NPS Form 10-900
(Oct. 1990)

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determinations for individual properties and districts. See instructions in *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials, and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Roebling Machine Shop

other names/site number _____

2. Location

street & number 675 South Clinton Avenue N/A ☐ not for publication

city or town Trenton ☐ vicinity

state New Jersey code NJ county Mercer code 021 zip code 08611

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this ☒ nomination ☐ request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property ☒ meets ☐ does not meet the National Register criteria. I recommend that this property be considered significant ☐ nationally ☒ statewide ☐ locally. (☐ See continuation sheet for additional comments.)

Signature of certifying official/Title — Date 7/7/97

Assistant Commissioner for Natural & Historic Resources /DSHPO

State of Federal agency and bureau

In my opinion, the property ☐ meets ☐ does not meet the National Register criteria. (☐ See continuation sheet for additional comments.)

Signature of certifying official/Title — Date

State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that the property is:

☒ entered in the National Register.
☐ See continuation sheet.
☐ determined eligible for the National Register
☐ See continuation sheet.
☐ determined not eligible for the National Register.
☐ removed from the National Register.
☐ other, (explain:) _____

Signature of the Keeper — Date of Action

Patrick Andrus — 9/4/97

Roebling Machine Shop
Name of Property

Mercer County, New Jersey
County and State

5. Classification

Ownership of Property
(Check as many boxes as apply)

- ☐ private
- ☒ public-local
- ☐ public-State
- ☐ public-Federal

Category of Property
(Check only one box)

- ☒ building(s)
- ☐ district
- ☐ site
- ☐ structure
- ☐ object

Number of Resources within Property
(Do not include previously listed resources in the count.)

Contributing	Noncontributing	
one		buildings
		sites
		structures
		objects
one	none	Total

Name of related multiple property listing
(Enter "N/A" if property is not part of a multiple property listing.)

N/A

Number of contributing resources previously listed in the National Register

none

6. Function or Use

Historic Functions
(Enter categories from instructions)

INDUSTRY/manufacturing facility

Current Functions
(Enter categories from instructions)

WORK IN PROGRESS/museum

7. Description

Architectural Classification
(Enter categories from instructions)

Industrial basilica

Materials
(Enter categories from instructions)

foundation Sandstone and concrete
walls Brick
roof Metal
other

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

Roebling Machine Shop
Name of Property

Mercer County, New Jersey
County and State

8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

- ☐ **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.
- ☒ **B** Property is associated with the lives of persons significant in our past.
- ☒ **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.
- ☐ **D** Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations N/A
(Mark "x" in all the boxes that apply.)

Property is:

- ☐ **A** owned by a religious institution or used for religious purposes.
- ☐ **B** removed from its original location.
- ☐ **C** a birthplace or grave.
- ☐ **D** a cemetery.
- ☐ **E** a reconstructed building, object, or structure.
- ☐ **F** a commemorative property.
- ☐ **G** less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance
(Enter categories from instructions)

Architecture
Engineering
Industry
Invention
Communications
Transportation

Period of Significance

1890-1947

Significant Dates

1890
1901

Significant Person
(Complete if Criterion B is marked above)

Charles Roebling

Cultural Affiliation

N/A

Architect/Builder

Charles Roebling

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographical References

Bibilography
(Cite the books, articles, and other sources used in preparing this form on one or more continuation sheets.)

Previous documentation on file (NPS): N/A

- ☐ preliminary determination of individual listing (36 CFR 67) has been requested
- ☐ previously listed in the National Register
- ☐ previously determined eligible by the National Register
- ☐ designated a National Historic Landmark
- ☐ recorded by Historic American Buildings Survey # _____
- ☒ recorded by Historic American Engineering Record # _____

Primary location of additional data:

- ☒ State Historic Preservation Office
- ☐ Other State agency
- ☐ Federal agency
- ☐ Local government
- ☐ University
- ☒ Other

Name of repository:
Invention Factory Science Center

Roebling Machine Shop
Name of Property

Mercer County, New Jersey
County and State

10. Geographical Data

Acreage of Property 1.16 acres

Trenton West, NJ Quad

UTM References
(Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing
1	18	521020	4450840
2			
3			
4			

☐ See continuation sheet

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Susanne Hand, Partner

organization Kinsey & Hand date April 17, 1997

street & number 14 Aiken Avenue telephone (609) 924-4990

city or town Princeton state N.J. zip code 08540

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps

A **USGS map** (7.5 or 15 minute series) indicating the property's location.

A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs

Representative **black and white photographs** of the property.

Additional items
(Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of SHPO or FPO.)

name City of Trenton

street & number 319 East State Street telephone

city or town Trenton state N.J. zip code 08608

Siting and Summary Description

The Roebling Machine Shop is located on a 1.16-acre lot along the intersection of South Clinton Avenue and Dye Street. The building served as the machine shop for the John A. Roebling's Sons Company, manufacturers of wire rope. Along Dye Street, the machine shop marks the eastern edge of the John A. Roebling's Sons original complex. A number of the John A Roebling's Sons former buildings located south, west, and north of the machine shop, and dating primarily from the early twentieth century, are currently being rehabilitated for office, commercial, cultural, and residential uses. Immediately to the south is parking for the new offices. A gas station at the corner of Dye and South Broad Streets, is scheduled for demolition. South and east of Dye street is an older residential neighborhood comprised primarily of nineteenth century row houses interspersed with vacant lots. At the northern end of the building, single train tracks remain and beyond there is a large, new metal structure in the form of a building frame hung with signs. This serves as the South Clinton Avenue entranceway to the stores and commercial establishments. Further north and east of South Clinton Avenue are additional late nineteenth and early twentieth century industrial buildings, mostly vacant, of the former John A Roebling's Sons works. Some original Belgian block paving remains around the mill yard of the Roebling Machine Shop and near the north entrance elevation.(figure 1) Original brick sidewalks laid in a herringbone pattern and bluestone and granite curbs remain along South Clinton Avenue and Dye Street.

The Roebling Machine Shop consists of two main sections, each a long 3-bay, 2-story brick structure, capped by a monitor roof. The original section, built in 1890 along South Clinton Avenue, is 170 feet in length; the later section, built in 1901 along Dye Street, is two and one-half times the length. Both sections are set close to the street and conform to the pattern of the streets, meeting at an obtuse angle where Dye Street intersects South Clinton Avenue. Both sections have similar form, materials, structure, fenestration, and architectural details. Each is built of load-bearing brick, with a brownstone foundation, full-height brick pilasters delineating the window bays, and corbeled brick detailing and cornices. The wood-framed double-hung windows at each story have multi-paned sash set within segmental-arched openings. The entrance elevations at both ends suggest the basilican form of the interior with a high shallow-pitched central section and lower side bays to accommodate the monitor roof and clerestory. The roof has three layers, an original tin layer and two subsequent layers of built-up roofing. Each of the main sections has one or two additions on the west. (photo 1)

The interior of the Roebling Machine Shop consists of a long, 40-foot high nave-like central section serving as the erecting bay beneath the monitor roof and continuous clerestory windows. To either side there is an aisle with gallery above. A bridge at the second story marks the angle where the older and newer sections meet. The 1890 section has a timber interior structure. The 1901 section has a combination of timber and steel framing. Both sections have Howe trusses supporting the roof. There are three traveling bridge cranes in the building spanning the central erecting bay and running its complete length. (photo 2)

The Roebling Machine Shop retains integrity from its dates of original construction and early expansion through its period of significance. The building's form, materials, structure, and architectural details are largely intact. The vast majority of the original windows are extant, except for the clerestory windows which are missing. Later additions, which reflect the changing needs of the industrial workplace, are small in scale.

Exterior Description of the 1890 Building and 1942 Addition

The earliest section, built in 1890 along South Clinton Avenue, is 68 feet by 140 feet with its entrance on the north end. The load-bearing brick masonry has 16-inch thick walls laid in common bond. Original multi-paned, wood-framed windows are paired at each opening with segmental-arched transoms above.

The north gable end has a tall central section flanked by full-height brick pilasters and topped by a shallow-pitched monitor roof. Flanking 2-story shed-roofed bays also have brick pilasters marking their corners. Corbeled brick follows the rake of both the central upper and flanking lower rooflines. The original doorway centered on this elevation had sliding double doors topped by a large wood-framed, multi-light segmental-arched transom set within a segmental brick arch. Inscribed in the stone keystone of the brick arch was the date "1890." The doorway was later raised, with a steel lintel replacing the brick arch and taller sliding wood doors, now covered by a metal enclosure, replacing the transom. At the second story of the central section, there are two large paired windows with 9/9 sash, 3-inch mullions, and segmental-arched transom. Centered within the gable of the monitor roof is a window of similar form and materials, with 6/6 sash, similar in size to the second story windows of this facade and building. Each end bay has paired segmental-arched windows at each story, except for the first story window east of the entrance which has an enlarged square-headed replacement window and door of unknown date, altering the symmetry of this facade. (photo 3)

The east side, along South Clinton Avenue, has eleven regular bays articulated by two-story high brick pilasters 12 feet on center rising flush from a low, random ashlar brownstone foundation. Windows are set within panels between the plain brick pilasters. The one alteration is at the first bay from the north which has two doors, large square-headed windows and transom, similar to the altered fenestration on the north entrance elevation. The window panels are recessed four inches from the foundation/pilaster plane. Three courses of corbeled bricks delineate the transition from the foundation to the wall panels and a similar pattern of corbeled bricks near the roof marks the transition from the window panel to pilaster plane at the top. The roof cornice is a simple double row of corbeled bricks.

Within each panel are paired wood-frame windows surmounted by a wood-frame segmental-arched transom. The windows at the first story are taller than those on the second, but all have similar form and

materials. Windows are set on 4-inch bluestone sills and are topped by a 12-inch segmental brick arch, comprised of alternating courses of soldier and header bricks. The paired windows at the first story each have 9/9 double hung sash with mullions between them and 6-light transoms above. Second story windows have 6/6 sash and similar mullion and transoms as the first story.

