Each year the Fall issue of the Museum's *Bulletin*, entitled "New Acquisitions—A Selection," serves to highlight a few of the thousands of works of art that have entered the collections. The Museum's Conservation Departments all play an important role in the process of acquiring these purchases, gifts, and bequests, providing material and technological data that complements the stylistic and historic evaluation each work receives before it is accessioned. The current issue of *met objectives* includes articles that describe several notable acquisitions, and the unique technical questions each one presents, while illustrating how these additions often force both curators and conservators to look at the collections with new eyes. This issue also highlights the completion of the Sherman Fairchild Center for Objects Conservation at The Cloisters.

met objectives

The Sherman Fairchild Center for Objects Conservation
The Metropolitan Museum of Art – Fall 2002
Treatment and research notes, Volume 4, No. 1

Origin and Influence: Technical Evidence for Establishing Provenience

Figure 1

The Museum's Department of Asian Art recently acquired a gold stem cup of complex origins (*Figure 1*). While related stylistically and iconographically to Chinese works attributed to the Tang dynasty (617–906), this goblet is clearly also indebted to the cultures of Tibet and Central Asia, and as such has been attributed to the region of Xinjiang, modern China's most northwestern province, and dated to the late seventh to eighth century, when Tibet dominated much of northern Central Asia.

The cup is small, less than nine centimeters in height, but with a weight of 171.8 grams, it is surprisingly heavy for its size. The exterior is decorated with extremely well-executed repoussé: twelve Chinese zodiacal animals occupy the horizontal band that encircles the mouth, while the remaining surface is enriched with stylized vine scrolls inhabited by beasts, both real and mythical. The background is textured with systematic ring punching that further enhances the vessel's expressive energy. With its bell-shaped body, slender stem, and flared foot, the cup's form reflects contemporary Chinese works, as illustrated by a cast, gilded bronze cup with simple incised decoration in the Museum's collection (*Figure 2*). Similar Tang cups, both cast and worked, are known in silver as well.

As evidenced by the quality of its decoration, the cup was obviously made for a wealthy and discerning patron. This assumption is supported by the lavish use of gold, which at the same time suggests a non-Chinese provenience, since ancient Chinese gold vessels are rare and extant examples tend to be flimsy. It is these seemingly incongruous characteristics, in addition to puzzling details of manufacture, that present interesting questions involving the interplay

Figure 2

between the styles and techniques of different cultures.

The cup is constructed from five separately manufactured elements: the decorated bowl and its plain liner, the decorated stem with intermediate knop and flared foot, the foot's lining, and on the underside of the exterior bowl, a squat, cylindrical drum (*Figure 3*). The bowl and liner were soldered together at the rim of the cup, and what would otherwise be a conspicuous seam is hidden behind a single row of granulation, visible only where some granules have been lost (*Figure 4*). The flared foot is soldered to its liner in a similar manner, with the latter extending just high enough to reach the lower edge of the knop.

The stem and its appurtenances are technically the most striking elements of the cup assembly. The interior of the hollow stem is visible from the underside of the foot, although due to its small diameter it is quite difficult to inspect. The presence of a vertical lap join, which can be seen in the radiograph (*Figure 3*), indicates that the foot was fabricated rather than cast or raised, and upon close examination the edges of the outer sheet can be discerned on its surface (*Figure 5*). The stem is not actually joined to the underside of the external bowl, but instead is soldered where it pierces the drum, which in turn was joined along its upper circumference to the bowl.

From a structural point of view this is by no means an ideal arrangement, as the flat sheet that forms the bottom of the drum could easily be deformed when the cup was subjected to mechanical stress, and despite the deeply embossed lotus petals, which helped to stiffen the drum by virtue of their radiating pleats, the goblet has indeed become distinctly lopsided. An inverted, truncated cone or similar shape would have been a better choice for the transitional element between stem and vessel, an arrangement that can resist deformation far more successfully. Still, these structural problems could have been mitigated had the stem been soldered directly to the bowl.

In pre-industrial societies soldering has always presented some technical difficulties. Soldering in early times necessitated heating what was essentially the *entire* object,

Figure 1. (cover) Stem Cup, *East Central Asian or northwest Chinese, period of Tibetan rule, late 7th–8th century. Hammered gold with repoussé decoration, h. 8.9 cm. Purchase, 2001 Benefit Fund, 2002 (2002.19).*

Figure 2. Stem Cup, *China, Tang Dynasty (617–906), late 7th–early 8th century. Gilded cast bronze with traced and punched designs, h. 6 cm. Purchase, Bequest of Dorothy Graham Bennett, 1998 (1998.312).*

Figure 3. X-ray radiograph of gold stem cup (Figure 1); a) outer bowl, b) liner, c) drum, d) stem with knop and flared foot, e) liner. Arrows also indicate the gap between the stem and the underside of the outer bowl (1), and the lap join on the stem (2).

