Examination, Technical Analysis, and Treatment of His Works in the Charles Bregler Collection of the Pennsylvania Academy of the Fine Arts

MARK F. BOCKRATH, VIRGINIA N. NAUDÉ, & DEBBIE HESS NORRIS

ABSTRACT—In 1985, the Pennsylvania Academy of the Fine Arts acquired Charles Bregler's Thomas Eakins Collection, the largest private holding of Eakins material, including drawings, photographs, oil sketches, and sculpture, most of which had been cataloged and restored by Bregler. Preparation of the collection for an exhibition at the Pennsylvania Academy in 1991 provided a unique opportunity to study Eakins's works in a variety of media. Mark F. Bockrath examines Eakins's working methods and painting materials in his oil sketches and finished paintings. Treatment of the sketches to undo Bregler's restorations is discussed. Virginia N. Naudé explains how the relief sculptures, *Spinning* and *Knitting*, were identified as the originals of all known plaster and bronze versions. Technical analysis of the sculpture by microscopy and x-radiographs show them to be complex assemblages in which the artist manipulated three-dimensional components into shallow relief. Conservation treatment of the reliefs to remove restorations is addressed. Debbie Hess Norris describes the 500 photographs by Eakins and his circle in the collection as representing a wide variety of processes and formats. Eakins's intentions as a photographer and the range of his subject matter are presented. Treatment work to stabilize the photographs is described as it addressed the various deterioration mechanisms of different processes.

1 INTRODUCTION

In 1985, the Pennsylvania Academy of the Fine Arts acquired Charles Bregler's Thomas Eakins Collection from Bregler's widow, Mary Bregler. The collection, including anatomical, perspective, and compositional drawings, photographs and negatives, sculpture, oil sketches, artists' materials, and other memorabilia, was the largest private holding of Eakins material. Charles Bregler (1864–1958) was a student of Thomas Eakins (1844–1916) who befriended Eakins's widow Susan Macdowell Eakins (1851–1938) late in life, helping her to identify, catalog, and preserve the numerous artworks, correspondence, and personal effects left in Eakins's studio after his death in 1916. Mrs. Eakins also entrusted the conservation of the collection to Bregler, and both Bregler and Mrs. Eakins made efforts to promote Eakins and to place his works in major collections. After the death of Susan Eakins in 1938, the remaining materials became the property of Bregler and then of his widow. Mary Bregler kept the material virtually inaccessible to scholars until it was acquired by the Pennsylvania Academy.

Following acquisition of the collection, the Pennsylvania Academy undertook a major project of researching, cataloging, and performing conservation treatments on the objects in the Bregler Collection in preparation for an exhibition entitled *Thomas Eakins Rediscovered: At Home, at School, at Work*, on view at the museum from September 26, 1991 to April 5, 1992. The following sections, by three separate authors, describe Eakins's techniques as revealed by scientific analysis of his paintings, relief sculptures, and photographs and the conservation treatments of these works.

2 THE PAINTINGS OF THOMAS EAKINS

MARK F. BOCKRATH

The paintings by Thomas Eakins in the Bregler Collection include 20 oil sketches of landscapes and figures and one finished portrait. They are listed in table 1.

TABLE 1 EAKINS PAINTINGS FROM THE BREGLER COLLECTION STUDIED AT PENNSYLVANIA ACADEMY OF THE FINE ARTS

2.1 EAKINS’S TECHNIQUE

Eakins used sketches to make compositional decisions and to note the true color and tone of elements in the design. All of the sketches in the collection were rapidly executed in a wet-into-wet technique. Eakins intended them as working sketches, and he often reused them several times, overpainting old sketches with new ones and scraping down unimportant sketches so that they could be repainted. He often painted several adjoining sketches on the same support.

The x-radiograph of Eakins's sketch *That's a New Game Down in 'Frisco*, a study for an illustration to a Bret Harte story, shows an earlier sketch when inverted. Eakins clearly painted this sketch over a study for the watercolor *Young Girl Meditating* (1877,
Eakins frequently transferred designs from his preparatory sketches to larger paintings by means of a grid of squares. This “ squaring up” process involved incising a grid pattern into all or part of the sketch with a pencil or stylus and then enlarging the design onto a canvas by use of a corresponding grid of larger squares. The direct correspondence of such a pattern from a sketch to a much larger painting can be seen by comparing the Pennsylvania Academy’s The Cello Player (1896) to its preparatory sketch at the Hecksher Museum. The lines appear in the same parts of the figure and background in both works.

