

NEW MOUNTING SYSTEMS PROVIDE MOBILITY FOR TWO ANCIENT OBJECTS AT THE MUSEUM OF FINE ARTS, BOSTON

SUSANNE GÄNSICKE, PAMELA HATCHFIELD, JEAN LOUIS
LACHEVRE, CRAIG URAM, AND DANTE VALLANCE

ABSTRACT—This article describes the recently completed remounting, transport, and reinstallation of two large-scale Egyptian objects at the Museum of Fine Arts, Boston: the exquisitely painted cedar coffin panels of Djehutynakht and the monolithic granodiorite sculpture of Lady Sennuwy. Both artifacts exhibit structural instabilities, their surfaces are severely compromised by degradation, and their considerable weight added to the challenge of handling. Information on previous treatments and installation methods was limited, further complicating the process of developing appropriate conservation and mounting measures. Custom-designed armatures were developed to stabilize the structural integrity of the objects and facilitate their move within the building, allow secure reinstallation for a temporary exhibition, and provide future mobility. The precarious nature of both objects dictated that handling had to be kept to a minimum. Decision-making processes, conservation and mounting measures, and armature design are discussed in detail.

TITRE—De nouveaux systèmes de montage permettent une mobilité accrue pour deux objets anciens au *Museum of Fine Arts, Boston*. **RÉSUMÉ**—Cet article décrit le montage, le transport, et la réinstallation récemment complétée de deux objets égyptiens à grande échelle au *Museum of Fine Arts, Boston* (Musée des beaux-arts de Boston): les panneaux extraordinairement peints du cercueil en cèdre de Djehutynakht et la sculpture monolithique en granodiorite de Dame Sennuwy. Ces deux objets souffrent d'instabilité structurelle, leur surface est sévèrement compromise à cause de la dégradation, et leur poids considérable rend la manipulation difficile. L'information était limitée sur leur traitement antérieur et leur méthode d'installation, ce qui compliquait davantage le processus de développement d'un traitement et support approprié. Des armatures faites sur mesure ont été développées pour stabiliser l'intégrité structurelle des objets et pour faciliter leur mouvement dans le musée, permettant ainsi une réinstallation sûre pour une exposition temporaire et la future mobilité de ces objets. La condition critique de ces deux objets dicte que la manipulation doit être

gardée à un minimum. Les processus décisionnels, les étapes de montage et de conservation, ainsi que la conception de l'armature sont discutés en détail.

TITULO—Nuevos sistemas de montaje dan nueva movilidad a dos objetos antiguos en el *Museum of Fine Arts, Boston*. **RESUMEN**—Este artículo describe el remontaje terminado recientemente, transporte y reinstalación de dos objetos egipcios de gran escala en el *Museum of Fine Arts, Boston* (Museo de Bellas Artes de Boston): los paneles exquisitamente pintados del ataúd de cedro de Djehutynakht y la escultura monolítica de granodiorita de Lady Sennuwy. Ambos objetos presentaban inestabilidad estructural, sus superficies estaban severamente comprometidas por la degradación y su peso considerable añadió dificultad al reto de la movilización. La información sobre tratamientos previos y métodos de instalación era limitada, lo cual complicaba aún más el proceso de desarrollar medidas de conservación y montaje apropiadas. Armazones diseñadas especialmente para este proyecto fueron desarrolladas para estabilizar la integridad estructural de los objetos y facilitar su transporte dentro del edificio, permitiendo una reinstalación segura para una exposición temporal, y proveer movilidad futura. La naturaleza precaria de ambos objetos determinaba que ambos objetos debían ser manipulados lo menos posible. Se discuten detalladamente los procesos de toma de decisiones, medidas de conservación y montaje, y el diseño de la armazón.

TÍTULO—Novos sistemas de montagem providenciam uma nova mobilidade a dois objetos antigos do *Museum of Fine Arts, Boston*. **RESUMO**—Este artigo descreve a recentemente remontagem, transporte e reinstalação de dois objetos egípcios de grande escala do *Museum of Fine Arts, Boston* (Museu de Artes Decorativas em Boston): os painéis de cedro pintados de forma requintada pertencentes ao caixão de Djehutynakht e a escultura monolítica de Lady Sennuwy em granodiorito. Ambos os artefactos exibiam instabilidades estruturais, as suas superfícies encontravam-se severamente comprometidas pela degradação, e o seu considerável peso adicionou

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desafios em termos de manuseamento. A informação acerca de tratamentos anteriores e métodos de instalação era limitada complicando, posteriormente, o processo de desenvolvimento de medidas apropriadas de conservação e de montagem. Armaduras feitas por medida foram desenvolvidas para estabilizar a integridade estrutural dos objetos e para facilitar a sua movimentação pelo edifício, para permitir uma reinstalação segura numa exposição temporária, e para providenciar uma futura mobilidade. A natureza precária de ambos os objetos ditou que o manuseamento deveria ser mínimo. O processo decisório, medidas de conservação e de montagem, e o desenho da armadura são discutidos em detalhe.

1. INTRODUCTION

At the Museum of Fine Arts, Boston (MFA), ongoing gallery renovations and collection relocations into other parts of the building as part of the Master Site Plan have recently resulted in a number of large-scale conservation and installation projects. Sculpture and funerary objects of the Egyptian collection, often installed many decades ago, were sometimes found cemented into walls, secured by other masonry supports, or sealed into immobile and inaccessible display cases.

Reinstallation of objects allows for in-depth study of their excavation, exhibition, and treatment histories, as well as provides the opportunity to reassess their multifaceted installation needs and develop optimal display systems. Additionally, the objects' long-term preservation benefits from placement in new, climate-controlled spaces or in state-of-the-art exhibition cases that allow the maintenance of highly controlled microclimates.

Although many objects were permanently installed in the galleries after excavation, temporary traveling exhibitions, some with international venues, demand increasing mobility of ancient objects. The risks and benefits of such frequent moves, however, must be evaluated carefully because the condition of many of these objects may be compromised by thousands of years of exposure and deterioration, coupled with the potential damage caused by handling.