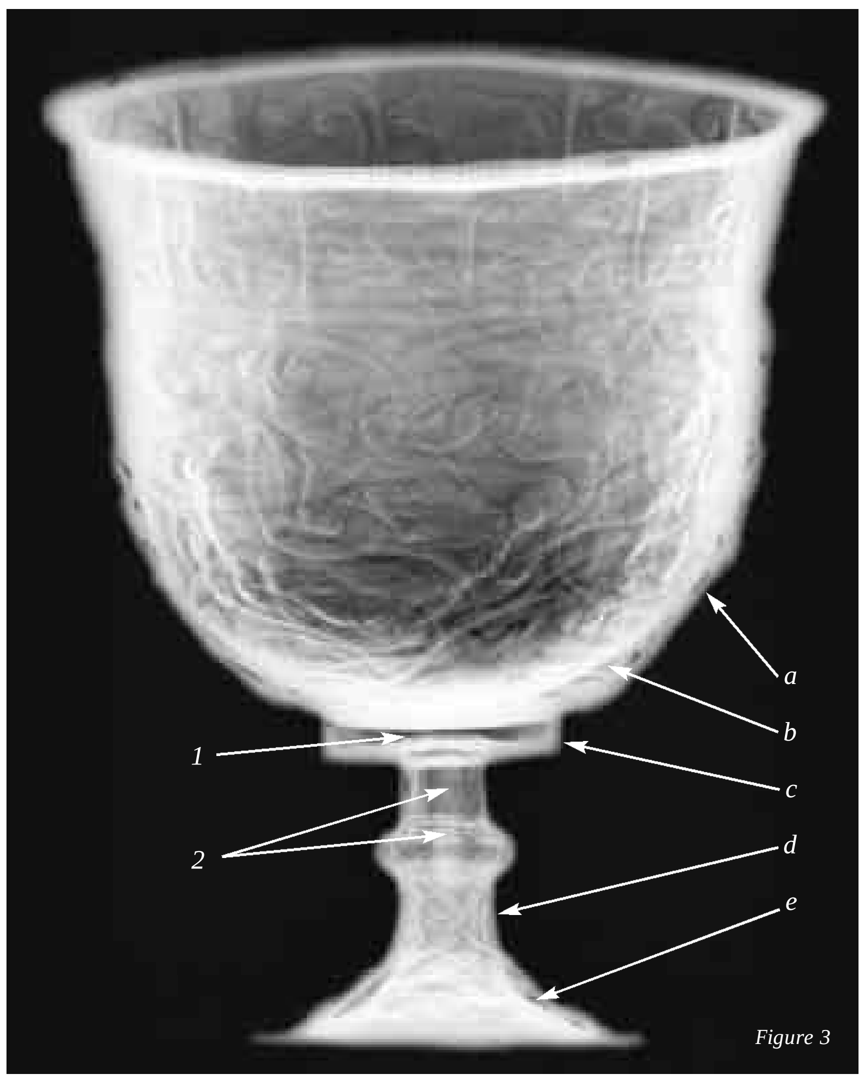

Figure 3

whether in an enclosed muffle furnace or on an open brazier. Unlike modern metalworkers who use soldering torches that combine copious heat with pinpoint accuracy, ancient goldsmiths had inadequate means to direct heat to where it was required, and had no way of judging the temperature other than actually watching the solder melt. The practical implications of these limitations are illustrated in the way the assembly of the cup was resolved. Because the drum was made as a separate element, rather than raised with the exterior bowl, the join between the stem and bowl would not have been visible during the soldering process. As a consequence, the artist decided not to solder the stem to the bowl. He must have considered "blind" soldering too great a risk, for if overheated, the cup—and with it, all labor invested thus far—could have collapsed and eventually melted.

The design of the cup, however, did force the goldsmith to take a similar risk, as he had to apply the extensive repoussé decoration to the outer bowl, the drum, and the foot before soldering the different elements together. This procedure is unusual in virtually all pre-industrial cultures, past and present. When problems of access demand that the decoration be executed first, joins made subsequently are usually mechanical, as the dangers inherent to the soldering process are too great. To judge from the quality and successful execution of the work, the artist certainly had superb technical skills, but still one might ask why such a technically demanding design, which so tested these skills, was chosen for this cup.

Surprising solutions and hybrid forms are to be expected at the interface of disparate cultures. In the case of the gold stem cup, where a highly skilled goldsmith applied his craft to a foreign visual vocabulary, a conspicuous disjunction between Chinese style and Central Asian solutions can be observed. Western China is one of many regions on the Eurasian continent where sedentary and nomadic societies of various ethnicities produced complex works reflective of multiple influences and origins.

Figure 4

Figure 4. Detail of gold stem cup (Figure 1), showing repoussé dragon and rim with loss of granules.

Since the acquisition process allows only a relatively brief assessment of a work of art, further investigation aimed at placing the cup within this continuum still remains to be undertaken. As future studies of silver Tang Dynasty hollowware provide crucial information about early Chinese techniques of working and joining precious metal sheet, the influence of these manufacturing traditions in Central Asia can be evaluated through comparison with new finds from this region. Together these insights should make it possible to recognize with greater assurance the contributions of the different cultures, and to better characterize the relationship between style and technology.

The Stem Cup *is featured in "Recent Acquisitions, A Selection: 2001-2002,"* MMA Bulletin *60 (Fall, 2002) p. 53. It can be viewed in the new installation "Glimpses of the Silk Road: Central Asia in the First Millennium."*

Richard E. Stone has been a conservator in the Sherman Fairchild Center for over twenty-five years. He specializes in the examination of metal objects and supervises the department's technical vetting of objects for acquisition by the Museum. His major research interest has been the technology of Renaissance bronze statues, especially as related to connoisseurship, and he has written on the casting technique of Donatello and the Mantuan sculptor Antico, among other topics. He regularly teaches a course on technical considerations for the art historian at the Conservation Center of the Institute of Fine Arts, New York University.

