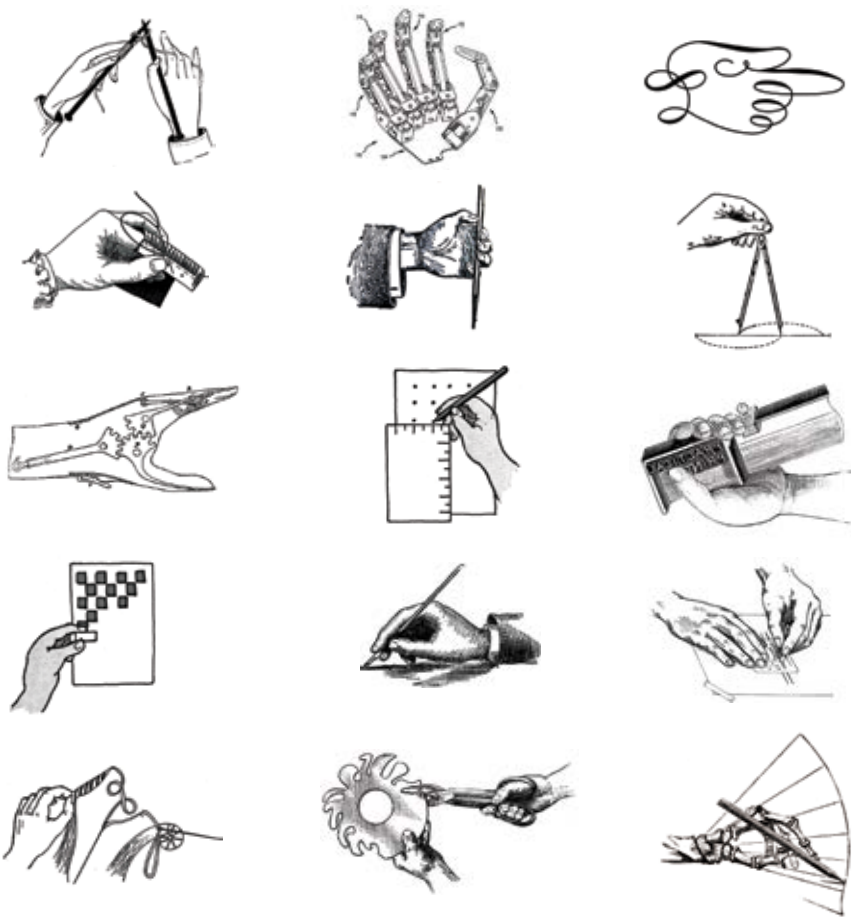
Working with the Hands

Applied Arts Training in New York City, 1800–2020



JENNIFER TOBIAS

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Bard Graduate Center
New York City
2021

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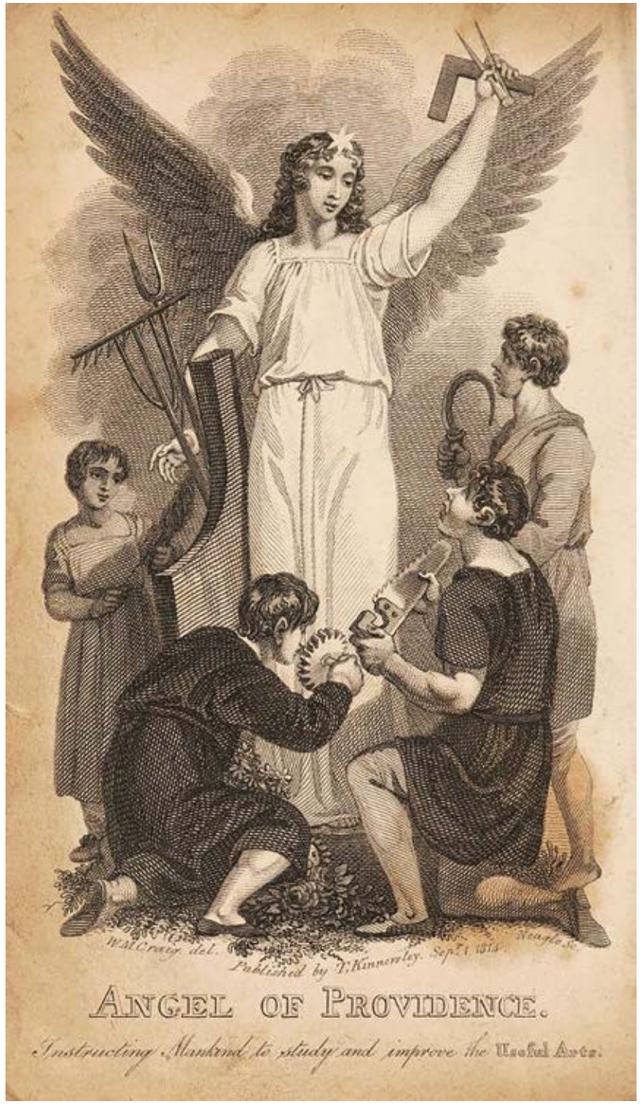


Opposite: "Angel of Providence" from Hewson Clarke and John Dougall, *The Cabinet of Arts, or General Instructor in Arts, Science, Trade, Practical Machinery, the Means of Preserving Human Life, and Political Economy* (London: J. M. Gowan for T. Kinnersley, 1817): frontispiece.

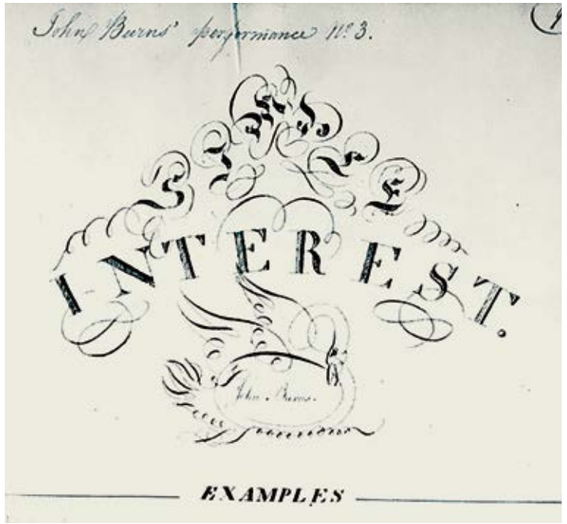
1. Moses Stambler, "The Effect of Compulsory Education and Child Labor Laws on High School Attendance in New York City, 1898–1917," *History of Education Quarterly* 8, no. 2 (1968): 189–214; doi.org/10.2307/367352.
2. *Where to Find Vocational Training in New York City: A Directory* (New York: Vocational Advisory Service, 1950).
3. Howard B. Rock, *The New York City Artisan, 1789–1825: A Documentary History* (New York: SUNY, 1989).

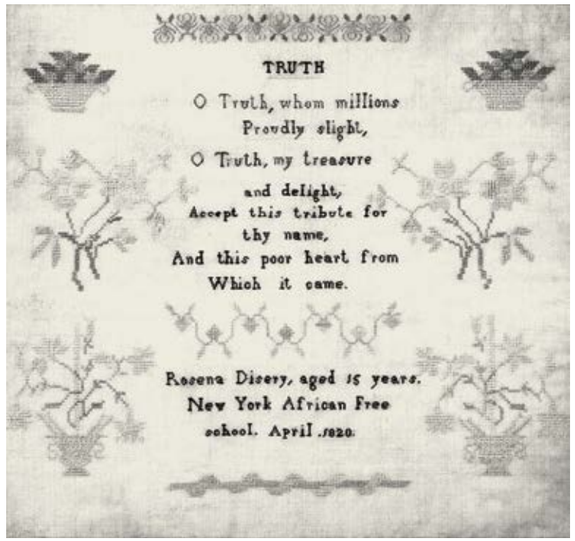
This project investigates more than a century of applied-arts education in New York City, beginning with early nineteenth-century penmanship and concluding with a twenty-first–century school devoted to social and political change. Selected skills, each matched with a training program, are described briefly, illustrated with documentary material, and supplemented by sources. The study concludes with an examination of associated pedagogical tools, such as manuals and toys, that have informed learners past and present.

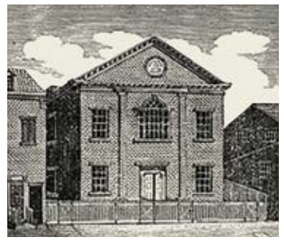
Formal education in New York City emerged gradually, beginning with the founding of a Free School Society in 1805 that led to a five-borough Board of Education in 1905. Child labor laws and compulsory education in the city were not established until the turn of the twentieth century. Once the city-wide public school system was established in 1925, many trade schools were absorbed into it. Private education, including vocational schools, continued in parallel.[1]

The training schemes examined here reflect this heterogeneity, with examples public and private, religious and secular, for and against organized labor, avant-garde and traditional. All programs offered the possibility of social mobility, yet at the same time many of them perpetuated injustices based upon race, ethnicity, class, ability, and gender. [2]

The legacy of those who followed the applied-arts path surrounds us, taking forms from subway mosaics to robust publishing to reliable ductwork. This publication and installation celebrate these practices. [3]







Above, top: John Burns, "The New York African Free School, Erected in the Year 1815," from *New York African Free School Records 1817–1832*, Volume 4. New-York Historical Society.