This article focuses on two large-scale objects recently remounted and relocated for the exhibition "The Secrets of Tomb 10A: Egypt 2000 BC": the cedar coffin panels of Djehutynakht (fig. 1) and the granodiorite sculpture of Lady Sennuwy (fig. 2).

The preparations for this exhibition lasted close to 5 years because many objects had never been treated or previously exhibited, although others had received some stabilization in the field or previous treatment at the MFA (Gänsicke et al. 2003). The extensive conservation work was generously funded by the Institute of Museum and Library Services.

Both objects derive from the Harvard University–Museum of Fine Arts Expedition (fig. 3). In 1913, excavations at Deir el-Bersha in Middle Egypt exposed tombs of local rulers and elites of the second millennium BC. Located in limestone cliffs on the east bank of the Nile, small rock-cut offering chapels are present above deep tomb shafts, leading to burial chambers within the bedrock. Tomb 10A, the burial of the local ruler Djehutynakht and his wife, although plundered in Roman times, retained an unparalleled collection of artifacts, including two sets of magnificently painted pairs of coffins, which were found one nestled inside the other, one pair for the nomarch and one pair for his wife (fig. 4) (Freed et al. 2009).

The monolithic granodiorite sculpture of a seated female figure, Lady Sennuwy, was discovered in the tumulus burial of a local ruler at Kerma in the northern Sudan (fig. 5) (Reisner 1923). Sennuwy and her husband Hepdjefa, a provincial Egyptian governor, were contemporaries of Djehutynakht, and their tomb is located in Middle Egypt not far from Deir el-Bersha. In antiquity, however, their tomb statues were plundered and brought to Nubia to be included in the burial of a local ruler (Kendall 1997). In the exhibition, the sculpture was again reunited with Egyptian material of the period in which it was created.

The two objects are of significant weight, and their surfaces are severely compromised by degradation. The cedar coffin panels of Djehutynakht are constructed from massive wooden timbers joined by mechanical means. Their surfaces are covered with fragile and partially unstable polychromy. The panels had to be manipulated with minimal surface handling. The monolithic granodiorite sculpture of Lady Sennuwy is severely cracked throughout because of deterioration of mineral veins within the rock. Although the resulting fragmented rock remains interlocked, handling during remounting had to avoid point pressure to the surface to avoid dislocation of fragments. In both instances, outdated display systems did not provide adequate structural support and could not be used for relocation within

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Fig. 1. The interior side panel from the outer coffin of Djehutynakht is decorated with delicate images of funerary items and magical inscriptions offering guidance and protection for the journey into the afterlife. Middle Kingdom, late Dynasty 11, early Dynasty, 2010–1961 BC, cedar, 115 × 262 × 16 cm. MFA 20.1823. © 2011 Museum of Fine Arts, Boston.



Fig. 2. Statue of Lady Sennuwy. Egyptian, Middle Kingdom, Dynasty 12, reign of Senwosret I, 1971–1926 BC, granodiorite, 172 × 1,16.5 × 47 cm. Harvard University–Museum of Fine Arts Expedition. MFA 14.720. © 2011 Museum of Fine Arts, Boston.

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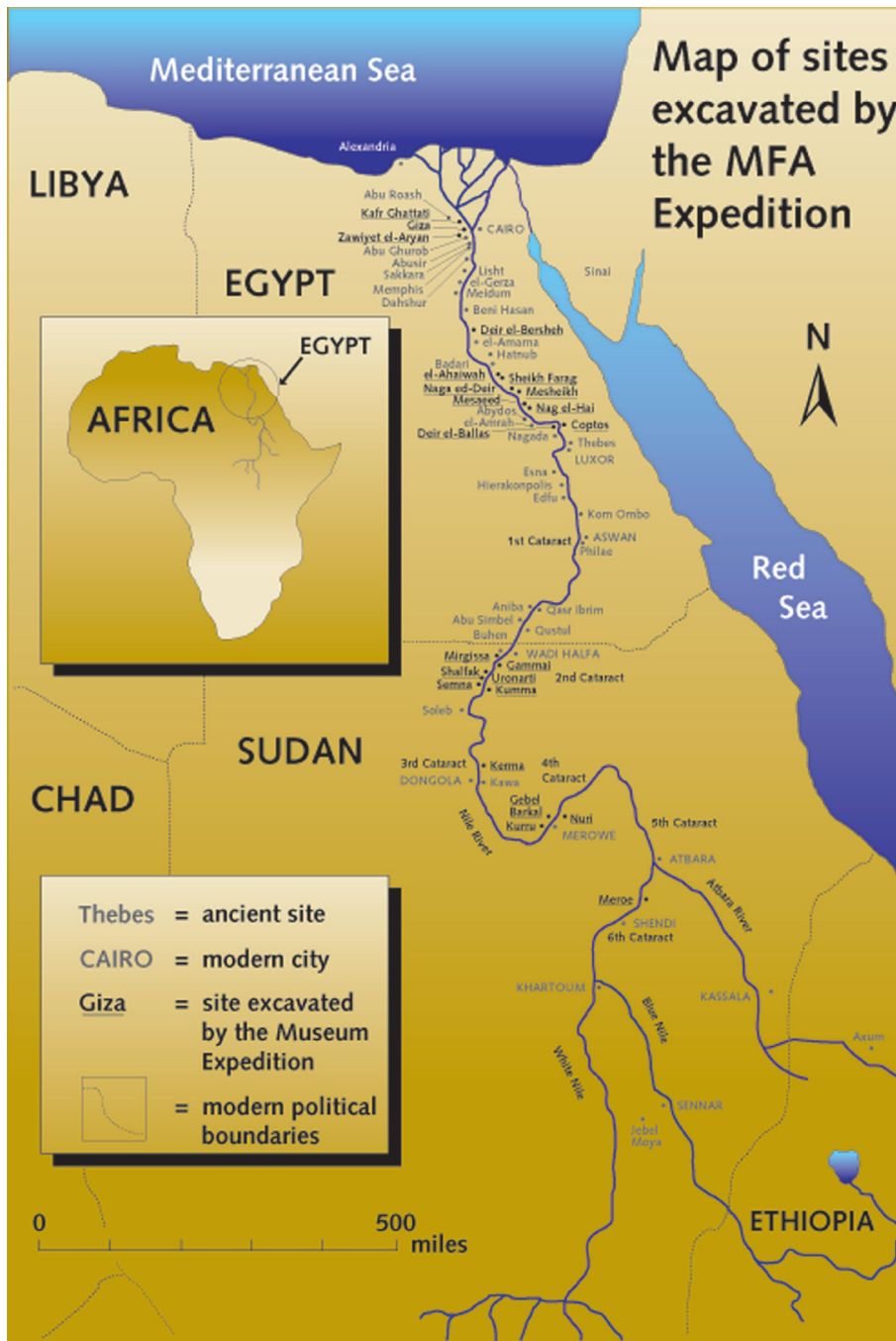