On the west side of the 1890 building, extending flush 27 feet from its entrance elevation is a one-story, steel-frame addition built in 1942. Its north elevation has a brick facade above a concrete foundation, a parapet with concrete coping, triple multi-paned steel windows, a central pilaster with the date "1942" inscribed near the top, and a double-doored entrance with a paired 10-light transom above. Along the addition's 132-foot-long western side, which extends to the second bay of the 1901 section, are nearly continuous rows of large, rectangular, multi-paned steel windows above a brick base and double doors near the south end. The low-pitched shed roof has two skylights. Second story windows of the original 1890 section remain on the west side, visible above the single story addition. (photos 3 and 4)

Interior Description of the 1890 Building and 1942 Addition

The interior of the 1890 section has a basilican form with a high, clerestoried central section and an aisle and gallery above to either side. The heavy timber interior framing is exposed and unadorned. It follows typical mill construction practices of the period, designed in this case to accommodate the loads of the crane, the second floor galleries, and roof. The framing timber appears to be southern yellow pine, which was commonly used in factories during the late nineteenth and early twentieth centuries.

The interior frame has 10-inch square timber posts between the erecting bay and the aisles/galleries from the floor to the top of the crane. Between the posts at the second floor level are 10-inch by 10-inch horizontal girders, fastened with steel brackets. These support 4-inch by 11-inch second floor joists, placed approximately 14 inches on center. Upper girders measuring 4 inches by 8 inches run along the tops of the main posts. The roof above the galleries is framed with triangular trusses consisting of a girder and principle rafter, two diagonal braces, and a plank post bolted onto either side of the rafter and girder. This post configuration continues upward to frame the walls of the clerestory. (photo 5)

The clerestory is framed with a truss consisting of upper and lower beams, similar-size principle rafters, four diagonal braces, two between the tie beams and two between the upper tie beam and the principal rafters, and the plank post continued from the gallery truss. The roof above the galleries and the monitor is framed with rafters between the trusses placed approximately 30 inches on center and supported by triangular blocks. The roof decking consists planks roughly 10 inches in width. (photo 6)

The 5-ton traveling crane, manufactured by the Shaw Electric Crane Company, appears to be original. It sits on top of steel crane rails attached to the timber posts at the second story with steel brackets. This allows the crane to travel the length of the central erecting bay of the building. The crane is

powered by 250-amp, triple-phase DC services supplied through triple wires than run above the west crane rail. (photos 5 and 6)

The first floor has 4-inch oak strip flooring laid on a diagonal. A steel stair runs from the second longitudinal bay north, up to a platform connecting to the east gallery. Alterations to the framing at the second floor suggests that this stairway was a replacement for an earlier stair in this location. At the northern end of the east gallery was the foreman's office, partitioned off from the gallery with wood tongue and groove plank walls topped with 12-light fixed sash. On the south side of the partition was the pattern shop, three bays of which have a wood base and triple multi-paned sash above extending between the posts. (photo 5) At the end of the galleries there are four steps up to the bridge which connects the two galleries of the 1890 section and accommodates the change in level to the galleries of the 1901 section.

On the west side of the first floor at the third bay from the north is one original interior entrance to the 1942 addition from the 1890 building. This addition, which served as a tool and dye shop, is a long unpartitioned space with ample natural light from the continuous windows and skylight. (photo 7) Two original windows from the 1890 building remain; the others now have thick metal mesh screens.

Exterior Description of the 1901 Building, the World War I Addition, and the 1946 Addition

The newer section of the Roebling Machine Shop was completed in 1901. Following the same basic form, materials, and details of the original building, this section has a 3-bay, 2-story monitor roof form and similar brick masonry and fenestration. This section, which measures 338 feet by 72 feet, is two and one half times longer and somewhat wider and taller than the original. (photo 8)

Changes in proportions and detailing between this section and the original 1890 building are evident. The brownstone foundation along Dye Street is higher and includes a quarter-round contour at its top to make the transition to the slightly recessed window panel. The panels themselves are wider with the brick pilasters between the window panels measuring approximately 18 feet on center and the windows are larger. These changes are more noticeable on the interior of the building where, in much of the building both sections are visible and experienced at the same time. (photo 9) On the exterior, the angle of Dye Street and South Clinton Avenue makes each of the street side elevations more of a separate viewing experience, although right at the intersection, the proportional variations are quite apparent. (photo 10)

The 1901 building was itself built in two sections, with the two end bays of the long sides and the gable end apparently built a very short time after the long main section. This extension has a basement, the only basement in the entire building, with segmental arched basement windows and window wells visible one three sides. On the southeastern side, along Dye Street, the foundation is brownstone to match the rest of the building; on the other two sides, the foundation is concrete and far less prominent. The main block and the 2-bay extension are all considered the 1901 building.

The datestone "1901" is inscribed in the keystone above the segmental-arched doorway of the southwest gable end. The design of this facade is similar to the gable end of the 1890 building. The 1901 section, retains more of its original doorway. The doorway changes here consists of a steel lintel inserted below the arch, rather than elimination of the arch. Double wooden sliding doors with cross-braced vertical-plank panels are old, but not original. At the second story of the central section and the first story of the southeast bay, the large paired windows have 4/4 sash with four-light transoms. The other second-story windows and the uppermost window in the central section have paired 6/6 sash with segmental-arched heads. The original opening at the first story of the northwest bay has been infilled with wood and a small, squarish window. (photo 11)

The southeast longitudinal elevation along Dye Street presents a long, repetitive symmetrical facade. The wood-frame windows appear to be original and largely intact, and are roughly similar to those in the 1890 section. Although the configuration of the windows (paired multi-light double-hung windows within segmental-arched openings) are like those of the 1890 section, the windows are not identical. First story windows in this section have paired 6/6 sash with paired, operable 6-light transom windows above. At the first story, the windows are wider than the 9/9 windows of the original 1890 section, and the transoms are taller, making for a larger and taller window opening. At the second story, the windows of the 1901 section are wider than the 9/9 windows on the 1890 section and have 6/6 sash with segmental-arched heads and no transoms. Between the stories near the intersection with South Clinton Avenue, a sign painted on the brick walls reads "Apex Lumber Company."

The northwest longitudinal side of the building, along the former mill yard, has two bays on its southwestern-most portion--the two bay extension of the 1901 section. It, too, has small altered windows, like the one on the southwest entrance elevation. Behind this was the drop forge shop, which projects out one bay with the shed roof extending from the clerestory over this section in a smooth line. The first story windows of its 6-bay long side have been infilled with brick and concrete or altered with newer doors. The windows above which also illuminated the high single story interior space of the drop forge shop are missing, but the original openings for these squat, segmental-arched windows remain. (photo 12)

Projecting out beyond the drop forge shop, roughly in the middle of this elevation is a 2 story brick addition. The addition was built in two sections. Its southwestern-most section, probably built during World War I, is a small squarish building housing a lavatory on each floor. It is built of yellow brick with two steel frame windows at each story, plain pilaster detailing, and a shed roof which slopes down toward the main building. (photo 12) The 1905 Lathrop Map shows a smaller separate building in this location, which probably served as the earlier lavatory for the machine shop. In 1946, the addition was doubled in size, replicating the form and details of the first addition. This later section is built of red brick.

The northwestern-most longitudinal side of the building resumes the plane of the two bay extension at the other end of the building. Its form, windows, and detailing are the same as the 2 longitudinal bays of the extension and the longitudinal bays of the Dye Street elevation. This section adjoins both the 1890 section and the one-story 1942 addition at an angle. (photo 13)

Interior Description of 1901 Building and its Additions

The scale of the 1901 section, creates an even more monumental interior space than the 1890 building, but the basic form, framing, and fenestration are quite alike. (photos 14 and 15)

The interior framing of the 1901 section is similar to that of the 1890 section with two notable exceptions. Both involve the use of metal rather than wood members. First, the posts framing the central erecting bay are cast steel. The lower portion of the posts extends to the second floor level where flanges support the gallery girders. The upper portion, also supported by flanges, is tapered at the base and extends up to the crane rail. The two portions are bolted together at the gallery floor level. The second variation are the steel girders that support the gallery floor between the posts. These are made up of channels bolted together to form an I-beam. (photo 16) The timber roof framing generally replicates that of the 1890 section. The roof trusses and framing above the galleries have the same configuration as in the 1890 section, but they are expanded to accommodate the wider span.

The 1901 section has two traveling steel cranes, a 10-ton Niles Crane on the southwest end and a 5-ton Shaw Crane on the northeast end. (photo 5) A portion of the original line shafting that delivered power to the various machines remains largely intact on the northwest gallery.

The evidence for the two-end bay extension being an afterthought is more striking on the interior than on the exterior. Brick end walls and window detailing from the originally planned gable end of the building are still visible on the interior, while the second story and roof framing appears to be uninterrupted, suggesting that the building was extended before the construction of the main section was completed. On the southeast aisle, the original brick end wall is one story high with a segmental-arched window still in place; in the drop forge shop to the northwest, the wall is two stories high and window arches are evident.

At the first story, the two-bay extension has modern offices set within the aisles, probably added in the 1980s when the building was used as a warehouse for the Apex Lumber Company. Beyond the offices at the northwest aisle and adjacent to the drop forge shop, there is a stairway leading to the portion of the gallery southwest of the drop forge shop. Between the central erecting bay and the drop forge shop, there is a brick, glass, and wood wall. At its lower level, this wall consists of a 12 inch brick portion about six feet high with a row of 20-paned steel window sash above and a double sliding doors in the center. The upper portion, extending to the clerestory windows, has 12 and 16-light wooden sash set within a wooden frame

with beaded-board sheathing. (photo 17) The drop forge shop is an unpartitioned one-and-one-half-story space, five bays long. Its roof framing is an extension of the gallery framing. Its first story windows have been infilled with brick or altered with newer doors, but its original squat, segmental-arched upper window openings remain.

A round-arched opening leads to the former lavatory in the World War I addition. This doorway appears to be original to the 1901 construction date and may have led to a small earlier appendage to the building. (figure 6) The foundation and floor of the World War I addition are concrete. The second floor also served as a lavatory. The 1946 addition adjoins and expands the World War I addition. There is a doorway to it from both the aisle of the 1901 section and the World War I addition. A steel stairway within this addition leads to its second floor. A large arched doorway connects the 1901 section to the southwest end of the 1942 addition.