Above: "New-York African Free-School, no. 2," from Charles C. Andrews, *The History of the New-York African Free-Schools* (New York: Mahlon Day, 1880): frontispiece.

Opposite, above: Detail from *New York African Free School Records 1817–1832*, Volume 4. New-York Historical Society.

Opposite, below: Rosene Disery, *Truth*, 1820. New-York Historical Society.

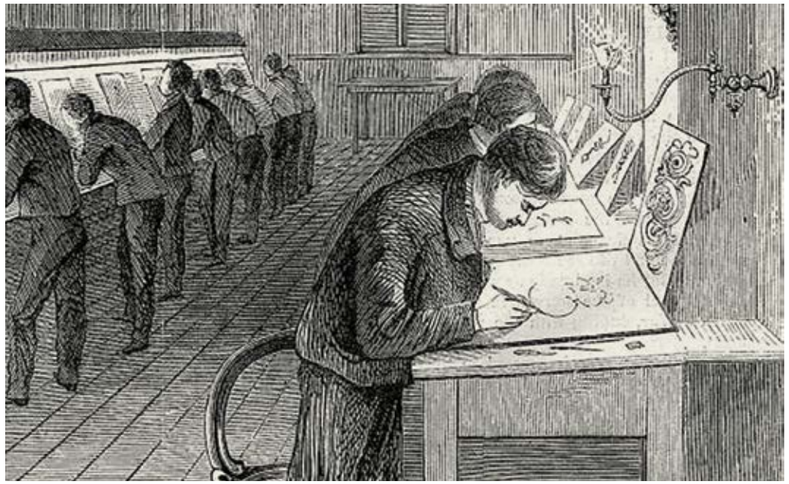
4. Charles C. Andrews, *The History of the New-York African Free-Schools* (New York: Mahlon Day, 1880): 5.
5. P. John Franklin Reigart, *The Lancasterian System of Instruction in the Schools of New York City* (New York: Columbia University Press, 1916).
6. *Manual of the Lancasterian System. . .* (New York: Public School Society, 1820), 50.

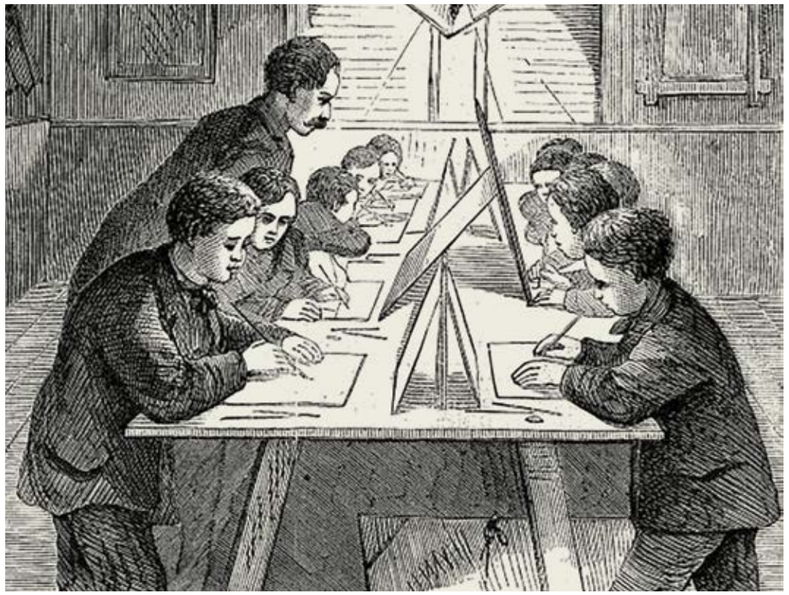
Founded in 1787 by the abolitionist New York Manumission Society to "teach the useful branches of education to the descendants of Africans, as well as to other classes of the human family," the New York African Free School educated thousands of students over the course of nearly fifty years. [4] Although slavery was gradually outlawed in New York State between 1789 and 1827, disenfranchisement and exclusion from formal education continued long afterward. At the same time, African diaspora peoples represented a major economic force, working in professions from heavy construction to skilled trades. Thus the literacy and numeracy promulgated by the school could be extremely valuable.

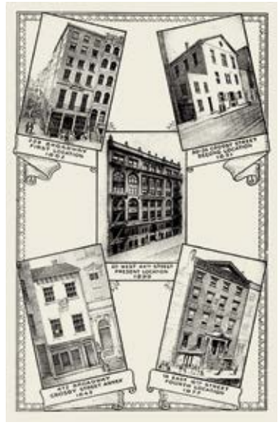
Beginning in a schoolhouse on Cliff Street in lower Manhattan, the program expanded to seven locations serving hundreds of students, although child labor and similarly harsh circumstances often limited attendance. In 1828, the average daily attendance of three hundred students represented a fraction of an estimated 1,800 "colored" city children in need of basic education.

Teaching followed the highly structured monitor system, in which students learned a lesson well enough to instruct others. To become literate, children first traced letters in sand and then learned spelling on slates. Penmanship involved copying, dictation, and even oral quizzes. For girls, literacy was reinforced by making embroidered samplers. [5]

Examples from the New-York Historical Society, shown here, document the students' achievements. The works demonstrate how organizers sought to stimulate "the eye, the ear, the tongue and the hand, aiding and impelling the mind through a series of exercises of the highest importance in expanding and training the intellect." [6]







Above: Visual history of Mechanics Institute locations, from Polly Guerin, *The General Society of Mechanics & Tradesmen of the City of New York: A History* (Mount Pleasant, SC: Arcadia Publishing, 2015): 114.

Opposite: "Drawing Classes of the Mechanics' Institute," *Harper's* (February 8, 1868): 84.

7. *History—The General Society of Mechanics & Tradesmen of the City of New York*; generalsociety.org/?page_id=196.
8. General Society of Mechanics and Tradesmen of the City of New York, *Prospectus of the Free School Department* (1900); dcmny.org/islandora/object/gsmt%3A687.

In 1820 the General Society of Mechanics and Tradesmen of the City of New York opened the city's third "free" school for boys, and a girls' school was added later that year. (Here "free" meant that members' children attended at no cost, while other students were subsidized by an endowment).

As a public school system became established, the Society discontinued day classes and in 1858, the renamed Mechanics Institute began offering "privately-endowed free evening instruction to respectable young men and women to improve themselves in their daily vocations." [7]

Enduring classes included drafting and electrical work. General applied design, cabinetwork, and ornamental relief work also had their day. Stenography and typewriting courses were popular among young women. [8]

Situated since 1899 in midtown Manhattan, the Society continued its courses and public lectures, supported by an active library. In addition to plumbing and electrical training, today's students study heating and air conditioning, construction management, and computer modeling—today's drafting standard.

Above: "Cooper Union," 1880. New York Public Library.

Opposite, above: Students engraving, from "New York City. The Monument of a Philanthropist," *Frank Leslie's Illustrated Newspaper*, April 14, 1883: 125.

Opposite, below: Ada C. Thompson, *Mr. Herrick Teaching Wood Engraved* [sic] *in the Women's Art School, Cooper Union*. ca. 1860. Cooper-Hewitt, Smithsonian Design Museum.

"Women not only become good engravers, but admirable designers," wrote the department director at the Cooper Union School of Design for Women in 1861.[9] The school was one of three institutes within the fledgling philanthropic endeavor founded by inventor and industrialist Peter Cooper to provide "instruction in the branches of knowledge which are practically applied in the daily occupations of the working classes by which they support themselves and their families." Programs were to be "addressed to the eye, to the ear, and the imagination, with a view to furnish a reasonable and healthy recreation . . . after the labors of the day."[10]

To that end, Cooper and architect Frederick Petersen designed a then-novel steel-framed building to house education programs as well as an innovation center, public forum, library, and eventually a decorative arts museum. By the building's completion in 1859, education programs comprised an evening school for men and daytime classes for both men and women. Merit-based, tuition-free admission was in principle blind to race, class, or gender.[11] Students selected for the four-year women's design program trained in composition, drawing, and wood engraving. The engraving program in particular was organized around commissions for publication in books and newspapers. The process involved incising a block of hard wood cut to the depth of type. Students used pointed tools called burins along with magnifiers to inscribe the very fine lines necessary to render detail and simulate shades of grey. Completed blocks were then set with type and printed.[12]

After graduating, women could meet a steady demand and work at engraving firm, where their pay would be comparable to that of men. Graduates also took on freelance engraving and illustration projects.