Fig. 3. Map with the excavation sites of the Harvard University–Museum of Fine Arts Expedition, including Deir el-Bersha in Middle Egypt and Kerma near the Third Cataract in the northern Sudan. Courtesy of Peter Der Manuelian, 2012.

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Fig. 4. A view into the burial chamber of Tomb 10A during excavation shows the coffins of Djehutynakht and his wife in situ. Harvard University–Museum of Fine Arts Expedition, 1915. © 2011 Museum of Fine Arts, Boston, negative EGYC6810.

the museum. Limited information was available on previous treatments and installation methods (fig. 6), which complicated the formulation of new conservation and mounting approaches.

Preparation for the work on each object required the collaboration of conservators, designers, mount-makers, and conservation and structural engineers. In addition, contractors with diverse technical expertise were hired, including masonry technology, metal fabrication, specialized engineering skills, and gamma-radiography.

The new custom-designed armatures were developed to fulfill two functions. First, they had to secure the structural integrity of the objects to aid in their long-term preservation. Second, they had to facilitate their move within the building, allow secure reinstallation for a temporary exhibition, and provide future mobility into galleries for permanent display. Both functions had to be fulfilled with minimal handling and surface contact with the objects.

2. THE BERSHA COFFIN PANELS

2.1 CONDITION OF THE PANELS AND PREVIOUS INSTALLATION

The panels are constructed of massive cedar boards, which were mechanically assembled in antiquity using carpenters' joinery techniques, including butt joints, wooden dowels, and copper ribbon ties (as used in ancient boatbuilding). The surfaces are carved and decorated with colorful pigments over a thin ground layer on the interior and partially also on the exterior (Terrace 1967). Large areas are covered with minute, incised inscriptions, some directly into the wood; others are carved into a layer of plaster. The largest coffins were disassembled at the time of excavation for removal from the tomb.

The panels sustained damage from ancient tomb robbers as well as post-excavation losses and abrasions when the panels were removed from the tomb shaft. Additionally water stains incurred after a fire

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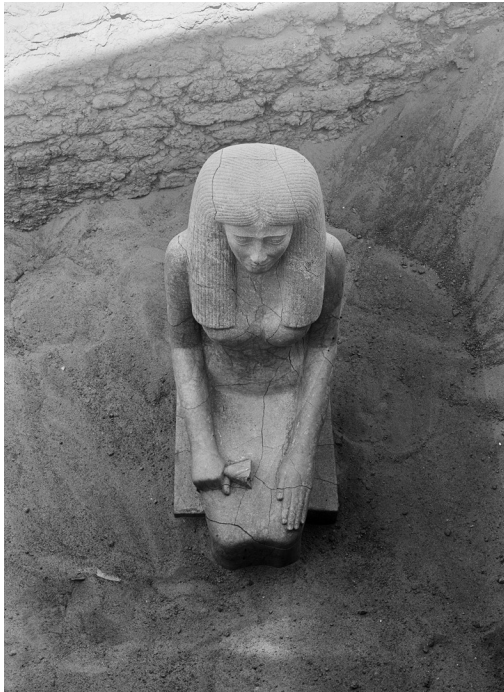


Fig. 5. The sculpture of Lady Sennuwy in situ during excavation at Kerma, Sudan. Harvard University–Museum of Fine Arts Expedition, 1913. MFA 14.720. © 2011 Museum of Fine Arts, Boston, negative EGYC5832.

broke out during trans-Atlantic shipping by boat (Gänsicke et al. 2003, 184–5). The painted decoration had been treated in the field and after arrival at the museum with a variety of natural and synthetic adhesives to secure the flaking and powdering surface (Hatchfield and Ryan 2011). The wood was splintered in areas damaged in antiquity when the tomb was vandalized. The wood was friable and easily abraded at points of contact with mounts. Vibration from movement and handling could dislodge painted decoration. The extremely delicate condition of the panels required that not only handling but also points of contact for mounts be severely restricted to minimize damage.

The coffin panels had been displayed since the 1960s in individual wooden and Plexiglas cases (fig. 7), in which they were shown as single panels to allow viewing of the beautiful interior decoration. In these cases, from which the panels had to be moved, U-shaped wooden cradles supported the

bottom edges, and the upper edges were secured with brass mounts. A substructure of wood and steel supported the weight of the panels on the interior of the base.

The weight of the panels ranged from 110 to 140 kg (250–300 lb.) for the head and foot ends to 320 kg (700 lb.) for the side panels and more than 450 kg (1,000 lb.) for the lid and base. The goal of remounting was to create a more stable system that would better support the extreme weight of the panels and would allow their transport and installation in two different exhibition spaces within the museum with a minimal amount of handling. The new support system needed to be unobtrusive in appearance and versatile enough in function to allow movement with various types of equipment, such as dollies, forklifts, and gantries, in anticipation of future design and installation requirements.

2.2 DESIGN OF NEW MOUNTING SYSTEMS AND TRANSFER INTO NEW FRAMES

Initially, temporary frames were to be used to transfer the panels from the exhibition case into new exhibition frames. However, a prototype fabricated from perforated steel tube stock required excessive handling of the objects and restricted access to surfaces for conservation treatment; therefore, this plan was quickly abandoned. Instead, the original wooden exhibition cases were used as transfer frames, with the use of roller lifts, to position the coffin panels for treatment and to facilitate transfer of the panels into new mounts. New powder-coated steel frames were designed by staff conservation engineers and conservators in collaboration with exhibition designers and were manufactured by a local metal fabricator. During the transfer from the old display case, the panels were freed at the upper edge by removing the brass mounts but remained balanced on the old U-shaped wooden supports.

