

Complexity in Creation: A Detailed Look at the Watercolors for The Birds of America

Reba Fishman Snyder

The New-York Historical Society's Audubon Collection consists of nearly 500 works on paper, of which 431 are the drawings used in producing *The Birds of America* prints. The rest are early works, alternate versions of birds, quadrupeds and loose prints. The watercolors for *The Birds of America* have been in the collection of the New-York Historical Society since 1863. They date from 1808 to 1840, with most of the work for *The Birds of America* done between 1820 and 1838. In 1990, the conservation staff of the Historical Society began an ongoing study of the Audubon collection in what is probably the first thorough examination by conservators. Each piece was carefully examined, conservation assessments of each drawing were made, and when necessary, treatments were planned and executed. As a result of this process, a significant amount of technical information about the materials and structure of these works of art was accumulated yet there is still much to be learned. It is clear that Audubon, with his assistants, created one of the most beautiful and complex series of art works on paper in the history of nineteenth century American Art.

Over 300 drawings for *The Birds of America* have been examined. Each was studied as consistently as possible, using a Nikon stereo-binocular microscope, ultraviolet illumination and raking light sources. Few, if any chemical analyses were performed as it was not critical to the current conservation treatments, and future analysis will be done as required.

Audubon's works are not merely watercolors in the traditional sense but are complex works made of a wide variety of media, glazes, papers and adhesives. Over the course of 30 years Audubon and his assistants made and reworked the drawings which were handled by many people over nearly two centuries. The drawings were exhibited as promotional material, but were also used as preliminary working drawings for the prints, as studies for oil paintings, and by John W. Audubon for the smaller Octavo edition. In the nineteenth century the drawings were sent across America and then to England and Scotland and back again. They were kept by the Audubon family before being purchased by the New-York Historical Society.

PAPERS USED BY AUDUBON

All of the drawings in the Audubon collection are on

hard sized, wove papers. The watermarks on these sheets were observed by viewing in strong raking light, because all are mounted to a dense cardstock which precluded using transmitted light. The watermarks indicate that Audubon used high quality papers produced from three different paper Mills. The most common watermarks recorded are: *J WHATMAN* with or without a date following, *J WHATMAN/ TURKEY MILL*, with and without a date following, *TURKEY MILLS/ J WHATMAN* with & without dates following and *TURKEY MILLS/ DATE/ J WHATMAN*. The *J. WHATMAN* watermarks came from the Balston Mill and *J WHATMAN/ TURKEY MILL* from the Hollingsworth Mill, both English. The different watermarks had been formally assigned in 1805, years after the two mills had been established.¹

The watermark *TG & C* which is the mark for the American papermaking mill (1787-1837) of Joshua and Thomas Gilpin and it appears rarely in this collection.

The collection includes many unmarked sheets and many with incomplete or indecipherable watermarks belonging to the Whatman family. Audubon's papers are typical of high quality, wove watercolor papers and it is extremely difficult to distinguish one paper from another without the watermarks.

The papers fall into three rough size categories, which fit the Whatman production sizes. They are: Double Elephant size (39 1/2 x 29 1/2 inches), Whatman Elephant size, (23 x 28 inches) and Whatman Medium size, (17 1/2 x 22 inches). Many of the drawings have been trimmed to smaller dimensions.

It should be noted that Audubon's collage cutouts came from the same type paper as his complete drawings. Audubon mined his own earlier drawings for birds of different plumage, sex or age to complete later works.

GENERAL WORKING METHODS

All of Audubon's drawings were executed in several media. The simplest pieces are pastel and graphite or watercolor and graphite. Most of the others contain any combination of watercolor, graphite, pastel, oil paint, gouache, chalk, ink, overglazing, and collage. Mostly self-taught, Audubon developed a wide range of drawing techniques and used a broad range of media to achieve his ends. While many of the techniques used in making

these pieces are not unusual for nineteenth century watercolorists, there are some techniques and ways of combining media that are unique to Audubon.

It seems clear, based on the differences within the individual drawings and the varied effects he achieved, that Audubon had a flexible approach to making these drawings. He used whatever means and techniques were at his disposal to draw the birds as true to life as possible. Thus, he used mixtures of the media available to him, incorporated earlier elements and relied on the help of assistants to produce the birds he had studied for so many years.

