Of Perspective and Aesthetic Revelation

Since its invention in the Quattrocento, linear perspective has bequeathed the distinguishing legacy of acquainting sympathetic and receptive cultures with the aesthetics of Greco-Roman art, and more specifically the art of fifth-century B.C. Athens. It was with its introduction that a singular idea was advanced: pictorial space is as important as subject matter. Neither before nor since, except through the direct or indirect inspiration of Western antique art, has an idea so absorbed the minds of artists. Had not the Romans, those great custodians of Greek art, imitated it and then, through experience, made it their own, this aesthetic would have disappeared.

Few original antique Greek paintings and sculptures survive; it is mostly through later copies and other art forms - vase painting and mosaics, for example - that one gleans the immense potential of the aesthetic. A quick survey of art preserved in the ruins of Pompeii, artifacts from the recently excavated city of Zeugma (near Belkis in modern-day Turkey), or the funereal portraits of Fayum in the Nile Valley confirms the nearly universal appeal embodied in the "grand norm" of this classic art. And it likewise affirms the meaning of originality in Western art, Buñuel's truism that "what doesn't grow out of tradition is plagiarism."

The structure of illusionistic space, particularly in the chiaroscuro, contributes much to freeing a viewer's imagination. It cancels knowingness and restores contemplation of the mystery of life. It promotes the "ultimate aim of the poet," which according to Thomas Hardy, "should be to touch our hearts by showing his own, and not to exhibit his learning, or his fine taste, or his skill in mimicking the notes of his predecessors." If the artist achieves "the subtle balance between evidence of means and the appearance of illusion," the viewer will penetrate the surface of the tableau and his perception of the subject matter will be enhanced.

There is one other aspect of representationist art derived from antiquity that is more difficult to articulate: hope. This mysterious and sublime urge is revealed in no other art. Since hope does not permit beauty or truth to remain neglected, practitioners of this art must be mature in their taste and imagination. The process of maturation is effected by immersion in the destructive element of inevitable ancestry. It is the humility, the displacement or submission of the ego, that evinces the loss of innocence which in turn allows for the expression of originality. This is the difference between representationists and contemporary neoprimitive mannerists; of self-expression, who, despite their brilliance and healthy self-acceptance, must forever remain sophisticated innocents.

On Perspective

In his treatise on painting, Leon Battista Alberti described linear perspective as a "most delightful and noble art." And for the next four hundred years, it continued to be so. It gave sweet reason to the poetry inherent in pictorial space. Every important school of painting and sculpture from the Quattrocento to the nineteenth century had its school of the Perspectivi. This is of particular interest to us because the elements and premise of perspective are easily understood and have not changed much since the theory's inception. There are an eye or a station point, a picture plane, and a figure or an object. The science is about the relationship among these three.

Alberti is generally acknowledged as having published the first text on linear perspective. This article is about one of the last such works by an artist of renown, the nineteenth-century French realist Thomas Eakins. His manual on linear perspective for the art student was unfinished and, at present, remains unpublished. True to the traditional teachings of this ancient and noble art, Eakins began his manual as Alberti had done before him: looking through a window at the buildings in the distance. Both men also wrote on the importance of and the pleasure to be had in application to this discipline. Little had changed, it seems, in the four hundred years that separated these two artists.

Although their texts express similar ideas, the works of these two artists do not so apparently reveal their respective sympathies. The impressive differences between their oeuvres show that the one is of the Quattrocento as much as the other is of the nineteenth century. These two men, along with many others, sought to define the essence of a matter of great complexity and profundity: classic illusionistic pictorial space. To examine pictorial space using perspective, that modern interpretation of the ancient Greco-Roman perception of illusionistic imagery, is at once to perceive nature and to
penetrate the sublime.

It has long been understood that the initial appeal of a painting is emotional. Then, having satisfied the sensuous the work must engage the intellect, gratifying that sense through the grace of its chiaroscuro and the beauty it achieves in the depiction of space. If the painting is lacking in either of these qualities, it must rely more heavily on its narrative content. In such cases, paintings cease to be poems about space and therefore incapable to inspire in their viewers contemplation of and musings about the sacred and the profane

O che dolce cosa è questa prospettiva!
Paolo Uccello

The landscape's greatest beauty is given it by distance; that is, a superior beauty resides in the effects of depth.
Auguste Rodin, Cathedrals of France

A portrait, at its best, should be a poem full of space and reverie.
Charles Baudelaire, Salon of 1845: Portraiture

A powerful and previously unknown place-processor unit within the brain perceives richly complex landscapes. It notices the layout of a space.