Eakins also frequently made oil sketches for his watercolors, a practice that is quite unusual when compared to that of his contemporaries. His finely rendered watercolors were planned with spontaneous oil sketches that were often larger than the watercolors for which they were made. The Bregler Collection contains another oil sketch for the watercolor Young Girl Meditating. The figure in the oil sketch is gridded for transfer in 1 in squares, while the more complex passages such as the face and hands are divided into a ¼ in grid.

Eakins’s oil sketches were done on a variety of supports, including paper, plain weave and twill fabrics, cardboard, and wood panels. The wood panels, which are of poplar or pine, were used by Eakins in the late 1870s and early 1880s (Siegl 1978), 73. Fabric and cardboard supports appear throughout the artist’s career.

Ground colors vary from sketch to sketch. The sketches on fabric all bear commercially prepared lead white oil grounds. A thin brown imprimatura was brushed onto the grounds of several sketches on canvas and on primed paper. Paintings done on wooden supports bore dark tan or brown grounds. The brown ground on the sketch Spinning: Study, which is on panel, was applied with a knife. The grounds on this sketch and on Eakins’s studies of nudes on cardboard are loosely applied with unmixed colors, suggesting that the artist used palette scrapings.

Eakins’s technique in his finished paintings was quite consistent throughout his career in terms of his materials. While the sketches were painted on a variety of supports, Eakins’s larger works are invariably on stretched and primed fabrics with smooth lead white oil grounds. Plain weave fabrics were used more often than twill weaves.

Eakins’s method of beginning a portrait is evident in such unfinished works as Mrs. Joseph Drexel (1900, Hirshhorn Museum and Sculpture Garden) and Portrait of a Young Man (ca 1902, Philadelphia Museum of Art), in which broad washes of local color are used to establish the major forms and tonal relationships in the composition. Eakins often sketched in the design with thin lines of dark paint or graphite. Graphite lines are visible in Portrait of a Young Man, loosely indicating placement of forms under the washes of paint (Siegl 1978), 146. Eakins sometimes used thin imprimaturas of tan, red-brown, or warm gray paint to tone the white ground as an initial step in his painting process.

After the initial laying-in of the work, Eakins’s method involved the application of multiple layers of paint, slowly building form and perfecting details. Eakins occasionally used painting knives in addition to brushes to indicate roughly textured highlights.

Eakins typically required many sittings for his portraits. Harrison Morris, former director of the Pennsylvania Academy of the Fine Arts who posed for Eakins in 1896, recalled: “I stood day after day while he patiently transcribed me—for his method stuck closely to the object” (quoted in Hendricks 1974, 220). Numerous sitters mentioned the difficulty of posing for Eakins for long periods with little rest, since Eakins seemed to lose track of time while painting.

### 2.2 EAKINS’S MATERIALS

Eakins’s palette in the oil sketches was examined by optical microscopy of crushed pigment samples. Thirty-two samples from 14 paintings were examined. The pigments identified by microscopy include lead white, vermilion, red, yellow and brown earth colors, ultramarine blue, viridian green, chrome yellow, organic red lake, and bone black. This palette of generally stable pigments, with its emphasis on warm colors, was described by Eakins’s student and friend Samuel Murray: “Eakins used mostly all earth colors ... across the top of the palette reading from right to left would be the following colors: cadmium yellow and orange, vermilion, light red, burnt sienna, permanent blue, Van Dyke brown, and black. Eakins didn't use bitumen, which is fatal to pictures meant to last; and he never used lakes or fancy colors that run and are not permanent—those synthetic, made from anilines” (quoted in McHenry 1946, 102–3). Chrome yellow, rather than cadmium yellow, was found in the Pennsylvania Academy’s samples. Chrome yellow was also identified on paint samples taken by conservator Theodor Siegl from Eakins’s paintings at the Philadelphia Museum of Art (Siegl).