The original wood floor of the 1901 section was replaced with a concrete slab in the 1960s. This floor ramps down along the aisles to meet the lower floor level of the 1890 section. At the central bay, the floor ramps up and stops abruptly, a considerable height above the floor of the 1890 section.

Summary

The Roebling Machine Shop is significant as the oldest intact building within the John A. Roebling's Sons Company, Trenton's greatest manufacturing business, employing in its heyday almost twenty percent of the city's industrial workforce. As the building in which the machines for the Roebling Company's wire rope products were designed, made, and repaired, the machine shop was a key building within the Roebling industrial empire for over fifty years. The machines invented, built, and reconditioned in this building were used to manufacture wire rope and related products that were critical in the development of bridges, buildings, ships, streetcars, airplanes, and telecommunications structures throughout the industrialized world.

Criterion C Architecturally, the building is significant as a magnificent and well-preserved example of a turn-of-the-century industrial basilica, an ancient public/religious building type adapted for industrial purposes. From an engineering perspective, the Roebling Machine Shop with its two major periods of development--1890 and 1901--reveals the evolution of industrial buildings at the turn of the century. The 1890 building represents typical industrial building design and construction of the mid-late nineteenth century. The 1901 building reflects the increasing use of new materials and technology in its combination timber and steel structure within a traditional industrial building form. As such, it represents a brief, important transitional moment in industrial building design, before the shift to steel-framed modern industrial buildings which radically changed the structure, and design, and appearance of modern industrial buildings.

Criterion B The Roebling Machine Shop is significant for its association with Charles Roebling, one of John A Roebling's three sons who owned, managed, and greatly expanded the company that John Roebling founded in 1849. Charles Roebling, President and Chief Engineer of the John A. Roebling's Sons Company, designed the machine shop and oversaw its construction. As the partner in charge of building and manufacturing, Charles Roebling also was responsible for the operation of the machine shop from the time it was built until his death in 1918.

Historical Development and Earlier Machine Shops for Wire Rope Factories

In 1849, John A. Roebling established a wire rope factory on a 25-acre site along the Delaware and Raritan Canal in Chambersburg, an area south of Trenton which the city annexed in 1888. An immigrant engineer from Germany, John Roebling pioneered the use of wire rope in Pennsylvania in the 1830s for inclined planes and aqueducts. At the suggestion of Peter Cooper, the New York inventor and entrepreneur who had established the Trenton Iron Company along the D & R Canal in Chambersburg in 1846, John Roebling built his factory along the opposite bank of the canal. Roebling himself designed the buildings and machinery, beginning a tradition of self-sufficiency in design and production that the Roebling

Company would follow for over one hundred years. This led the Roebling Company to develop extensive machine shop facilities as in integral part of their manufacturing operations.

John Roebling's original factory consisted of two buildings, a wire drawing mill and a rope shop. As production grew, Roebling, a brilliant engineer and inventor, designed various processes and machines to improve the manufacture of wire rope. In 1861 John Roebling designed a 64 by 180 foot new brick machine shop and rope factory. The building's design and structural system both typified standard industrial construction practices of the period and influenced the design of the 1890-1901 machine shop. It had a 35 foot wide by 15 foot high main gable-roofed section for eight rope and stranding machines with a 20 foot machine shop at one end and a 26 foot shed-roofed section on the long side. The load-bearing brick building had pilasters placed sixteen inches on center with single, round-arched 16/16 windows between. The interior structure adapted roof trusses of the period to span the 35 foot main bay and 26 foot shed. (figure 4)

John Roebling died in 1869, following a tragic accident at the Brooklyn Bridge construction site. His sons, Washington and Ferdinand, took over the business. Charles joined the firm in 1871 at the age of twenty-one, after studying engineering at Rensselaer Polytechnic Institute. These three sons, each specializing in a different area, significantly enlarged the Roebling industrial enterprise. Washington was the bridge engineer and builder. Ferdinand was the financial manager, marketing Roebling's products world-wide and investing profits so as to have ready and liquid capital for factory expansion. Charles Roebling oversaw the design, construction, and operation of the factories.

Charles Roebling's first major task was to modernize and expand the company's capacity for rolling rods into wire. With the help of the Roebling Company's superintendent, Charles Swan, Charles Roebling erected a complicated and innovative rolling mill, expanding the original Chambersburg site to the north. Charles Roebling also built a galvanizing shop to manufacture the special wire needed for telegraph lines.

By 1876 the business had grown to the point where the brothers decided to incorporate, establishing the John A Roebling's Sons Company. Charles Roebling became President in 1877. In the 1870s and 1880s, the John A. Roebling's Sons Company pursued several expansion strategies simultaneously. The Roebling Company built upon its national prominence in rope manufacturing and suspension bridges by mounting impressive displays at major expositions and establishing sales offices in major cities. The company diversified operations, producing more of the materials it needed, such as billets and rods. It also increased the variety of finished products it produced. Major products included galvanized wire for telegraph lines, electrical wire, wire cable for elevators, and wire cable for streetcars. By 1880, the Roebling Company had five hundred employees.

In the 1880s, Charles Roebling expanded and rebuilt his father's 1861 rope factory. He also designed special 2-story rope rooms to house a new generation of huge machines to spin long lengths of rope without splices for streetcars. Charles followed John Roebling's basic vertical designs for the new machines, starting with the 30-ton rope machine and leading to the 80-ton rope machine, a mammoth 64 foot tall rope layer which was the industry's largest for many years.

Charles Roebling also continued his father's practice of combining a machine shop and manufacturing facility within a single building. In 1877, he built a wire mill with a machine shop on a portion of the ground floor and in the 1880s he converted the first floor of the braiding shop to a machine shop. The Roebling Company also jobbed out some machining during this period to small foundries, blacksmiths, and machine shops in the area, such as the Peter Wilkes Foundry on Pearl Street.

Charles Roebling improved upon his father's industrial designs, particularly with regard to windows and lighting. Charles understood the importance of natural light in industrial building design. He began designing buildings with larger windows and paired windows to increase light within the building. The maximum penetration of useful light from standard-sized side windows was calculated at 20 to 25 feet. By expanding the window openings, the multi-story Roebling buildings of the 1870s and 1880s were up to 60 feet wide with adequate natural light.

Peter Cooper's Trenton Iron Company was also expanding in the post Civil War era, and as the demand for wire rope grew, Trenton Iron was one of the companies that began making wire rope in competition with Roebling. Trenton Iron's early machine shops, like Roebling's, were integrated into manufacturing buildings. The Trenton Iron Company was the first of the two companies to construct a building to house a large separate machine shop. Trenton Iron's machine shop, built in 1888, also influenced the design of the 1890 Roebling Machine Shop. Trenton Iron's machine shop building was an industrial basilican design, divided into three bays with expansive multi-paned windows and transom set within a segmental-arched opening. A tall narrow center bay lit by a monitor roof served as an erecting area and had a traveling crane overhead. Side bays were used as working areas. (photo 18)

Thus, when Charles Roebling designed the machine shop in 1890, he had a number of buildings which provided models, from his father's 1861 machine shop and rope factory, to his own combination factory and machine shops from the 1870s and 1880s, to the Trenton Iron Works machine shop of 1888.

The Cathedral of Industry: Design and Construction of the Roebling Machine Shop

The 1890 machine shop was the John A. Roebling's Sons first major building on the eastern edge of its main block. Within ten years, the building was expanded to two and one half times its original size. The machine shop's size, design, and location reflect the shop's importance within the factory as well as the growth and prosperity of the Roebling Company.

The design of the building combined both ancient and up-to-date architectural and construction elements to create a utilitarian building for machine making. The building form itself was the ancient form of the basilica, adapted for industrial use. The earliest basilicas were ancient Roman buildings, used as assembly halls, with a monumental central space lit by clerestory windows. Aisles or two story galleries flanked the long, high, open central space. Roofs were supported by timber trusses. Early Christians adapted the Roman basilica form for churches. The basilican church became a religious building type that was popular for many centuries in the west. The cross section of Old St. Peter's basilica in Rome, built in the fourth century, shows the high clerestoried central space or nave, timber truss roofs, and columned aisles. And, although this enormous church building had a five bay plan with two aisles to the sides of the nave, its basic form and structure is similar to the Roebling Machine Shop, built some fifteen hundred years later. (photo 19)

The Roebling Machine Shop did not have the rich colored stone columns of Old St. Peters, or the decorative detailing of other Christian basilicas. The Roebling Machine Shop revealed the unadorned essence of its structural form in its straightforward timber (or steel in the 1901 section) posts and exposed trusses. The machine shop was the basilica with the structure revealed, the utilitarian basilica for turn-of-the-century industry. In its size, structure, lighting, aspects of its form, and importance within the Roebling Complex, the Roebling Machine Shop is aptly characterized as a "Cathedral of Industry."

The building's structure, size, materials, lighting, and power sources reflected state-of-the-art technology, as evidenced by factory manuals of the period, to suit its machine shop use. The two major periods of building construction--1899 and 1901--reveal technological changes at the turn of the century; with the 1901 building incorporating steel into its structural system.

The Roebling Machine Shop, like other industrial buildings of the period, required a building that would facilitate an efficient manufacturing process. One manual of the period stated the obvious. The building must "fit the mill. The form, length, height and width will then depend on the contents."[1] Another extolled the utility of industrial buildings with 3 bays, describing a building rather like the machine shop. The 3-bay shop is "quite commonly used where it is desired that the main part of the building be open and be provided with a traveling crane that will sweep the building, while the side rooms are used for lighter tools and miscellaneous work."[2]

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[1] Tyrell, Henry G., *A treatise on the Design and Construction of Mill Buildings and Other Industrial Plants* (Chicago, 1911), 12-13.

[2] Ketchum, Milo S., *The Design of Mill Buildings and the Calculation of Trusses in Framed Structures* (New York, 1903), 141, 157-158.