Figure 5

Figure 5. Detail of gold stem cup (Figure 1). Arrows indicate edges of lap join on the foot.

Defining Authenticity

The articles presented in this issue of *met objectives* illustrate the role of the Museum's conservation departments in the process of evaluating proposed acquisitions, and so it seems appropriate here to consider the nature of authenticity, as this concept carries such powerful effect within the art world. Authenticity has always been an issue of high profile, not only for museums and private collections, but also for the public at large. Obvious interest in accurate historical presentation aside, this visibility seems to derive from our fascination with crime, and the amusement and reassurance we gain from knowing that even the most learned professionals can sometimes be deceived. Some forgers have become celebrities themselves, if only posthumously, and can occasionally hold claims to being artists in their own right. Indeed, in this context it has been said that there are no fakes, only misattributed objects, whereby, ironically, a truly fine forgery remains a work of art.

Although many fakes may be rather obvious to the experienced and well-educated observer, there is that small but dangerous group of fraudulent works so carefully executed as to have proven deceptive to even the most sensitive eyes. The *Fonthill Ewer* (*Figure 6*) entered the Museum as a masterpiece of Renaissance goldsmithing, but on the basis of technical and historical evidence we now recognize that it was made after 1799, with the intention of catering to a specific taste among collectors of the time. It is nonetheless an artistic masterpiece, but of quite a different kind than we once supposed.

Other works, such as the *Rospigliosi Cup* (*Figure 7*), which was previously attributed to Benvenuto Cellini and now also known to be of nineteenth-century manufacture, may be copies of lost originals if not outright forgeries, and are currently exhibited with appropriately altered labels. While these examples illustrate that some fakes are revealed over time, the more skillful ones may survive to quite a respectable age, and the best are presumably immortal. As a consequence, the fakes least likely to damage our historical perceptions are those most likely to reveal themselves, while fakes that have shaped or perverted our vision of the past most profoundly may, unfortunately, never be detected at all.

Attribution in the traditional sense is entirely within the province of the art historian using the tools of stylistic analysis and historical documentation. Conservators provide evidence of entirely independent origins that lends arguments previously based on stylistic insights alone a new dimension otherwise unobtainable, sometimes helping to avoid the possible danger of circularity in stylistic attribution.

On occasion the most compelling art historical evidence and the most acute technical data do not agree. Modern conservators are trained in the modern scientific tradition, wherein the notion of truth is inseparable from its probability, and not just a simple right or wrong. To use a familiar parallel, a criminal court instructs a jury to decide the truth "beyond all reasonable doubt," while a civil court is satisfied with a "preponderance of evidence." The humanities have usually opted for the more rigorous standard, while science maintains that there is no better truth available than what the present preponderance of evidence suggests.

Once opened, cases of questioned authenticity are seldom closed. Conservators and curators alike must be willing to reevaluate their positions and, furthermore, must remain open to new intuitions or previously unavailable data—based either on art historical or technical investigations—even when they elicit discussion about the integrity of works thought to be well above suspicion.

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Figure 6. Fonthill Ewer. *Ewer, workshop of Ferdinand Eusobio Miseroni (Prague, act. 1656–84), ca. 1680. Smoky quartz. Mounts, French (probably Paris), ca. 1814–17. Enameled gold with diamonds, overall h. 25.1 cm. The Jack and Belle Linsky Collection, 1982 (1982.60.138).*

Figure 7. Rospigliosi Cup, *Italian or French, first quarter 19th century. Gold, partially enameled, pearl, h. 19.4 cm. Bequest of Benjamin Altman, 1913 (14.40.667).*

Reconsidering a Romanesque Reliquary Cross

A major aim of the Museum's acquisition policy is the procurement of objects of the highest artistic merit, while building strength and continuity in the collections. A late twelfth-century, double-armed reliquary cross believed to be from Limoges (*Figure 8*), acquired by the Museum earlier this year, satisfies all of these criteria. Curators in the Department of Medieval Art and The Cloisters first learned of the cross in 1993, but possible import restrictions and the asking price at that time placed it out of reach. Also of great concern were doubts expressed by a noted scholar about the authenticity of some of the inlays, which are the dominant feature in the decorative scheme. The cross was taken off the market, but when it reappeared recently, Peter Barnet, Michel David-Weill Curator in Charge, thought it warranted further evaluation. The subsequent examination serves as an interesting case study that illustrates the methodology applied in vetting objects under consideration for acquisition, and highlights the resources available at the Museum for elucidating the physical nature of works of art that cannot be sampled or subjected to any form of invasive examination.