9. *Annual Report* (New York: Cooper Union, 1861): 12; hdl.handle.net/2027/uiug.30112114006346.
10. *Annual Report* (New York: Cooper Union, 1860): 9; cdm16045.contentdm.oclc.org/digital/collection/p16045coll1/id/7/rec/1.
11. Thomas Hughes, *Life and Times of Peter Cooper* (New York: Macmillan, 1886); catalog.hathitrust.org/Record/011408336. U.S. Office of Education, Art and Industry, *Drawing in the Public Schools* (Washington, DC: U.S. Government Printing Office, 1885); archive.org/details/artindustryeduca00unse.
12. Sarah Fuller, *A Manual of Instruction in the Art of Wood Engraving* (Boston: J. Watson, 1867); archive.org/details/cu31924031253549.

Above: "Brooklyn Howard Colored Orphan Asylum," early 1900s. Brooklyn Public Library.

Opposite, above: "Howard Orphanage and Industrial School Children Learning How to Make and Repair Furniture," early 20th century. New York Public Library.

Opposite, below: "Howard Orphanage and Industrial School Children Learning How to Build Greenhouses," early 20th century. New York Public Library.

13. "Industrial School for Colored Folks," *Brooklyn Citizen*, March 23, 1899: 10.
14. Ibid.
15. Booker T. Washington, *Working with the Hands: Being a Sequel to Up from Slavery, Covering the Author's Experiences in Industrial Training at Tuskegee* (New York: Doubleday Page, 1904); digital.library.wisc.edu/1711.dl/QOJOAP4BPKLHP8U. Louis R Harlan, *Booker T. Washington: The Making of a Black Leader, 1856–1901* (London: Oxford University Press, 2005).
16. W. E. B. Dubois, "Of the Training of Black Men," *Atlantic* (September 1902): 289–97; theatlantic.com/magazine/archive/1902/09/of-the-training-of-black-men/308774. *The Negro Artisan* (Atlanta: Atlanta University, 1902); archive.org/details/negroartisanrepo00dubo.

"The colored people have decided that an industrial school for the industrial development of the race is an imperative necessity, and they are going ahead intelligently to bring the establishment of such a school to a happy fruition," reports an 1899 article about a proposed addition to the Howard Orphan Asylum in Brooklyn's Weeksville neighborhood. The Howard Orphanage and Industrial School was incorporated in 1868 with a mission to "shelter, protect and educate the destitute orphan children of colored heritage." [13] Unlike similar institutions, it was directed, funded, and run by African Americans.

Architect William Mundell designed its 1883 building, and in 1894 an annex for the industrial school was added, with "the upper portion . . . used as dormitories for our older boys and employees and the lower or basement portion for laundry purposes and work shop." [14] By 1900, students could learn carpentry, chair caning, and sewing. According to one source, at the time it was the only vocational school in the state to admit African Americans.

In 1911 the program moved to Kings Park, on Long Island's North Shore, following the pastoral models of Tuskegee Institute in Alabama and the Hampton Institute in Virginia. The argument of Tuskegee president Booker T. Washington for "working with the hands" promoted vocational training and apprenticeships as a means to racial equity, an approach that increased access to education but indirectly legitimated oppressive Jim Crow laws. [15] Moreover, reformer W.E.B. DuBois was wary of vocational education's limits, arguing forcefully that "the foundations of knowledge in this race, as in others, must be sunk deep in the college and university." [16]

In a region filled with estates and de facto segregation, 250 children moved to the bucolic but underbuilt facility. Under the direction of a Tuskegee graduate, the curriculum embraced agricultural training as well as carpentry, construction, cooking, and shoe repair. Typical of American orphanages at the time, this emphasis on labor meant that children were indentured to families, with some of their earnings to be released to them once they came of age.

The facility closed in January 1918. Funds were (and still are) directed toward supporting Black students living in Brooklyn, Queens, and Long Island.

Above: "Tiffany Glass and Decorating Company," from *King's Photographic Views of New York* (Boston: Moses King, 1895): 581.

Opposite: "View of the Glass Room, with Women at Work," from Polly King, "Women Workers in Glass at Tiffany Studios," *Art Interchange* 33 (October 1894): 87.

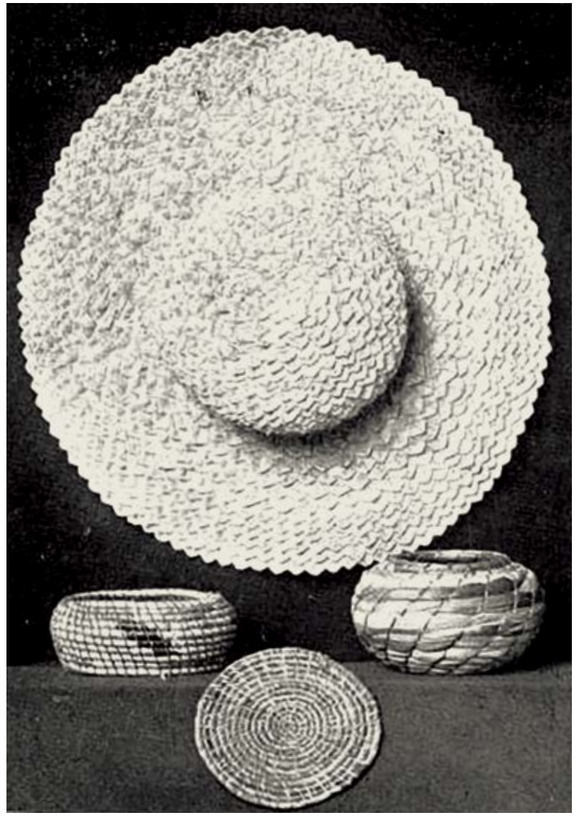
17. Polly King, "Women Workers in Glass at Tiffany Studios," *Art Interchange* 33 (October 1894): 86–88.
18. Ibid.
19. Martin P. Eidelberg, Nina Gray, and Margaret K Hofer, *A New Light on Tiffany: Clara Driscoll and the Tiffany Girls* (London: New-York Historical Society, 2007). Mark Bassett, "Breaking Tiffany's Glass Ceiling: Clara Wolcott Driscoll, 1861–1944," *Cleveland Institute of Art News* (January 2012): cia.edu/news/stories/breaking-tiffanys-glass-ceiling-clara-wolcott-driscoll-1861-1944.
20. *Glass Archive* (Long Island City: Neustadt Collection of Tiffany Glass, 2021); theneustadt.org/collections/the-glass-archive.

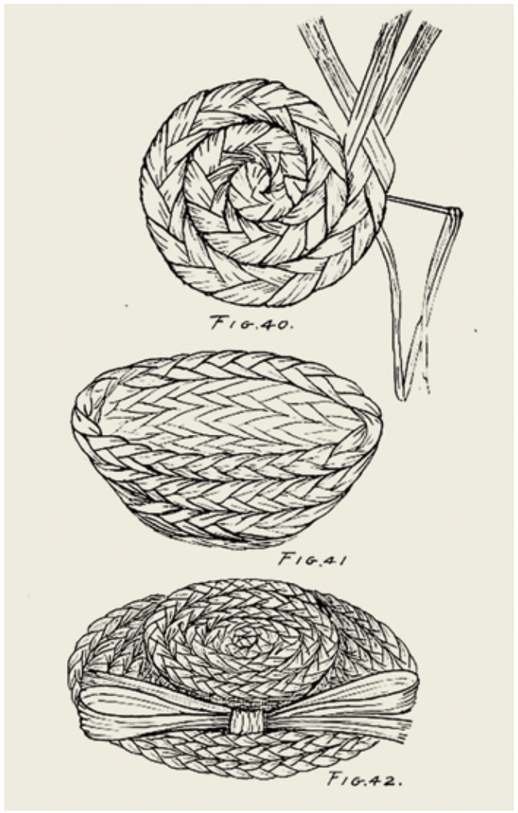
In 1894 a journalist visited the Tiffany Glass Works near Madison Square in Manhattan and reported on their "experiment of employing women," concluding that "the work accomplished has been so satisfactory that now they have a corps of 35 young women employed in every branch of glass work." "Tiffany Girls," as they were known, were recruited from training programs at the Y.W.C.A, Cooper Union, and the School of Applied Design, "where there was no tuition . . . in order that those who were really breadwinners might profit by the employment." [17]

At the studio, the team selected, cut, and edged stained glass. In this process, a design drawing was painted on to a framed glass sheet, with a copper pattern added for popular products. Using this outline, workers chose each piece of stained glass for a given design: "innumerable pieces must be held against the light, and shifted this way and that, to ascertain their best advantage." Next, a colleague "[cut] it into the exact shape of the paper, smoothing off rough edges and uneven places with pincers." After edging each piece with a copper strip, the composition was ready for assembly. [18]

Former trainee Clara Driscoll supervised this group. She became one of several women designers at Tiffany and took on increasing responsibilities between the late 1880s and 1908 or 1909. Driscoll innovated the popular dragonfly motif, along with many other Tiffany works in glass and metal. [19]

Tiffany Studios remained popular and prolific until the 1930s, when the studio and the glassworks in Corona, Queens, closed. The glassworks inventory was acquired by the Neustadt Collection of Tiffany Glass and is preserved as a study collection in Long Island City, Queens. [20]





Above: "Brooklyn Institute of Arts and Sciences," early 1900s. Brooklyn Public Library.