Next, the underside of the panel was protected with high-density polyethylene (HDPE). With the use of blocking and a pry bar, the panels were jacked up to allow placement of the winch and rail system to facilitate the move into the new frames. This custom-made apparatus was fabricated from 1.3-cm (½-in.) HDPE, ratchet winches, and 5-cm (2-in.) nylon webbing straps, with neoprene cushioning positioned on top of the glide to elevate the strap.

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Fig. 6. The sculpture of Lady Sennuwy is moved at an unknown date within the museum by sliding over cylindrical wooden rollers, a method used since antiquity. © 2011 Museum of Fine Arts, Boston.

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Fig. 7. A previous installation of the panels at the museum includes the outdated exhibition cases from which the panels had to be removed. © 2011 Museum of Fine Arts, Boston.

The panels were moved slowly from the old cases directly into the new metal frame, using HDPE as a gliding support (fig. 8).

Clips used to connect the panels to the frame (fig. 9a) were manufactured in-house. Because of the extreme fragility of the surfaces, two types of steel clips were designed to minimize pressure on the surface of the panels. The first type uses a steel pad, which pivots on the rounded end of a 1.9-cm ($\frac{3}{4}$ -in.) bolt, allowing compensation for irregular surfaces at the top and bottom surfaces of the panel (fig. 9b). The ends of the pad are adjusted with set screws to conform to the front and back surfaces of the panel. The second type of clip was fabricated from steel to support the bottom edge of the coffin at two points of contact (fig. 9c). In all cases, points of contact were carefully selected and limited to stable surfaces (fig. 10). The clip interiors were lined with HDPE and polyethylene foam (Volara), and visible surfaces of the clips were painted to match the panels after mounting was completed (fig. 11).

2.3 INSTALLATION AND MOBILITY

The largest and most elaborate set of polychromed cedar coffin panels belonging to the nomarch Djehutynakht formed the centerpiece of the exhibition. These panels were to be exhibited disassembled as four separate side panels. Once securely mounted into the new frames, each frame was fitted with pneumatic tires secured to the frame using perforated steel tubing and “driven” to the exhibition gallery (fig. 12). In the gallery, each panel was lifted into the exhibition case with a forklift fitted with customized grips at the tips of the forks. For installation of the coffin panels, lid, and base, custom-designed rigging gear was fabricated, including custom-made slings and special lifting arbors (stiffeners) fabricated with structural steel tubing to balance loads and relieve pressure on loose joinery.

The same system was used to move the large lid, which had been previously displayed vertically. It was moved, like the panels, into a new steel frame. However, the lid and the coffin base were required

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Fig. 8. The coffin panels are moved from the old exhibition cases into their new frames, which were placed adjacent to the cases. A custom-made HDPE rail system with attached winch grabbed the preexisting U-shaped wooden cradles at the base of the panels and allowed a controlled and slow movement into the new frames.

to lie flat during the temporary exhibition. The steel frame, fabricated for the lid, was used to lower it into the horizontal position using a gantry (fig. 13). The frame was removed for the temporary exhibition.

An adjustable tilt rack was fabricated from perforated steel tubing for the coffin base to facilitate movement through narrow doorways. The tilt rack could be positioned at a 45° angle for transport through the building and flat to prepare for movement of the coffin base into position with the gantry. It remained in a horizontal position for the exhibition. After finishing work was completed on the exteriors of the display cases, only the interior surface of the powder-coated steel frames remained visible, giving the illusion that the panels almost float within the exhibition cases (fig. 14).

To accommodate display in a smaller permanent gallery after the special exhibition, the coffin's four side panels and lid were exhibited upright against gallery walls. The steel frames once again served as moving and display units. After the temporary exhibition, the frame was once again attached to the lid to facilitate lifting back into the vertical position with the gantry.

3. LADY SENNUWY

3.1 CONDITION OF THE SCULPTURE

The larger than life-size sculpture of Lady Sennuwy was carved from a monolithic block of granodiorite that weighs approximately 1,100 kg (2400 lb.). On excavation, it exhibited a dense network of cracks, which had occasionally been interpreted as having been caused by fire. It also suffered breakage into four large fragments during transport in the field and was repaired in the Sudan (Reisner 1914). During the 1970s small fragments became dislocated from the object while on display, and a total of 35 L (9¼ gal.) of 20% polyvinyl acetate in toluene was injected while the figure remained installed in the galleries.

For the purpose of investigating the cause of cracking, the stone was sampled along crack lines, and polished cross-sections were prepared for examination in the scanning electron microscope. The cracking appears to have been caused by oxidation of iron-rich minerals, such as pyrite. The volume increase, which these microscopic particles

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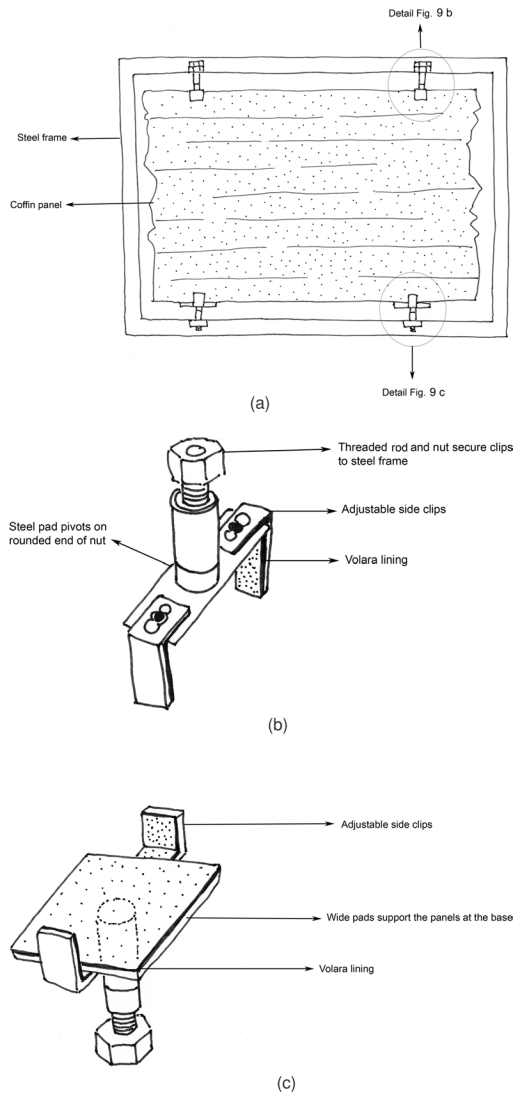