The 1890 Machine Shop For the 1890 Machine Shop, Charles Roebling devised a three-bay plan in the basilican form with a wide erecting bay beneath a monitor roof and 2-story bays to either side. This design maximized the shop's planned use of the traveling crane technology and allowed for sufficient natural light within the building. As the Roebling Company built vertical wire rope layers, the shop's tall central bay serviced by a traveling crane was the space for the largest milling machines, for moving materials, and for fabricating and erecting. The side bays provided space for medium-sized machines and for pattern making on the second floor galleries. The width of the central bay, which measured 28.1 feet wide on the interior, was significantly wider than the central erecting bay of the Trenton Iron Works Machine Shop. This wider erecting bay was a more efficient design for building large machines.

The relatively new technology of electric power is evident in the Roebling Machine Shop, especially in relation to the traveling crane. Traveling cranes had been used in iron companies for a number of years, but the advent of electricity increased their effectiveness. The traveling crane consists of a hoist mounted to a carriage that rolls along overhead rails. Early hand-operated versions, which employed rope or chain attached to gears, were slow and laborious. Steam-driven belts or rope increased efficiency, but required cumbersome equipment. Electric motors increased efficiency still further, by enabling the power drive to be mounted directly onto the carriage of the traveling crane. The motor picked up electricity from wire that ran parallel to one of the crane rails. The cranes and their lift hooks could thereby move the length and width of the building more quickly.

Although electricity had a significant impact on the traveling crane, it was of more limited use in lighting the machine shop. During this period, the Roebling Company typically used a combination and electric and gas lighting, but the interior light from these sources was inadequate. Like other industrial buildings in the complex, this building had to be designed to make maximum use of natural light. In a load-bearing brick building, a good solution was the basilican form with a continuous clerestory for the central bay, and the largest possible windows at both stories of the longitudinal bays. Building upon earlier precedent, the machine shop, with its large paired windows, was constructed 65 feet wide.

Visual documentation of the 1890 Machine Shop within the industrial context of its early days is available from several sources. The building outline appears on the Trenton Sanborn Map of 1890 as "Being Built." (figure 5). An 1894 photo shows Roebling workers, presumably machine shop workers, outside the main entrance to the building, revealing the original doorway design with its large paired segmental-arched transom. An 1898 bird's eye view of the Roebling Company by a Philadelphia artist H. Longacre shows the machine shop visible amidst a densely packed complex of multi-story buildings. At least six of the buildings have a monitor roof form. The scene includes canal boats being loaded by horses,

steam locomotives, trolley cars, boiler chimneys with black smoke and steam exhausts with white smoke.[3] (photo 20)

The 1901 Section Fueled by the growth of the cable car industry, bridge building, and newer international markets for products, the Roebling Company had to expand the machine shop only ten years after its construction. The company acquired over a dozen row houses and other buildings along Dye Street for the addition. The new section followed the same 3-bay and monitor roof form of the 1890 section with similar masonry and wood-frame windows and doors. It was built two and one half times larger and slightly taller and wider than the original. The windows were made larger and the exterior pilasters and interior posts were set farther apart. This increased size generates an even more monumental interior space than the 1890 section. It is the monumental scale, as well as the basilican form that creates the character of this expanded "Cathedral of Industry."

The 1901 section also is significant from an engineering perspective. It exemplifies the changes taking place in structural systems at the turn of the century, due to developments in steel technology and production. The 1901 section marks an important transitional step in the change from timber framing to steel framing. The 1901 section has the same basic structure as the 1890 section, but it has a combination timber and steel frame. This section has cast steel columns and steel girders supporting the second floor galleries. The roof trusses are wood, like the 1890 building. Although Charles Roebling used steel roof framing in 1897 in the Mott Street Generating Station, he used the more traditional wood truss for this building.

Although the combination of timber and steel framing was not atypical of the period for industrial buildings of this type, the construction and detailing of the steel columns in this building is unusual. Typical steel columns of the period were built up with channels, plates, and flat bars riveted together, as seen in the Roebling Company's Machine Shop at Kinkora and as illustrated in factory manuals of the period. The columns in the 1901 section are comprised of a lower section extended to the second floor level where flanges support the gallery girders. The upper portion is tapered at the base and extends up to the crane rail, also supported by flanges. The two portions are bolted together at the gallery floor level. It appears as if these columns were custom-cast with the cast steel tube with cap plates, stiffeners, and tapered transitions formed directly as part of the casting process. This may be a rare example of best-

[3] The painting, now in the collection of the State Museum, Trenton, New Jersey, shows the machine shop somewhat longer than built. In the painting, the building appears to have seventeen bays on its western elevation. This appears to be artistic license or, more likely, error on the part of an artist who was otherwise quite accurate in his depiction of the buildings. The 1890 Sanborn Map shows a more precise building size.

quality construction practice of the period. The columns, therefore, appear to have special historical engineering significance.[4]

The 1901 section also has some surviving original equipment. In the first step of the transition from steam power to electrical power, a single motor powered a single line shaft which drove the machines on one floor or section of a shop. The northwest gallery of the 1901 section retains its electric motor and much of the historically significant line shafting.

The growth of the Roebling Company and the corresponding growth of the machine shop is apparent from comparing the 1898 bird's eye painting with a 1908 bird's eye view. By 1908, the site has filled with new buildings and the 1901 section of the machine shop is prominently angled toward the middle ground at the right hand section of the picture.[5] (photo 21)

Civic Capitalism and the Roebling Company's Twentieth Century Expansion

In 1898, the United States Steel Corporation, a newly formed conglomerate that had bought up and consolidated a number of small steel companies, offered to buy the Roebling Company. Although the Roebling brothers were interested, negotiations and broke down over the selling price. By not selling out as many of their competitors did, the Roebling Company was bucking a new national trend to consolidate manufacturing under large holding companies. In 1922, the Roeblings once again resisted the temptation to sell out to larger interests.

The Roebling Company's twentieth century history, therefore, represents a continuation of civic capitalism in Trenton—industry run by businessmen with strong local roots and interests. Civic capitalism was the norm for American industry in the nineteenth century and it fueled the growth and prosperity of America's industrial cities. Starting in the late nineteenth century in most major industries, civic capitalism was replaced by national capitalism--conglomerates and large vertically organized companies with a national rather than a local or even regional perspective.

The history of the Trenton Iron Works, on the other hand, with its sale in 1904 to a national company, the American Steel and Wire Company, represents the change to this newer type of economic and industrial organization. Trenton Iron's parent company looked nationwide for investment and expansion

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[4] This is the view of Philip Paul, Leonard Busch Associates, PC, Trenton, New Jersey who prepared the structural condition analysis of the Roebling Machine Shop for the Roebling Historic Structures Report. See 55-56 of the *Report.*

[5] This picture, from the Roebling Collection at Rutgers University, also takes liberties in depicting the machine shop. The change in plane from the drop forge shop to the main body on the southwestern-most portion of that longitudinal side is accurate, but the return to the main plain of that elevation is not shown. And, like the 1898 bird's eye, the 1890 building is too long.

opportunities and Trenton Iron and the city itself were early casualties. The Roeblings did not sell their company until 1953. John A. Roebling's Sons Company, therefore, represents an unusually long-lasting industrial enterprise which retained its civic capitalistic roots, maintaining and reinvesting in its local factories decades after many other local industries, like its nearby competitor, Trenton Iron, had sold out.[6]

The John A. Roebling's Sons Company did expand outside of Trenton in the twentieth century, but its new factories were within the Trenton metropolitan region and the company continued to use, maintain, expand, and modernize its Trenton factories. Because of scarce and high land prices, a large part of the company's major twentieth century expansion was ten miles south along the Delaware River in a new steel production factory complex known as the Kinkora Works within the new company town named Roebling. At the Kinkora Works, Charles Roebling designed a machine shop in 1907.

The Kinkora Machine Shop represents a last example of a Roebling Company machine shop. On the interior, it was a large two-bay structure with a wide and tall erecting bay on one side beneath a monitor roof and continuous clerestory and a lower two story bay on the other. On the exterior the building looked like a basilican form with a two-bay extension on one side, but it was not. Instead, there was a very wide single erecting bay space with one side aisle within the asymmetrically extended area. Architecturally, this asymmetrical arrangement lacked the classic grace of the symmetrical basilican form machine shop in Chambersburg. (photo 22) From an engineering standpoint, however, the building represented a technological advance. Despite its somewhat traditional looking brick exterior with segmental-arched windows and pilasters, the Kinkora Machine Shop had a steel frame. The building burned down in the 1990s.

In Trenton, twentieth-century expansion took the form of modernization and rebuilding. Four major fires between 1908 and 1915 were responsible for some of the rebuilding. In 1905, Charles Roebling built the Mott Street Flat Rolling Shop, a large two story building with a monitor roof and exterior form and detailing quite similar to the Machine Shop. After a fire in 1911 which destroyed its roof and interior, Charles rebuilt the Mott Street Flat Rolling Shop in 1912. The rebuilt building has survived, and is the one other building that is roughly contemporaneous with the machine shop and has a similar large size, exterior form, and detailing. Unlike the machine shop in Chambersburg (but like the Kinkora Machine Shop), the interior structure was all steel.

The Roebling Company's difficulties during this period were due to labor unrest as well as the disastrous fires and the two problems may not have been unrelated. The Roebling Company's two fires in 1915 were believed to have been arson. Washington Roebling, with an attitude that typified the Roebling

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[6] Cumbler, John, T., *A Social History of Economic Decline: Business, Politics, and Work in Trenton,* (New Brunswick, N.J., and London, 1989), 5-7, 70-71.

response to increasingly tense labor relations, attributed the fires to a 1914 machinists strike and disgruntled foreign workers. Between 1910 and 1917, Roebling workers staged seventeen strikes. In the machinists' strike of 1914, the machinists union submitted a plan for standardized wages based upon skill level to the city's machine shops. The Roebling Company, along with Trenton's other large employers, would not negotiate, and the strike ended in the machinists' defeat three months later.

