Near East: Problems of Chronology and Provenances." In *Annales du 13^e^ Congrès de l'Association Internationale pour l'Histoire du Verre, Pays Bas, 28 août–1 septembre 1995*, pp. 225–46. Lochem, The Netherlands, 1996.

von Saldern et al. 1974 Axel von Saldern, Birgit Nolte, Peter La Baume, and Thea Elisabeth Haevernick. *Gläser der Antike: Sammlung Erwin Oppenländer*. Exh. cat. Museum für Kunst und Gewerbe, Hamburg, and Römisch-Germanisches Museum, Cologne. Mainz am Rhein, 1974.

Saliger 1987 Arthur Saliger, ed. *Dom- und Diözesanmuseum Wien*. Schriftenreihe des Erzbischöflichen Dom- und Diözesanmuseums Wien, n.s., 10. Vienna, 1987.

Sarpellon et al. 1989 Giovanni Sarpellon et al., eds. *Salviati: Il suo vetro e i suoi uomini, 1859–1987*. Venice, 1989.

Sarre 1925 Friedrich Sarre. *Die Keramik von Samarra*. Forschungen zur islamischen Kunst, 2. Die Ausgrabungen von Samarra, 2. Berlin, 1925.

Satoh et al. 1994 Eisaku Satoh, Kayoko Yamada, Ken-ichi Hirasawa, Toshiyuki Takyu, Yoshio Akai, Yasuhiro Takeshita, Yoko Shindo, and Mutsuo Kawatoko. "Analysis of the Contents of a Glass Kohl Bottle Excavated from al-Ṭūr, Archaeological Site in South Sinai, Egypt." *Proceedings of the Japan Academy* 70, ser. B, no. 6 (1994), pp. 77–80.

Sayre 1964 Edward V. Sayre. *Some Ancient Glass Specimens with Compositions of Particular Archaeological Significance*. Upton, N.Y, 1964.

Sayre and Smith 1961 Edward V. Sayre and Ray Winfield Smith. "Compositional Categories of Ancient Glass." *Science* 133 (1961), pp. 1824–26.

Scanlon 1966 George T. Scanlon. "Fusṭāṭ Expedition: Preliminary Report 1965, Part I." *Journal of the American Research Center in Egypt* 5 (1966), pp. 83–112.

Scanlon 1968 George T. Scanlon. "Fustat and the Islamic Art of Egypt." *Archaeology* 21 (June 1968), pp. 188–95.

Scanlon 1974 George T. Scanlon. "Fusṭāṭ Expedition: Preliminary Report 1968, Part I." *Journal of the American Research Center in Egypt* 11 (1974), pp. 81–91.

Scanlon 1998 George T. Scanlon. "Lamm's Classification and Archaeology." In Ward 1998, pp. 27–29.

Sčapova 1978 Julia Sčapova. "À propos des coupes dites de Sainte Hedwige." In *Annales du 7e Congrès International pour d'Étude Historique du Verre, Berlin-Leipzig, 15–21 août 1977*, pp. 255–69. Liège, 1978.

Scerrato 1979 Umberto Scerrato. "I cristalli di rocca." In Gabrieli and Scerrato 1979, pp. 497–520.

Schmidt 1922 Robert Schmidt. *Das Glas*. 2d ed. Handbücher der Königlichen Museen zu Berlin. Berlin and Leipzig, 1922.

Schmitz et al. 1997 Barbara Schmitz, with Pratapaditya Pal, Wheeler M. Thackston, and William M. Voelkle. *Islamic and Indian Manuscripts and Paintings in the Pierpont Morgan Library*. New York, 1997.

Schmoranz 1898 Gustav Schmoranz. *Altorientalische Glas-Gefässe*. Vienna, 1898.

Schmoranz 1899 Gustav Schmoranz. *Old Oriental Gilt and Enamelled Glass Vessels Extant in Public Museums and Private Collections Reproduced in Their Original Colouring and Described*. Vienna and London, 1899.

Shalem 1996 Avinoam Shalem. *Islam Christianized: Islamic Portable Objects in the Medieval Church Treasuries of the Latin West*. Ars Faciendi, 7. Frankfurt am Main, 1996.