Linear perspective is the flesh, heart, and soul of classic pictorial space, from placing the objects in a still-life to the disposition of figures in a composition. This is done not necessarily by projecting a diagram but by being able to intuitively and plausibly place the components of a composition in space.
Course Syllabus, New York Academy of Art

I have decided to keep . . . the Boss's [Thomas Eakins's] perspective drawings. These are all for future students - that is the thought and hope that prompt me to care for them.
Charles Bregler in a letter to Samuel Murray, 23 July 1939

**Thomas Eakins and Linear Perspective**

Anyone familiar with Thomas Eakins's paintings probably also knows his perspective drawings. Throughout his career, Eakins did preparatory drawings for almost all of his finished paintings, an approach that enabled him to resolve complex issues involving the disposition of figures in pictorial space. Until 1985, contemporary scholars and connoisseurs were unaware of the extent of Eakins's interest in the "delightful and noble art" of perspective. The recently cataloged Charles Bregler Collection at the Pennsylvania Academy of the Fine Arts better reveals the artist's enthusiasm, including as it does nearly one hundred perspective drawings by him. Some of these are cartoons for his watercolors and oil paintings; a few others are purely intellectual exercises. The largest group, however, consists of finished drawings created to illustrate a book on perspective that Eakins hoped to publish.

Apart from his artwork, Eakins also made a comprehensive inquiry into perspective through teaching and writing. He gave his first formal lecture on the subject at the Pennsylvania Academy of the Fine Arts on 13 March 1880. He continued to lecture annually there on perspective and composition until his resignation in 1886. He also spoke about perspective at the Brooklyn Art Guild, the National Academy of Design, the Art Students League, and Cooper Union in New York; the Drexel Institute in Philadelphia; and the Art Students' League in Washington, D.C. One record of his audiences' enthusiasm is Thomas Anshutz's comment in a letter to J. Laurie Wallace, written on 7 August 1884: "it [perspective] was [sic] now the all-engrossing topic [in the Pennsylvania Academy's studios]." Eakins's book on perspective would have been useful for his students both as a reference guide to his lectures and in the making of their own artwork. In all probability, he wrote the manual primarily in response to a request made by his students.

Most important, perspective provided Eakins with a way to examine the difference between the depiction of representationist pictorial space and the depiction of pictorial space derived from the experience of photography. This distinction between classical pictorial space (in images that create the illusion of depth) and nonclassical pictorial space (in images that cancel the illusion of depth - specifically, photographic depictions of space), coupled with the eventual triumph of camera-conditioned perceptions, constituted the main aesthetic and intellectual impetus behind nearly all modern artistic movements of the twentieth century. Nonclassical pictorial space neither develops nor appreciates the art of the Renaissance; instead, it draws on models from Asian art, tribal art, and children's art. It draws on nearly everything, that is, except the art founded on the discoveries of ancient Greece and Rome. The immediacy of this divergence was apparent to Eakins because nearly all of his perspective cartoons were made not from life or from his imagination but directly from photographs. And for each of those photographs, he constructed a scaled perspective grid to analyze its
Photography had a tremendous influence on the painters of Eakins's era; from the art academicians to the salon rebels, most of them took or worked from photographs. During this period, the European art academies taught that the photograph gave painters new means to depict space. Eakins himself took hundreds of photographs in an exhaustive attempt to study pictorial space, anatomy, and photography itself. The invention of the medium in the nineteenth century brought about the most radical change in the perception and depiction of space since the rediscovery of classical pictorial space in the Quattrocento. It altered the way people looked at and thought about nature.

The difference between a painting re-presenting Greco-Roman pictorial illusionism (a category that includes nearly any Western painting dating from the beginning of the Renaissance through to the advent of photography) and a photograph or a painting inspired by the experience of a photograph can be seen when the two kinds of pictures are viewed upside down. Even inverted, a painting based on the spatial illusionism of antiquity will retain the illusion of space and all its volumetric elements. Inversion of a camera-conditioned painting or a photograph, in contrast, will cancel its spatial effects and reduce it to an assemblage of tonal and linear patterns. As Gore Vidal has noted, "A photograph is . . . all busy flatness."

What separated Eakins from most of his contemporaries was that he made good use of the nonclassical pictorial space of the photograph. He took pains to ensure that his photographs would mimic the principles of linear perspective, wherein the picture plane is imagined to be perpendicular to a level ground plane and parallel to the view of the artist. Such an analysis of photographic imagery was unusual in the nineteenth century and would be rarer still in the twentieth. But for the previous 450 years it had been a common and necessary practice for artists to examine pictorial space by means of a conceptual device called the picture plane. The studio exercise of drawing through an Albertian net was a popular method to introduce and resolve the complexity of spatial perception.

The 450-year tradition of investigating space through the picture plane began in the Renaissance; it is this conceptual plane that distinguishes the pictorial space of the Renaissance from that of the antique. Since the Quattrocento, all Western schools of painting and sculpture have had at their foundation a school of the Perspectivi. Historically, the relationship between the Perspectivi and their respective schools of painting and sculpture has been as follows: at the outset, the Perspectivi make an immense effort to analyze spatial imagery by projecting a linear diagram, on the basis of which succeeding members of the school resolve their vision exclusively in oil, charcoal, or clay. Since each new generation of Perspectivi reconsiders the same principles of linear perspective the scaled pictorial analysis has remained nearly identical through more than four centuries. Thus Eakins's analysis is virtually indistinguishable from Leonardo's.