Opposite, left: "Articles made of Corn Husks," from *Laura Rollins Tinsley, Practical and Artistic Basketry* (New York: E.L. Kellogg, 1904): 115.

Opposite, right: Illustration from Anne Lowden Jessup and Annie Elizabeth Logue, *The Handicraft Book, Comprising Methods of Teaching Cord and Raffia Construction Work, Weaving, Basketry and Chair Caning in Graded Schools* (New York: A.S. Barnes, 1912): 85.

21. *Year-Book of the Brooklyn Institute of Arts and Sciences* (Brooklyn: Brooklyn Institute, 1905); archive.org/embed/yearbookbrookly03sciegoog.yearbookbrookly03sciegoog.
22. "Exhibit of Pupils' Work," *Brooklyn Daily Eagle*, October 3, 1905: 11; bklyn.newspapers.com/image/53935907.
23. "Students of Basketry and Weaving Put Knowledge to Practical Account," *Brooklyn Daily Eagle*, October 6, 1906: 23; bklyn.newspapers.com/image/53912671.

Founded in 1823 as the Brooklyn Apprentices Library, the Brooklyn Institute of Arts and Sciences was rechartered in 1889, when organizers sought to establish "a broad and comprehensive institution for the advancement of science and art . . . a large and active association, laboring not only for the advancement of knowledge, but also for the education of the people through lectures and collections in art and science." [21]

By the turn of the century, enthusiastic membership and philanthropic support led to rapid expansion, with departments established to study, collect, and disseminate virtually every branch of human inquiry. Today's Brooklyn Museum, Children's Museum, Botanic Gardens, Academy of Music, and Prospect Park Zoo, as well as the Cold Spring Harbor Laboratory, are offshoots.

Lectures, exhibitions, and courses at the Institute addressed subject areas rivaling those of a university and included paleontology, chemistry, and mathematics. The decorative arts were represented by departments of architecture, engineering, domestic science, fine arts, education, photography, and film. In addition to lectures, these departments offered day and evening courses, such as several types of drawing (architectural, mechanical, landscape, and figure).

In 1904 Evalyn M. Griswold initiated classes in weaving and basketry, and she would teach crafts at the Institute for the next thirty years. Basketry students in the twenty-week course learned weaving and coiling, using materials such as palm bark, grass, corn husks, and raffia.

According to articles appearing at the time in the *Brooklyn Daily Eagle*, "the classes appeal directly to the domestic woman, and it is hoped they may be of use to the practical homemaker." [22] Urban students were encouraged to collect materials during pastoral summer vacations, and traditional practices of native peoples were appropriated and adapted for the largely bourgeois audience. Prospective educators were also encouraged to take the courses, while others sought marketable skills. For example, "one enthusiastic woman saw in the work a possible means for earning money . . . and has more than realized her hope." [23]

Above: "Building of the Red Cross Institute for Crippled and Disabled Men," from Douglas C. McMurtrie, *The Organization, Work and Method of the Red Cross Institute for Crippled and Disabled Men* (New York: Red Cross, 1918): pl. following p. 26.

Opposite, above: "Artificial Limb Workshop," ca. 1925. University of Massachusetts Libraries.

Opposite, below: Bain News Service, "Artificial Limb Shop for Disabled Soldiers at Red Cross Institute, New York City," 1918. National Archives.

Recognizing an acute need for physical mobility aids among millions of injured World War I soldiers, the American Red Cross initiated a program in 1917 to develop prosthetics for disabled veterans. The Red Cross Institute for Crippled and Disabled Men mobilized virtually every type of applied art into modern research and development in the field. [24]

Located in the Gramercy Park area of Manhattan, the Institute offered multiple training programs. In addition to developing prosthetics, veterans could learn oxy-acetylene welding, drafting, film projection, printing, and typesetting on then-standard Monotype machines. Programs for "photographic technique," auto repair, and "dental mechanics" were also considered. In its first three months of operation, staff referred more than two hundred veterans to 355 positions, resulting in more than a hundred successful placements. [25]

In cultivating prosthetics, organizers reasoned that a disabled person has "a keen appreciation of the requirements for his product and can . . . work with a clearer idea of the object in view." Moreover, "the demand for artificial limbs . . . is unprecedented and the manufacturers are all seeking a wider supply of skilled labor. This insures prompt employment upon graduation for any competent pupils." [26] To make these complex, particular, and intimate works, the Institute shop was equipped with "extensive bench facilities for the hand work of hollowing, shaping, and finishing; gas forge and anvil; nickel-plating equipment; leather dept with special sewing machines; a fitting room where plaster casts . . . are taken and finished limbs adjusted; lathe equipment for metal and wood working; a drill press; grinding and polishing heads; a band saw; and a sanding machine." [27] Photographs show a wide variety of results, although there appears to be little technical documentation of specific designs.

The Institute was intended to continue in peacetime to address prevalent industrial injuries and to foster "scientific research and experimentation looking toward the improvement of . . . artificial limbs and the standardization of material and design." [28] To that end, the Institute reincorporated as an independent organization in 1920.

24. John Culbert Faries, *Three Years of Work for Handicapped Men* (New York: Red Cross, 1920); archive.org/details/threeyearsofwork0000john. "The Red Cross Institute for Crippled and Disabled Men and the 'Gospel of Rehabilitation,'" (New York: New York Academy of Medicine, 2018); nyamcenterforhistory.org/2018/08/27/gospel-of-rehabilitation.
25. Douglas C. McMurtrie, *The Organization, Work and Method of the Red Cross Institute for Crippled and Disabled Men* (New York: Red Cross, 1918); archive.org/details/101560462.nlm.nih.gov. James R. Cameron, *Instruction of Disabled Men in Motion Picture Projection, an Elementary Text Book* (New York: Red Cross, 1919); catalog.hathitrust.org/record/001044664.
26. Ibid.: 7.
27. Ibid.
28. S. Gelber, "A 'Hard-Boiled Order': The Reeducation of Disabled WWI Veterans in New York City," *Journal of Social History* 39, no. 1 (September 1, 2005): 161–80; doi.org/10.1353/jsh.2005.0101.

Above: Wurts Brothers, "310 East 67th Street, New York Trade School," 1931. Museum of the City of New York.

Opposite: New York Trade School Photographs, 1940s–50s. New York City College of Technology Archives.

29. *Schools of The Metropolitan Museum of Art Records*; metmuseum.org/art/libraries-and-research-centers/watson-digital-collections/metropolitan-museum-of-art-publications/schools-of-the-metropolitan-museum-of-art-records.
30. *Catalogue* (New York: New York Trade School, 1898); archive.org/details/catalogue6219newy.
31. *Catalogue* (New York: New York Trade School, 1942); archive.org/details/catalogue1818newy.
32. *The Metropolitan Museum of Art, Art Education; an Investigation of the Training Available in New York City for Artists and Artisans* (New York: De Vinne, 1916); archive.org/details/arteducationinve00metrrich. *Where to Find Vocational Training in New York City. A Directory* (New York: Vocational Advisory Service, 1950).