Shalem 1998 Avinoam Shalem. "Some Speculations on the Original Cases Made to Contain Enamelled Glass Beakers for Export." In Ward 1998, pp. 64–68.

Sharakhimov 1973 Sh. Sharakhimov. "Novye stekliannye sosudy s Afrasiaba" (New glass vessels from Afrasiyab). *Afrasiab* 2 (1973), pp. 224–33.

Shindo 1992 Yoko Shindo. "Glass." In *Egyptian Islamic City: Excavation Report, 1978–1985*, edited by Kiyohiko Sakurai and Mutsuo Kawatoko, pp. 304–35, 572–617. Tokyo, 1992. In Japanese.

Shindo 1993 Yoko Shindo. "Islamic Marvered Glass from al-Ṭūr, South Sinai." In *Annales du 12e Congrès de l'Association Internationale pour l'Histoire du Verre, Vienne-Wien/ 26–31 août 1991*, pp. 297–305. Amsterdam, 1993.

Simpson 1979 Marianna Shreve Simpson. *The Illustration of an Epic: The Earliest "Shahnama" Manuscripts*. Outstanding Dissertations in the Fine Arts. New York, 1979. [Ph.D. diss., Harvard University, Cambridge, Mass., 1978.]

Smith 1957 Ray Winfield Smith. *Glass from the Ancient World: The Ray Winfield Smith Collection*. Exh. cat. The Corning Museum of Glass. Corning, N.Y., 1957.

Smith 1964 Ray Winfield Smith. "History Revealed in Ancient Glass." *National Geographic* 126 (September 1964), pp. 346–69.

Soucek 1978 Priscilla Parsons Soucek. *Islamic Art from the University of Michigan Collections*. Exh. cat. Kelsey Museum of Archaeology, University of Michigan. Ann Arbor, 1978.

Soucek et al. 1981 Priscilla Parsons Soucek and Christine Verzár Bornstein, with Emma Alexander, Vicky Clark, Andrew Ehrenkreutz et al. *The Meeting of Two Worlds: The Crusades and the Mediterranean Context*. Edited by Clifton Olds. Exh. cat. University of Michigan Museum of Art. Ann Arbor, 1981.

***SPA* 1938–77** Arthur Upham Pope and Phyllis Ackerman, eds. *A Survey of Persian Art from Prehistoric Times to the Present*. 16 vols. London and New York, 1938–77.

***Splendeur des Sassanides* 1993** *Splendeur des Sassanides: L'Empire perse entre Rome et la Chine, 224–642*. Exh. cat. Musées Royaux d'Art et d'Histoire. Brussels, 1993.

Stern 1989 Eva Marianne Stern. "Glass Vessels Exhibited in the Bölge Museum, Adana/Adana Bölge Müzesinde sergilenmekte olan cam eserler." *Belleten* 53, nos. 207–8 (August 1989), pp. 583–606.

Stern 1995 Eva Marianne Stern. *Roman Mold-Blown Glass: The First through Sixth Centuries*. [Toledo Museum of Art.] Rome and Toledo, Ohio, 1995.

Stern and Schlick-Nolte 1994 Eva Marianne Stern and Birgit Schlick-Nolte. *Early Glass of the Ancient World, 1600 B.C.–A.D. 50: Ernesto Wolf Collection*. Ostfildern, Germany, 1994.

Stiaffini 1999 Daniela Stiaffini. *Il vetro nel Medioevo: Tecniche, strutture, manufatti*. Tardoantico e Medioevo. Strumenti, 1. Rome, 1999.

Strauss 1955 Jerome Strauss. *Glass Drinking Vessels from the Collections of Jerome Strauss and the Ruth Bryan Strauss Memorial Foundation: A Special Exhibition*. Exh. cat. The Corning Museum of Glass. Corning, N.Y., 1955.

Suriano and Carboni 1999 Carlo Mario Suriano and Stefano Carboni. *La seta islamica: Temi ed influenze culturali/Islamic Silk: Design and Context*. Exh. cat. Museo Nazionale del Bargello. Florence, 1999.