Eakins produced about 30 watercolors in the 1870s and 1880s. His watercolor box, with its numerous colors, brushes, and other painting implements, forms one of the most interesting parts of the Bregler Collection’s wealth of artists’ materials. The box is labeled by Bregler as Thomas Eakins’s, although it may also have been used by Susan Eakins, herself a capable watercolorist. The set of colors began with a small mahogany box from the English manufacturer Waring and Dimes. Other colors were added by Eakins from paints made by Winsor & Newton, Newman, and MacPherson’s Tints by Ackerman, all English manufacturers. A few stray colors in porcelain tubes are also present, as well as sable and camel hair brushes with both wooden and goose quill handles, a tablet of sumi ink, and glass dishes for mixing colors. The colors are all hard cakes, most in the form of embossed tablets bearing the names of the color and the manufacturer.

Colors were identified from their labels or by microscopy of crushed samples when the cakes were illegible. The pigments identified include aureolin, Naples yellow, gamboge, a barium- strontium chromate yellow, red, yellow and brown earth colors,
Van Dyke brown, Cologne earth, vermilion, organic red lake, a possible violet lake, emerald green, cobalt blue, indigo, Prussian blue, zinc white, bone black, and lamp black. Some colors were pre-mixed tints consisting of several pigments. All colors were in use during the period of Eakins's watercolor production.

2.3 BREGLER'S RESTORATIONS

The conservation of the paintings in the collection provided an opportunity to study Charles Bregler's methods and intentions as a restorer. In an effort to authenticate the oil sketches, Bregler wrote inscriptions on labels on the reverse of mounted sketches, supplying anecdotal information about the sketch's origin, identifying the painting for which it was made, and declaring his ownership of it. In many instances, Bregler incised inscriptions into the paint of the sketch itself to further ensure its identification.

Bregler's labels sometimes discuss his restoration methods and his reason for choosing certain types of mounts. On the reverse of Girl with a Fan (ca. 1906–08), which was painted on fabric and mounted by Bregler to plywood with an attached stretcher using a lead white adhesive, is an inscription reading: "Rebacked on a wood panel/ by a special process/ making the painting safe for all time/ by Charles Bregler." Bregler often attempted to turn sketches into more finished paintings by painting out areas of exposed ground at the edges with thick oil paint in order to continue the sky or foreground to the edges of a rectangular format in landscapes. He also repainted backgrounds in figure studies.

Bregler cut some sketches to make a composition of his own choice before repainting. He also incised outlines around some sketches as a guide for framing. To the missing corners of two sketches he added paper pieces similar in texture to Eakins's original paper supports.

Bregler also cut wooden panels bearing multiple studies into individual compositions. Landscape Study: The Fairman Rogers Four-in-Hand was once on the reverse of a panel that bore a Delaware River scene and two studies of heads. Bregler split the panel in half with a saw whose marks can be plainly seen on the reverse of the panels. The landscape and head studies were then separated into individual panels as well. Panels split in this fashion were then mounted by Bregler with lead white and nails to Masonite. Bregler mounted other small sketches on fabric and paper to cardboard with animal skin glue.

2.4 CONSERVATION TREATMENT

Conservation treatment of the paintings involved undoing most of Bregler's restorations. Yellowed natural resin varnishes and overpaint were removed wherever possible. After cleaning all paintings were revarnished with Acryloid B-72 and inpainted with Bocour Magna colors. Bregler's additions of paper to the corners of the mounts were revealed by overpaint removal but were left in place to add structural support. They were not inpainted, however, so as to clearly identify them as nonoriginal.

In instances where wooden panels were split by their nailed mounts or appeared unstable, the Masonite, nails, and lead white adhesive were removed mechanically before the panels were repaired. If the mounted panel appeared stable, no treatment was performed.

Delaware Riverscape from Glouster (ca. 1881) had been cut by Bregler into two pieces. As discussed previously, these scenes were among several sketches once belonging to the same panel. The left side had been acquired by the Pennsylvania Academy in 1966. After the right side was acquired in 1985, the staff decided to reunite the pieces into a single composition. Fortunately, the contours of the cut edges matched well, and the Masonite mounts were not well adhered. Lascaux 360 hv acrylic dispersion adhesive was used to attach ragboard pieces spanning the join on the reverse of the panels as an initial step in rejoining them. This adhesive is flexible enough to allow for movement in the wood in this 4 in high panel. Two small blocks of pine were then adhered to the reverse of the panels across the join with hide glue and were clamped to bring the front surfaces of the panels into line, providing a flush join. The join line was then filled on the front with vinyl paste spackle, textured with microcrystalline wax and Liquitex Polymer Gloss Medium, and inpainted with Magna. The sketch then read as the panoramic view intended by the artist.