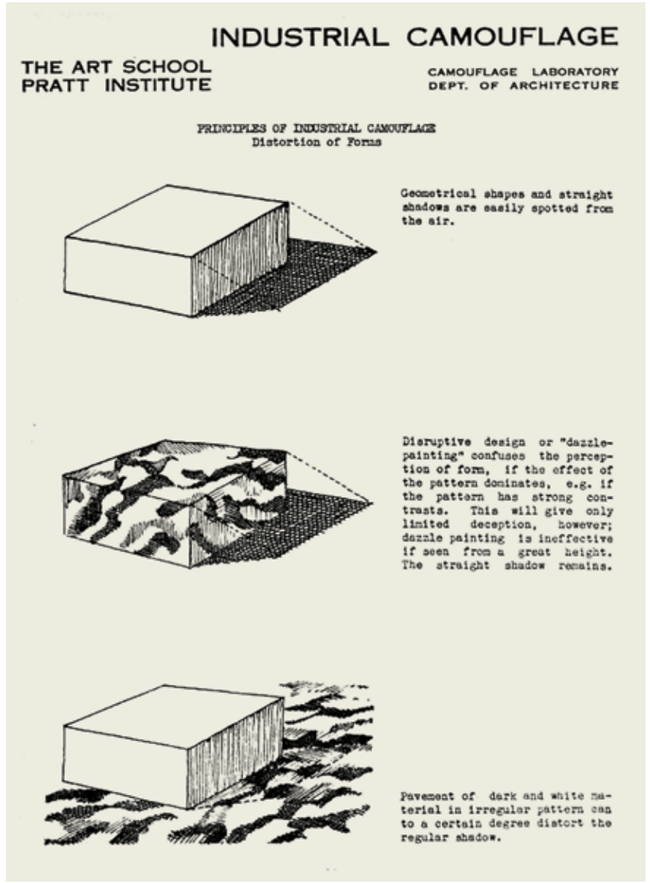
Citing applied-arts training programs in Europe, the trustees of the Metropolitan Museum of Art noted in 1880 how they "raised the standard of taste in the community, but . . . have [also] been the means of enriching the manufacturers."[29] In service of both, that year they founded the Industrial Art Schools of the Metropolitan Museum of Art, a precursor of the New York Trade School.

Organized by architect and philanthropist Richard Tylden Auchmuty, the school became independent in 1895. An endowment fund established in 1882 by the industrialist J. Pierpont Morgan underscored the school's aversion to organized labor and the apprenticeship system.

Starting with courses on carpentry and metalwork, the program rapidly expanded. [30] Lectures on history and theory complemented courses in carriage construction, as well as fresco painting and ornament. By 1881, women could study tempera decoration of textiles, leather, and glass. Sign painting classes started in 1898, and by the mid-twentieth century, piano repair, television broadcasting, and data processing courses were on offer. [31] Metalwork programs continued, including sheet metal and welding, along with related skills such as plumbing and electrical wiring. The sheet metal shop was organized for the construction of prescribed objects such as vents, cornices, and skylights, while plumbing and electrical trainees worked on stripped-down model buildings constructed within the school.

Metalwork was "one of the largest classes of mechanics and one of the most important," according to an applied arts school directory published by the Met in 1916. "The variety and extent of the metal trades . . . include the most delicate jewelry at one extreme and steam engines and structural iron at the other with innumerable grades between." From basic wiring to intricate air conditioning systems, for over a century these "innumerable grades" of skill have remained crucial to modern life. [32]

Renamed the Vorhees Technical Institute in 1961, the school was absorbed by the New York City College of Technology in 1970.



INDUSTRIAL CAMOUFLAGE

THE ART SCHOOL
PRATT INSTITUTE

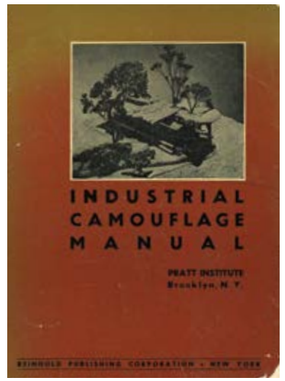
CAMOUFLAGE LABORATORY
DEPT. OF ARCHITECTURE

PRINCIPLES OF INDUSTRIAL CAMOUFLAGE
Distortion of Forms

Geometrical shapes and straight shadows are easily spotted from the air.

Disruptive design or "dazzle-painting" confuses the perception of form, if the effect of the pattern dominates, e.g. if the pattern has strong contrasts. This will give only limited deception, however; dazzle painting is ineffective if seen from a great height. The straight shadow remains.

Pavement of dark and white material in irregular pattern can to a certain degree distort the regular shadow.



Above: Cover of Konrad Wittmann and Pratt Institute Art School, *Industrial Camouflage Manual* (New York: Reinhold, 1942).

Opposite, left: "Principles of Industrial Camouflage: Distortion of Forms," in Konrad Wittmann and Pratt Institute Art School, *Industrial Camouflage Manual*, (New York: Reinhold, 1942): 44.

Opposite, right: Student painting camouflage model, *Prattonia*, 1942: 145. Brooklyn, Pratt Institute. Courtesy Pratt Institute Archives.

33. "A Look Back: How Pratt Students and Faculty Designed for Deception in World War II," *Pratt News*, May 5, 2020. Rick Beyer and Elizabeth Sayles, *The Ghost Army of World War II* (New York: Princeton Architectural Press, 2015). "Konrad Wittmann (Architekt)," Wikipedia; de.wikipedia.org/wiki/Konrad_Wittmann_(Architekt).
34. Konrad Wittmann and Pratt Institute Art School, *Industrial Camouflage Manual* (New York: Reinhold, 1942); archive.org/details/industrialcamouf00wittrich. *Prattonia* (Brooklyn: Pratt Institute, 1942): 144–47.
35. Ibid., 147.
36. The Museum of Modern Art. *Camouflage for Civilian Defense*. 1942; moma.org/calendar/exhibitions/3046.

In September 1940, as war spread in Europe, James Boudreau, the art school dean at Pratt Institute, an Air Force veteran, and a member of the Army reserve, initiated a camouflage design program directed by German émigré artist, architect, and teacher Konrad Wittmann. Faculty member William Goodridge, whose background was in theater, developed a materials and model shop, and industrial design faculty members Alexander J. Kostellow and Army captain Peter Rodyenko also participated. The Pratt family estate in Glen Cove on Long Island was used as a testing ground, and aerial documentation was provided by Boudreau and his wife, Helen Cronenwett. [33]

According to Wittman's detailed 1942 *Industrial Camouflage Manual*, students constructed models to study shadows, and a yearbook shows field testing of full-scale artillery decoys. [34]

Several graduates were recruited to the military unit known as the Ghost Army, most notably the artist Ellsworth Kelly. As reported in the 1942 Pratt yearbook, "Everyday, with the news of new battles pouring in, there come reports of increasing camouflage efficiency, and new methods thought up by men in the field." [35] In addition, student work was incorporated into a traveling exhibition developed in 1942 by the Museum of Modern Art entitled *Camouflage for Civilian Defense*. [36] Despite these successes and its popularity with students, the program ended for unknown reasons not long afterward.

Above: Irving Underhill, "Manhattan Trade School for Girls, Lexington Avenue and 22nd Street," 1918. Museum of the City of New York.

Opposite, upper left: Mabel Dean Bacon Vocational High School yearbook title page, *Torch*, 1950; upper right and lower left: photographs from *Torch*, 1952; lower right: Student design for a hat.

37. Mary Schenck Woolman, *The Making of a Trade School* (1910); archive.org/stream/makingoftradesch00woolrich.
38. Elisabeth Irwin, "A Trade School Building for 2,500 Women," *New-York Tribune*, September 8, 1918; chroniclingamerica.loc.gov/lccn/sn83030214/1918-09-08/ed-1/seq-30.
39. Paul Lukas, "Permanent Record," *Slate* (September 18, 2011); slate.com/articles/life/permanent_record/features/2011/permanent_record/lucille_fasanalla_saved_the_romper_she_made_as_a_student_at_manhattan_trade_her_whole_life.html. Paul Lukas. *Lucille Fasanella's Sample Book*; flickr.com/photos/65516705@n00/sets/72157626372514808/show.

In New York City, women and girls had long been able to enroll in informal applied-arts training programs, but one such school became a public powerhouse: the Manhattan Trade School for Girls. Opened in 1902 in a private house in today's Chelsea area of Manhattan, the school moved within a few years across town to a facility that could accommodate five hundred students, and by 1910 it had been absorbed into the city's fledgling school system. [37] In 1919, the school's ascendance was marked by its move to a purpose-built high rise near Gramercy Park. City Superintendent of School Buildings C.B.J. Snyder designed the Gothic-clad, industrial-strength steel structure with minimal columns and maximum floor loads. [38] Of the city's four public trade schools at the time, only Manhattan Trade enrolled women.

For decades, students learned in a racially integrated, self-contained environment with its own (profitable) economy and even facilities for sports and hygiene. There students could pursue garment trades such as dressmaking and millinery (including embroidery, the design and production of gloves, and the arrangement of flowers and feathers), as well as lampshade making, sample mounting, "brush and glue trades" (primarily box making), and the intriguing category of "novelties." [39]

As with many vocational schools, the institution's name changed several times, first to Manhattan Industrial High School in 1929, next to Manhattan High School of Women's Garment Trades, and then to Mabel Dean Bacon Vocational High School around 1947.

The curriculum changed over time, too. The "beauty culture" studies of 1918 became cosmetology and hair-styling programs by mid-century, and by the 1980s, business education, nursing, dental assistance, and cosmetology had become the primary focus. In 1998, Snyder's resilient Gothic skyscraper became the School of the Future, a digitally oriented program complete with Silicon Valley support.