Swietochowski and Carboni 1994 Marie Lukens Swietochowski and Stefano Carboni. *Illustrated Poetry and Epic Images: Persian Painting of the 1330s and 1340s*. Exh. cat. The Metropolitan Museum of Art. New York, 1994.

Tait 1991 Hugh Tait. "Europe from the Middle Ages to the Industrial Revolution." In *Five Thousand Years of Glass*, edited by Hugh Tait, pp. 145–87. London, 1991.

Taniichi 1988 Takashi Taniichi. "Islamic Glass Vessels Recently Excavated in China." *Bulletin of the Okayama Orient Museum* 7 (1988), pp. 97–108. In Japanese.

Tatton-Brown and Andrews 1991 Veronica Tatton-Brown and Carol Andrews. "Before the Invention of Glassblowing." In *Five Thousand Years of Glass*, edited by Hugh Tait, pp. 21–61. London, 1991.

Tavernier 1677 Jean-Baptiste Tavernier. *The Six Voyages of John Baptista Tavernier, Baron of Aubonne, through Turky, into Persia and the East-Indies, for the Space of Forty Years*. London, 1677.

Tehrani 1987 Sa'id Golkar Tehrani. *Rāhnamāī mūza abgīna ve safālīna hāīrān/Guide to the Glassware and Ceramics Museum of Iran*. Translated by Claude Karbassi. Tehran, 1987.

***Terres secrètes* 1992** *Terres secrètes de Samarcande: Céramiques du VIIIe au XIIIe siècle*. Exh. cat. Institut de Monde Arabe. Paris, 1992.

Theophilus 1963 Theophilus. *On Divers Arts: The Treatise of Theophilus*. Edited by John G. Hawthorne and Cyril Stanley Smith. Chicago, 1963.

Toledo Museum 1969 Toledo Museum of Art. *Art in Glass: A Guide to the Glass Collections*. Toledo, 1969.

Tomobe 1992 Naoshi Tomobe. *Microcosms of Brilliance: Glass around the World*. Tokyo, 1992. In Japanese.

***Treasures of the Orient* 1979** *Treasures of the Orient*. Tokyo, 1979. In Japanese.

***Treasures on Grassland* 2000** *Treasures on Grassland: Archaeological Finds from the Inner Mongolia Autonomous Region*. Exh. cat. Shanghai Museum. Shanghai, 2000. In Chinese.

***The Treasury of San Marco* 1984** *The Treasury of San Marco, Venice*. Exh. cat. The Metropolitan Museum of Art, New York. Milan, 1984.

***Trésors d'art* 1952** *Trésors d'art du Moyen Âge en Italie*. Exh. cat. Musée du Petit Palais. Paris, 1952.

Trever and Lukonin 1987 K. V. Trever and V. G. Lukonin. *Sasanidskoe serebro, Sobranie Gosudarstvennogo Ermitazha: Khudozhestvennaia kul'tura Irana, III–VIII vekov* (Sasanian silver in the Hermitage collection: Artistic culture in Iran, third–eighth century). Moscow, 1987.

al-'Ush 1964 Abu-l-Faraj al-'Ush. "Les Verres conservés au département de l'art arabe musulman du Musée National de Damas." *Bulletin des Journées Internationales du Verre*, no. 3 (1964), pp. 55–64.

al-'Ush 1976 Abu-l-Faraj al-'Ush. *Musée National de Damas, Département des Antiquités Arabes Islamiques.* Damascus, 1976.

Vannini 1987 Guido Vannini, ed. *L'antico Palazzo dei Vescovi a Pistoia*. Vol. 2, pt. 2, *I documenti archeologici.* Arte e archeologia, 23. Florence, 1987.

Vavra 1954 Jaroslav Raimund Vavra. *Five Thousand Years of Glass-Making: The History of Glass*. Translated by I. R. Gottheiner. Prague, 1954.

Verità 1998 Marco Verità. "Analyses of Early Enamelled Venetian Glass: A Comparison with Islamic Glass." In Ward 1998, pp. 129–34.