3 THE SCULPTURE OF THOMAS EAKINS

VIRGINIA N. NAUDÉ

The known body of Thomas Eakins's sculptural work includes no more than 50 unique images and falls into 3 distinct categories, each of which is represented by works in the Bregler Collection. Eakins created three-dimensional sketches for paintings, polychromed anatomical casts, and relief sculpture. He worked in wax, clay, and plaster.

3.1 EAKINS'S THREE-DIMENSIONAL SKETCHES

Among the three-dimensional sketches are five plasters in the Bregler Collection that document the working process for Eakins's
3.2 EAKINS’S ANATOMICAL CASTS

The plaster anatomical casts were made for teaching. Dissection was offered as part of the art school curriculum, and Eakins frequently took gelatin molds from cadavers to preserve the anatomical information revealed during course work. Eakins and his students painted the casts with various colors to emphasize the information on them: red for muscles, yellow for tendons, brown for skin, and white for bone. A neck and foot in the Bregler Collection are representative of the genre of anatomical casts, and the neck carries the typical Latin nomenclature painted on the polychromed surface with Eakins’s characteristic block lettering.

3.3 EAKINS’S RELIEF SCULPTURE

The first two groups of sculptural work serve study or instructional purposes. The last group, relief sculpture, was created for presentation and usually was executed on commission. This section discusses the examination and treatment of a set of reliefs in the Bregler Collection, Spinning (1883) and Knitting (1883). The discovery that they were assemblages, not plaster casts, led to new insights about Eakins’s working methods as a sculptor.

In the reliefs (figs. 1–2), those familiar with Eakins’s paintings and photographs will recognize his attention to the activities of everyday life, his technical interest in detail and sharp focus, and his eagerness to develop compositions that challenged him to solve problems of perspective. The rendering of a tilt-top table seen in Knitting, as well as in numerous sketches and paintings is discussed in Eakins’s unpublished writing “Sculptured Relief.” In this manuscript at the Philadelphia Museum of Art, which he drafted and reworked for his own use as lecture notes, Eakins attempted to develop a mathematical system to guide perspective rendering in shallow and high relief.
Many scholars have written about Eakins's labors to execute the commission for *Spinning* and *Knitting*. They were to be realized as stone carvings on a chimneypiece in the Philadelphia townhouse of James P. Scott. The artist's dedication to the project and his devastation in the face of the client's rejection of his work are well known (Turner 1983, 165–70; Foster and Liebold 1989), 155. Eakins valued the reliefs, exhibited them, and later had them cast in bronze. At least two sets of bronzes and four sets of plasters existed in his lifetime, and more have been made since.

The Bregler reliefs are believed to be originals of all the other known versions for several reasons. First, integral to each relief, on the back and around the sides, is auxiliary plaster that appears to serve as part of a mother mold. The large wires and unexplained voids and irregularities in the auxiliary material confuse reading of the x-radiographs (figs. 3–4). The relief and mold faces are coated with shellac, indicating that the works were prepared to be used in casting. Second, the Bregler reliefs are not plaster casts but are assemblages, composed of separate pieces, surfaced and painted for presentation. All the other known replicas are casts; all have the same dimensions, allowing for bronze shrinkage. Third, details of fillings around the border of *Spinning* show clear contrast of texture on the Bregler relief and only subtle contrast on the recasts.

The border for *Spinning* was added by Eakins during the working process. In the x-radiograph (fig. 3), dowels of a less dense material can be seen above the hanging wire on the left. These dowels continue around the relief, joining an outer oval to a central oval image. The border enlarged *Spinning* and gave it the same outside dimensions as its companion *Knitting*. The image of the woman spinning was intentionally rendered smaller than the image of the woman knitting because the viewer was intended to first encounter the reliefs at a point where *Spinning* would be nearer. Eakins wanted to compensate for the discrepancy in
Spinning appears to be assembled from a number of components. The x-radiograph shows armature in the two projecting legs of the spinning wheel and in all three legs of the stool. The armature is unnecessary considering the shallow relief plane in which these design motifs rest or support they receive from adjacent material. It appears that the armature was necessary for modeling these motifs in three dimensions and that they were later reduced to relief as Eakins reworked them into the composition. Three recasts of Spinning from Eakins's studio have a wire in the central projecting leg of the stool or have no armature at all. X-radiographs of casts of Spinning from the Philadelphia Museum of Art and the Art Institute of Chicago show the single wire. A privately owned cast was damaged extensively and showed no metal in the area of the stool. There is no armature in the wheel, which is rendered in high relief and had suffered damage. There are, however, a number of very small nails or wires under the painted surface. The wires are too thin to show up on the x-radiograph but they may have been of structural use as the wheel was being assembled.