Although it is not known for certain whether any of Eakins's students projected linear-perspective diagrams for their paintings, it is very unlikely that more than a few did, and in the next generations of the school of Philadelphia painters and sculptors, probably none at all did. Yet the illusionistic paintings and sculptures created by these successors were nonetheless original re-presentations of an aesthetic whose intellect and poetry were founded on linear investigations of space. Without Perspectivi, there can be no schools of painting or sculpture; instead, what forms is a cohesive group of well-practiced provincial painters and sculptors. This is because perspective is critical to the appreciation and development of ideas pertaining to the Renaissance, particularly the notion of originality.

The Renaissance brought a renewed appreciation of the classical pictorial space of antiquity. It marked the first time since antiquity that painters placed the same importance on illusionistic pictorial that they placed on subject matter. The excitement of this new aesthetic can be seen in and is confirmed by the spread and speed of the successive regional rebirths that started in Florence in the Quattrocento and then moved northward. This aesthetic movement was advanced by the then recent northern refinement of the ancient craft of oil painting, which became crucial to the development of representationist thought: prior to its introduction, Italian painters had been restricted to fresco and tempera, media ill suited to depicting space. It was in the Seiscente that the first school of modern oil painting originated in Venice.

Oil was, and is, the most expedient medium for exploiting the full potential of the three types of perspective: linear, aerial and color. All three are based on the observation of objects as they move away from the eye. In linear perspective, objects appear to diminish in size; in aerial perspective, they lose their outlines, contrasts, and details; in the perspective of color they look progressively bluer and cooler. Together, all three types of perspective attempt to depict in painting the effect of the human eye's perception of the actual world of nature. It is in oil painting that, in one writer's words, "one's awareness of gorgeously spread oil paint is simultaneously experienced as an incomparable illusion of shimmering silk. This subtle balance between evidence of means and the illusion of appearance is the classic painterly ideal."

Photography, charming though it can be, is incapable of reproducing spatial relationships that invoke in the viewer a
mental awareness of both the meaninglessness and the mystery of life. Eakins is one of the few who have made pictorial sense of the photograph, seeing it as a tool rather than a hindrance to the imagination, and a means to further the fine art of oil painting. His oil bozetti made directly from photographs, his perspective diagrams, and his insistence on direct observation either of life models or of mannequins in making his paintings all isolate his response from those of his contemporaries the academicians and the salon rebels. His studio practice further insulated him from the enchanting allure of the photograph, especially its surface of emulsion on paper, a property antithetical to the understanding of fine oil painting. Like most representationist paintings, Eakins's works are a revelation, whereas camera-conditioned paintings are at best a disclosure of trivia. Eakins was hardly the first painter to avail himself of a camera device: Canaletto in the eighteenth century and Vermeer in the seventeenth century are but two well-known precedents. Canaletto never used the distortions that occur in every camera projection, but Vermeer frequently did, and through them achieved the surface pattern arrangement and abstract elements that would become such an integral part of the twentieth-century viewer's perceptions of space.

The method that Eakins employed for making linear-perspective drawings was based on the fundamentals of perspective outlined four centuries earlier by Alberti in his treatise On Painting. Eakins recorded in his perspective manual, "A perspective drawing is easily made by tracing on a window pane. Changes are produced by varying the relation of the distance between the eye and the picture plane and the object drawn. To illustrate the law of changes I have chosen a very simple problem and dogmatically assert that the law in this case is sufficient to cover the whole science of perspective, which is of great simplicity and of easy comprehension." His series of sporting paintings exploit this science of illusionistic space and demonstrate its importance if painting is to be inventive. Up to that time, this genre was rather low in the hierarchy of aesthetics. Very few painters, if any, saw the potential in the depiction of man at play. There are no European or British sporting images that are on the level of Eakins's rowing pictures. None that has the authority of scale as in The Champion Single Sculls (Max Schmitt in a Single Shell), none the audacity of chiaroscuro as in The Biglin Brothers Turning the Stake, and none the gloomy poetry of The Pair-Oared Shell. In short, there is not another instance in which sporting paintings attain the level of high art.

Eakins's struggle to resolve the aesthetics of spatial structure resulted in a body of work that revealed a new appreciation of atmospheric representationist artwork. It also sparked a renaissance of painting and sculpture in Philadelphia, and subsequently throughout America, in the twentieth century. As in the case of many influential regional art movements Philadelphia's bearing on that era's representationist and related aesthetics would be widespread, in some instances obvious, in others less so. Resisting the dominant sway that the 1917 Armory Show had on twentieth-century American artistic sensibilities Edward Hopper and later Fairfield Porter, along with a minority of other painters, looked towards Philadelphia for their intellectual relevance. Even the photorealist movement of the 1960's and '70's was another, although secondary, response to Philadelphia's impact.