In many works, Audubon drew the birds first and the backgrounds were filled in later, either by himself or by his assistants. This is true of the *White-throated Sparrow* (1863.17.008) where a central flower is painted over a sparrow, using lead white gouache to cover the opaque bird. There are also clear examples of birds added after the completion of the floral background, as in the *Northern Parula* (1863.17.015) where, the upper bird is drawn over the vertical flower stem which is visible through the transparent watercolor. The addition of cut-out birds after the flowers or foliage was painted is another example of background before bird. There are many examples of birds and backgrounds so completely integrated that it is impossible to say which came first, even when it is known that a collaborative effort occurred.

GRAPHITE

Audubon was consistent in his use of a graphite underdrawing. The underdrawing was normally over-painted with watercolor, oil paint or pastel but there is usually an area of graphite underdrawing clearly visible through thin watercolor washes, as in the *Foot of the Great-Black Backed Gull* (1863.18.28) and the *Red Knot* (1863.17.315). The graphite outlines the birds, flowers and foliage, often describing the pattern of the bird's feathers and reticulation in the feet. In a few pieces, the outline is not precisely followed and the graphite lines show minor alterations in execution of the design. Uncolored areas of underdrawing can be seen in other works. A loose but detailed landscape in graphite is seen in the background of the *Spotted Sandpiper* (1863.17.310). These areas were probably left uncolored because Audubon trusted Havell to adequately complete his work on the copper plates.

Graphite was also used to indicate the position of landscape details or design alterations to Havell, as in the *Sharp-tailed Grouse* (1863.17.382) where graphite lines over oil paint show the position of the mountains on the right and a small graphite mark over the left bird shows the new position of the right bird in the print.

Audubon used graphite over pastel, attempting to

shade the forms, as in the feet of the *Brown Pelican* (1863.17.421). This technique is unusual and only moderately successful, since the graphite both compresses and covers most of the pastel pigment. The graphite can also abrade pastel, as in back of the *Magnolia Warbler* of 1812 (1863.17.050). Graphite has a different surface sheen than black or gray pastel and this metallic, slightly iridescent quality becomes extremely important in Audubon's later pieces. Sometimes, graphite was used over watercolor or pastel areas in a more delicate way as small curving lines, making soft downy feathers on the chest or head of a bird and giving greater definition to each form.

Audubon's most characteristic use of graphite is the drawing of hundreds of short, repetitive lines over the watercolor form of the bird. The graphite lines define the shape and direction of the feathers. These closely spaced lines are most often drawn on a diagonal to catch the light from a different angle. One of the best examples of this is in the *Magnificent Frigatebird* of 1832 (1863.17.271), where layers of watercolor have been built up to create an iridescent green-black body and wings which are further defined by hundreds of graphite lines enhancing the iridescence and giving form to the bird.

PASTEL TECHNIQUES

Audubon's earliest works are simply pastel over a graphite underdrawing as in the *Dickcissel* of 1811 (1863.18.02). Audubon applies individual sticks of color over a graphite underdrawing. The pastel appears 'flat' yet despite the smooth paper surface, a significant amount of pastel is deeply embedded in the paper. It is not clear if this compression was the result of Audubon's heavy application of pastel and some preparation of the sheet, or the result of previous storage conditions in which the drawings were stacked in heavy piles.

Audubon began to layer different colors of pastel using darker colors over lighter ones to create shadows of color. He eventually built up extremely dense layers of pastel, as in the *Black Vulture* (1863.18.23) of 1820. Despite this remarkable example of thickly applied pastel, Audubon cannot really modulate the forms using only pastel.

PASTEL AND WATERCOLOR

The combination of watercolor with pastel and graphite underdrawing is one of Audubon's slightly unusual techniques. After 1820, he began to use watercolor and more graphite to supplement the pastel. The earliest example in the Society's collection is the Cooper's Hawk of ca. 1809, in the lower right of the *Northern Goshawk and Cooper's Hawk*, (1863.17.141). The hawk is pastel with graphite underdrawing, but the landscape is a muddy mixture of watercolor and glazing.

Watercolor washes within individual pastel birds were used to describe some of the identifying features of the birds (eyes, beak, claws or feather markings). This is seen in the *Bald Eagle* of 1820 (1863.18.40), where the landscape and most of the bird is pastel but the eagle's head and claws and the head of the dead goose are in watercolor.

Another of Audubon's innovations was the use of an underlayer of thin watercolor wash, with overdrawing in the same color pastel. In these drawings, it appears that the watercolor wash was applied and allowed to dry before the application of the pastel. Thus, the pastel particles remain loosely bound and so maintain their intensity and reflective quality while the color is enhanced by the underlying watercolor.