World War I boosted business, with demand for wire rope for ships, airplanes, and mine barrages to trap enemy submarines. The Roebling Company contributed much of the eighty million feet of wire for the 220-mile long North Sea mine barrage across the English channel. Wartime orders coming so soon after the major fires taxed the Roebling plants beyond their limits. The machine shops in Trenton and Kinkora could not build new machines fast enough. Charles Roebling's response to the crisis was to buy wire rope factories in Clinton, Massachusetts and Plainfield, New Jersey to obtain their existing machinery. The war brought an end to an era. Ferdinand died in 1917 and Charles died in 1918. John A. Roebling's Sons Company had grown to nearly ten thousand workers.

The years 1915 through 1932 brought the highest profits ever for the Roebling Company. The great twentieth-century revolution in transportation with the ascendance of the automobile led to a new era of bridge building as part of the creation of a massive nationwide road network. The Roebling Company had a large role in supplying wire rope and cables for such bridges as the Bear Mountain Bridge in New York, the George Washington Bridge, and the Golden Gate Bridge in San Francisco. With this surge in new contracts, the Roebling Company made a major investment in new plants and equipment. Many of the nineteenth-century buildings in and around John Roebling's original site in Chambersburg had become obsolete and were torn down to make way for modern factories. The building projects of the 1920s and 1930s have a more modern industrial appearance and structure, with steel frames, extensive bands of steel windows, concrete walls with brick exteriors, flat roofs, and saw-tooth and monitor skylights. (photo 23) The scale of this rebuilding echoed Charles Roebling's great building campaigns while destroying many of Charles' buildings.

After the completion of the Golden Gate Bridge in 1937, John A. Roebling's Sons Company Company began to lose money. A 1938 management study suggested that the Roebling Company eventually would have to become part of a large steel company. World War II boasted production and profits, but the end of the Roebling Company and the civic capitalism it represented was near. In 1953 John A. Roebling's Sons Company was sold to the Colorado Fuel & Iron Company.

The Machine Shop in Context

The effect of the rebuilding of the Chambersburg plant in the 1920s and 1930s, from today's perspective, increases the historic significance of the machine shop. The machine shop is not only the oldest building on the site, but a building that was continuously used as an critical part of the John A.

Roebling's Sons manufacturing enterprise for over fifty years. Unlike many older nineteenth and early twentieth-century buildings on the site, the machine shop did not burn down or get torn down.

The machine shop is a rare surviving industrial building in central New Jersey with a basilican form and a structure that represents the transition from traditional timber framing to the all-steel framing. The building itself embodies a significant moment in that transition. In its 1890 section, the structure is traditional timber; in its 1901 section, it is combination timber and steel. Within a few short years, as can be seen in both the 1905 Mott Street Flat Rolling Shop and the destroyed 1907 Kinkora Machine Shop, steel structural systems became the norm. Within another few years, the steel frame with concrete walls established a new modern industrial building type which completely replaced the older traditional forms like the basilican form.

The machine shop is one of five extant buildings site that was identified as a key building of the John A. Roebling's Sons Company's Company.[7] The building has national significance because of the enormous contribution John A. Roebling's Sons Company's various and innovative wire rope products made to major buildings, bridges, streetcars, telecommunications structures, ships, and airplanes throughout the country. The building has state significance as a key building within the John A. Roebling's Sons Company, one of the largest and most important most industrial companies in the state for several decades.

The Roebling Machine Shop has local significance for several reasons. It is a large surviving machine shop in a city where machine shops were once a thriving part of the local industrial economy. The building has local significance because the John A. Roebling's Sons Company was a major industry within the city of Trenton, employing at one time, twenty percent of the city's industrial workforce. The machine shop was the building in which the most skilled employees—tool and dye makers, machinists, pattern makers, welders, pipefitters, and forgemen—worked. The Roeblings were Trenton's most prominent family and Charles Roebling, with whom the building is most closely associated, was a major force in Trenton's civic and economic life. With the loss of Charles Roebling's mansion, formerly on West State Street, and many of the industrial buildings Charles built on the Chambersburg site, the machine shop is one of only five surviving historic buildings of major significance associated with Charles Roebling that remain within the city of Trenton.

The Roebling Machine Shop is the one machine shop that remains of the several Roebling machine shops built. John Roebling's original 1861 Machine Shop and Rope Factory, Charles Roebling's two machine shops of the 1870s and 1880s, and Charles Roebling's Kinkora Machine Shop are all gone. The

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[7] This identification was from a 1987 historic sites survey of the Roebling Complex (which included twenty buildings) and the Trenton Iron/American Steel and Wire Complex undertaken by the Trenton Roebling Community Development Corporation in conjunction with the SHPO.

machine shop of Roebling's competitor, Trenton Iron, is extant but is currently vacant and deteriorating. Plans are underway for an adaptive use of the Roebling Machine Shop that especially befits the building's historic industrial significance: the Roebling Machine Shop is to become the Invention Factory Science Center.

Bell, William E. *Carpentry Made Easy: Of the Science and Art of Framing, on a New and Improved System*. Philadelphia: Howard Challen, 1857.

Blue Center, .Trenton, N.J.: John A. Roeblings's Sons Company, 1926-1930. Roebling Company magazine.

Cumbler, John T. *A Social History of Economic Decline: Business, Politics, and Work in Trenton*. New Brunswick, N.J., and London: Rutgers University Press, 1989.

Cyclopedia of Architecture, Carpentry and Building. Chicago:, American Technical Society, 1909.

Fairnairn, William. *Treatise on Mills and Millwork- Part II On Machinery of Transmission and the Construction and Arrangement of Mills*. London: Longman, Green, Longman , Roberts, and Green, 1863.

Ketchum, Milo S. *The Design of Mill buildings and the Calculation of Trusses in Frames Structures*. New York: Engineering News Publishing Company, 1903.

Insurance Map of Trenton, New Jersey. Sanborn Map Company, 1890 and 1908.

Map of Trenton, New Jersey. J.M. Lathrop, 1905.

Mumford, John Kimberly. *Outspinning the Spider: The Story of Wire and Wire Rope*. New York: Robert. L. Stillson Co., 1921.

Roebling, Washinton A. "In Memoriam to Charles Roebling,", 1918, unpublished.

Schuyler, Hamilton. *The Roeblings: A Century of Engineers, Bridge Buildings, and Industrialists*. Princeton, N.J.: Princeton University Press, 1931.

Trenton Thwaite, B.H. *Our Factories, Workshops, and Warehouses, Their Sanitary and Fire-Resisting Arrangements*. New York: E. & F.N. Spon, 1882.

Tyrell, Henry G. *A Treatise on the Design and Construction of Mill Buildings and Other Industrial Plants*. Chicago: Myron C. Clark Publishing Company, 1911.

Woodbury, C.J.H. *Fire Protection of Mills and Construction of Mill Floors*. New York: John Wiley & Sons, 1982.

Zink, Clifford. *John A. Roebling's Sons Company, American Steel & Wire Company.* National Register nomination report, 1987.

Zink, Clifford W and Hartman, Dorothy White. *Spanning the Industrial Age: The John A. Roebling's Sons Company, Trenton, New Jersey 1848-1974.* Trenton, N.J.: Trenton Roebling Community Development Corporation, 1992.

Zink, Clifford W. *Roebling Machine Shop Historic Structure Report,* Trenton, N.J.: Trenton Roebling Development Corporation, 1993

Notes: The principal sources used were the *Roebling Machine Shop Historic Structure Report* and *Spanning the Industrial Age: The John A. Roebling's Sons Company, Trenton, New Jersey 1848-1974.* For additional photos of the Roebling Machine Shop, see the *Historic Structure Report* which includes seventy-five photos of the machine shop, primarily 1993 photos and 1987 photos from the HAER survey. For a more detailed discussion of the John A Roebling's Sons Company and a more complete bibliography, see *Spanning the Industrial Age.*

Zink is not listed as author of the *Roebling Machine Shop Historic Structure Report*, but he is the principal author. The structural evaluation of the building including the historical significance of the cast steel columns of the 1901 section was prepared by Philip Paul, Leonard Busch Associates PC, Trenton, New Jersey.

Verbal Boundary Description

The boundary of the Roebling Machine Shop coincides with the boundary of Block 138, Lot 152 in the city of Trenton. The legal description is as follows:

BEGINNING at the point of intersection of the Westerly line of South Clinton Avenue with the Northwesterly line of Dye Street and running: thence

(1) South 31 degrees 33 minutes 55 seconds West, along the said line of Dye Street, 374.32 feet to a point: thence
(2) North 58 degrees 24 minutes 45 seconds West, a distance of 95.02 feet to a point: thence
(3) North 31 degrees 35 minutes 15 seconds West, a distance of 299.87 feet to a point: thence
(4) North 15 degrees 16 minutes 15 seconds West, a distance of 145.57 feet to a point: thence
(5) North 74 degrees 47 minutes 05 seconds East, a distance of 119.59 feet to a point in the aforesaid Westerly line of South Clington Avenue: thence
(6) South 15 degrees 07 minutes 55 seconds East, along the said line of South Clinton Avenue 163.77 feet to the point and place of the BEGINNING.

Verbal Boundary Justification

The boundary is a line of convenience. Although it incorporates the entire building, lot, and historically significant sidewalk associated with the Roebling Machine Shop, it does not include other adjacent and nearby buildings of significance associated with the John A Roebling's Sons Company. This larger industrial area has a SHPO opinion of eligibility dating from 1980 and a national register nomination form first was prepared for the district in 1987. Opposition from other property owners halted further efforts to list a John A. Roebling's Sons Historic District on the national register. In 1996 the city of Trenton became the owner of the Trenton Machine Shop.

Photographs

Photographed by Susanne Hand, Kinsey & Hand, April, 1997. Historic photos further identified below.

Photo Number (identified on back of each accompanying photo)

1. Roebling Machine Shop, 1901 Section, showing drop forge shop, World War I addition, and 1942 addition and 1890 section at the rear. View north from parking lot.

2. Roebling Machine Shop interior showing 1901 addition, roof trusses, two traveling cranes, and 1890 section at rear. First floor and clerestory windows show angle of the two sections. View northeast roughly from middle of 1901 section.

3. Roebling Machine Shop, 1890 building and 1942 addition. View south from mill yard.

4. Roebling Machine Shop, 1890 building, 1942 addition, and intersection with 1901 building. View southeast from porch of former 1929 Rope Shop, currently under rehabilitation for commercial use.