Philadelphia, a regional center for perspectivist thought in the nineteenth century, would be the last region in the New World to maintain an appreciation of the pictorial ideas founded in the Renaissance. This meant that it would resist modernist tendencies longer than other places: for example, longer than New York. This outlook presented those retardataire Philadelphia artists with the then unique opportunity to contradict modernist philosophy, which is to say, camera-conditioned thought, from the outside. Although this was not a verbal consensus the spatial imagings of Eakins and his successors collectively are in contrast to modernism; that is, their artwork is derived from human experience. For them thought derived from the so-called innocent, objective recorder of truth, the camera denies or belittles the value of that experience. In such work they contradict a belief, medieval in its origins, that removes the point of view from human experience and replaces it with one that is abstracted not from nature but from a philosophy that discounts memory. Artwork derived from perspective allows for one to investigate and reflect on truth while artwork that incorporates modernist philosophy must have the certainty of truth. The first allows one to attempt to know humanity through itself; the other allows an initiate to pretend to the vantage point of the gods. Modernism, the so-called great leveler, is the conclusion of the Enlightenment.

The inference in all of this is that there is an essential attribute derived from the Philadelphia school of painting making it the most sublime and influential, even if unfashionable, among representationist movements of the modern era. That it - which can be called atmospheric illusionism or atmospheric representationist art - has made such a deep impression upon the psyche may be due to its ability to impel or prod the memory, "so that one is rediscovering something one has known inside one self's the whole time, what one has foreseen. To do this is to persuade or dissuade the rational and, in turn, recognize poetic unreason." For example, in oil portraiture the chiaroscuro - the means by which the poet analyzes the phenomena of light - makes possible the elevation of genuine portraiture from a depiction of a likeness. In the Portrait of Mrs. Thomas Eakins by Eakins the viewer can sense the immense understanding or sympathy of the painter for the sitter. This does not necessarily refer to a loving but rather an intimate relationship between the artist and
sitter: in short, the ability for the poet Eakins to reveal himself: "to touch our hearts by showing his own." In contemplation of this work, the viewer does not wish harm to come to this person depicted though in fact she is long dead. In contrast, for one viewing a photograph or a camera-conditioned depiction of a person, "the dominant impression is one of nostalgia, The snapshots get old, they seem quaint, and one is constantly reminded of how things used to be." Compare this portrait with the photograph of the same subject.

The present-day reaction to portraiture is often a juvenile retort to the poet's steadfastness of rejecting logical argument. What presently passes as portraiture, and all depiction of representationist thought, is usually the attack of sarcasm avenging itself on true feeling. The poet who intuits "Delusive Hope's" implication will need to disentangle the rationalist's, that favored child of the enlightenment, rhetoric. Primarily, he or she will make clear the distinction between new and original; and, enthusiasm and creativity. Pictorial space is not infinite and within its domain not all matters of thought can inhabit; and yet the boundaries and that within those boundaries remain nearly untouched and therefore unknown. In Western Art, this remains the heart and blood of the creative and original. There is no ideology, no narrative or technology that sustains or illumines that which is depicted by the poet. But, all representationist painters must respond to it. The range of response can be at one end profound as in Titian's Bacchus and Adrienne or The Flaying of Marsyus; or in another instance capricious, as in Adrien Brouwer's Tavern Scenes; and, of course, all matters in between. No true poet is in service to anything but his or her Muse.

Part Two: Eakins's Perspective System: An Explanation

This is an explanation of Eakins's particular perspective system. There are many different types of perspective systems but they all are based on the relation among the eye, the picture plane and the object. The next few illustrations show a windowpane on which has been traced the view of the buildings and rooftops directly across. This drawing was made by first choosing a stationary point from which to draw and, not moving from this point, closing one eye and then starting to draw. The following illustrations show what changes occur to the drawing when you change your eye or station point. These next few illustrations show the geometric proof on which linear perspective is based, The most important idea to remember is that objects appear to diminish in size as they move away from the eye. If one were to imagine a glass cube with each side divided into 16 squares one would have a very good image of how Eakins conceived to set up a perspective drawing. If you place this imaginary cube into one point perspective, that is, one side is parallel to the picture plane, then you would have the foundation for placing any object into perspective provided you know some essential measurements of the object (My illustrations of Eakins's method of making perspective drawings from a photograph. In this case, a photograph of a small box on the studio floor is made into a perspective drawing and then into a painting.) Imagining an incised glass cube containing the object to be drawn is a useful practice recommended for young artists learning how to draw objects in space.

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Appendix I.

Linear Perspective Texts

It is of interest that although in the past century there has been no shortage of texts on the subject of linear perspective, rarely in this period does an artist of renown write one. This was not always true. Since the Renaissance it has been a laudable practice for artists to chronicled the science of linear perspective by writing texts, pamphlets, or manuals on the subject. The following select list should impress upon the reader that fact and, in most cases, each artist's seriousness in briefly foregoing his expertise of such matters in the studio and to have a go at it in print. Most of these artists would respond with puzzlement and astonishment if they could view perspective's limited role in the twentieth century. They would argue that this lack of appreciation cripples twentieth-century man and woman. That this science with its primary viewpoint has much to offer for at the very least it enables the practitioner to experience that ancient dictum, "Know thyself."