Vernoit 1996 Stephen J. Vernoit. "Islamic Art, XI, 2: Collectors and Collecting; Europe and North America." In *The Dictionary of Art*, edited by Jane Turner, vol. 16, pp. 553–55. London, 1996.

Vernoit 1998 Stephen J. Vernoit. "Islamic Gilded and Enamelled Glass in Nineteenth-Century Collections." In Ward 1998, pp. 110–15.

***Verres antiques* 1954** *Verres antiques de la collection Ray Winfield Smith.* Exh. cat. Musée Mariemont. Brussels, 1954.

Ward 1993 Rachel Ward. *Islamic Metalwork*. Eastern Art Series. New York, 1993.

Ward 1998 Rachel Ward, ed. *Gilded and Enamelled Glass from the Middle East*. London, 1998.

Ward 1999 Rachel Ward. "The 'Baptistère de Saint Louis': A Mamluk Basin Made for Export to Europe." In *Islam and the Italian Renaissance*, edited by Charles Burnett and Anna Contadini, pp. 113–32. Warburg Institute Colloquia, 5. London, 1999.

Warmus 1984 William Warmus. *Émile Gallé: Dreams into Glass.* Exh. cat. The Corning Museum of Glass. Corning, N.Y., 1984.

Watson 1985 Oliver Watson. *Persian Lustre Ware*. The Faber Monographs on Pottery and Porcelain. London and Boston, 1985.

Watson 1997 Oliver Watson. "Glass from the Islamic World." In Liefkes 1997, pp. 26–35.

Watt and Wardwell 1997 James C. Y. Watt and Anne E. Wardwell. *When Silk Was Gold: Central Asian and Chinese Textiles*. Exh. cat. The Metropolitan Museum of Art, New York, and Cleveland Museum of Art. New York, 1997.

Wedepohl et al. 1995 Karl Hans Wedepohl, Ingeborg Krueger, and Gerald Hartmann. "Medieval Lead Glass from Northwestern Europe." *Journal of Glass Studies* 37 (1995), pp. 65–82.

Welander-Berggren 1990 Elsebeth Welander-Berggren. "Från Mesopotamien till medeltid." *Antik et Auktion* (January 1990), pp. 42–47.

Welch 1963 Stuart Cary Welch. *The Art of Mughal India: Painting and Precious Objects.* Exh. cat. Asia House Gallery. New York, 1963.

Welch 1985 Stuart Cary Welch. *India: Art and Culture, 1300–1900.* Exh. cat. The Metropolitan Museum of Art. New York, 1985.

Wenzel 1988 Marian Wenzel. "Islamic Gold Sandwich Glass: Some Fragments in the David Collection, Copenhagen." *Journal of the Royal Asiatic Society of Great Britain and Ireland* (1988), pp. 45–72.

Whitcomb 1985 Donald S. Whitcomb. *Before the Roses and Nightingales: Excavations at Qasr-i Abu Nasr, Old Shiraz*. New York, 1985.

Whitehouse 1968 David Whitehouse. "Excavations at Sīrāf: First Interim Report." *Iran* 6 (1968), pp. 1–22.

Whitehouse 1970 David Whitehouse. "Excavations at Sīrāf: Third Interim Report." *Iran* 8 (1970), pp. 1–18.

Whitehouse 1985a David Whitehouse. "The Corning Museum of Glass." *Arts and the Islamic World* 3, no. 3 (autumn 1985), pp. 67–70.

Whitehouse 1985b David Whitehouse. "Transparent Mystery." *Connoisseur* (December 1985), pp. 130–31.

Whitehouse 1990 David Whitehouse. "Islamic Cameo Glass Ewer." In Charleston 1990, pp. 72–73.

Whitehouse 1991 David Whitehouse. "Islamic Glass." In *Sotheby's Concise Encyclopedia of Glass*, pp. 38–45. Boston, 1991.

Whitehouse 1993 David Whitehouse. "The Corning Ewer: A Masterpiece of Islamic Cameo Glass." *Journal of Glass Studies* 35 (1993), pp. 48–56.

Whitehouse 1997 David Whitehouse. *Roman Glass in The Corning Museum of Glass.* Vol. 1. Corning, N.Y., 1997.