Fig. 9. Schematic drawing (a) of the steel frame and attached clips (not to scale); the custom-made clips, which suspend the coffin panels within the larger frame, have a high degree of adjustability. Schematic drawing (b) of the clips that hold the coffin panels at the upper edge (not to scale). An example (c) of the clips supporting the panels at the bottom edge (not to scale); basic adjustability is similar to that of the clips in figure 9a. Depending on the shape of the bottom edge, which was highly uneven in some areas due to damage, the pad's shape had to be adjusted.



Fig. 10. In areas where the bottom edges of the coffin panels are narrow and uneven due to damage, bottom clips are T-shaped, with a narrow vertical member and a larger horizontal bar at the top.

experience during oxidation, leads to pressure, which causes the formation of fissures throughout the rock. This process has been identified on other Egyptian sculptures of granodiorite (Klemm and Klemm 1985; Klemm et al. 1988).

3.2 EXAMINATION OF EXISTING MOUNTING SYSTEM

The sculpture had been displayed for decades at the MFA in the large sculpture gallery on the second floor. It was situated on a gray-painted block, but no information existed about previous installation methods and materials, although archival images showed it being moved into the gallery on wooden rollers.

To visualize the composition of the existing base and any anchors that might connect the sculpture to it, a company specializing in industrial testing conducted gamma-radiography in the galleries to both long sides of the base. The sculpture itself could not be penetrated because of the exposure time required for such examination.

The radiographs showed two 3.2-cm (1¼-in.) hollow steel pipes imbedded into the walls of the base, connecting the side walls for reinforcement, and the presence of a number of rebar rods embedded into the walls. Further exploration included drilling through the concrete base to establish wall thickness. A boroscope was used to view the interior of the base and the exposed underside of the sculpture.

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Fig. 11. A detail of the new clips that hold the upper edge of the panel, after final adjustment and painting.



Fig. 12. The coffin lid, mounted into its new frame, can now be transported easily through the museum with the use of a temporary pneumatic travel wheel system.

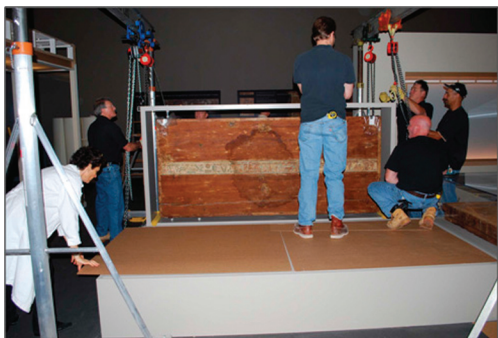


Fig. 13. The steel frame also serves as a means to allow lowering of the lid by use of a gantry into horizontal position for display.



Fig. 14. The coffin of Djehutynakht as displayed in the exhibition "Secrets of Tomb 10A: Egypt 2000 BC." The four free-hanging panels can be viewed from front and back. In the center, the lid and coffin base are shown flat. © 2011 Museum of Fine Arts, Boston.

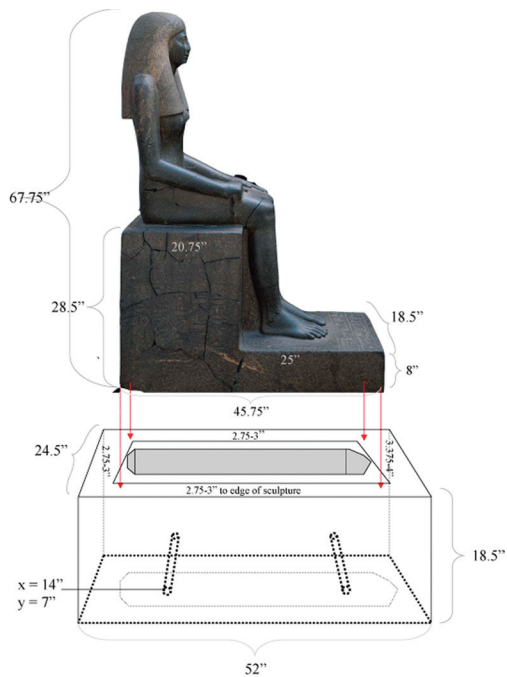


Fig. 15. Schematic drawing of the old concrete base with two horizontal reinforcement bars.

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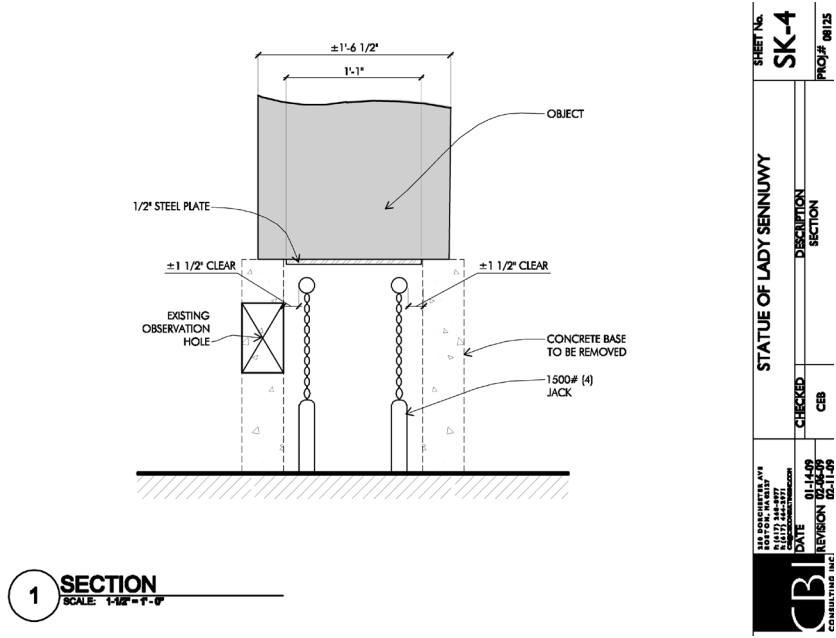


Fig. 16. Drawing for the support system that was to be assembled inside the old hollow base to lend support during transfer onto a new steel frame. Courtesy of CBI Consulting, 2010.