Piero della Francesca (c. 1420-1492), De perspective pingendi, c. 1480.
Lorenzo Ghiberti (1378-1455 ), Third Commentary, c. 1455 .
Leonbattista Alberti (1404-1472), De Pictura, manuscript: 1435, printed: 1540.
Leonardo (1452-1519), Della Pictura, c. 1492 (no longer extant).
Albrecht Dürer (1471-1528), *Underweysung der Messung*, 1525.

Lorenz Stoer (c. 1540-1620), *Perspectiva a Laurentio Stoer in lucem prodita*, 1556.

Martino Bassi (1542-1591), *Dispareri in material d'architettura, e perspettiva*, 1572.

Francois d'Aguilon ( - ) & Peter Paul Rubens (1577-1640), illustrator, *Opticorum libri sex*, 1613.

Jacques Androuet Du Cerceau (c. 1520-1584), *Lecons de perspective positive*, 1576.

Jan Vredeman de Vries (1527-1604?), *Perspective*, 1568.

Pietro Accolti (1625-1642), *Lo Inganno degli occhi, prospettiva pratica di Pietro Accolti*, 1625;

Jean-Francois Niceron (1613-1646), *La perspective curieuse ou Magie artificie de effets merveilleux*, 1638.

Jean Dubteuil (1602-1670), *Diverses methods universelles et nouvelles en tout ou en partie pour faire des perspectives*, 1642.

Bernardino di Francesco Contino (d. 1597), *Prospettiva pratica*, 1643.

Abraham Bosse (1602-1676), *Maniere universelle de Mr. Desargues*, 1648.

Jacques Le Bicheur (1599-1666), *Traicte de Perspective*, c. 1661.

Samuel van Hoogstraeten (1627-1678), *Inleyding tot de hooge schoole der schilderkonst*, 1641.

Andrea Pozzo (1642-1709), Prospettiva de Pittori e Architetti d'Andrea Pozzo, 1693.

Giuseppe Castiglione (1688-1766) & Nien His-yao (n.d.) [a student of Castiglione], *Shih-hsueh* (a Chinese adaptation of Pozzo's text.), Peking, 1729.

Brook Taylor (1685-1731), *New Principles of Linear Perspective*, 1719.

John Joshua Kirby (1716-1774), *Dr. Brook Taylor's Method of Perspective Made Easy*, 1754.


J.M.W. Turner(1775-1851), Lecture Notes & Diagrams, c. 1811.


Adele Le Breton (b. 1794), *Traite de perspective simplifiee*, 1828.


Joseph-Alphonse Adhemar (1797-1862), *Traite de perspective a l'usage des artistes*, 1836.


Maxfield Parrish (1870-1966), *Illustrated Perspective Lessons*, c. 1890 (no longer extant).

**Endnotes:**

1. This will seem an unusual declaration to those whose orthodoxy assumes linear perspective to be a passing historical phenomenon.


3. Thomas Hardy, Notebook, 1 July 1879.


2. Although Eakins was born in Philadelphia, he considered himself to be a French painter by training. This explanation solved a fundamental historical problem of Eakins' aesthetic lineage.

3. The Bregler Collection was acquired by the Pennsylvania Academy of the Fine Arts in 1985. Charles Bregler (1865-1958) was a student of Eakins's who did a great deal to preserve Eakins's memory as a painter and teacher. His efforts and intelligence provided Eakins enthusiasts and scholars with a treasure. According to Bregler, many of the drawings that he tried to save turned to dust upon his moving (from Eakins's widow house) or unrolling them.

4. Written on the drawings that were to illustrate the perspective book are notes, most probably intended for a book printer, in Eakins's handwriting.


6. Wallace Collection, the Joslyn Art Museum, Omaha, Nebraska. Adam Emery Albright, a student at the Pennsylvania Academy in 1883, stated that Eakins used an elaborate mechanical contraption in his lectures. "Memories of Thomas Eakins," *Harper's Bazaar* 81, no. 7 (August 1947): 184.

7. This unfinished and unpublished manual, written circa 1882, is in the collection of the Philadelphia Museum of Art. It is a miscellany of incomplete essays on a variety of subjects, perspective, composition, optics, and reflections of objects in the water. Some museum collections, most notably those of the Philadelphia Museum of Art and the Hirshhorn Collection in Washington, D.C, contain drawings that are the working illustrations for this manual. These were originally created for the text and are often quite finished in appearance. The Bregler Collection contains many of the actual finished drawings for the text. Of interest is that Eakins's friend Leslie W. Miller; of whom Eakins painted that magnificent full-length portrait (1901) now in the collection of the Philadelphia Museum, published a perspective manual *Essentials of Perspective* in 1887. Miller, then principal of the School of Industrial Arts of the Pennsylvania Museum, was a student at Columbia College of William R. Ware the author of a standard classic in perspective *Modern Perspective* (4th ed., 1882) as well as the *American Vignola* (1903). In regards to other contemporary texts that Eakins knew, also see footnote 38.