Above: On press at the New York School of Printing, from Brian Cassidy, Bookseller, Collection of Printing Photographs from New York School of Printing, n.d.

Opposite: New York School of Printing yearbook cover, 1960.

40. "Printing Trade School Grew from Hudson Guild Boys' Club," *New York Times*, February 7, 1926; 168; nyti.ms/2P8rO8U.
41. "Glass Walls to Mark New Home of Printing School on W. 49th St," *New York Times*, January 13, 1957; nyti.ms/31eF4ve. Christopher Gray, "The Slipcovering of a School," *New York Times*, October 13, 2011; nytimes.com/2011/10/16/realestate/streetscapes-hells-kitchen-the-slipcovered-school.html.

Printing and publishing have long thrived in New York City. Throughout the nineteenth century, Publisher's Row near Fulton Street in lower Manhattan represented the center of American journalism. During the twentieth century, midtown was a nexus of journalism, literature, and advertising. Beginning with traditional letterpress, local printers periodically adapted technologies innovated elsewhere, such as Linotype (Baltimore) and Monotype (Philadelphia), and followed technology shifts to color, offset, and digital printing.

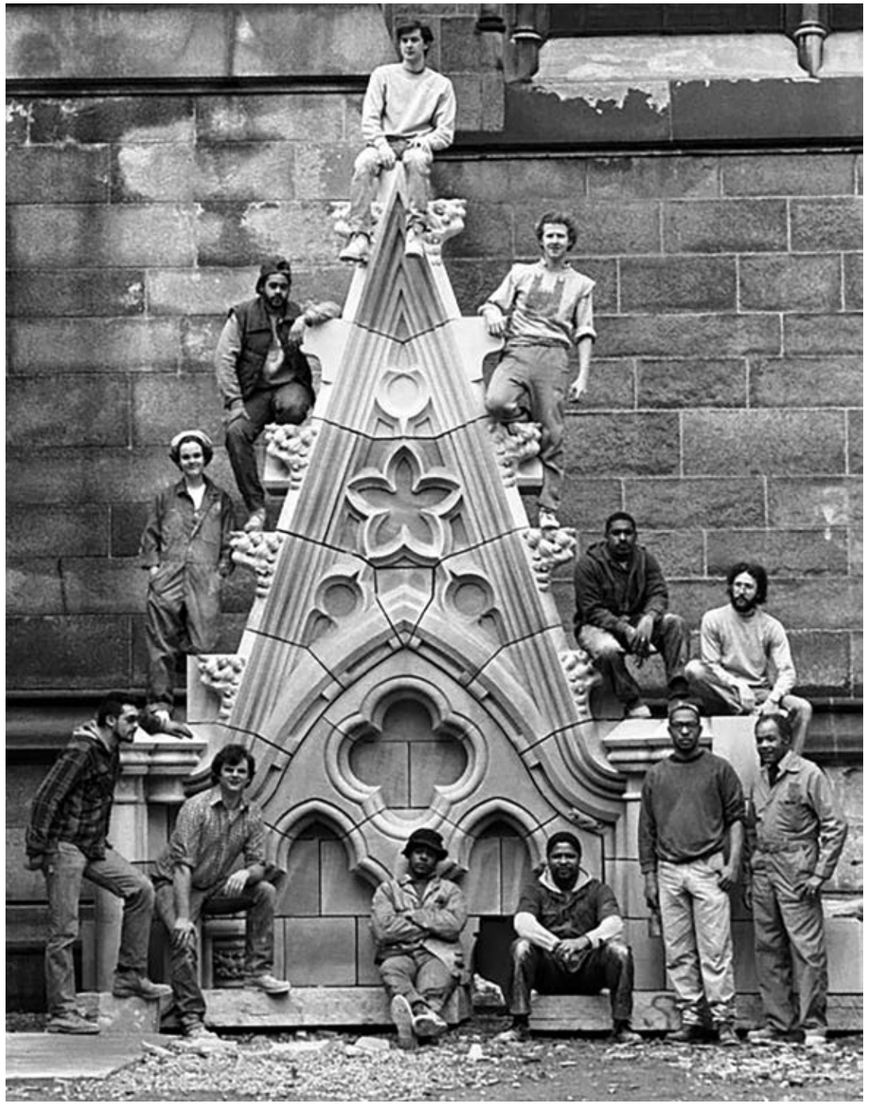
Organized labor strongly influenced training and entry into the profession. Area printers began organizing in the 1790s, and a Typographical Society was founded in 1809, consolidating into a Typographer's Union in 1850. Training took the form of apprenticeships and some educational collaborations. At the same time, schools as well as philanthropic programs helped to meet demand. The New York School of Printing (the best known of its many names) took all of those forms over the course of its ninety-nine year history.

The school began as a printing club for boys, initiated in 1913 at the Hudson Guild neighborhood house in Manhattan's Chelsea area. It grew to become a School for Printers' Apprentices, in which "capital, labor and education are interested," as one contemporary source noted. The school was renamed the New York School of Printing in 1925 and soon integrated into the city school system. The program moved to a "well equipped shop" on West 14th Street, then to 23rd Street, and again ten blocks north to Eighth Avenue. [40]

In 1959 architects Hugh Kelly and B. Sumner Gruzen designed an expansive modernist facility for the program in Hell's Kitchen, a structure punctuated by an undulating brick auditorium and an exterior mural by Hans Hofmann. [41] Escalators, another Hofmann mural, and a printing wall of fame were installed inside. Window walls spanned two sides of the building, designed to admit light but to minimize shadows, glare, and heat gain.

In addition to print training, the program expanded to related trades such as type cutting, typesetting, photo engraving, and lithography. Although racially integrated by the 1950s, women were excluded until well into the 1970s.

The school closed in 2012, and the future of the building is uncertain.



Above: "The Cathedral of St. John the Divine, New York City," n.d. Boston Public Library.

Opposite: Stoneworkers posing on all the cut stones for a gablet, Cathedral of St. John the Divine, March 20, 1986. From left, standing: Al Rivera, Alan Bird, James Jamerson, Angel Ecobar, Ruben Gibson, and Frank Walcott; second row: Cynie Linton, Jose Tapia, D'Ellis "Jeep" Kincannon; third row: Eddie Pizarro and Joseph Kincannon; top: Nicholas Fairplay. Photograph: Robert F. Rodriguez.

"It's like it's in your blood, the rhythms, the sound, the smell, the scale of things," said Treese Robb in early 2001, reflecting on the Stoneyard Apprenticeship program at the Cathedral Church of St. John the Divine in north Manhattan. [42]

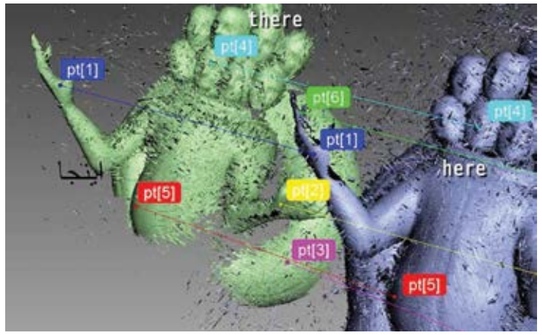
Construction of one of the world's largest Gothic cathedrals began in 1892 but stopped at the onset of World War II. In 1978, Dean James Parks Morton initiated an apprenticeship program in which area residents were trained by British masters of medieval stone carving.

Apprentices first learned to carve limestone architectural ornaments and then progressed to the creation of sculptural elements. One participant, a taxi driver from Nigeria, brought his training as a wood carver to the program. [43]

More than one hundred apprentices were trained over the course of the program, and at least eleven participants became professional stoneworkers. The apprentices completed much of the central portal and raised the south tower by fifty feet. [44]

The program ended in 1994, after an unsuccessful attempt at self-funding and mechanization. Today, the website *divinestone.org* documents the program, and one can join a stone carving workshop run by a former apprentice.

42. Daniel Watkin. "Memories Chiseled in a Cathedral's Stone," *New York Times*, February 23, 2001; nyti.ms/2M0aEZj.
43. William E. Geist, "Taking the Long View of Building a Cathedral," *New York Times*, March 19, 1986; nyti.ms/39iNciM.
44. Herbert Muschamp, "St. John the Divine: It Can't Go On. It Goes On," *New York Times*, December 20, 1992; nyti.ms/3d8AmVw.



Above: Eyebeam in Bushwick, Brooklyn.

Opposite (clockwise): Digital Day Camp; Morehshin Allahyari, *She Who Sees the Unknown*, 2017; participatory event; Frédéric Eyl and Richard The, *The Unresolved Image*, 2016. Courtesy Eyebeam.