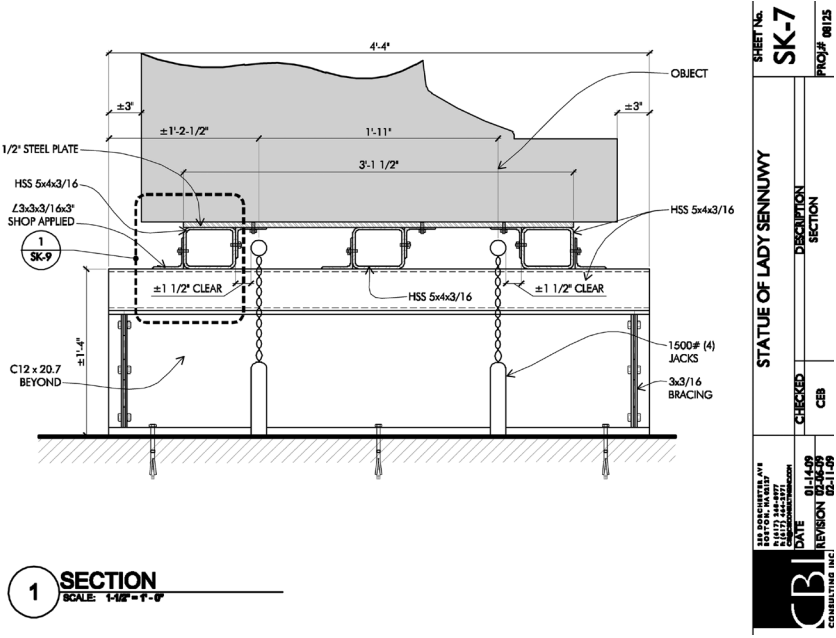


Fig. 17. Drawing of the long side of the sculpture, showing the steel pallet, lower steel frame, and interior, temporary support system. Courtesy of CBI Consulting, 2010.

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Fig. 18. The temporary support, as designed in figures 16 and 17, has been inserted into the hollow concrete base through holes cut into its long sides. The sculpture is strapped to a gantry for added support during the ensuing mechanical removal of the concrete base. © 2011 Museum of Fine Arts, Boston.

The examinations revealed that the sculpture was supported by a rectangular, hollow, concrete base with side walls 13 cm (5 in.) thick, a front wall 13 to 15 cm (5 to 6 in.) thick, and a back wall 10 cm (4 in.) thick, whereas the upper surface of the base was, in fact, open underneath the sculpture (fig. 15). While the rationale for this unusual design was unclear, it was apparent that the sculpture could not be moved freely onto a new movable support because its structural stability was precarious due to the large cracks in its center and the extensive network of fissures throughout.

3.3 DESIGN OF NEW MOUNTING SYSTEM

Both the new base and the transfer process were designed with the primary goal of minimizing vibrations to the sculpture. Any pressure to the statue's surface, which might result in dislocation of loose fragments, had to be avoided. Therefore, the object could not be touched in the process, which would have exerted pressure on the sculpture. Measures had to be devised to substitute the existing base in situ for a new one. An engineering company the MFA has used for more than 15 years to aid in the design of



Fig. 19. The concrete base has been removed, and the sculpture remains supported by the temporary support system. The gantry continues to provide additional security during this transitional moment before installation of the steel armature. © 2011 Museum of Fine Arts, Boston.

large-scale metal armatures was contracted to assist in planning the different stages of removing the sculpture from the concrete base and transferring it onto a new movable armature.

The design of the project included (1) cutting openings into the concrete base to allow insertion of a temporary support system into the hollow interior of the existing base (fig. 16), (2) removal of the current concrete base, and (3) assembly of a new, two-part steel frame (fig. 17) around the temporary support, which, in the end, was to be removed. The newly designed steel armature consisted of two parts: (1) a structural steel pallet made of a 1.3-cm ($\frac{1}{2}$ -in.) plate with two cross layers of $13 \times 10 \times 2$ -cm ($5 \times 4 \times \frac{1}{16}$ -in.) tubing and (2) lower steel frame, which can be secured to the floor.

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Fig. 20. The upper part of the metal base, the pallet, is assembled underneath the sculpture, whereas the temporary support remains in place. The pallet is supported by additional screw jacks at its outer edges until the second part of the steel frame is installed.

3.4 PREPARATIONS FOR TRANSFER ONTO THE NEW STEEL FRAME

Openings that measured approximately 48 × 30 cm (19 × 12 in.) were cut by a mason into both long sides of the concrete walls. Holes were drilled to create perforated lines in the concrete, which could be further broken up by chiseling. The size of these openings was determined by engineers' calculations to guarantee that the compromised old cement base retained sufficient strength to support the weight of the sculpture. Once both sides were opened, access was provided to assess the interior of the base and the underside of the sculpture.

Next, a temporary modular wooden support system was constructed to fit through the narrow openings of the concrete base. The blocking system was assembled inside the base, beneath the sculpture. Two pairs of miniature leveling jacks with swiveling heads were locked into position, two in front and two in back, on top of the blocking system. This support

would bear the weight of the sculpture during the short period in which the figure was freed of the former concrete block and before insertion of the new steel armature.