8. C.M. Woodhouse wrote, "I would have liked to have been born in Florence in 1417 to enjoy the early Renaissance and to witness the Council of Greeks and Latins in 1439. Instead . . . I am content to have been born exactly five centuries later, in time to witness the end of the era which those miracles began."

9. Eakins's true contemporaries were the French Realists. David Sellin in *The First Pose* (New York:: W.W. Norton & Co., 1976), notes that Eakins was a French Realist, not an American Realist. In a letter to the secretary of the treasury, Eakins, who had been trying to get back three of his paintings from U.S. Customs in New York, where they had been detained since their arrival from an exhibition in Paris, wrote: "I am an American citizen born here and a painter by profession. Some years ago I went to France where I received my artistic training." Elsewhere he noted, "I was born in Philadelphia July 25th 1844. 1 had many instructors, principal ones Gérôme, Dumont (sculptor), Bonnat" (letter from Eakins to Harrison Morris, Director of the Pennsylvania Academy, 12 June 1894, Pennsylvania Academy Archives).

10. Eakins's master at the Ecole des Beaux-Arts, Jean-Léon B. Gérôme, used a pictorial space conditioned by the camera in his mature work. Turn one of Gérôme's grand historical paintings upside down, and the space becomes very flat - a quality particularly evident in the disunion between the ground plane and the figures disposed upon it in his paintings *Christians Martyrs* (1863-83) and *Chariot Race* (n.d.).

11. Eakins published a tract in 1886 in a scientific journal on the tendons that articulate the wrist. In 1894 he read a paper at the Philadelphia Academy of Natural Sciences entitled "On the Differential Action of Certain Muscles Passing More Than One Joint." A physician of the time commented that no other American artist knew more about anatomy than Eakins, who probably knew as much about the subject as many physicians.

12. Eakins apparently took, or oversaw the taking of, more than 650 photographs. See Susan Daly and Chery Leibold *Eakins and the Photograph* (Washington. D.C.: Smithsonian Institution Press, 1944) 2 He also had in his studio nearly two hundred more photographs by other photographers. Eakins helped to refine the Marey wheel, a device that enabled the photographing of continuous movement at timed intervals. It differed from Eadweard Muybridge's apparatus, which was essentially a battery of cameras that took multiple photographs in succession. Eakins worked with Muybridge for two years at the University of Pennsylvania.

13. Salvador Dali expressed this idea when he wrote, "To look is to think" *60 Secrets of Magic Craftsmanship*, trans. Haakon M. Chevalier [reprint. New York: Dover Publications, 1992], 26). Leonardo voiced a similar thought in his proof that painting was superior to all the other arts, because "it is directed to the most noble and divine of all organs, the eye. To compare the ear to the eye is as absurd as to compare the nose to the ear. It is the sense of sight through which mankind primarily and profoundly perceives nature." (Leonardo on Painting, trans. Martin Kemp and Margaret Walker [New Haven and London: Yale University Press, 1989]. 20-21. Jacob Bronowski likewise summarized The Biology of Perceptionby George Wald, Ragnar Granit and H.K. Hartline, winners of the 1968 Nobel Prize in Physiology and Medicine: "How can we exercise fine discrimination when the units with which we work (like the rods and cones in the eye, like the neurons that lead back to the brain) are so coarse? In short, how does mankind perceive nature? It is the most important question of the last half of the twentieth century for anyone who seeks to examine all aspects or nature" (The Origins of Knowledge and Imagination, [New Haven and London: Yale University Press, 1979], 21).

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17. Salvador Dali expressed this idea when he wrote, "To look is to think" *60 Secrets of Magic Craftsmanship*, trans. Haakon M. Chevalier [reprint. New York: Dover Publications, 1992], 26). Leonardo voiced a similar thought in his proof that painting was superior to all the other arts, because "it is directed to the most noble and divine of all organs, the eye. To compare the ear to the eye is as absurd as to compare the nose to the ear. It is the sense of sight through which mankind primarily and profoundly perceives nature." (Leonardo on Painting, trans. Martin Kemp and Margaret Walker [New Haven and London: Yale University Press, 1989]. 20-21. Jacob Bronowski likewise summarized The Biology of Perceptionby George Wald, Ragnar Granit and H.K. Hartline, winners of the 1968 Nobel Prize in Physiology and Medicine: "How can we exercise fine discrimination when the units with which we work (like the rods and cones in the eye, like the neurons that lead back to the brain) are so coarse? In short, how does mankind perceive nature? It is the most important question of the last half of the twentieth century for anyone who seeks to examine all aspects or nature" (The Origins of Knowledge and Imagination, [New Haven and London: Yale University Press, 1979], 21).