The cross is composed of silver-gilt sheet attached to a wooden support and adorned with "faceted" and cabochon inlays. A fragment of the True Cross was mounted at the upper crossing on the principal face, while other relics placed on both sides had been visible either behind rock crystal inlays or through small, circular openings in the silver (*Figure 9*). In all, the cross originally held ten relics, several of which might still be present. The silver surfaces are richly embellished with a lively, sophisticated patterning created in repoussé, with additional punchwork on the obverse of the sheet, and applied components such as twisted and beaded wire. Examination at low magnification was sufficient to recognize the characteristic appearance of hammered silver sheet and the tool marks associated with burnishing a spongy layer of amalgamed gold, and surface analysis of the gilding with X-ray fluorescence spectrometry (XRF) confirmed the presence of mercury. These technical features, in addition to the idiosyncratic sizes and shapes of the "gemstones", the vacillating tension in the twisted wire, the varying

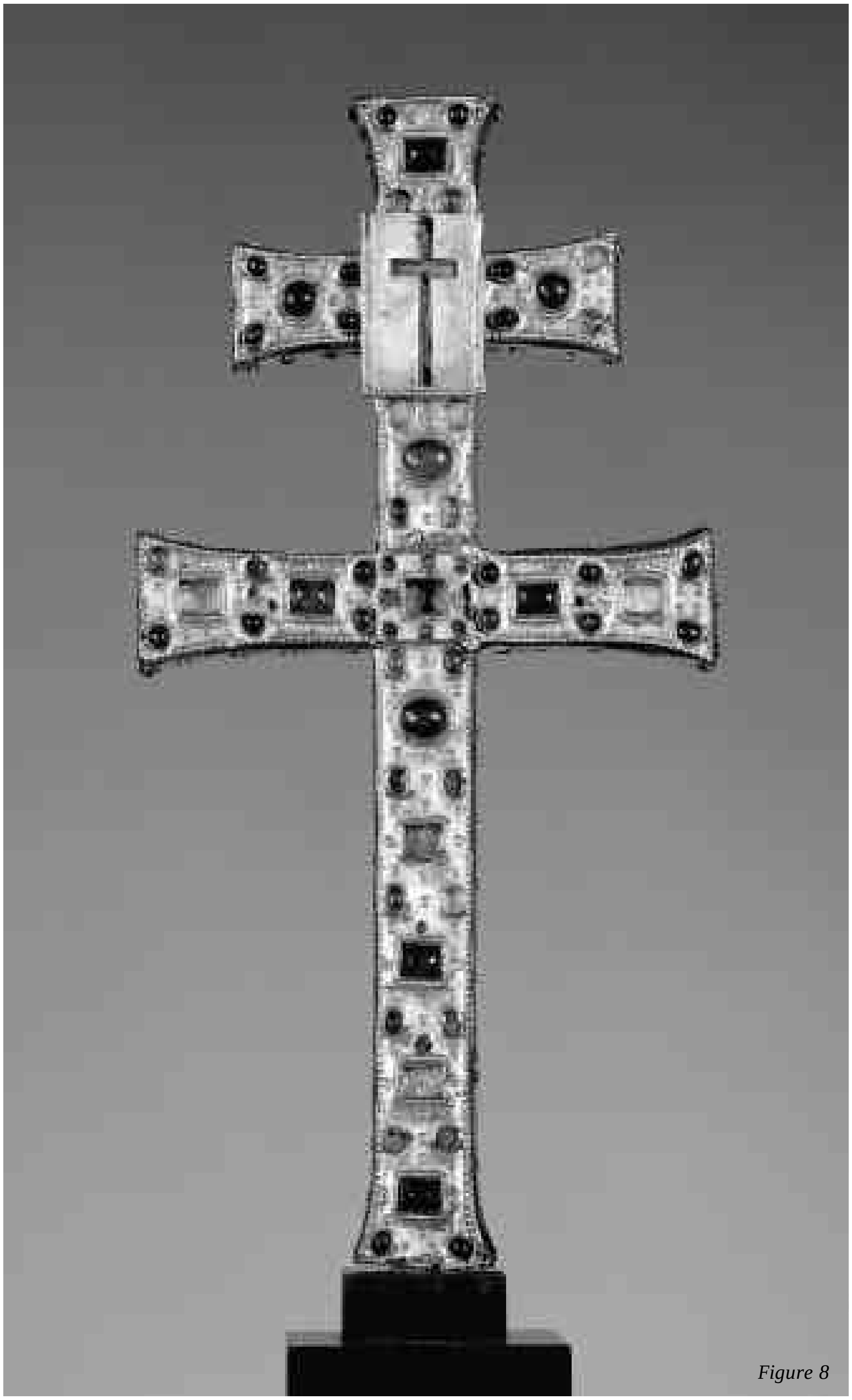

Figure 8

Figure 8. Reliquary Cross, *French (Limoges?), ca. 1180. Gilded silver, rock crystal, glass, and faience inlays, wood core, h. 29.8 cm. Purchase, The Cloisters Collection and Mme. Robert Gras Gift, in memory of Dr. Robert Gras, 2002 (2002.18).*

Figure 9

amounts of solder utilized, and the inconsistent use of heat in securing the soldered elements, are indicative of medieval fabrication.

Of the sixty-two inlays originally on the obverse and the thirteen on the reverse, several are now missing. Those remaining are made of glass (*Figures 9, 10*), apart from three shaped from rock crystal that covered the relics on the principal face, and a single turquoise-colored inlay in the upper crossing on the reverse (*Figure 11*). During examination of the cross it became apparent that the silver cladding had been removed and remounted several times, either to remove relics or to stabilize the wooden armature. It is quite possible that these interventions resulted in the loss of those inlays now missing, although the majority shows no sign of having been dislodged from their settings.