To conform to the uneven surface of the underside of the sculpture, a custom-made support was prepared. First, two 2.5-cm (1-in.) holes were drilled into the back of the base to receive two 1.6-cm ($\frac{5}{8}$ -in.) steel rods, which ran from the back to a third opening cut into the front of the base, measuring 5 × 41 cm (2 × 16 in.), at the front of the base. Second, a steel plate 1.3 cm ($\frac{1}{2}$ in.) thick was surfaced with Sikadur epoxy paste, which was covered with an isolating layer of polyethylene sheeting. Third, the steel plate with its bed of epoxy was fed through the slot at the front and rode along the two steel rods until it was positioned above the jacks. The jacks were raised to lift the steel plate off the steel rods. The rods were removed. The jacks were raised further until the separating layer and the epoxy made contact with the

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Fig. 21. The lower steel frame has been inserted underneath the pallet. The new steel armature is fully assembled, and the temporary internal support system has been removed. Additional external wooden braces are applied to the sculpture for the move to the exhibition gallery.

bottom of the statue. The jacks were raised a little further to allow the epoxy to take the shape of the bottom of the statue and fill any voids. The epoxy was then allowed to cure.

The residues of the old polyvinyl acetate adhesive, which had collected because of seepage and cold flow between the underside of the sculpture and the top of the concrete, were softened with poultices of acetone on cotton and were removed. The statue was ready for removal from the concrete base.

3.5 TRANSFER AND REMOUNTING

After these initial steps of stabilization, design, and manufacture of a new base, the sculpture had to be separated from the hollow concrete block. The surface was wrapped with high-density polyethylene

stretch wrap, and the sculpture was additionally strapped and connected to a gantry to keep it steady and stable (fig. 18).

The four leveling jacks beneath the sculpture were turned slowly and evenly to raise the statue only a few millimeters off the base so that the jacks and the temporary blocking system were taking the full weight of the statue. The mason cut the base in half with a core drill, and two high-capacity screw jacks were used to pry apart the two halves of the concrete base. With the aid of a forklift, the two halves of the concrete base were removed from beneath the sculpture. For a short moment, the sculpture remained supported by the temporary system alone, with the additional bracing described (fig. 19).

At this point, the new upper steel pallet bypassed the screw jacks and was attached to holes that were predrilled into the steel plate beneath the sculpture (fig. 20). Next, the larger steel base was inserted underneath and connected to the pallet. In the end, the wooden blocks and jacks were removed, the sculpture stood solidly on the ground on its new support system, and the safety harness was removed from the gantry.

The fully assembled armature bears the weight and fully supports the underside of the sculpture (fig. 21). For transportation, the lower part of the new base can be disassembled. The statue can then be lowered on the upper pallet and moved closer to the floor with the aid of a motorized pallet jack. This method keeps the center of gravity low. The elevated metal base is used for display and can be clad and skirted to accommodate design requirements (fig. 22). External clips were added to the pallet to prevent sideways movement of the sculpture.

4. CONCLUSION

The process of remounting the two objects provided a rich opportunity to review the ancient and post-excavation history of both objects and the various types of damage that occurred as the result of burial, transport, and handling. The new mounting systems of both objects now serve as a means of transport and provide a secure base and display apparatus. The new mounts offer a certain degree of mobility within the building, facilitate installation in different settings, and increase flexibility for future design. In particular, the frames fabricated for the coffin panels

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CRAIG URAM, AND DANTE VALLANCE



Fig. 22. The steel frame was designed to serve as a transport and display unit. The sculpture is shown as displayed in the temporary exhibition in 2009 with the new skirted base. © 2011 Museum of Fine Arts, Boston.

allow flexibility of movement and new vertical and horizontal display options.

Providing access to the collection and facilitating new interpretation in a new environment remain constant challenges to conservators, engineers, and designers. Limitations are sometimes imposed by the building envelope, which dictates moving routes on the basis of elevator capacity, door openings, and floor loading issues. Loading issues, in particular, dictate the choice of additional equipment used to move heavy sculptures because machinery adds significant amounts of weight and may render certain gallery spaces inadequate for some larger objects.

Other limitations may be imposed by choices of design, which determine height and footprint of bases and sizes of cases. The collaboration of conservators, other museum professionals, and contractors engaged in providing access to and long-term preservation of art objects requires open dialogue and ingenuity. Best practices for mountmaking today include approaches that provide the greatest amount of safety

but also remain flexible, with a minimal amount of intervention.

The changing landscape of today's exhibition environment presents increasing challenges to standard techniques for the installation of works of art. Technological advances in many fields are applied to the needs of artwork, especially related to the mounting, handling, and installation of monumental artifacts (March et al. 2006; Tsu et al. 2008). As a result, conservation staff increasingly uses technology from diverse fields or draws on the expertise of outside specialists.