45. Claire Voon, "As Eyebeam Turns 20, the Arts Nonprofit Moves to Bushwick," *Hyperallergic* (November 1, 2017); hyperallergic.com/408850/eyebeam-new-bushwick-home-at-20.
46. Maximiliano Durón, "Eyebeam Reformats Its Quietly Influential Technology-Focused Artist Residency," *Artnews* (February 22, 2021); artnews.com/art-news/news/eyebeam-residency-program-change-ford-foundation-1234584327.

The experimental art and technology incubator known as Eyebeam was founded in 1998 by innovator and philanthropist John S. Johnson, whose mission was to foster socially progressive, collaborative digital innovation by artists, designers, engineers, and programmers.

Eyebeam continues a tradition of New York City innovation centers, such as the Bell Telephone Laboratories (1898–1966) and Experiments in Art and Technology (founded in 1966). These presaged today's incubators, including the School for Poetic Computation (founded in 2013 and located at Westbeth, the former Bell Labs site), and the Cornell Tech campus in development on Roosevelt Island.

Eyebeam's path-breaking projects include reBlog, a file sharing protocol; Fundrace, a campaign finance geocoding system; and Rap Research Lab, an authoritative rap lyrics database. A new journalism school and Rapid Response program are addressing current events. Perhaps most influential, Eyebeam's open-source creative coding platform OpenFrameworks makes programming more accessible to multidisciplinary creators. [45]

These initiatives, along with Digital Day Camp and a steady stream of fellows, enable diverse creators to learn, create, and disseminate new ideas. [46]

Above: "Black Schoolhouse." Courtesy The Black School.

Opposite, above: The Black School Studio. Courtesy The Black School.

Opposite, below: Examples from Process Deck, 2018. Courtesy The Black School.

47. Hrag Vartanian, "What Does a Black Radical Art Education Look Like?," *Hyperallergic* (September 20, 2018); hyperallergic.com/461509/what-does-a-black-radical-art-education-look-like.
48. Ana Tuazon, "Breaking the Art World's 'Closed Circle,'" *Frieze*, no. 214 (October 2020); frieze.com/article/breaking-art-worlds-closed-circle.

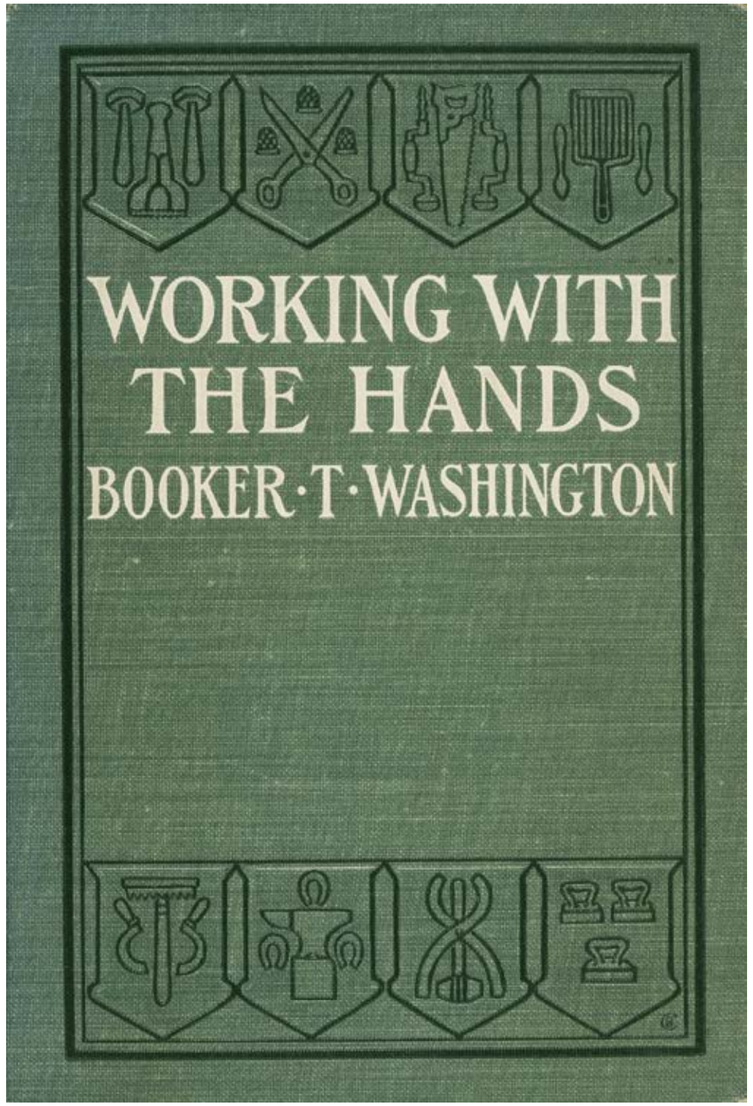
Using the Civil Rights–era Freedom Schools and Black Panther Liberation Schools as models, artist-educators Shani Peters and Joseph Cullier founded The Black School in 2016 as "a socially engaged proactive practice to educate Black/PoC [People of Color] students and allies on how to become radical agents of social and political change."

Currently located at Harlem–area high schools and youth centers, design-oriented workshops include photography, new media, and screen-printing in service of collaborative, community-oriented projects at a range of scales. Although it is oriented toward a K–12 audience, multigenerational involvement is an important aspect of the program.

To guide projects, the school's 2018 Process Deck invites participants to make an outline incorporating a principle, question, theme, tactic, medium, and form, to be considered in a community context. [47]

Resulting projects include Art as a Catalyst for Change 2019, a visual identity for anti-gun–violence after-school programs at the Bronx Museum of the Arts. The School also organized recent local iterations of the nationwide Black Love Festival.

School organizers envision a permanent home, with a crowdfunding campaign in progress and a commitment to community-oriented design guided by architects Bryan C. Lee Jr. and Whawn Allen in collaboration with architects from the firm LOT-EK. To that end, a group project involves the construction of pyramids as a scaffold for generating intentions about educational reinvention. [48]



Above: "School when in Draughts," (detail) in *Manual of the Lancasterian System (New York: Public School Society of New-York*, 1820): 43.

Opposite: Cover of Booker T. Washington, *Working with the Hands* (New York: Doubleday Page, 1904).

49. John Franklin Reigart, *The Lancasterian System of Instruction in the Schools of New York City* (New York: Columba University Press, 1916); archive.org/embed/lancasteriansyst00reig.

In English, the term *manual* is derived from the Latin word for hand. Similarly, the type of handbook known as a *vade mecum* means *go with me* in Latin, which suggests both a book traveling with the reader and a reader following along with an instructional text. An interconnection between physical and mental action is implied by both of these terms. This interrelationship is found in several works, examined here, that informed selected practices in this study.

First, detailed narratives of early nineteenth-century instruction manuals are discussed in a manual for running a primary school, with the emergence of mass-market educational publishing in the late nineteenth century explored through a cyclopedia of technical drawing. Next, the cultivation of progressive education at the turn of the twentieth century is examined in the well-known hands-on practice of Friedrich Froebel, but also in underexplored confluence with the Hampton and Tuskegee Institute's philosophy of "working with the hands." Examination of a process-driven card deck and app are presented as a concluding example of emerging interrelationships between academic and applied, analog and digital, hands-on and virtual pedagogical tools of our time.

HANDLING THE MANUALS

Organization of the New York African Free School is detailed in the 1820 *Manual of the Lancasterian System of Teaching Reading, Writing, Arithmetic, and Needle-Work, as Practised in the Schools of the Free-Society of New York*.[49] The rigorous order and detail in this manual is entirely consistent with the highly codified Lancaster or monitorial system. From specifying where and how students must stand to outlining minute-by-minute lesson plans, the manual packages the system for franchising. Originating in England early in the nineteenth century, texts like this one helped to disseminate the practice worldwide, often through colonialism. Moreover, since student teaching was integral to the system, it had a built-in mechanism for self-perpetuation.

During the late nineteenth century in the United States, instructional manuals flourished, thanks to the rise of mass-market publishing and distribution, along with increased literacy, the professionalization of primary education, and the

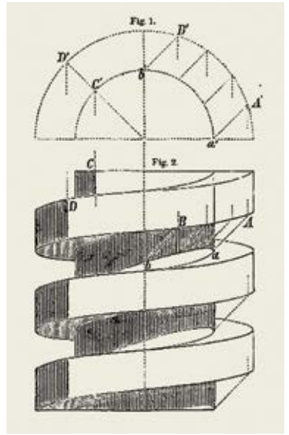
promise of social mobility through industrialization. From photography to steam engineering to domestic management, educational publishing thrived during this period. Technical drawing treatises reflect all of these trends, and *Appleton's Cyclopedia of Drawing* represents an enduring example. Daniel Appleton's expansive New York City publishing enterprise embraced numerous topics, with the color-printed, 700-page drawing manual printed in at least two editions between 1857 and 1896. [50] The career viability of technical drawing is reflected in the subtitle, indicating its use by "mechanic, architect, engineer, and surveyor" through the articulation of "geometrical projection, mechanical, architectural, and topographical drawing, perspective and isometry" and more.