5. Roebling Machine Shop interior showing intersection of 1890 building and 1901 section including two traveling cranes and bridge. Window and window sash partition at gallery level to right is former pattern shop. View south from 1890 section.

6. Roebling Machine Shop interior showing 1890 section, including gallery level, clerestory, roof trusses, traveling crane, and entrance elevation windows. View north from bridge.

7. Roebling Machine Shop interior of 1942 addition. View north from south end of addition.

8. Roebling Machine Shop, 1901 section. View north from Dye Street.

9. Roebling Machine Shop interior showing intersection of 1890 building and 1901 section, including angle of intersection, structural system, 2 traveling cranes, bridge, and variation in size and detailing of first story windows. View east from 1901 section.

10. Roebling Machine Shop exterior showing intersection of 1890 building in foreground and 1901 section, changes in height of windows and monitor roof, and painted brick signs between the stories. View southwest from South Clinton Avenue.

11. Roebling Machine Shop, entrance elevation of 1901 section. View northeast from parking lot.

12. Roebling Machine Shop exterior showing drop forge shop and its altered fenestration, World War I addition, 1946 addition (barely visible), and in background 1942 addition and 1890 building. View northeast from parking lot.

13. Roebling Machine Shop exterior showing edge of 1946 addition, 1901 section, 1942 addition, and 1890 building. View north east from mill yard.

14. Roebling Machine Shop interior showing structure and all levels of 1901 section including first story, gallery level, gallery trusses, central bay trusses, and clerestory windows. View east from gallery southwest of drop forge shop.

15. Roebling Machine Shop interior of 1901 section showing central erecting bays, side bays, and entrance elevation fenestration in background. View southwest from 1901 section near intersection with 1890 building.

16. Roebling Machine Shop interior of 1901 section showing steel and timber structural system including cast steel posts. View north west near intersection with 1942 addition.

17. Roebling Machine Shop interior of 1901 section showing central erecting bay, wall of drop forge shop, structure, and fenestration. View northeast central erecting bay.

18. Trenton Iron Company Machine Shop interior showing narrow central erecting bay. 1987 photo from *Roebling Machine Shop Historic Structures Report.*

19. Old St. Peter's Basilica, Rome, fourth century, from "The Vatican Collections," Metropolitan Museum of Art, as illustrated in *Spanning the Industrial Age.*

20. "Works of John A. Roebling's Sons Company," H.B. Longacre, 1898, New Jersey State Museum Collection, as illustrated in *Spanning the Industrial Age.* Roebling Machine Shop is visible in middle ground at right. The building appears larger in the painting that it was at the time.

21. Upper Works of John A. Roebling's Sons Co., Trenton, N.J., ca. 1908, from Roebling Catalogue, Rutgers University, as illustrated in *Spanning the Industrial Age.*

22. Kinkora Machine Shop exterior, 1990. Photo of now-destroyed building by Clifford Zink as illustrated in *Spanning the Industrial Age.*"Upper Works of John A. Roebling's Sons Co., Trenton, N.J., ca. 1908, from Roebling Catalogue, Rutgers University, as illustrated in *Spanning the Industrial Age.*

23. John A. Roebling's Sons Company, Trenton, N.J.., Dallin Aerial Survey, July, 1931 from Hagley Museum and Library, Winterthur, Delaware as illustrated in *Spanning the Industrial Age*.

Additional Visual Documentation

Figure 1. Roebling Machine Shop site plan.

Figure 2. Roebling Machine Shop First Story Floor Plan

Figure 3 Roebling Machine Shop Gallery Level

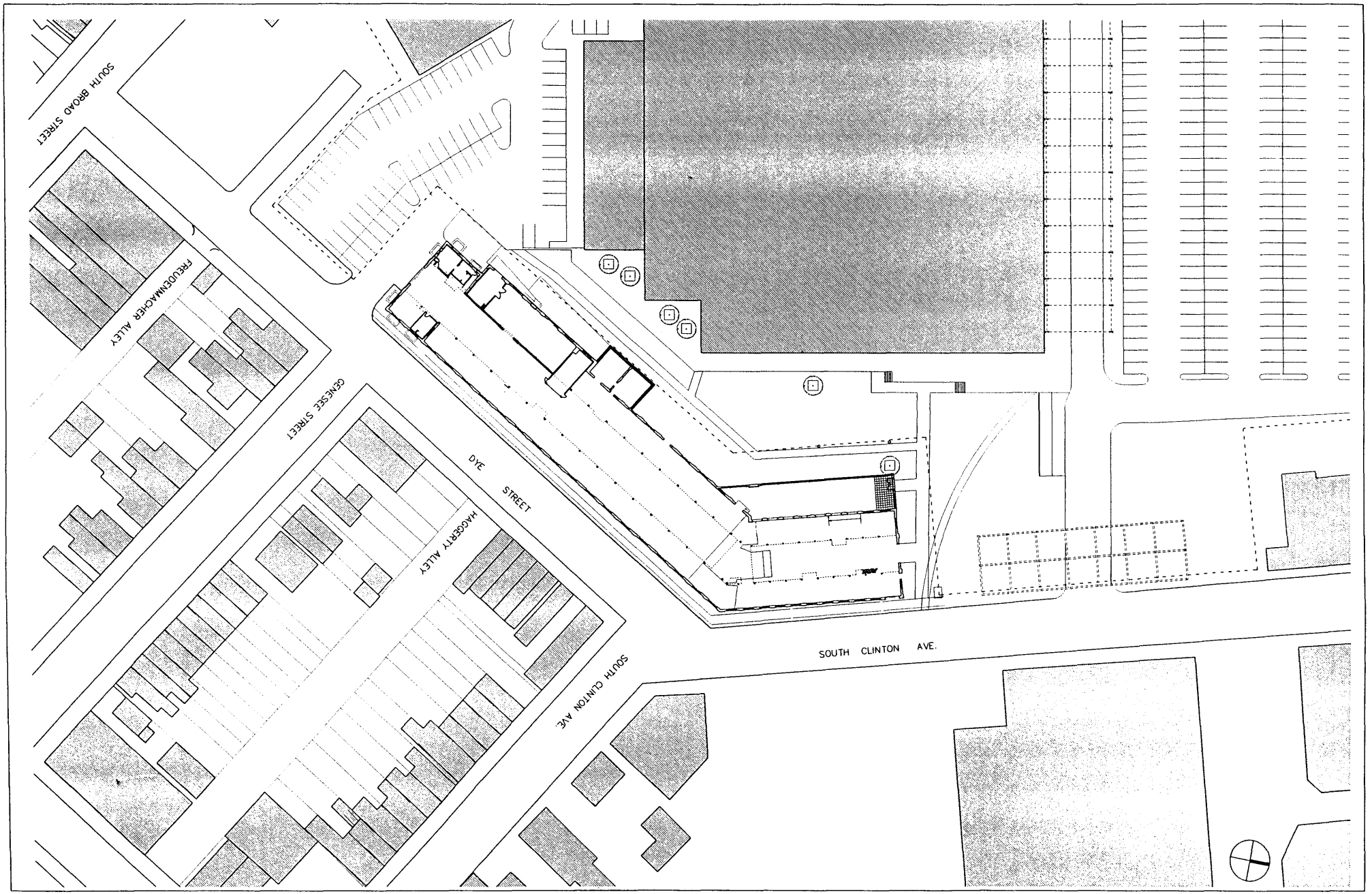
Figure 4. John Roebling's c.1861Rope Factory and Machine Shop--south elevation, plan, and cross section, Rensselaer Polytechnic Institute, Troy, N.Y., as illustrated in the *Roebling Machine Shop Historic Structures Report.*

Figure 5. 1890 Sanborn Insurance Map

Figure 6. 1908 Sanborn Insurance Map

Roebling Machine Shop
Trenton, Mercer County, NJ

Figure 1



SITE PLAN

RALPH LERNER ARCHITECT
AND PARTNERS

306 ALEXANDER STREET
PRINCETON, NEW JERSEY
08540 USA

voice 609-683-1001
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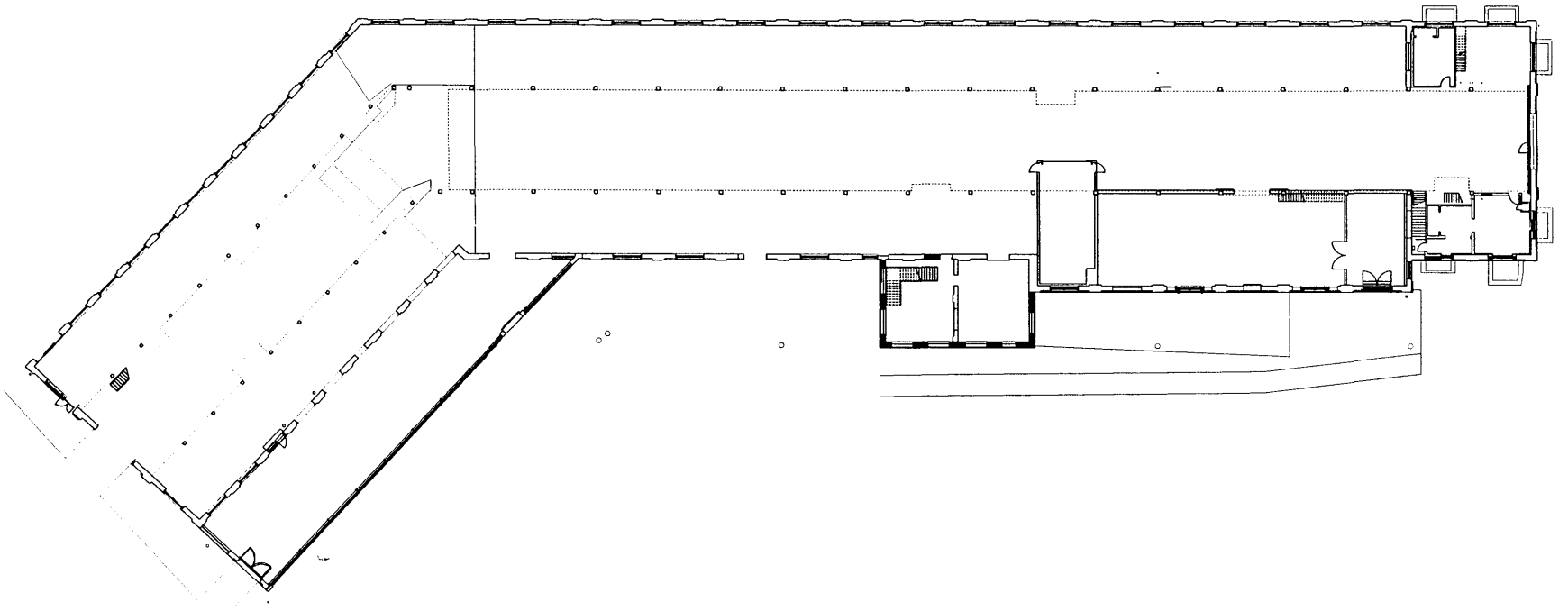
project no. - 9606
file name - 9606-A1.DWG
date - 21 APRIL 1997
drawn by - BL
revision -
note -