During the medieval period, the use of glass as a substitute for precious and semiprecious stones became prevalent as the demand for more affordable church furnishings grew. In the twelfth century, Eraclius explains how to mold "gems" out of Roman glass in his *De Coloribus et Artibus Romanorum*, while Theophilus prescribes the reuse of Roman glass tesserae to create enamels. Analyses undertaken in conjunction with the exhibition "Enamels of Limoges, 1100-1350," presented at the Metropolitan Museum and the Louvre, indeed confirm that the compositions of enamels used in the Limousin during the twelfth century and into the first quarter of the thirteenth century correspond closely to known compositions of Roman glass. These results were obtained primarily through energy-dispersive X-ray spectrometry analyses of polished samples, while open-architecture X-ray diffraction (XRD) and XRF were utilized to identify colorants and opacifiers, and to provide qualitative elemental data for enamels that could not be sampled. On the other hand, no research had been undertaken specifically on glass inlays found on enameled objects from Limoges. Using XRF and open-architecture XRD, both non-destructive techniques, it was established that the compositions of the glass elements on the cross, as well as the nature of the colorants and opacifiers present, are consistent with both Roman glass and Romanesque enamels.

Of particular interest is the large, blue, slightly domed cabochon in the upper crossing on the reverse. Microscopic examination revealed a granular, milky white, glassy substrate overlaid with a translucent turquoise glaze. XRD analyses indicate that the white core material is primarily quartz, while lead oxide was detected in the glaze, where it presumably functioned as a flux. XRF analysis established the colorant of the glaze to be copper-based, and confirmed the presence of lead, along with calcium and sodium, the latter as well present as a fluxing agent. While it was not possible to examine the blue inlay in section, the evidence strongly suggests it is faience. Although this material is generally associated with ancient Egypt, its manufacture continued in the Near East, and faience was still being produced there when the reliquary cross was made. Given the position of Limoges as a major stop on trade and pilgrimage routes, it can be expected that

Figure 9. Reverse of reliquary cross (Figure 8). Detail with "faceted" glass inlay. A relic would have been visible through a perforation in the silver sheet.

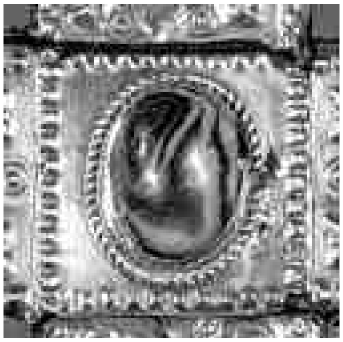

Figure 10

Figure 10. Reverse of reliquary cross (Figure 8). Detail with glass cabochon marbled to resemble chalcedony.

Pete Dandridge is Conservator in the Sherman Fairchild Center, where he began working in 1979, after receiving his M.A. in conservation and a certificate of advanced studies from the Cooperstown Graduate Program in the Conservation of Historic and Artistic Works of Art. Since 1984, he has had primary responsibility for the ivories, enamels, and metalwork in the collections of the Department of Medieval Art and The Cloisters. He has published and lectured on Byzantine ivories, the gilding of silver in Byzantium, Early Christian and Migration Period jewelry, Limoges enamels, and related subjects.

local artists had access to exotic materials, although faience has thus far not been reported in this context.

The material and technological investigations carried out in the Fairchild Center, and the stylistic and historical analysis by Barbara Boehm, Curator in the Department of Medieval Art, were used to build an increasingly strong case supporting the authenticity of the cross, including the glass inlays. This interdisciplinary exchange allowed the work to be dated more precisely and to be placed within a more specific art historical context, and demonstrated that the reliquary cross would fill a lacuna in the Museum's collection of Romanesque liturgical silver. Although little is known about the organization of workshops in medieval Limoges, and in particular whether masters worked exclusively in precious metals, the quality of execution of the objects in the "Enamels of Limoges" exhibition suggests that "goldsmiths" might have worked in copper as well as gold or silver. For every floret or other motif executed in silver, one finds a corresponding detail worked into thin copper sheet, engraved or punched into the thick copper plaques used for champlevé enamelwork, or depicted in enamel. Indeed, the *Ambazac Chasse* from the treasury of Grandmont, dated between 1180 and 1190, provides some of the more striking parallels to the cross, even though it is executed entirely in gilded copper (*Figure 12*). All of the decorative metalworking techniques present on the cross can also be found on the chasse, along with the extensive use of glass and faience. Seen in this context, the reliquary cross constitutes an important link between objects of embossed silver that are embellished with "gems", and those executed in copper and decorated with champlevé enamel, studded with settings for cabochons, or engraved with ornamental patterns.

The Reliquary Cross *is featured in "Recent Acquisitions, A Selection: 2001-2002,"* MMA Bulletin *60 (Fall, 2002) p. 12, and is currently on display at The Cloisters.*

Figure 11

Figure 11. Reverse of reliquary cross (Figure 8). Detail with faience inlay in the upper crossing.