Further indications of the artist's manipulation of sculptural components were seen after removal of the single campaign of repair and retouching, discussed below. The figure of the woman appears to have been placed into the sculptural plane. A mold mark on her neck might suggest that she was cast from an earlier study. Interruptions in the plaster behind her back and in front of her neck are evident. A spongy filling material was found in patches around her form. The artist used the same material in a large filling at the top and a small filling at the bottom of the border. Under ultraviolet light, these fillings appeared green, indicating the presence of natural resin. A sample from the patch on the top of the border was identified by optical microscopy and microchemical analysis as crushed noncalcined bone in a resin varnish binder.

Although there is painstaking attention to detail on the figure and spinning wheel, the background is modeled very loosely. Samples were not taken below the relief surface, so that the materials the artist used to secure and make transitions between the assembled components remain unidentified. Familiar materials such as clay or wax may have been used as well as the filling material identified on the surface. The background may have been built directly in plaster during the final stages to prepare a painted surface for presentation to the client. Eakins intended this object as the first form of a process. He was not aware that he would be asked to suddenly cease his labor when he had completed the pieces now known as the Bregler reliefs. He intended to have them cast in bronze and to use the bronze versions as models for a stone carver (Foster and Leibold 1989), 155, letter 62.

In the relief Knitting, one observes the similar phenomenon of an assembled work. The table top has been placed on the relief surface as a separate element. The cat was most likely modelled separately and later positioned underneath the chair. It is fully supported by armature, although its placement on the surface clearly does not require auxiliary support. It appears that during work on this original piece Eakins may have set “knitting needles” into the hands of the figure, consistent with his desire to understand an action completely to portray it accurately. Stubs of wires barely noticeable between certain fingers are so positioned that, if they were extended, they could be read as knitting needles placed at the same angle as they are painted in a 1877 watercolor of a woman knitting Seventy Years Ago (Princeton Art Museum).

Samples from both reliefs studied in cross section show a layering pattern that suggests three working stages in the artist's studio and one campaign of restoration. Samples were examined using polarized light microscopy and microchemical analysis (Gill 1991). Working upward, the layers were identified as (1) plaster; (2) slightly pigmented varnish; (3) grime; (4) slightly pigmented varnish; (5) thin, clear varnish; (6) grime; (7) shellac; (8) grime; and (9) retouch paint in spots. Pigments identified in the varnish layers were ivory black, red ochre, yellow ochre, burnt sienna, zinc yellow, and chrome yellow.

3.4 CONSERVATION TREATMENT

The 1989 conservation of Knitting and Spinning involved removal of superficial grime and overpaint from the generally stable shellac layer. The thick overpaint was consistent in texture and solubility. In areas of deterioration or damage, it was applied in numerous layers.

A thin barrier coating of Acryloid B 72 was applied to the clean shellacked surface. A filling paste was made from acrylic latex caulk (Dap brand) and microspheres (West Systems 409). On Knitting, the filling paste was used to adjust the previous restoration of the cracked table top. On Spinning, it was placed in the background behind the figure spinning, where spongy original fillings had apparently crumbled away, and on the damaged projection of the spinning wheel. On both reliefs, scattered voids from large chips were filled. Wherever final tooling was necessary, the filling was surfaced with Polyfilla. All new material was toned with acrylic paint.