Audubon developed the mix of pastel and watercolor into a more complex technique of applying pastel over wet watercolor, possibly using wet pastel sticks. Moisture compresses the pastel and changes its reflectance, making it more like thick watercolor, or synthetic chalk. The earliest example in the collection dates from 1815. It is often difficult to distinguish the transition between the watercolor and the pastel of the same color. This may be the result of additional water applied over the pastel to blend it.

Pastel was sometimes applied in a few delicate strokes to add color to a very dark area, as in the blue pastel over the black body of the *Atlantic Puffin* (1863.17.213), and similarly in the *Magnificent Frigatebird* (1863.17.271). Frequently, black pastel or chalk was applied over layers of glazed and unglazed black watercolor to create a subtle range of matte and shiny black surfaces that define the bird. This is illustrated in the back and wing of the *Great Cormorant* (1863.17.266) where black pastel strokes are a dense matte black compared to the unglazed watercolor areas. Both are matte compared to the shiny glazed watercolor. The addition of a few pastel touches continues throughout the production of works for *The Birds of America*. Even though Audubon was capable of reproducing virtually any texture or surface in watercolor he never completely abandoned pastel for softness and texture.

WATERCOLOR

Watercolor was a natural choice for the birds and foliage as it allows for a great range of color and detail to be drawn fairly quickly. Audubon probably used dry cake watercolor for most of his career but may have used the moist pans in the 1830's, as they were readily available in England.

Audubon usually applied watercolor in a traditional manner, laying in two or three thin washes of color to make a form. Without magnification, the color often appears to be a single, controlled wash. This traditional technique was used in most of the birds, flowers and

foliage, but Audubon developed a technique of layering of watercolor washes to an extreme degree. In a few of his works, he applied innumerable washes of transparent watercolor, building up the layers to make a dense opaque color. This is most clearly seen in the bright red of the central *Scarlet Tanager* of 1836 (1863.17.354) and the dark colored blacks of the *Magnificent Frigatebird* (1863.17.271). These birds can give the impression of being made with a single layer of gouache or tempera, but careful examination of the edges, observation of the reflectance, and study of small damages show that many layers of watercolor were applied. In some of the dark, black birds the watercolor layers can be extremely complex. Black, blue, green, purple and brown were applied to capture the density and varied colors present in a 'black' bird. Once the color was built up, smaller strokes of color were used to make surface texture or help in defining the bird's form or the paint was scratched to make white lines.

Audubon chose to layer his paints for a specific effect which showed the changeable and deeply complicated colors of the living birds. He was often remarkably effective in capturing the indescribable colors of some of the birds.

AUDUBON'S WHITES

There are three ways of creating whites in watercolor compositions; to use the white reserve of the paper; to use opaque white pigment (gouache); and to scrape away wet watercolor revealing the paper below. Audubon used all three techniques. Most often, by following his own careful underdrawings, he allowed the white paper to define the white elements of a form. The white page reserves were usually defined by delicate overdrawing in graphite or watercolor.

Audubon used white paint or pastel to enhance some flat areas of white paper. He generally used a thin wash of white pigment which is nearly invisible, even under magnification. Its presence can best be seen in the very subtle contrast between the slightly yellowed unpainted paper and the brighter, whiter painted areas. It is likely that these white pigments had some Calcium carbonate component.

Audubon and his assistants also used white paint with watercolor to make details and highlights. In the nests of the *Barn Swallow* (1863.17.173) and the *Yellow-breasted Chat* (1863.17.137), the more opaque fibers and straw of the nest are thin lines of gouache.

There are a few occasions when whites were thickly applied, as in some of the egrets and herons. In these birds, the white, which is probably lead white, is applied in narrow but dense lines, giving a three-dimensional quality to some of the feathers. This creation of a thick impasto is an uncommon technique for Audubon, but

one that clearly captures the desired effect.

Thickly applied whites were used to cover mistakes in a few drawings as can be seen around the head of the *Maggie Jay* (1863.17.096). The white used in most areas of heavier impasto appears to be lead white or a mixture of lead with other whites. When used as a watercolor, lead white has been known for centuries to be susceptible to conversion to a dark gray or black form of lead.² This has occurred in a number of pieces in this collection, most obviously in the correction in the *Maggie Jay*, but also in many more subtle areas. Some high impasto parts of the white tails of the herons and egrets have darkened. The visual effects of white becoming dark can be quite disturbing, but the alteration on nearly all of these whites is so complete that conservation treatment to alter them was unsuccessful.