Figure 12

Figure 12. Ambazac Chasse, *French, Limoges, from the abbey of Grandmont, 1180-1190. Gilded copper, semi-precious stone, glass, and faience inlays, wood core, h. 58.6 cm. Church of St. Anthony, Ambazac (Haute-Vienne). (Image courtesy of Inventaire général-SPADEM)*

The Sherman Fairchild Center for Objects Conservation at The Cloisters

After four years of planning and construction, the *Sherman Fairchild Center for Objects Conservation at The Cloisters* opened officially on May 6, 2002. This new facility was made possible by the continued generous support of the Sherman Fairchild Foundation, and provides, for the first time, an on-site, modern laboratory specifically designed for the examination and treatment of objects.

The Center houses workstations, office space, and a library that comfortably accommodate four to five staff members and interns. The facility was designed for convenience and flexibility, with the health and safety of the conservators in mind. Its location in proximity to The Cloisters' freight elevator, and the installation of large doorways without saddles, assure a safe route for objects brought to the laboratory. Three worktables are mounted on wheels and can be adjusted in height so that a comfortable working position is easily obtained. Each workstation has been equipped with an air exhaust trunk that can be positioned as desired, while the ambient air quality is monitored and controlled from the central computer system in the Museum's main building on Fifth Avenue. An additional station was designed specifically for the treatment of stained glass, and features a large, built-in, light table and special drawer units for storing complete and disassembled panels.

Overhead fixtures with daylight-balanced fluorescent tubes, suitable for inpainting, supplement the western light that enters through three large lunette windows. Additional spotlights that match the color temperature of the lighting used in the galleries allow conservators to check how the objects will appear when on display. All fixtures are equipped with polycarbonate shields that filter out damaging ultraviolet radiation, while interior storm windows serve the same purpose for sunlight. These windows are also designed to filter out infrared light and thus reduce heat gain, to create a thermal barrier that prevents condensation on the metal and glass of the outer frames, and to serve as an auxiliary security measure.

Scientific instrumentation at the Center now includes a 200 kV X-ray radiography system that enables the successful imaging of most objects at The Cloisters. The new Zeiss Axioplan is a modular transmitted-light and incident-light polarizing microscope, configured with ultraviolet-light filter cubes and a digital camera connected directly to a dedicated computer. A Zeiss Stemi SV-11 stereomicroscope, several computers, and a Nikon digital camera were acquired as part of a program for digital imaging separately funded by the Booth-Ferris Foundation.

The wall color, cabinetry, and cork flooring in the facility's design are based on the original Cloisters offices as they appeared when first constructed in the nineteen-thirties. Modern materials, such as laboratory-grade, stained oak cabinets with counter tops made of *Fireslate*, a fireproof and solvent-resistant artificial material that resembles stone, were employed to create this appearance, and as a result the new, state-of-the-art conservation center blends perfectly with its historic surroundings.

Figure 13

Figure 13. The Sherman Fairchild Center for Objects Conservation at The Cloisters.

The Sherman Fairchild Center for Objects Conservation at The Cloisters was designed by David Flory of Einhorn Yaffee Prescott Architecture and Engineering, P.C. Michele D. Marincola, Conservator, selected appropriate finishes, oversaw the project, and guided the design to insure its suitability for the modern practice of conservation. The Center was built by the Westerman Construction Company, Inc., with Richard David as construction manager. Systems for air control were designed by John Altieri Associates. Ann Kaufman Webster, the Museum's Manager of Architecture and Historic Preservation, was responsible for the complicated task of coordinating the construction of these modern facilities in a landmark building.

The Visual Examination of a Roman Portrait Head

At The Metropolitan Museum of Art a long-term project is currently underway for the renovation of the Greek and Roman Galleries. The resulting increase in gallery space will include a large courtyard, currently used as a public restaurant, to house classical sculpture. During the past several years, in anticipation of this expansion, the Museum acquired several ancient marbles.

As part of the scrutiny to which possible acquisitions are subjected, it is the responsibility of the Museum's conservation departments to evaluate evidence relating to the physical condition of a work of art, and from this to reconstruct its history. In the case of ancient marble statuary, the archaeological environment, as well as circumstances of display in antiquity and modern times, are important considerations. Human intervention, in the form of damages, wear, and in instances of reuse, repair, and restoration, can also be seen. An experienced eye is one of the conservator's most valuable resources, and frequently a significant amount of information can be gleaned from careful examination under magnification and ultraviolet light.

A recently acquired Imperial Roman portrait of a woman (*Figure 14*) can be used to illustrate just how the understanding of an object's current condition can aid in piecing together its history. As a starting point, evidence of original manufacture is considered. The consistent color and grain of the stone throughout the sculpture indicate that the head was carved from a single block of marble. The carving style on the front of the portrait differs from that on the reverse, where there is less detail, tool marks are still visible, and the marble surface is not as highly polished (*Figure 15*).

Whereas many examples of ancient Greek marble statuary survive with some original pigments, our knowledge of Roman polychromy is far more limited. With the aid of a stereomicroscope, several areas on the portrait can be noted where traces of color survived under soil accretions. The hair, the lips, and the irises and eyelids were all painted in shades of red or orange, while a series of regularly spaced lines, also red, denoted the eyelashes and eyebrows (*Figure 16*). The pupils were painted black.