4 THE PHOTOGRAPHS OF THOMAS EAKINS

DEBBIE HESS NORRIS

The Bregler Collection includes 500 photographic prints attributed to Thomas Eakins and his circle. This is one of the largest holdings of Eakins's photography in the world. Specific attributions of individual images has proved difficult, however, and is currently an ongoing effort. It is likely, for example, that many of these photographs were taken by Thomas Eakins but printed by
Thomas Eakins utilized and depended upon photography to sharpen his vision. He admired photography's "uncompromising honesty" and often made photographs as studies for his works. In 1883, for example, Eakins took photographs of a group of male students at a swimming hole on the Brandywine River. These photographs serve as a study in pose and gesture, anatomy and posture. The structural composition of these photographs, which were printed in both albumen and platinum, is remarkably close to that of his painting The Swimming Hole (1884-85, Fort Worth Museum of Art).

Eakins's works focused principally on value, not color. The monochromatic nature of photography, therefore, allowed him to instantly record and analyze distinct values, structural forms, and gradations of tone. In many cases Eakins's figural studies, like his painted portraits, stand by themselves as penetrating studies of personality and anatomy.

For Eakins, still photography was an invaluable aid to the study of the figure. In fact, he was convinced that a comprehensive understanding of anatomy was essential for all successful artists, and therefore, using his students as models, he compiled a photographic atlas of comparative body types. In his Naked Series, models are depicted in seven fixed poses. For each model, there are seven separate albumen prints that have been mounted overall (with a water-soluble adhesive and, in many cases, in a fixed, symmetrical configuration) onto secondary supports measuring 3 1/16 x 10 in or 4 x 10 in. Eakins also posed students in classical costumes, as he did not want them to study Greek statuary (an accepted practice at the French academies) but preferred that their work be modeled from life. These Arcadian photographs permitted Eakins to reconcile his innate desire to portray nature accurately with his love and appreciation for Greek art.

4.1 EAKINS'S TECHNIQUE

The vast majority of Eakins's photographs date from the period 1880 to 1900. He utilized a 4 x 5 in American Optical Camera (designed for portrait work) and a multitude of photographic printing processes, although the vast majority of his work is in albumen or platinum. Other processes include cyanotype, silver gelatin printing-out and developing-out papers, and collodion chloride process.

This albumen process, consistently praised for its innate ability to render detail, dominated the 19th-century photographic market, and, therefore, it is not at all surprising that Eakins used this readily available printing material so frequently. The albumen photograph consists of an egg white or albumen binder coated onto a 100% rag, lightweight paper support. The final image material (the material that absorbs and scatters light) is photolytic or printed-out silver. The albumen photographs in the Bregler Collection exhibit many of the typical deterioration characteristics associated with this process, including fading of the photolytic silver image, yellowing, cracking and/or crazing of the egg white binder layer, and structural deterioration to both primary and secondary supports.

In the platinum process, the final image material (platinum metal) is embedded directly in the paper support, creating (in comparison to the albumen process) a softer, matte-surfaced effect. The platinum process, popular primarily with fine art photographers at the turn of the century, is characterized by prints that exhibit a short tonal range and low contrast. Platinum papers were often hand-coated by the photographer. Close examination of the Eakins materials indicates that he (or his assistants) applied these light-sensitive salts to a variety of paper supports by both brush application and flotation methods. Many of the platinum prints in this collection exhibit an embrittled and yellowed primary support, resulting from a number of factors that are intrinsic to the photographic process including the presence of residual iron salts and acids utilized in their manufacture. Because platinum is an extremely noble metal, these images do not exhibit image fading.

4.2 CONSERVATION TREATMENT

A long-term preservation plan was developed for the Eakins photographic print materials in the Bregler Collection. This plan reflects the collection's general condition and its projected use and therefore includes the recommendation for stabilization treatments such as consolidation of flaking binder layers and repair of severe structural damages to primary and secondary supports, collective rehousing in polyester sleeves and/or ragboard mats to allow access to scholars, establishment of rigid exhibition and handling guidelines, and storage in a controlled low relative humidity (30%-40%) environment.

As described in this plan, the conservation treatment of these photographs concentrated on their stabilization and long-term preservation. Cosmetic treatments, for the most part, were not employed, although they may be required in the future as specific images are selected for exhibition and/or publication.

The most significant treatment problems posed by the Eakins photographic materials included the reduction of embedded dirt and grime from aged albumen binder layers as well as the reduction of cross-linked pressure-sensitive tapes and the removal of embrittled secondary supports.