18. This idea of turning paintings upside down to observe the pictorial depth originated with Arthur DeCosta, professor emeritus of
painting and drawing at the Pennsylvania Academy of the Fine Arts. The action is a revealing because it momentarily disrupts the subjective reading of the painting and allows for a more objective analysis. Mr. DeCosta says the idea came to him from hearing art teachers tell their students to turn their paintings upside down to make sure they had no pictorial depth (the practice started at the height of the fashion for non-objective painting). He noticed that representationist paintings turned upside down retained their pictorial space: "In a representationist painting or one that is not camera-conditioned, the elements of the painting do not appear as flat patterns on the canvas. That is; to say, the expanses of space - for example, the sky or a path in the landscape will appear as a flat pattern or lose their spatial quality when the painting is turned upside down. Spatial illusions must remain intact when the painting is turned upside down in order for the painting not to be camera-conditioned. Spatial illusions remain intact in Eakins but not in Degas, true for Ingres but not for Courbet" (interview with Arthur DeCosta, 8 March 1995). In a letter (no longer extant but recorded in Lloyd Goodrich, Thomas Eakins: His Life and Work [New York: Whitney Museum of American Art, 1933], 16), to Earl Shinn, Eakins mentioned his concern for spatial illusionism: "I sent on my little picture. It it better than those Biglin ones. I did not care to exhibit the Biglin ones for that reason. They are clumsy and although pretty well drawn are wanting in distance & some other qualities."


21. Linear perspective was unknown to the ancients, Jacob Bronowski explains, "The credit for discovering the foundation for linear perspective belongs to an Arab of the eleventh century, Alhazen (abu-'Ali Al Haseb ibn Al-Haytham, ca. 965-1039 A.D.). His treatise of optics, Opitacae Theaurus Alhazeni, related how rays of light converge on the eye. Alhazen first recognized that we see an object because each point of it directs and reflects a ray of light into the eye. This is the point on which the Greeks had it wrong. They believed that we see an object because light goes from the eye to the object. It was impossible to explain the reason that an object closer to the eye is larger than one farther away based on this principle. It was linear perspective based on Alhazen's observations that rightly deduced the reason a closer object appears larger than the same object farther away." (The Ascent of Man [Boston and Toronto: Little, Brown and Company, 1973], 179). Alhazen's manuscript, translated into Latin from the original Arabic, is in the collection of the Vatican Library in Rome. In its margins are notes by Lorenzo Ghiberti.

22. The Perspectivi of any particular school can be a group or a single individual.

23. The Philadelphia school of painting and to a lesser extent the Philadelphia school of sculpture have continued to thrive up to the present. They are the only American schools that have survived, uninterrupted, for nearly two hundred years. The Philadelphia school in turn spawned the only true American school of painting, the Ashcan School, whose primary practitioners - Robert Henri, George Luks, John Sloan and George Bellows - each acknowledged an enormous debt to Eakins. The succeeding generation of New York realists, which included Fairfield Porter and Edward Hopper, were likewise heirs to the Philadelphia school. It is of interest here that no school of painting developed directly from Eakins's extensive work in anatomy or photography.

24. According to John White, "It is important to remember that the invention of a mathematically based perspective system during the early years of the fifteenth century was heralded, not by the publication of a treatise, but by the painting of a pair of panels. It was Filippo Brunelleschi who chose to make known his new discovery this way. The panels are now lost" (The Birth and Rebirth of Pictorial Space, [Cambridge, Mass: Belknap Press of Harvard University Press, 1987], 113). During the fifteenth century, many artists were excited by the new discovery of linear perspective. Brunelleschi, Ghiriberti, and Alberti who are credited with bringing the system to the attention of other artists comprise the first identifiable school of perspectivists. Alberti is thought by many to have had the greatest influence on his contemporaries on the subject of linear perspective because of his treatise Dellà Pittura ("On Painting"). This notion is, however, mistaken. Although Alberti's was one of the first written account of the subject, it was published in 1511, seventy-six years after it was written. This speaks to the importance of painting and sculpture and the studio practice, which most ably conveyed ideas such as linear perspective more profoundly and more rapidly than the printed word. Even J. R. Spencer notes in his introduction to Alberti's work that there is little evidence to link the text to the actual spread of linear perspective (Alberti, On Painting, 29).

25. It was Leonardo who defined the three types of perspective in his notebooks (volume 1, part 1). His book on perspective is now lost.

26. The Notebooks of Leonardo da Vinci, trans. Jean Paul Richter, (reprint, New York: Dover Publications, 1970) volume 1, part 21: "Introduction to Perspective: That is of the Function of the Eye. Behold here O reader! a thing concerning which we cannot trust our forefathers, the ancients, who tried to define what the Soul and Life are - which are beyond proof, whereas those things, which can at any time be clearly known and proved by experience, remained for many ages unknown or falsely understood. The eye. whose function we so certainly known by experience, has, down to my own time, been defined by an infinite number of authors as one thing: but I find, by experience, that it is quite another."