Figure 14

Figure 14. Portrait Head of a Woman, *Roman, ca. 40–20 B.C. Marble, h. 26 cm. Purchase, Philodoroi Gifts, 2000 (2000.38).*

Visual examination of the head could be profitably supplemented with instrumental analysis. X-ray fluorescence, energy-dispersive X-ray spectrometry (EDS), and polarized light microscopy were used to indentify the pigments present. The reds and oranges are an iron oxide in the form of red ochre. The black is probably carbon, a conclusion based on the absence of any elements that could be detected using EDS. Traces of lead found in the areas of the lips and eyes suggest the use of red lead. It is possible that the extant pigments do not reflect the portrait's final appearance; red ochre, which is by far the most common pigment, could have been used in a ground layer onto which other pigments were applied.

Historic sources suggest that this type of portrait was most likely to have been displayed in an indoor environment, as a funerary monument or in another private context.

Kendra E. Roth is Associate Conservator at the Sherman Fairchild Center, where she has worked on the Greek and Roman installation project since 1997. After completing internships at the Philadelphia Museum of Art and the Conservation Analytical Laboratories (Smithsonian Institution), she received her M.S. in art conservation from the State University of New York at Buffalo in 1996, and a postgraduate Certificate in Advanced Training from the Straus Center for Conservation at Harvard University in 1997. She has worked on archaeological excavations at Kaman Kalehoyuk and Kerkenes Dağ.

This could explain the absence of ancient weathering that might have occurred had the piece been exposed to the elements for an extended period. The presence of tool marks on an otherwise finished work can signal that the stone was reworked at a later date, but in this case examination of the reverse of the head under ultraviolet light demonstrated that the surface appears as it did when the stone was buried. While in theory the marble could have been recut in ancient times, it is more likely that the unfinished quality of the work is an indication that the portrait was placed in a niche and not meant to be viewed in the round, a circumstance typical of Roman portraiture of this kind. The portrait was probably neglected or vandalized when the building in which it was housed fell into disuse, and damage to the nose and cheeks occurred before or at that time. When viewed under ultraviolet light, the fluorescence both in the damaged areas and on original, undamaged surfaces that were directly exposed to the burial environment is comparable.

Spread over much of the surface of the stone are root marks, which establish that the portrait was buried in fertile soil for an extended period (*Figure 15*). Although they look very similar, root marks are not actual roots, but mineral pseudomorphs that form as a result of contact between a plant and the stone. Calcium in the marble is leached by a caustic biological compound and over time is redeposited, replicating the form of the original root. Other compact mineral accretions are also scattered over the surface, especially along the woman's right jaw. While the authenticity of this portrait was never in doubt, it may be noted that fraudulently applied surface deposits tend to be more loosely adhered and less compact.

The portrait, once excavated, was cleaned of burial soil and, presumably, on this occasion much of the original polychromy was unintentionally removed. At some point, a sizable piece of stone was cut from the back of the head and reattached (*Figure 17*). That this alteration was made in the relatively recent past is clear, because under ultraviolet illumination the sawn edges around the join do not fluoresce, unlike the exterior surfaces that were in direct contact with soil. The color and grain of the marble, as noted earlier, are consistent throughout, and both pieces have similar accretions and root marks. Other evidence demonstrating that this is neither a replacement nor a repair necessitated by accidental damage lies in the fact that the fragment's join surface is fractionally smaller than the opposing break surface on the head. The loss of material corresponds to the kerf of the blade used to saw the stone. No indications for the use of a modern or ancient pin were visible in radiographs, suggesting that the section was reattached with an adhesive, although under ultraviolet illumination none was observed around the join. A possible motive for such an alteration remains obscure, but when the back of the head was sawn off the resultant fragment was retained, presumably under the assumption that it would be rejoined at a later time.

Although emphasis is often placed on high-tech methods of study, the value of careful visual examination should not be underestimated. This deceptively straightforward process, when combined with a solid knowledge of ancient techniques, the properties of the material in question, and an experienced eye, are invaluable in understanding the physical condition of ancient stone statuary.

The Portrait Head of a Woman *was featured in "Recent Acquisitions, A Selection: 2000–2001,"* MMA Bulletin *59 (Fall, 2001) p. 12, and is currently on display in the Museum's temporary Roman sculpture gallery.*

Figure 15

Figure 15. Detail of portrait head (Figure 14), illustrating different degrees of finish on the front, side, and rear surfaces. A root mark is noted with an arrow.

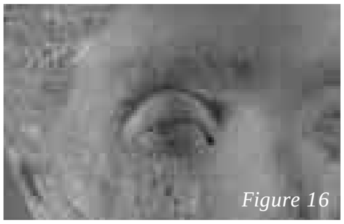

Figure 16

Figure 16. Detail of portrait head (Figure 14), with traces of paint delineating the pupil, eyelashes, and eyebrow of the proper right eye.

Figure 17

Figure 17. Reverse of portrait head (Figure 14), with reattached fragment.