Invention Factory Science Center
at the Roebling Machine Shop

675 S. CLINTON AVE.
PRINCETON, NEW JERSEY
08611

Roebling Machine Shop
Trenton, Mercer County, NJ

Figure 2



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GROUND FLOOR PLAN

scale - 1" = 50'

0 10 20 50

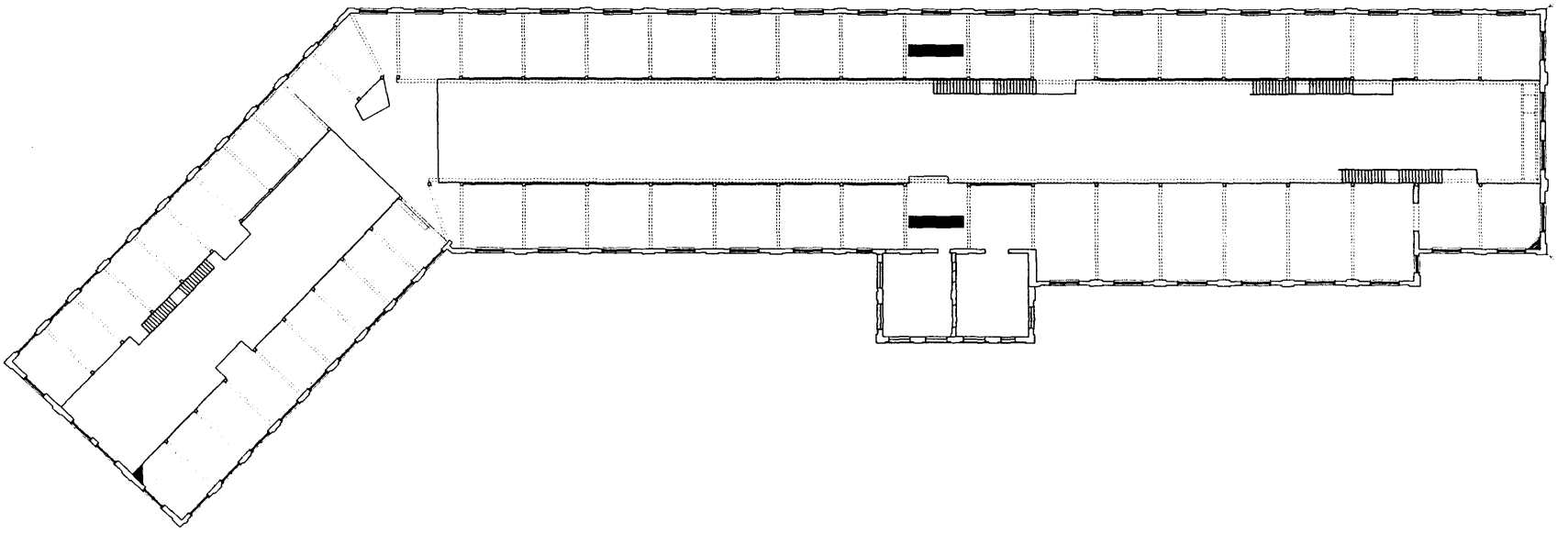
project no. - 9606
file name - \invention factory\a2exis.dwg
date - 21 April 1997
drawn by - EJ
revision -
note -

Invention Factory Science Center
at the Roebling Machine Shop

675 S. CLINTON AVE.
TRENTON, NEW JERSEY
08611

Roebling Machine Shop
Trenton, Mercer County, NJ

Figure 3



SECOND FLOOR PLAN

scale - 1" = 50' 0 10 20 50

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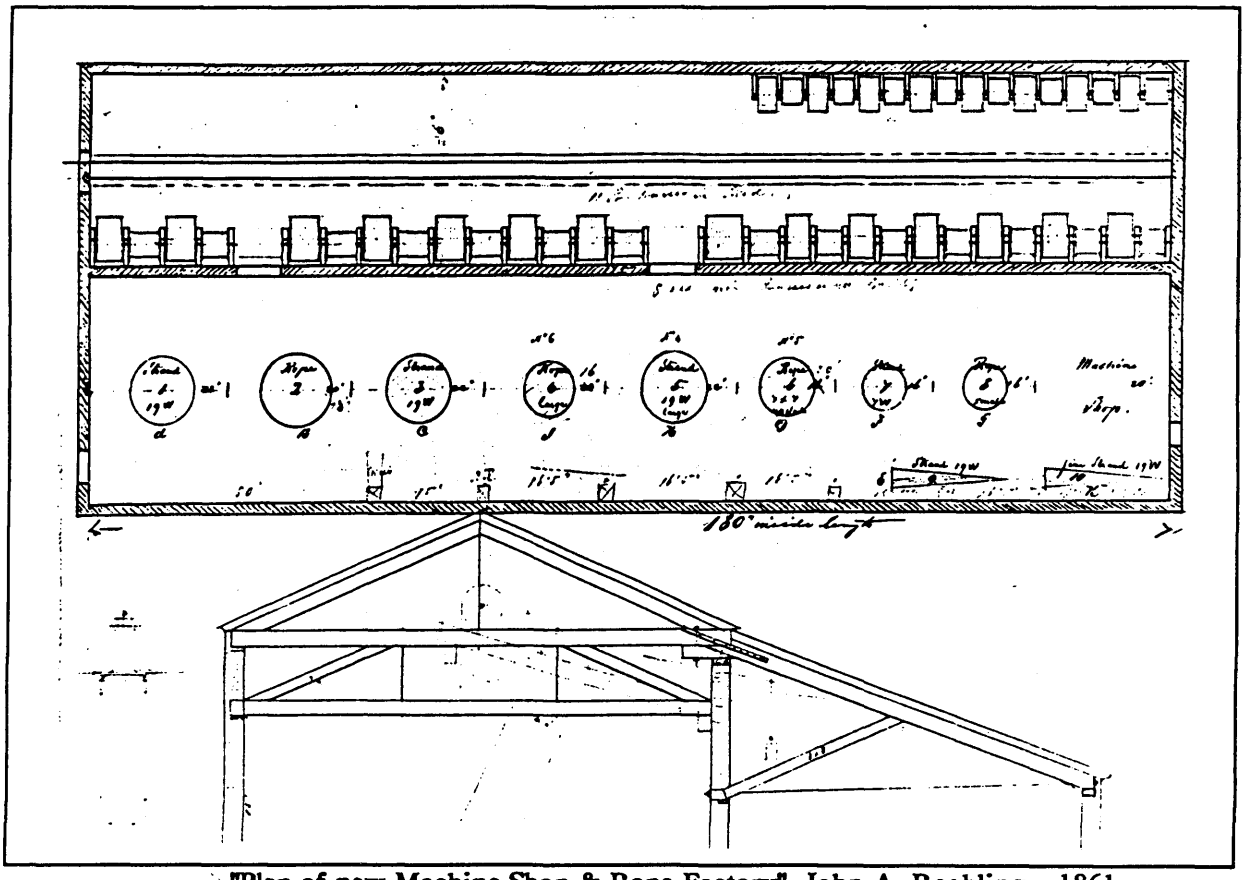
project no. - 9606
file name - \invention factory\a2exis.dwg
date - 21 April 1997
drawn by - bl
revision -
notes -