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REFERENCES

- Freed, R., L. M. Berman, D. M. Doxey, and N. S. Picardo. 2009. *The secrets of Tomb 10A: Egypt 2000 BC*. Boston: MFA Publications.
- Gänsicke, S., P. Hatchfield, A. Hykin, M. Svoboda, and C. M. Tsu. 2003. The Ancient Egyptian Collection at the MFA, Boston, Part 1: A Review of Treatments in the Field and their Consequences; and The Ancient Egyptian Collection at the MFA, Boston, Part 2: A Review of Former Treatments at the MFA and their Consequences. *Journal of the American Institute for Conservation* 42: 167–236.
- Hatchfield, P., and G. Ryan. 2011. Selected case studies in the treatment and preservation of Middle Kingdom polychromed wood in the collections of the Museum of Fine Arts, Boston. In *Decorated surfaces on ancient Egyptian objects: technology, deterioration and conservation*, eds. J. Dawson, C. Rozeik, and M. M. Wright. 2011. London: Archetype Publications in association with the Fitzwilliam Museum and Icon Archaeology Group. 78–86.
- Kendall, T. 1997. *Kerma and the Kingdom of Kush 2500–1500 B.C.* Washington, D.C.: National Museum of African Art, Smithsonian Institution, 24–27.
- Klemm, D. D., and R. Klemm. 1985. Verwitterungerscheinungen an altägyptischen Bau- und Kunstdenkmälern aus Stein. Natursteinkonservierung, Internationales Kolloquium, München, 21–22. Mai 1984, Bayerisches Landesamt für Denkmalpflege. *Arbeitsheft* 31: 176–180.
- Klemm, D. D., R. Klemm, and J. Lipinska, 1988. Der fortschreitende Zerfall einer Statue Thutmosis III aus Quarzdiiorite. In *Akten des Vierten Internationalen Ägyptologen Kongresses München 1985 (2)*, ed. S. Schoske. Hamburg: Helmut Buske Verlag, 65–72, pl. 2–4.
- March, T., L. Bruno, H. Kariya, W. Ng, E. Pearlstein, and H. Stockman. 2006. Conservation of Assyrian reliefs at the Brooklyn Museum. *AIC Objects Specialty Group Postprints* 13: 143–167.
- Reisner, G. A. 1914. *Expedition diaries, Kerma*, 106.
- Reisner, G. A. 1923. Excavation at Kerma, parts 4–5. *Harvard African Studies* 6: 34–5, 509, pl. 31, fig. 343.
- Terrace, E. 1967. *Egyptian paintings of the Middle Kingdom: the tomb of Djehuty-nekht*. New York: George Braziller.
- Tsu, M. C., P. Hatchfield, C. Kondoleon, and C. Barnes. 2008. Where theory meets practice: the conservation and presentation of a Roman floor mosaic at the Museum of Fine Arts, Boston. In *Lessons learned: reflecting on the theory and practice of mosaic conservation: proceedings of the 9th ICCM conference, Hammamet, Tunisia, November 29–December 3, 2005*, eds. A. Ben Abed, M. Demas, and R. Thomas. Los Angeles: The Getty Conservation Institute, 108–117.

CONSULTANTS

Gamma-radiography:

Baker Testing Services Inc.
22 Reservoir Park Dr., Unit 1
Rockland, MA 02370-1062
781-871-4458

Engineering:

CBI Consulting Inc.
250 Dorchester Ave.
Boston, MA 02127
617-268-8977
Fax: 617-464-2971

Mason:

Mike DeBlasio
PO Box 1121
Littleton, MA 01460
978-486-3307

Metal manufacturer:

Quincy Steel & Welding Co.
444 Sea St.
Quincy, MA 02169-2705
617-472-1180

SUSANNE GÄNSICKE, PAMELA HATCHFIELD, JEAN LOUIS LACHEVRE,
CRAIG URAM, AND DANTE VALLANCE

SOURCES OF MATERIALS

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Somerville, MA 02145
617-623-3010
Fax: 617-629-2585
www.rogersfoamcorp.com

AUTHOR BIOGRAPHIES

SUSANNE GÄNSICKE is conservator of objects at MFA, where she has been employed since 1990. She holds a certificate in archaeological conservation from the Römisch-Germanisches Zentralmuseum, Mainz, Germany, served an advanced-level internship at the MFA, and served an Andrew W. Mellon Fellowship in Objects Conservation at the Metropolitan Museum of Art. She worked as site conservator at the New York University–Apis Expedition at Memphis, Egypt, at the MFA Expedition at Gebel Barkal, Karima, Sudan, and has most recently taught in the Field School for Architectural Conservators, American Research Center in Egypt, Luxor, 2008–2010. Her research interests include the examination and treatment of Egyptian and Nubian material culture, ancient metalwork and technology, and issues of site preservation. Address: Objects Conservation, Conservation and Collections Management, Museum of Fine Arts, Boston, 465 Huntington Ave., Boston, MA 02115; sgansicke@mfa.org

PAMELA HATCHFIELD is the Robert P. and Carol T. Henderson Head of Objects Conservation at the MFA. She received graduate degrees in conservation and art history from the Institute of Fine Arts at New York University. Pam is a fellow of the American Academy in Rome, the American Institute for Conservation of Historic and Artistic Works (AIC), and the International Institute for Conservation and serves as vice president of AIC. She has taught, lectured, and published on various subjects, including the museum environment, the examination and treatment of archaeological wood and stone, and the conservation of contemporary art, and authored the book *Pollutants in the Museum Environment: Practical Strategies for Problem Solving in Design, Exhibition and Storage*, with support from an AIC Kress Publications Fellowship. Address: as for Gänsicke; phatchfield@mfa.org

JEAN LOUIS LACHEVRE has worked at the MFA for 37 years as conservation assistant (1973–1986), assistant conservator (1987–1998), and conservation engineer (1998–present). He specializes in reconstruction and remounting of midsize and over-life size sculptures and is also responsible for overseeing

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large object handling, installations (including independent suspension and earthquake mounts), storage, and special crate design for large-scale and heavy objects for long-distance travel. Jean Louis served as a field conservator at excavation at Deir el-Bersha, Sakkara, and the Giza Plateau in Egypt, where he surveyed and documented tomb architecture. He is a graduate of the School of the Museum of Fine Arts, Boston. Address: as for Gänsicke; jlachevre@mfa.org

CRAIG URAM is a conservator of objects at the Smithsonian Institution's National Museum of African American History and Culture. Craig has been an assistant objects conservator at the MFA, a Sherman Fairchild Assistant Objects Conservator at the Isabella Stewart Gardner Museum, and a Samuel H. Kress advanced-level intern at the Straus Center for Conservation at Harvard Art Museums. Craig also held a Kress fellowship at Historic New England and internships at the Carnegie Museum of Art, the Hirshhorn Museum and Sculpture Garden, and the MFA Boston's Objects Lab. Craig holds a masters of arts and a certificate in advanced studies in art conservation from Buffalo State College. Address: 3400 Pennsy Dr., Hyattsville, MD 20785; uramc@si.edu

DANTE VALLANCE is collections engineer at the MFA, where he has worked for 5 years. His responsibilities include design and fabrication of mounts for large-scale objects and design and execution of systems for the packing, rigging, moving, and storage of large-scale and exceptionally fragile objects, sculptures, and paintings. He served as the team leader for the packing of 36,000 objects, which had to be relocated for the Museum's Master Site Plan-related building activities. Before working at the MFA, he worked for 15 years in the commercial art services industry as a fine art rigger, packer, and installer. He also served as a special projects manager for Artex Fine Art Services. Address: as for Gänsicke; dvallance@mfa.org

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