27. DeCosta. "Painting, Mediums and Brush Response."

28. Beyond his use of linear perspective, Eakins was also able to make pictorial sense of photographs thanks to his sound training in drawing and painting. For the rowing paintings, the Swimming Hole, and the William Rush paintings (and perhaps for others as well), he made models in miniature of his scenes and painted from them. "When I came back from Paris," Eakins told his students, "I painted those rowing pictures. I made a little boat out of a cigar box, and rag figures with red and white shirts, blue ribbons around the head. and I put them out into the sunlight on the roof and painted them, and tried to get the true tones." Lloyd Goodrich, Thomas Eakins (New Haven: Yale University Press, 1982). 1: 108.

29. Vermeer was never lauded in his own day as he is in ours. Part of the reason for this was that contemporaries were unfamiliar with
the appearance of camera-conditioned space and the optical effects created by the camera in rendering form, color and texture. The visual memory of Vermeer and his contemporaries relied on nature, and linear perspective influenced paintings, drawings and prints. At present the reverse is true: human perception now relies on photographic images, so that paintings dating from the advent of the camera are often not fully appreciated, and their structure is ignored or misunderstood.

30. Eakins' finished linear perspective drawings should technically be called cartoons, since they were transferred directly to the tableau.

31. Not only would the aesthetic championed by the camera-conditioned artists destroy the concern for classical pictorial space, but it would also eliminate the reason for the leitmotif of that space: the nude. Modernism, a camera-conditioned art movement, is incapable and intolerant of the intensity of thought necessary to preserve and develop the nude. The figure and the figurative have allowed artists a safe and mediocre genre in which to work. The Nude is nor a multicultural phenomenon but rather a particular invention of fifth-century Athens.

32. Contrast Clement Greenberg's comment of modernist art being able to criticize itself from the insideModernist Painting.

33. This is the premise for the artist to start with a blank sheet of paper or blank canvas. As Laura Riding explained. "Historical time had ended." Anarchism Is Not Enough (Garden City: Doubleday, Doran &.Co., 1928) and A Survey of Modernistic Poetry, (London: Heineman, 1929).


35. For example, a painting of a person derived from the experience of the camera is more likely to be an oil collage than a portrait.

36. Arthur DeCosta, "Is Photography Art?"

37. Any chance of hope is easily rupture in the face of facts. But the penultimate fact is without hope: life is unbearable. As one version of the anti-feminist fable of Pandora reads, "who when she opened the box [that she had been wanted to leave be], loosed the imprisoned Spites that might plague mankind; such as Old Age, Labour, Sickness, Insanity, Vice, and Passion. Out these flew in a cloud, stung [her husband] Epimetheus and Pandora in every part of their bodies, and then attacked the race of mortals. Delusive Hope, however, whom Prometheus had also shut in the box, discouraged them by her lies from general suicide." Robert Graves, The Greek Myths, (Baltimore: Penguin Books. 1955), 147-48.


39. This is how the Eakins Perspective Manual begins. The manual is set up so that each lesson is followed with a drawing exercise for the reader to do.

40. Christina Masschelen Currie's essay in the catalogueEakins: The Rowing Pictures made an analysis of the physical surface of Eakins' tableaux. Ms. Currie is correct in her assessment that certain indentation marks are caused from transferring an image onto the tableau. But the images in question were not made from a drawing, as she supposes, but directly or indirectly from a photograph.


42. See footnote 24.

43. About this time Leonardo wrote "painting is truly a science ...[for] its philosophical and subtle speculation considers all manner of forms: sea, land, trees, animals, grasses, flowers... all of which are enveloped in light and shade." His reply, "Because writers had no access to the definitions of the science of painting... Since painting does not achieve its end in words it is placed below the... sciences through ignorance... Few painters make a profession of writing since their life is too short for its cultivation." (Kemp and Walker, Leonardo on Painting,12).

44. Inscribed on the temple of Apollo at Delphi.

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About the author:

Patrick Connors is a 1980 graduate of the Certificate Program of the Pennsylvania Academy of the Fine Arts where he primarily studied under Arthur DeCosta. In 1982 he graduated from the University of Pennsylvania with a bachelor of fine arts degree. He is a painter who lives and works in Philadelphia. His work is exhibited nationally and is in both private and public collections. In 2000-2001 his work was exhibited at the National Academy of Design, the Butler Institute of American Art, Somerville Manning Gallery, Meredith Long & Company, and Hirschl & Adler Galleries. In 1998 he was awarded a Pollock Krasner Foundation Grant for Painting. Presently, he teaches painting and drawing in both the Certificate Program at the Pennsylvania Academy of the Fine Arts and the Graduate School of the New York Academy of Art. Also, he has lectured at the Yale University Art
He has lectured on Thomas Eakins at the New York Academy of Art, the Pennsylvania Academy of the Fine Arts, the Yale University Art Gallery and the Philadelphia chapter of Classical America. He is author of "The Oil Sketch and Representationist Thought in the Philadelphia School of Painting." (left: The portrait of the author is by Arthur DeCosta, oil on linen, 10 x 8 inches)

For further biographical information please see America's Distinguished Artists, a national registry of historic artists.