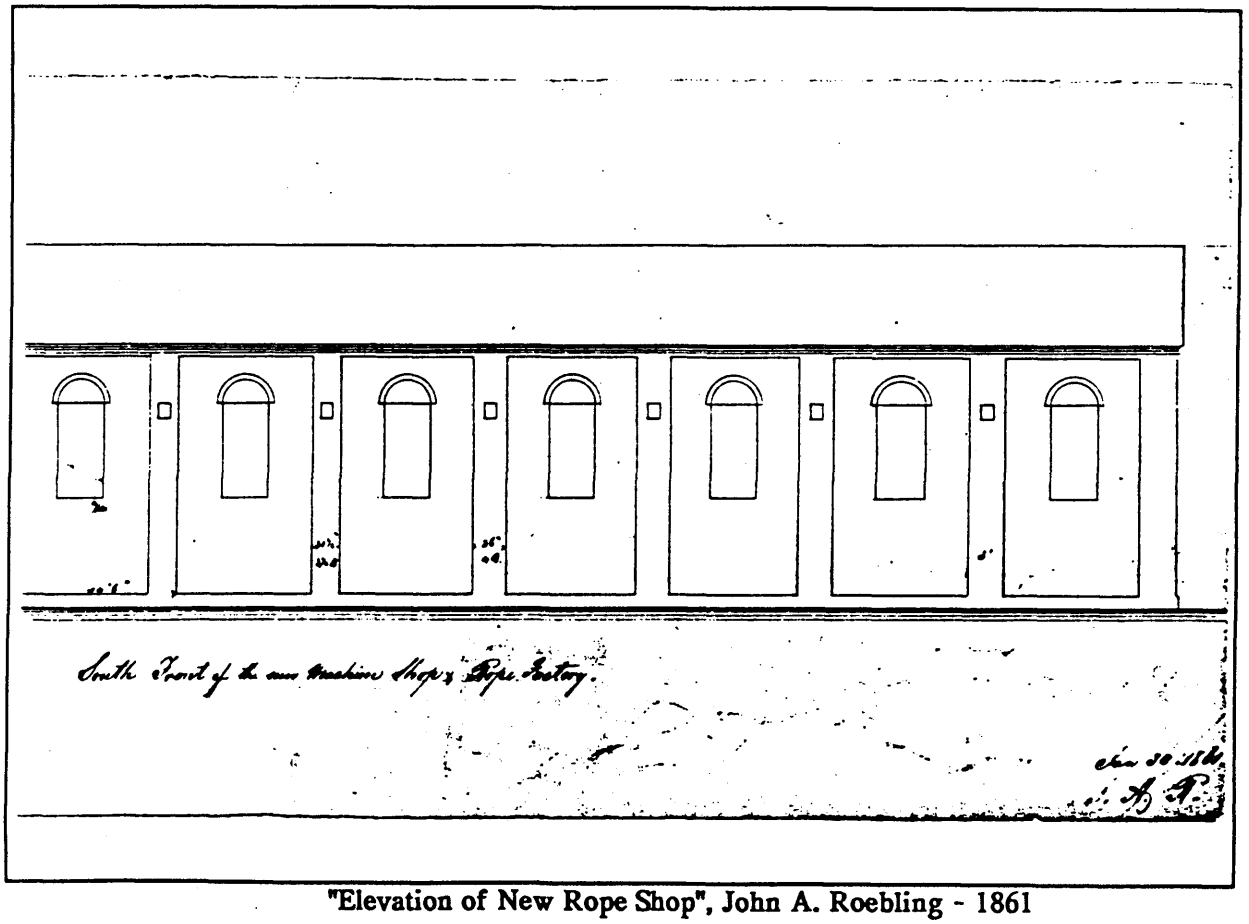
Invention Factory Science Center
at the Roebling Machine Shop

675 S. CLINTON AVE.
TRENTON, NEW JERSEY
08611

Figure 4



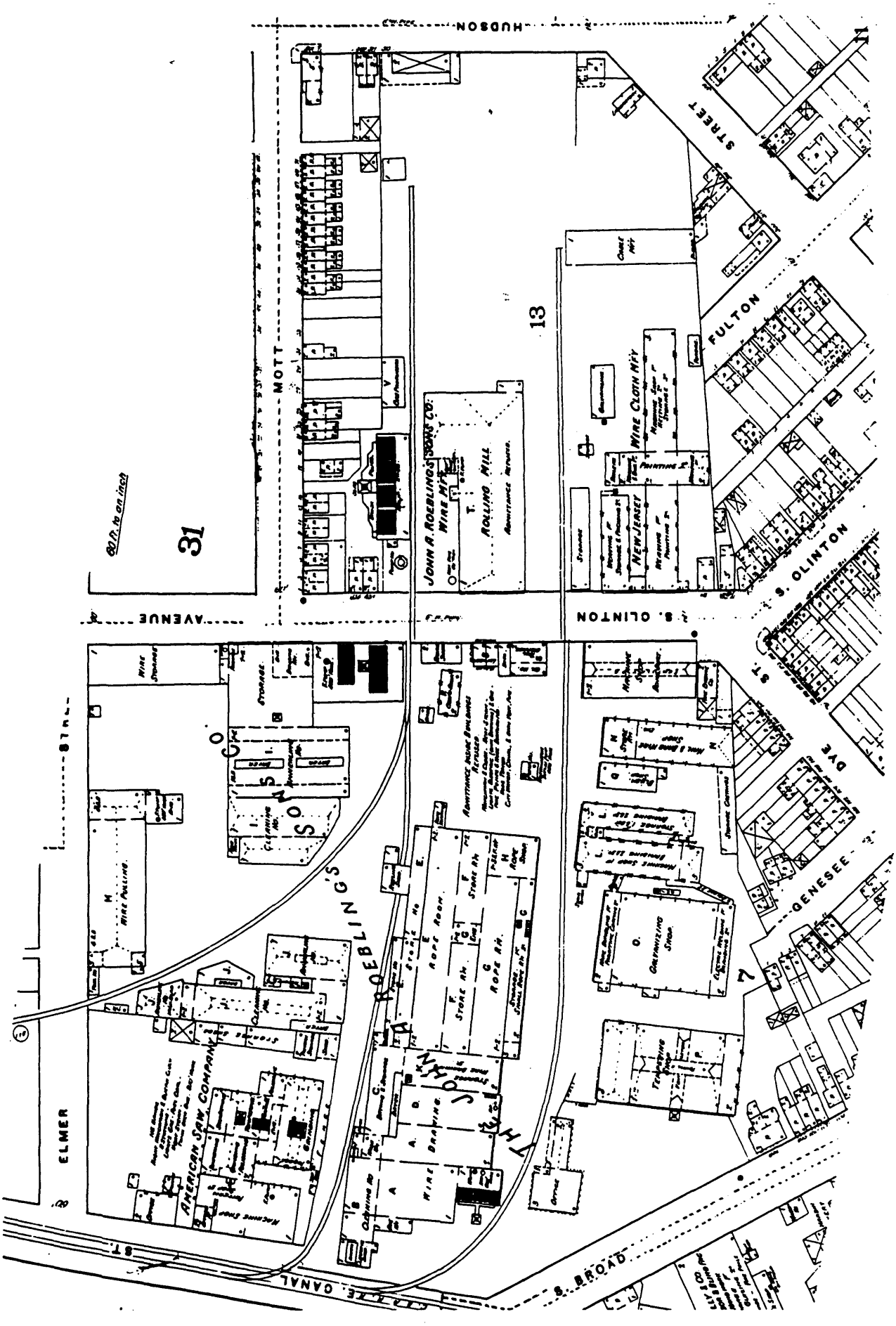
"Plan of new Machine Shop & Rope Factory", John A. Roebling - 1861



"Elevation of New Rope Shop", John A. Roebling - 1861

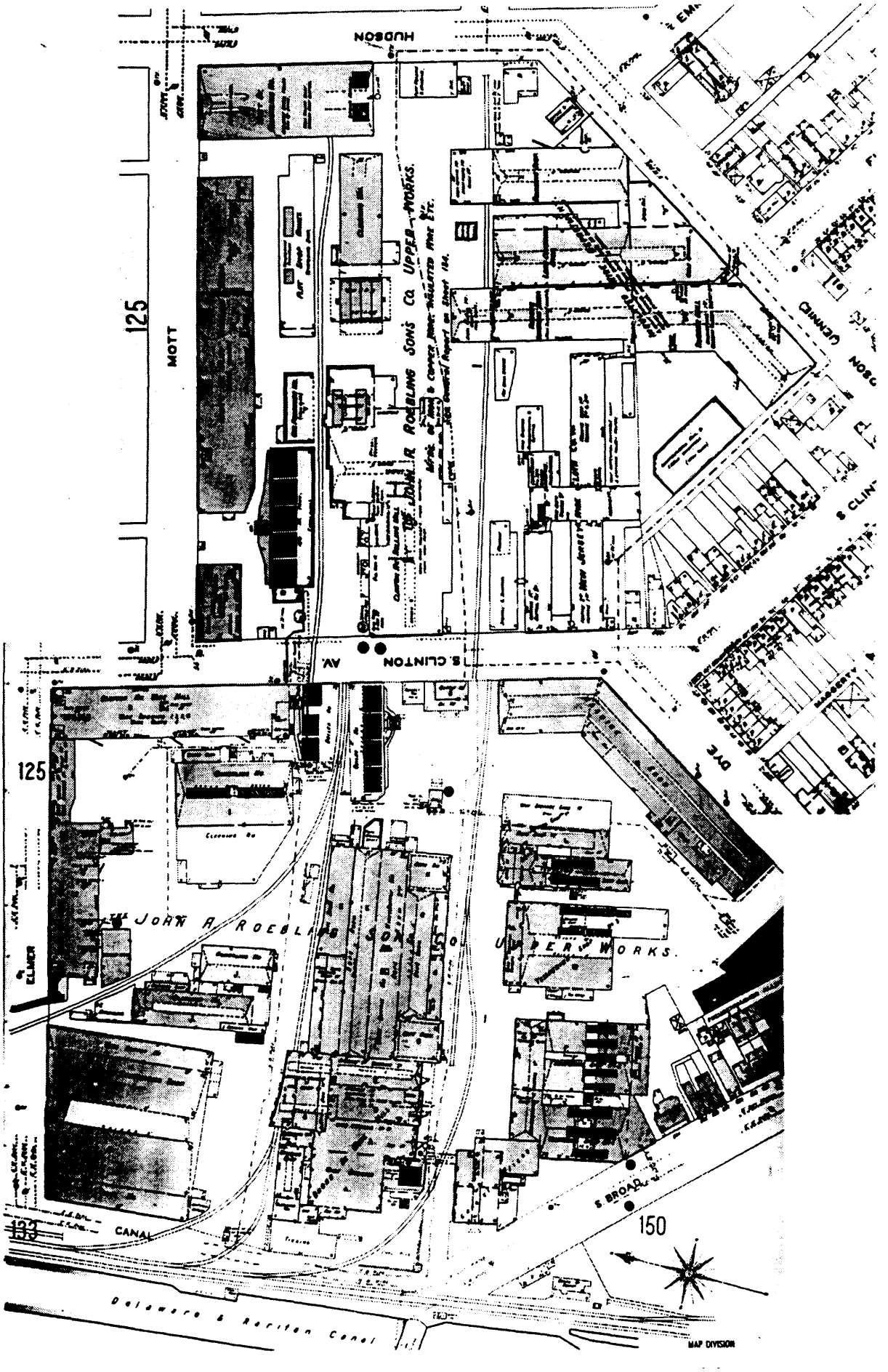
Roebling Machine Shop, Trenton, Mercer County, NJ

Figure 5 1890 Sanborn Map



Roebling Machine Shop, Trenton, Mercer County, NJ

Figure 6 1908 Sanborn Insurance Map



Roebling Machine Shop, Trenton, Mercer County, NJ