Whitehouse 1998 David Whitehouse. "Islamic Glass and Italy, 1200–1500." In *Papers from the EEA Third Annual Meeting at Ravenna, 1997*, edited by Mark Pearce and Maurizio Tosi. Vol. 2, *Classical and Medieval*, pp. 191–95. BAR International Series, 718. Oxford, 1998.

Wiet 1929 Gaston Wiet. *Catalogue général du Musée Arabe du Caire: Lampes et bouteilles en verre émaillé.* Cairo, 1929. [Reprinted 1982.]

Wilkinson 1973 Charles K. Wilkinson. *Nishapur: Pottery of the Early Islamic Period*. New York, 1973.

Yoshimizu 1985 Tsuneo Yoshimizu. *The Glass Art of Émile Gallé*. Tokyo, 1985. In Japanese.

Zampieri 1997 Girolamo Zampieri, ed. *"Gioielli" del Museo Archeologico di Padova: Vetri, bronzi, metalli preziosi, ambre e gemme*. Quaderni del Pedrocchi. Il collezionismo. Padua, 1997.

Zebrowski 1997 Mark Zebrowski. *Gold, Silver and Bronze from Mughal India*. London, 1997.

Zecchin 1968 Luigi Zecchin. "I primi cristalli muranesi giunti in Oriente." *Vetro e silicati* 12 (1968), pp. 17–20.

Zecchin 1969 Luigi Zecchin. "Un decoratore di vetri a Murano alla fine del Duecento." *Journal of Glass Studies* 11 (1969), pp. 39–42.

Zecchin 1970 Luigi Zecchin. "Fornaci muranesi fra il 1279 ed il 1290." *Journal of Glass Studies* 12 (1970), pp. 79–83.

Zecchin 1973 Luigi Zecchin. "Cronologia, vetraria veneziana e muranese." *Rivista della Stazione Sperimentale del Vetro* (1973), pp. 19–22, 63–66, 119–22, 165–68, 213–16, 257–60.

Zecchin 1987 Luigi Zecchin. *Vetro e vetrai di Murano: Studi sulla storia del vetro.* Vol. 1. I grandi libri. Venice, 1987.

Index

Italic references indicate illustrations.

Photograph Credits

Photographs were provided by the owners of the works and are reproduced with their permission; their courtesy is gratefully acknowledged. The following are additional credits.

Avshalom Avital: cat. nos. 22, 23, 80, 88

Catarina G. Ferreira: cat. nos. 127, 128

Image Source 2000: cat. nos. 18, 30, 33, 34, 36, 42, 58, 60, 85, 132, 133, 142, 156

Courtesy of the Israel Antiquities Authority (excavated by The Eretz Israel Museum, Tel Aviv, and the Texas Foundation for Archaeological and Historical Research, Houston), fig. 1

Paul Lachenauer, the Photograph Studio, The Metropolitan Museum of Art: cat. nos. 14, 27, 31, 32, 46, 68, 71, 79, 97, 108, 114, 116, 120, 121, 126, 145, 146, 153

Georg Niedermeiser: cat. nos. 2, 6, 7, 48, 49, 61, 66, 70a–e, 78a,b, 82, 87, 98

© 2000 Museum Associates/LACMA: cat. nos. 137, 140, 141

V&A Picture Library: cat. nos. 1, 8, 15, 20, 28, 44, 76, 113, 115, 119, 130

Bruce White: cat. nos. 4, 12, 13, 16, 17, 24, 26, 37, 41, 45, 50, 51, 52, 53, 54, 63, 72, 77, 81, 104, 139, 143, 144

Nicholas L. Williams: cat. nos. 3, 5, 9, 11, 19, 25, 38, 43, 47, 55, 64, 69, 73, 74, 75, 86, 90, 93, 94, 95, 101, 102, 103, 105, 106, 112, 122, 131, 134, 147, 148, 149, 150, 152, 154, 155, 157

© Ole Woldbye: cat. nos. 10, 21, 29, 39, 40, 57, 65, 89, 91, 96, 100, 107, 110

ISBN 0-300-08851-5