HANDS-ON

The progressive education movement that emerged at the turn of twentieth century revolutionized primary education. [51] Advocates Friedrich Froebel, Maria Montessori, Rudolf Steiner, and Helen Pankhurst embraced childhood as the primal phase of human development, best cultivated through the inherent curiosity, creativity, and physicality of children. Hands-on methods involving structured play with educational toys (known as "occupations" or "gifts") led to the establishment of enduring schools around the world.

The characteristic exercise of paper weaving is evoked by the Brooklyn Institute's basketry classes. Froebel integrated paper into several gifts, which American companies such as Milton Bradley soon monetized. The proliferation of basketry guides then and now also attests to spread of the practice.

Similar goals and methods are found in the pedagogy of vocational education developed at the Tuskegee and Hampton Institutes. [52] This approach guided the Howard Orphanage and Industrial School, led by one of many Tuskegee graduates who became teachers. In this context, Booker T. Washington's 1904 book *Working with The Hands* articulates a common objective: "The hands, the head, and the heart together, as the essential elements of educational need, should be so correlated that one may be made to help the others." [53]



Above: Illustration from William Worthen, *Appleton's Cyclopædia of Drawing, Designed as a Textbook for the Mechanic, Architect, Engineer, and Surveyor* (New York: Appleton, 1866): 327; below: Elma E. Korb, *Paper Weaving Album*, 1908. Collection Lawrence and Elyse Benenson. Photograph: Norman Brosterman.

50. William Worthen, *Appleton's Cyclopædia of Drawing, Designed as a Textbook for the Mechanic, Architect, Engineer, and Surveyor* (New York: Appleton, 1866); archive.org/details/appletonscyclopd00wort.
51. Arthur Zilversmit, *Changing Schools: Progressive Education Theory and Practice, 1930–1960* (Chicago: University of Chicago, 1993); Thomas Müller and Romana Schneider, *Montessori: Teaching Materials 1913–1935, Furniture and Architecture* (Munich: Prestel, 2002); Ellen Lupton and J. Abbott Miller, *The ABCs of [Triangle Square Circle]: The Bauhaus and Design Theory* (New York: Princeton Architectural Press, 2019); Norman Brosterman and Kiyoshi Togashi, *Inventing Kindergarten* (New York: Harry N. Abrams, 2002).

Above: Process Deck cards; below: Workshop at the Black School. Courtesy The Black School.

52. James Levy, "Forging African American Minds: Black Pragmatism, 'Intelligent Labor,' and a New Look at Industrial Education, 1879–1900," *American Nineteenth Century History* 17, no. 1 (May 2016): 43–73; dx.doi.org/10.1080/14664658.2016.1172425.
53. Booker T. Washington, *Working with the Hands: Being a Sequel to Up from Slavery, Covering the Author's Experiences in Industrial Training at Tuskegee* (New York: Doubleday Page, 1904): v; digital.library.wisc.edu/1711.dl/Q0JOAP4BPKLHP8U.
54. Michel Felix Suarez and H. R Woudhuysen, eds., *Oxford Companion to the Book* (Oxford: Oxford University Press, 2010).

HEAD AND HANDS

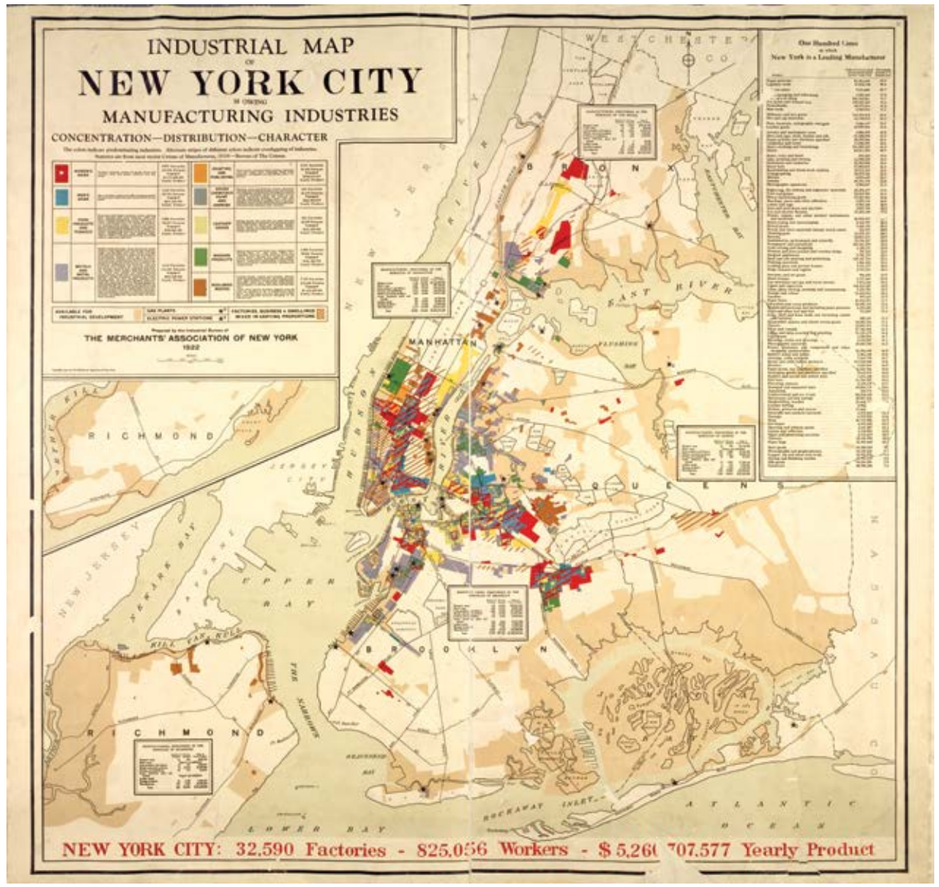
In the twentieth century practices examined here, the remote authority of manuals are integrated with participatory, game-oriented methods. This is seen in the field testing of camouflage detailed in the 1942 Pratt manual, for example, but it is most powerfully embodied in the Process Deck and App developed recently by The Black School.

In the first half of the twentieth century, increased leisure time and mass-media consumption for many in the United States engendered interest in participatory games and adventure stories. [54] Beginning with board games and dime novels, emerging into serialized drama and role-playing games, and flowering into computer gaming and virtual realities, today's educational tools blend analog and digital, YouTube and DIY, individual and collective learning.

On the one hand, remote education is on the rise and multiplayer computer games enable worldwide engagement. On the other, parents debate the value of "screen time," and Silicon Valley executives enroll their children in thoroughly analog Montessori schools. At the same time, life online engenders public interest in hands-on experience, seen in the revival of vinyl records and Polaroid cameras, craft brewing and urban farming.

Our final example makes sense in this context. The Black School's Process Deck originated in 2018 as a traditional playing card deck that was later developed into a smartphone app. With participants prompted to consider principle, question, theme, tactic, medium, and form in envisioning community-oriented applications, the Process Deck can be considered a true game of life.

In this way, even as life becomes more virtual, working with the hands remains deeply human, engendering socially purposeful, formally diverse, platform-independent practices that engage the minds and bodies of learners past, present, and future.



Opposite: "Industrial Map of New York City Showing Manufacturing Industries Concentration Distribution, Character." Industrial Bureau of the Merchants' Association of New York, 1922. New York Public Library.

Back cover: New York Superintendent of Schools, *Preparation for Trades; Manhattan Trade School for Girls, Vocational School for Boys, Murray Hill Vocational School, Brooklyn Vocational School for Boys* (New York: Clarence S. Nathan, 1916: 76); archive.org/details/preparationfortr00newy.

SOURCES
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City University of New York archives
Cooper-Hewitt Smithsonian Design Museum
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Museum of the City of New York
New-York Historical Society
New York Public Library
Pratt Institute Archives


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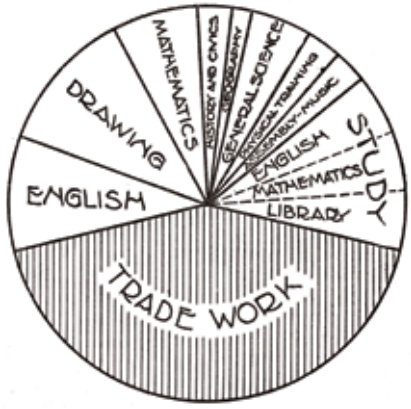
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