White lines and highlights were also produced by scraping away watercolor to emphasize a form or add texture, as in the wing of the *Trumpeter Swan* (1863.17.376) and in the head, bodies & foliage of the *Carolina Parakeets* (1863.17.026). Scraping was used more broadly to give an uneven, textured look to the nest of the *Barn Swallow* (1863.17.173).

SELECTIVE GLAZING

The use of a thin layer of a natural gum or gelatin as a glaze over watercolor is often seen in nineteenth century prints and watercolors. Audubon and his assistants, Joseph Mason, George Lehman and Maria Martin, used glazes to intensify colors and alter the surface gloss of certain areas of the landscape and foliage. Glazes were also used to emphasize details, to create more animated surfaces and to enhance the subtle gloss and matte contrast of the birds' feathers. This contrast is often seen on darker birds like the *Great Cormorant* (1863.17.266). The thickest glaze layer in the collection is in the *Blue Jay* (1863.17.102) where the dripping egg yolk is made of a very heavy layer of slightly yellow glaze over darker yellow and brown watercolor.

The glazes are all transparent with a range of yellow tones. The thinnest glazes show a smooth surface, while some of the thicker ones exhibit cracking or fracturing of the glaze and the paint below. In some instances the glazes are so thin that it is impossible to say whether they are a separate layer of glaze or simply a watercolor extra rich in gum media. In most cases, even when cracked, the glaze and underlying paint is stable and well adhered to the paper.

No chemical analysis was done of the glazes, but solubility testing demonstrates that all are water-soluble. This means that they are not egg white or egg yolk, which rapidly become insoluble in water. The use of egg proteins has often been attributed to Audubon and the question of their presence on these pieces is an interesting

one,³ however no evidence of egg white or yolk used as a glaze has been securely identified.

METALLIC PAINTS

One component seen in only three drawings is metallic paint. It is present in the *Wild Turkey* (1863.17.001), the *Mallard* (1863.17.221) and the *Ruby-throated Hummingbirds* (1863.17.047) all of 1825. In each case, a gold colored metallic paint was applied and then partially covered by watercolor. The overlaying watercolor was probably used to enrich the color of the metal resulting in a shiny colored gold. In the hummingbirds and the mallard, the metal, which has been exposed to the environment, has discolored, probably through oxidation. It no longer has the bright shine associated with gold and it might be brass or bronze powder. In the *Wild Turkey*, where it has been almost entirely covered by other layers of watercolor, the metal paint still shows some of the reflective sparkle of gold. This is visible under magnification and only as a result of the partial loss of the over-paint through abrasion and poor adhesion.

The use of a metallic paint shows, once again, Audubon's interest in experimenting with varied materials to get an effect. Here he may have wanted a reflective, golden shine different from the metallic gray shine of graphite. Audubon appears to have used this metallic paint only in 1825 and his limited use of it suggests that he was not particularly pleased with its effect.

COLLAGE

Rarely seen in other works of this period, Audubon's use of collage appears to relate to the production pressures of *The Birds of America*. Although he went to England in 1826 with over 250 drawings, many more were needed to complete the project he envisioned. Audubon continued to produce drawings over the next ten years and used cutout pieces of earlier drawings as collage elements in later pictures. He most often added an older cutout figure to a new drawing, placing the collage bird(s) among the newer birds, then adding all or part of the background. One example is the addition of the central bird of c.1821, to the later *Wood Duck* (1863.17.206). Sometimes Audubon placed a collage bird on a completely new watercolor background, or on a blank sheet of paper, as in the *Bald Eagle* (1863.17.011), where the bird of 1822 was completely cut out and repositioned on paper watermarked after 1830.

Collage was also used to make occasional corrections. This is seen in the head of the *Great Egret* (1863.17.386), where a piece of paper was placed over the original, possibly damaged, head of the bird and completely repainted. The watercolor landscape was then painted, integrating the new head of the bird with the background. This appears to be a labor saving device.

The poor condition of some of the early pastel collage pieces suggests that these birds were cutout and left unmounted for some period, thus they may have acquired the small tears, creases and holes we now see.