A Recumbent Lion of the Old Kingdom

Recently the Museum's Department of Egyptian Art had the rare opportunity to acquire a pink granite statue of monumental proportions: a recumbent lion (*Figure 18*) excavated by Edouard Naville in 1891 at Herakleopolis Magna, some seventy miles south of Cairo. The work was carried out under the auspices of the Egyptian Exploration Fund, and in recognition of its financial support of the Fund's undertakings, the lion came into the collection of the McLean Museum and Art Gallery in Greenock, Scotland. Since the lion was found in the remains of a Ramesside temple, it was dated to that period and its muzzle and ears were restored on the basis of New Kingdom prototypes.

Displayed out-of-doors at various times over the last century, the lion, when first viewed by Dorothea Arnold and Marsha Hill of the Museum's Department of Egyptian Art, was covered with a thick, green layer of biological growth and dark patches of dirt and soot. In spite of this, the curators recognized in the powerful figure a quality previously overlooked by earlier generations of Egyptologists: a sense of suspended vitality, seen particularly in the spare indications of its musculature, considered to be more typical of Old Kingdom statuary. Features such as the halo-like face mane and the high position of the tail supported this new attribution.

The lion was brought to the Sherman Fairchild Center for examination, and with the permission of its owner, was cleaned in its entirety before it was actually accessioned. This is an unusual measure, but an accurate evaluation of the stone's condition was essential. Granite is low in porosity and high in mechanical strength, and while generally resistant to deterioration, under certain conditions it can sustain damage in the form of granular disintegration and spalling. As the surface of the statue was cleaned, lichens were found growing beneath dislodged crystal grains, but the underlying cause of this deterioration was recognized as the saline desert environment in which the stone had been buried. Fortunately, the lion was found to be in stable condition and, in addition to subtle stylistic details that further confirmed the new dating, areas with original surface polish were revealed.

The cleaning was carried out by Ann Heywood, Associate Conservator, using distilled water and an anionic detergent (*Figure 19*). After the Museum acquired the lion, Heywood worked with the Egyptian Department and with Molding Studio Supervisor Ron Street to prepare it for display. The nineteenth century restorations of the muzzle and ears, fixed with iron rods and a friable, gray, fill material, were removed. Using several Old Kingdom prototypes, Street created a modern replacement for the muzzle, first preparing a model in a non-drying, oil-based clay and then casting it in plaster. A silicon rubber mold taken from the plaster model was used to cast a hollow shell of epoxy mixed with strands of fiberglass (*Figure 20*). The new muzzle is supported by a brass rod inserted into the channel drilled for the original iron mount, with a bulked adhesive to fill gaps around the outer edges of the join. The replacement of the ears awaits future discoveries that might provide suitable models.

The Recumbent Lion *is featured in "Recent Acquisitions, A Selection: 2001-2002,"* MMA Bulletin *60 (Fall, 2002) p. 6. This notable acquisition is currently guarding the Temple of Dendur, and with the opening of the newly reinstalled Egyptian Galleries in Fall 2003, it will be placed in front of the tomb of Perneb, another monumental work of the Old Kingdom.*

Figure 18. Recumbent Lion, *Egyptian, from Ihnasya el-Medina (Herakleopolis Magna), Old Kingdom, 4th–mid 5th Dynasty (ca. 2575–2450 B.C.). Granite, l. 120.1 cm. Purchase, Anonymous Gift, in honor of Annette de la Renta; Annette de la Renta Gift; and Anne and John V. Hansen Egyptian Purchase Fund, 2000 (2000.485).*

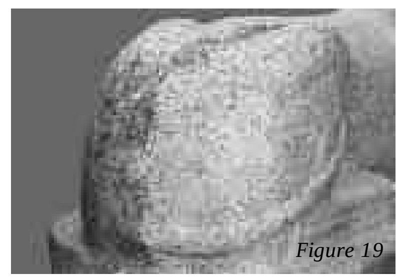

Figure 19. Detail of granite lion (Figure 18), showing its surface partially cleaned of soot and biological growth.

Figure 20. Ron Street, Molding Studio Supervisor, fitting the epoxy replacement muzzle.

The Sherman Fairchild Center for Objects Conservation provides for the preservation and technological study of ten curatorial collections in the Metropolitan Museum. The activities of the Center encompass the conservation of archaeological objects, sculpture, furniture, ceramics, and glass, as well as investigative research related to mechanisms of deterioration, preservation treatments, and historical technology. More than thirty professional conservators, scientists, and installers conduct their work in modern facilities located in the Henry R. Kravis Wing. These laboratories are equipped for a variety of analytical and investigative methods, including electron microscopy, X-ray spectrometry, X-ray diffraction, Fourier transform infrared spectroscopy, ultraviolet-fluorescence microscopy, metallography, and radiography. Areas of research that are of special long-term interest to the Center's staff include the development and testing of methods for the treatment of deteriorated stone sculpture, the development of safe and effective methods for the monitoring and control of biodeterioration, and the evolution of metalworking technologies throughout the world.

Staff members also serve as adjunct faculty at the nearby Conservation Center of New York University, and the Fairchild Center is the site of seminars and internships for students from this and other graduate programs. Postgraduate fellowships are awarded annually to conservators and other researchers from institutions in the United States and abroad.

Visit The Metropolitan Museum of Art at www.metmuseum.org

The Portrait Head of a Woman *currently on display in the Museum's temporary Roman sculpture gallery* *(see page 9).*

Starting in December 2002,

met objectives

will be accessible on the Metropolitan Museum's website.

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