A wide variety of materials and techniques have been utilized successfully for the reduction of embedded dirt and grime from photographic surfaces. Surface cleaning of aged albumen binder layers, however, is often problematic, as these egg white binders are characteristically cracked and crazed. Dirt and grime may quickly and irreversibly become embedded within these...
deteriorated binder layers if moisture is utilized. Furthermore, crumbled vinyl erasers may further disrupt a photograph's fragile surface. Finally, the use of human saliva, which many conservators have describe to be more "controllable," may not be recommended for albumen photographs because it contains a small amount of lysozyme among a significant number of other constituents. Lysozyme acts as a bactericide, which lyses or attacks strains of bacteria—a possible concern is that it may attack the glycoprotein found in egg white.

During this project, all Eakins's albumen photographs were evaluated under 30x magnification to ascertain if surface cleaning could be safely accomplished. For cleaning, a Mars Staedtler eraser and/or distilled water applied with cotton swabs were utilized. Mars Staedtler erasers were selected because they are free of sulfur, and it has been postulated that sulfur-containing eraser residue inadvertently left behind in a paper's support will interact adversely with silver photographic images.

Many of the photographs in the Bregler Collection had been overall mounted or tipped onto extremely embrittled and deteriorated secondary supports with both water-soluble and pressure-sensitive adhesives. Most of this work was performed by Charles Bregler. Owing to the deteriorated and vulnerable nature of the mounts, it was determined that, in many instances, mount removal would be required to ensure the collection's long-term preservation. Removal from poor-quality secondary supports required extensive photographic documentation, followed by the use of moisture or moisture vapor, often applied through a Gore-Tex membrane. For discolored pressure-sensitive tapes, solvent gels, prepared with the appropriate solvents, were utilized.

5 CONCLUSION

In conclusion, visual and technical analysis of the incredibly diverse works in the Bregler Collection, including perspective, anatomical, and compositional drawings; oil sketches; sculptures; and photographic works, has allowed the Pennsylvania Academy of the Fine Arts to learn a tremendous amount about Thomas Eakins, his working technique, his scientific exactitude, and his creative vision.

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OTHER SOURCES


AUTHOR INFORMATION

MARK F. BOCKRATH has been chief conservator and lecturer in materials and techniques at the Pennsylvania Academy of the Fine Arts in Philadelphia since 1986. He graduated from the University of Delaware in 1978 with an interdisciplinary B.A. degree in art history/chemistry, and received his master's degree from the University of Delaware. Winterthur Museum Art Conservation Program in 1981. He interned at the Intermuseum Laboratory in Oberlin, Ohio, and subsequently worked as a painting conservator at the Washington Conservation Studio in Kensington, Maryland, and at the Intermuseum Laboratory before coming to the Pennsylvania Academy. Address: Pennsylvania Academy of the Fine Arts, 118 North Broad St., Philadelphia, Pa. 19102.

VIRGINIA N. NAUDÉ, president/sculpture conservator, Norton Art Conservation, Inc., received an A.B. in history of art from Bryn Mawr College and served a five-year apprenticeship at the Victoria and Albert Museum in the Metalwork Conservation and Sculpture Conservation departments. Since 1978, she has been consulting conservator for the sculpture collection at the Pennsylvania Academy of the Fine Arts, where she has directed technical research and treatment programs for the sculpture collection, with special emphasis on the work of William Rush and Thomas Eakins. Address: Norton Art Conservation, Inc., 752 Germantown Pike, Lafayette Hill, Pa. 19444.

DEBBIE HESS NORRIS is a Fellow in the American Institute for Conservation. She received M.S. in art conservation from the University of Delaware, Winterthur Museum Art Conservation Program in 1980. She now serves as assistant director and assistant professor of photographic conservation in the same program. She also maintains a private practice in the preservation of photographic materials and lectures widely on the subject. Address: 106 Danforth Place, Wilmington, Del. 19810.

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The paintings by Thomas Eakins in the Bregler Collection include 20 oil sketches of landscapes and figures and one finished portrait. They are listed in table 1. Table 1 eakins paintings from the bregler collection studied at pennsylvania academy of the fine arts. The lines appear in the same parts of the figure and background in both works. Eakins also frequently made oil sketches for his watercolors, a practice that is quite unusual when compared to that of his contemporaries. The Bregler Collection contains another oil sketch for the watercolor Young Girl Meditating. The figure in the oil sketch is gridded for transfer in 1 in squares, while the more complex passages such as the face and hands are divided into a 1/4 in grid.