The collage pieces are applied with a water soluble adhesive, probably a high quality gelatin. A small amount of excess adhesive can occasionally be seen at the edge of a collage piece. In order to position the cutout on the background, Audubon drew light graphite lines or made white scratches over the watercolor as guides for placement of the collage piece. The alteration in placement of the collage as indicated by these lines, appears to be a conscious choice, not an accidental movement of the collage. All the collage pieces are securely attached to the backing paper, but many show 'air bubbles.' These are areas on the verso of the collage with little or no adhesive, or where the adhesive may have dried too rapidly to adhere to the paper. Over time, these unrestrained areas of paper have expanded through the absorption of environmental moisture, and they show the effects of long term surface abrasion. Other non-adhered areas appear as deep creases, suggesting that air bubbles were present when the pieces were mounted to cardstock. Some of the bubbles were probably crushed during the mounting process.

OIL PAINT

Areas of oil paint were added to a small number of drawings, often over previously painted watercolor backgrounds. There is no evidence that oil paint was mixed with either watercolor or pastel to make a true 'mixed media' layer and no evidence that oil paint was used in any of the birds. There are however, several clear examples of oil paint covering an earlier watercolor background. It is not always possible to know what lies beneath the oil paint additions.

The oil paint films are usually thin and are often very simple, as in the water and sky of the *Trumpeter Swan*, where two areas of flat color were applied. However, there are a few works in which the oil paint is handled in a more complex and fluid manner, where colors are blended and details are drawn, although the paint is still relatively thinly applied. The best example of this is the background sky of the *Brown Pelican* (1863.17.421).

The use of oil paint with watercolor on paper is uncommon in the nineteenth century. In these drawings, the oil halo is small, possibly showing that Audubon used 'dry' oil paints with a minimal amount of oil. This kind of staining is often most obvious on the verso of the paper. Staining behind the oil paint branch in the *Chuck-Will's Widow* (1863.17.052) was revealed during conservation treatment while no oil halo was visible on the recto.

The oil paint film is relatively inflexible and does not

respond easily to changes in environmental humidity, and so it is remarkable that so few of these works show problems with cracking paint associated with the natural movement of the paper. This might be the result of the mounting of the works onto relatively dimensionally-stable cardstock.

CONCLUSION

Technical examination of the Audubon collection has revealed the extraordinary complexity as well as the inconsistencies of Audubon's techniques. Audubon used many traditional artist's techniques and he combined many of these within individual drawings. He used these and other techniques as a starting point and developed original methods of using and combining traditional mediums. His combined use of less common materials (metallic paint, oil paint, collage) with traditional ones has resulted in mixed media works that are fascinating but whose methodology is often difficult to comprehend. It seems clear that Audubon's overall intent was to create on paper, then translate into print, a comprehensive series of birds rendered as naturally as possible.

The use of early collage works in some drawings and the addition of later oil paint backgrounds appear to be the result of time limitations. At the same time he was traveling with both drawings and prints to sell subscriptions, Audubon had to maintain a production schedule. His solutions to these pressures were usually remarkably successful and the drawings are more interesting as a result of his inventions. Audubon's commitment to producing high quality work was also demonstrated by his use of high quality papers and materials.

Audubon's methods of producing the drawings and his documented concern for them probably insured their survival in the first half of the nineteenth century, despite the drawings' long history of travel and use. The acquisition of the drawings by the New-York Historical Society in 1863 insured that the largest collection of Audubon drawings would survive and be available for study by scholars, conservators and naturalists as well as for the enjoyment of diverse audiences.

NOTES

¹ These dates have been recorded on the watermarked papers: Following the *J WHATMAN* watermark; 1808, 1810, 1816, 1817, 1821, 1826, 1827, 1830, 1831, 1836, 1837. Following the *TURKEY MILL* family of watermarks: 1810, 1811, 1817, 1818, 1827.

² See R.D. Harley, *Artist's Pigments 1600-1835*, American Elsevier Publishing Co. Inc., New York, 1970, pp. 156-161. Where she discusses the history, uses and problems with lead white paint.

³ Egg mixed with a finely ground pigment becomes an egg tempera paint which tends to have a matte surface and to repel water. There is no evidence of large areas of egg tempera paint in this collection, but there are a few small examples of an opaque, viscous-looking yellow material that was applied over other areas of watercolor, which could be pure egg yolk. Without chemical analysis, it is impossible to say if these are egg or merely an opaque gouache. Any sampling would be invasive and is not necessary for conservation treatment. These areas are completely stable.

This article is a much shorter version of an essay written by the author published in *John James Audubon: The Watercolors for the Birds of America*, Edited by A. Blaugrund & T. Stebbins, Villard Books, 1993. Please refer to the book for color illustrations and significant additional information.

Reba Fishman Snyder, Paper Conservator
New York Historical Society
170 Central Park West
New York, NY 10028